Oct. 9, 10, 11, 1967

Sherman House, Chicago, Ill.

FOR PERSONAL INFORMATION ONLY OF:

R. T. Newman
Chemist
Southern Ry. System
Chattanooga Tenn 37403
% Diesel Shops

Electric Storage Battery Company

is now

ESB Incorporated...

which more correctly identifies the producer of the industry's broadest line of packaged power systems and related products.

An integral part of the ESB Incorporated family is the **EXIDE** Industrial Group, and its marketing facility, the **EXIDE** Industrial Marketing Division.

Under the **EXIDE** trademark, we have been supplying the railway industry dependable, low-cost packaged d-c power for quite some time. These applications include diesel engine starting, car lighting and control, signal service and our most recent contribution, solid-state alternators, designed as the modern replacement for undercar rotating alternators.

EXIDE developed, and is continually improving, a line of low-maintenance diesel starting batteries. By reducing watering requirements to only four times a year, plus other cost-saving features such as corrosion-resistant patented silvium grids, H-C oil negatives and epoxy seals, the **EXIDE-Ironclad** MS series has become the standard of the railway industry.

Quality products, backed by constant research to find better ways to use packaged energy systems, are just a few good reasons why **EXIDE** continues to enjoy the trust and reliability the railway industry places in our products.

The **EXIDE** Industrial Marketing Division maintains offices in more than 50 principal cities throughout the United States. We are listed in the "Yellow Pages" under "Batteries - Industrial." Please call us if we can be of any assistance.

EXIDE INDUSTRIAL MARKETING DIVISION
ESB INCORPORATED Philadelphia, Pa. 19120

ESB | Exide

Exclusive Design — Proven in Railroad Service

Surrette

MULTIPLATE BATTERIES

WITH REZISTOX PLATES — RUBBER CLAD 5 PLY INSULATION INCLUDING DYNEL FOR DIESEL LOCOMOTIVES

Lifetime Rubber Separators — Dynel Tubes & Fibreglass with Koroseal

Dynel Tubes protected by rubber envelopes with solid edges, eliminate any possibility of treeing or shorts at plate edges. Heavy plate feet protrude through die cut rubber insulators on bottoms of plates, elements rest on plate feet not on plate frames. Plates are sealed top, bottom and sides with both rubber and Dynel.

Requires 50% Less Water

More effective plate area results in faster cranking longer. Beats any battery in total performance.

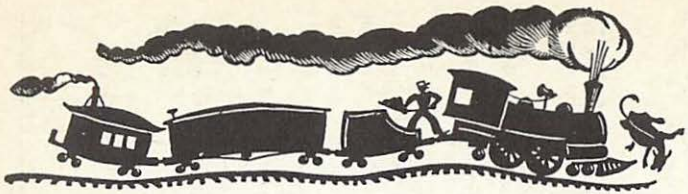
51 Railroads have purchased Surrette Batteries

1. Lower current density per plate made possible by the greater number of plates and greater effective plate area. 2. Reduces water consumption. 3. Reduces positive plate oxidization. 4. Anticipated service life increased by months. 5. Requires up to 50% less watering and attention through their greater service life.

Exclusive REZISTOX GRID CONSTRUCTION makes possible 40% more plate area. Costs no more than other recognized brands. Proven in tests and field service over a 25-year period. The extra capacity, lower current density per plate, REZISTOX plates, 5 Ply Insulation with Dynel is a bonus which reduces maintenance and adds months of longer trouble-free life.

Rubber Monobloc Containers also available for Low Compartments.

The Surrette STORAGE BATTERY CO., Inc.
Jefferson Ave., Salem, Mass.



ATTENTION ALL MEMBERS:

THE MEMBERSHIP SPECIAL IS ROLLING!

PAY YOUR DUES — (Check your card) THEN GET A NEW MEMBER TODAY!

MANY THANKS!

Active (Railroad) Memberships $5.00 Per Year. Associate Members $5.00.
MEMBERSHIP APPLICATION or RENEWAL (Please Underscore)

SPECIAL NOTICE: THIS IS NOT A CHECK. PLEASE ATTACH YOUR PERSONAL, PRINTED CHECK BEING SURE IT BEARS THE **BANK ROUTE NUMBER** AND **YOUR OWN PERSONAL ACCOUNT NUMBER. PLEASE USE THE PRINTED CHECK YOUR BANK HAS FURNISHED YOU, OTHERWISE IT WILL NOT CLEAR ALL THE BANKS IT HAS TO CLEAR.** MAKE IT PAYABLE TO: "LOCOMOTIVE MAINTENANCE OFFICERS ASSOCIATION", 1721 Parker Street, North Little Rock, Ark. **IN AMOUNT OF: $5.00.**

Dues for year ending December 31, if paid by August 11. (Includes Receipt of All Advance Papers and One Copy of Technical Committee Reports and Annual Proceedings.)

All Members attending the Annual Meeting will pay an additional $5.00 registration fee there.

THIS IS **NOT** A CHECK. ATTACH YOUR OWN PERSONAL, PRINTED CHECK BEARING BANK ROUTING AND YOU ACCOUNT NUMBER.

Important: Complete **all** information below.

NAME (Print) _____

Position _____

Company _____

Your Point of Company Service:

Street _____

City _____ State _____ Office Zip Code _____

***Very Important: We MUST have your COMPANY OFFICE Zip Code Number. Thanks. New Postal Regulations will force us to write you for your Company Office Zip Code Number if you don't send it, PLEASE DO.**

Important: Were you with another company last year, if so, name company _____

Recommended by _____

SUPPLY MEMBERS: Payment of dues and registration fee at Chicago will entitle you to attend **our meetings only:** Not the exhibits or entertainment; they are owned by Railway Supply Association, Inc., 332 So. Michigan Ave., Chicago, in which we recommend membership.

INDEX

MONDAY, OCTOBER 9, 1967

		Page
10:00 a. m.	President's Address: G. M. Beischer, Chief Mechanical Officer — Locomotive, C. & O. Ry., B. & O. R.R., Huntington, W. Va.	9
10:30 a. m.	Special Address: L. S. McGregor, Chief of Motive Power & Car Equipment, Canadian National Ry., Montreal 3, Que., Canada	28
11:00 a. m.	Report of the Committee on Fuel and Lube Oil. Topic: PROGRESS REPORT ON PERFORMANCE, COMPATABILITY, ECONOMICS, IMPROVED HANDLING AND TESTING OF FUEL AND LUBE OIL	44
2:00 p. m.	Report of the Committee on New Developments in Motive Power Maintenance. Topic: NEW CONCEPTS FOR MAINTENANCE CONTROL OF TODAY'S LOCOMOTIVES	82
	TUESDAY, OCTOBER 10, 1967	
9:00 a. m.	Report of the Committee on Shop Equipment. Topic: SHOP EQUIPMENT TO MEET THE NEEDS OF MODERN LOCOMOTIVES	142
10:30 a. m.	Report of the Committee on Diesel Mechanical Maintenance. Topic: A CRITICAL EXAMINATION OF DESIGN AND MAINTENANCE REQUIREMENTS FOR INCREASED LOCOMOTIVE AVAILABILITY	204
2:00 p. m.	Report of the Committee on Diesel Electrical Maintenance. Topic: THE EFFECT OF AC-DC ELECTRICAL SYSTEMS ON DIESEL LOCOMOTIVE PERFORMANCE AND AVAILABILITY	256
	WEDNESDAY, OCTOBER 11, 1967	
9:00 a. m.	Report of the Committee on Diesel Material Inventory and Control. Topic: IMPROVED MATERIAL CONTROL AND AVAILABILITY THRU COORDINATION OF MECHANICAL, PURCHASES AND STORES DEPTS., AND SUPPLIERS	303
10:15 a. m.	Report of the Committee on WHAT'S *YOUR* PROBLEM?	318
12:30 p. m.	President's Luncheon	331

1967 Advertisers Index

This space dedicated to the firms listed below for their cooperation and assistance in making possible the publication of our Twenty-Ninth Annual Proceedings in the year 1967.

Advertiser	*Page*
ABEX Corp	56
ACF Industries, Inc., American Car & Foundry Div.	129
ADM Chemicals, Div. of Ashland Oil & Rfng. Co.	55
Aeroquip Corp., Barco Div.	37
Aeroquip Corp., Industrial Div.	97
Air Maze Division, Rockwell Std. Corp.	217
Alco Products, Inc.	219
American Air Filter Co. (Engine and Compressor Products Dept.)	227
American Oil Co.	71
Assoc. of American Railroads	4
Amsted Industries, Inc.	34
Anaconda Wire & Cable Co.	141
Apex Railway Products Co.	72
Ashland Oil & Refining Co., Inc.	178
Automatic Steam Sales Co.	115
Baldwin-Lima-Hamilton Corp., Industrial Equipment Div.	103
Berwick Forge & Fabricating Co.	221
Binks Manufacturing Co.	262
Boron Oil Co.	46
Brenco, Inc.	31
Morris B. Brewster Co., Inc.	32
C & D Batteries, Div. of ELTRA Corp.	223
C & H Chemical Co.	11
Cam Industries, Inc., Div. of Peerless Tool Co.	123 & 143
Gallaway Mills, Inc.	45
Cardwell Westinghouse Co.	202
Chandeysson Electric Co.	259
Chemical Supply Co.	203
Chicago Pneumatic Tool Co.	54
Chrome Crankshift Co., Inc.	231
Chromium Corp. of America	107
Cities Service Oil Co.	51
Cleveland Graphite Bronze, Div. of Clevite Corp.	13
Component Engine Parts, Inc.	149
John J. Connell Co., Inc.	225
Continental Oil Co.	73
Cougar Chemical Co.	283
Dale Bearings, Inc.	74
Dalmo Victor Co.	74
Dearborn Chemical Co., Div. of W. R. Grace & Co.	213
The Detroit Graphite Co.	268
DO Company	229
Duff-Norton Co.	15
E. I. DuPont DeNemours & Co.	185
Thomas Edison Industries, McGraw-Edison Co.	125 & 281
Louis G. Eitzen Co., Inc.	58 & 59
Elastic Stop Nut Corp. of America	233
El Dorado Manufacturing Corp.	260
Electric Storage Battery Co., Exide Industrial Marketing Div.	Front Cover
Electro-Motive Division, General Motors Corp.	25

Advertiser	Page
Elicon National, Inc.	91
Evans Products Co., Transportation Equipment Div.	17
Everson Electric Co.	235
Ex-Cell-O Corp.	16
Fairbanks-Morse Div., Colt Industries	237
Farboil Co.	201
Farr Co.	20
Fine Organics, Inc.	76
T. J. Fleming Co.	12
Freightmaster, a division of Halliburton Services	87 & 307
Garlock, Inc.	147
General Electric Co.	215
General Radiator, Inc.	175
General Steel Industries, Inc.	278
Gould National Batteries, Inc.	19
Graham-White Sales Corp.	161
Griffin Wheel Co.	127
Gulf Oil Corp.	53
Gustin-Bacon Division, Certain-teed Products Corp.	176
Hanlon and Wilson Co.	33
Huck Manufacturing Co.	99
Humble Oil & Refining Co. & Associated Companies	57
Hyatt Bearings Division General Motors Corp.	279
Hydra-Cushion, Inc.	239
Ingersoll-Rand Co., Advertising Div.	211
International Car Corp.	186
International Research & Develmpt	21
J & J Castings, Inc.	205
Kelty Radiator Co.	155
Kiene Diesel Accessories, Inc., Ill. Auto Elec. Co.	145 & 209
Koppers Company, Inc., Metal Products Division	39
K W Battery Co.	140
Linde Division, Union Carbide Corp.	22
The Liquidometer Div. of Simmonds Precision Products, Inc.	163
Lix Corp. of Missouri	194
Lord Manufacturing Co., Division of Lord Corporation	101
Lubri-Gas Company, Inc.	197
MacLean-Fogg Lock Nut Co.	68
Magnaflux Corp.	26
Magnus Metal, Div. of National Lead Co.	113
Magnuson Products Corp.	274
Manganese Steel Forge Co.	105
Marathon Oil Co.	151
Marshall Car Wheel & Foundry Co.	282
McConway & Torley Corp.	284
Metal Finishers, Inc.	111
Miller Allied Corp.	173
Miller Felpax Corp.	132
W. H. Miner, Inc.	138
M & J Diesel Locomotive Filter Corp.	61
Mobil Oil Corp.	75
Modern Railroads	264
Morganite, Inc.	70
Mosebach Manufacturing Co.	131
Motor Coils Manufacturing Co.	290 & 291
Motor Oils Refining Co.	79
Nalco Chemical Co.	171
National Castings Division, Midland-Ross Corp.	109
National Electric Coil, Division of McGraw-Edison	241
The New York Air Brake Co.	285
Norma Hoffmann Bearings Co.	263
North American Supply Co.	18
Oakite Products, Inc.	159
Ogontz Controls Co.	247
Albert E. Owen & Co.	119
Parker Seal Co.	206 & 207
Peck Products Co.	88 & 89 and 190 & 191
Phillips Manufacturing Co.	93
Pilot Packing Co., Inc.	249
The Pocket List of R.R. Officials	174
Power Parts Co.	121
Precision Engineering Co.	Outside Back Cover
Prime Manufacturing Corp.	165
Punch-Lok Co.	137
Purex Corp., Ltd., Turco Products Division	135
Racon Equipment, Inc.	139
Radiation, Inc.	84 & 85
Railroad Friction Products Corp.	52
Railway Locomotives & Cars	5
Research Products Mfg. Co., Inc.	199
Richmond Foundry Co.	153
Ringsdorff Carbon Corp.	267
Ross Company	23
Rust-Oweum Corp.	181
Safety Electrical Equipment Corp.	130
Sardello, Inc.	257
Scullin Steel Co.	48
Shell Oil Co.	67
Sherman House	133
Sinclair Refining Co.	69
John R. Sinding Co.	276
SKF Industries, Inc.	275
Sloan Valve Co.	117
Snap-On Tools Corp.	43
Snyder Company	177
Southland Manufacturing Co.	136
Speer Carbon Co.	289
Magna Kold Division, Sprague Engineering Div. of Teledyne, Inc.	269
Stackpole Carbon Co.	41
Standard Oil Co. of California	47
Standard Oil Co. of Kentucky	77
Standard Railway Equipment, Div. of Stanray Corp.	81
Stratoflex, Inc.	265
Striegel Supply & Equipment Corp.	195
A. Stucki Co.	134
Super Company	261
Superior Diesel Filter Co.	63
Surrette Storage Battery Co.	Inside Front Cover
Texaco, Inc., Railway Sales Div.	65
Thompson Products Ind. Div., Thompson Ramo Wooldridge, Inc.	189
Timken Roller Bearing Co.	266
Triangle Engine Rebuilders, Inc.	271
Trott Electronics, Inc.	187 & 297
Unarco Industries, Inc.	50
Union Carbide Corp., Carbon Products Division	Inside Back Cover
Vacu-Blast Corp.	29
Van Der Horst Corp.	35
Vapor Corp.	95
Wagstaff Battery Manufacturing	288
Waugh Equipment Co.	273
Weigand Engineering Corp.	287
Westinghouse Air Brake Division	167
Wheel Truing Brake Shoe Co.	179
Whiting Corp.	64
Wilson Engineering Corp.	277
Wix Corp.	183
Wyandotte Chemicals Corp.	157
Youngstown Steel Door Co.	272

POWER TO MOVE AMERICA
Fast-moving diesels, thousands of horsepower strong, streak out of the horizon at daybreak. Colossal new diesels like this power the trains that move America's food... fuel... raw materials... manufactured products. ☐ The efficiency of this power helps hold down the cost of living. ☐ Railroads are constantly developing new ways to serve our growing transportation needs... helping keep America on the move.
ASSOCIATION OF
american railroads

A "ONE-TWO" COMBINATION

That's hard to beat . . .

WORKING TOOLS FOR EVERY MECHANICAL DEPT. MAN

Railway Locomotives and Cars . . . published monthly. Edited exclusively for railway mechanical and electrical men . . . latest developments in locomotives, cars, shops, diesel maintenance, new products . . . latest "how-to-do-it" ideas. Subscription prices to railroad men: One year — $3.00; two years — $4.00.

Railway Age weekly . . . the only railway magazine to bring you concise, time-saving articles and news **every week,** crisply edited for fast reading . . . covering the whole field of railroading, including new motive power developments. Subscription prices to railroad men, $6.00 for one year; $8.00 for two years.

SIMMONS - BOARDMAN PUBLISHING CORP.

30 CHURCH STREET, NEW YORK 7, N. Y.

USING RAILWAY EDUCATIONAL BUREAU TRAINING

is like running in the 8th notch . . . you can get ahead fast with the help of a Technical Training Program . . . Modern methods of Maintenance, Inspection, and Trouble Shooting in easy to follow step by step instructions. Study as an individual . . . or with a group . . . by correspondence or in class. Inquiries welcome, or use coupon.

THE RAILWAY EDUCATIONAL BUREAU

1809 Capitol Avenue Omaha 2, Nebraska

Check below or write for information—no obligation

- ☐ Locomotive Maintenance and Inspection-Electrical-Mechanical
- ☐ Apprentice Training
- ☐ Railway Supervision
- ☐ For Individual
- ☐ Advance study for Journeyman
- ☐ Car Inspection
- ☐ For group or club

Position_____ R.R._____

Name_____

Address_____

YES SIR, WE ARE ASKING FOR YOUR TROUBLES!

Bring your *headaches* to the Pre-Convention Presentation nearest you, YOUR PRE-CONVENTION PRESENTATION. BRING YOUR *FRIENDS*, too. *Also*

If you can do things better than the ways those fellows at the "Head Table" suggest: Get up on your hind feet and tell 'em so.

This is no picnic, come with: Fire in your eye, — Trouble in your heart, — Ideas in your head, — A friend on each arm.

Pack your GRIPES and GRIEFS and unload them at YOUR Pre-Convention Presentation!

ANNUAL MEETING: CHICAGO, SEPTEMBER 30, OCTOBER 1, 2, 1968

1968 PRE-CONVENTION PRESENTATIONS

April 1, 5:30 P. M. — CHICAGO RAILROAD DIESEL CLUB, 365 W. Monroe
Topic: "Standardization of Diesel Locomotives and Components By Builders, Suppliers, and Railroads."

April 11, 9:30 A. M. — ROANOKE, SOUTHERN AND SOUTHWESTERN RAILWAY CLUB, Roanoke Hotel
Topic: "Choosing A Diesel Locomotive To Fit The Job."

April 18, 1:00 P. M. — DALLAS, SOUTHWESTERN RAILWAY CLUB, Baker Hotel
Topic: "Shop Equipment and Procedures For Improved Diesel Locomotive Maintenance."

April 23, 6:00 P. M. — PHILADELPHIA RY. M. U. CAR CLUB, Engineers Club, 1317 Spruce
Topic: "Electric Car Designs For Lower Maintenance Costs."

April 29, 6:00 P. M. — DENVER, MILE-HIGH RAILWAY CLUB, Pomponios D-X Restaurant
Topic: "Present Day Diesel Locomotive Electrical Problems."

May 6, 6:00 P. M. — ST. LOUIS RAILROAD DIESEL CLUB, King Louis IX Room, Union Station
Topic: "Present Day Diesel Locomotive Mechanical Problems."

May 22, 1:30 P. M. — MEMPHIS, MID-SOUTH AIR BRAKE AND DIESEL CLUB, Hotel Claridge
Topic: "Service Evaluation of Present Diesel Locomotive Fuel and Lube Oils."

★ "ECONOMY" IS THE THEME OF OUR 1968 PROGRAM ★

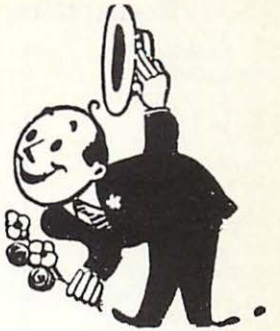
At our General Executive Committee Meeting, a round-table discussion stressed the special need this year for developing all the money-saving ideas possible thru the committee reports, and pointed out the necessity for conducting our work in the most economical way possible regarding both "off territory" travel expense and time.

PLEASE HELP US IN THIS SPECIAL "ECONOMY EFFORT" by:

Writing to the Technical Committee Chairmen all the money-saving ideas you have developed on their respective Program Topics.

Keeping "Off-Territory" travel in our work to a minimum. THIS MEANS "HOME FOLKS" WILL BE DEPENDED ON TO MAKE THESE PRE-CONVENTION PRESENTATIONS A SUCCESS; BE SURE YOU ATTEND ANY OF THE MEETINGS REALLY CLOSE BY AND CONVENIENT FOR YOU TO ATTEND. WE NEED THE HELP OF ALL "THE NEIGHBORS" THIS YEAR. WILL APPRECIATE IT.

LOCOMOTIVE MAINTENANCE OFFICERS ASOCIATION PRESIDENT'S HONOR ROLL



Period Ending December 31, 1967

A 'Bouquet' to these fellows who brought in the 1967 membership!

Members Sent In	
West Coast Region:	
H. W. Atkinson	2
T. W. Bellhouse	19
W. O. Brown	7
R. F. Chitwood	5
E. T. Cuyler	13
L. M. Day	6
W. A. Ericson	6
R. W. Fowler	1
M. Gogol	4
D. Houweling	1
N. L. McCracken	3
E. I. Norman	24
F. R. Olds	23
J. C. Orr	2
E. F. Peters	44
Ky Pruchnicki	16
J. Rubens	19
W. F. Scoble	1
P. L. Scott	1
T. O. Siegmund	84
R. L. Smith	16
W. F. Stevens	4
T. A. Tennyson	1
D. A. Keating	3
Central Western Region:	
M. C. Barton	1
M. J. Bowyer	1
D. H. Bristow	2
F. D. Bruner	24
H. N. Chastain	1
W. R. Cowdrey	4
C. W. Cramer	21
I. J. Davies	1
R. B. Davis	1
L. B. English	2
H. V. Gill	3

Members Sent In	
J. W. Gill	1
E. L. Green	2
S. L. Hanan	5
E. M. Hiatt	18
W. L. Huebner	1
T. F. Kelly	1
R. J. Kuhlmeier	1
C. H. Ludwig	3
L. L. Luthey	5
A. F. Mansheim	1
V. L. Marlo	18
D. M. Miller	9
D. S. Neuhart	1
E. L. Rohrer	1
G. E. Rodgers	2
C. B. Root	2
J. D. Schroeder	6
G. F. Sgitcovich	3
T. R. Smith	6
A. R. Snyder	2
J. M. Swayze	1
J. D. Whitlock	2
J. R. Williams	1
Northwestern Region:	
W. G. Carlson	1
A. Q. Ford	1
T. R. Hamilton	2
S. W. Johnstone	2
D. S. Kukull	1
T. G. Kotnour	1
R. H. Maas	3
E. D. Shabert	1
R. H. Seitz	12
C. P. Stendahl	2
R. G. Tausch	10
F. A. Upton	31

Members Sent In	
Eastern and New England Region:	
R. A. Brouillet	1
C. A. Beaver	16
J. J. Butler	43
B. J. Doneski, Jr.	1
R. S. Frees	1
H. J. Koch, Jr.	20
R. V. Krapish	4
H. P. McDonald	3
R. H. Paul	13
A. C. Prie	2
G. H. Snyder, Jr.	3
T. W. Webster	9
R. T. Weiss	10
J. J. Wright	2
Southern Region:	
W. W. Albury	1
C. D. Allen	1
G. M. Beischer	12
L. H. Booth	3
P. J. Brannigan	7
C. O. Carlson	1
J. A. F. Craig	1
W. F. Dadd	1
O. M. Dorsey	6
J. J. Ekin	1
W. L. Ellison	10
A. W. Gibson	34
J. S. Glynn	1
H. B. Herrin	6
P. R. Lewis	3
J. H. Long	16
C. M. Machin, Jr.	1
E. A. Manetta	2
W. C. Marlette	10
R. J. May	50
R. R. McDaniel	4

Members Sent In	
C. L. Miller	1
L. C. Ott	2
E. V. Price	3
K. T. Reed	1
E. K. Shaffer	4
R. M. Shahan	1
R. A. Shields, Jr.	2
F. D. Sineath	1
I. E. Smith	1
S. D. Smith	1
C. E. Stewart	7
B. D. Venable	2
J. K. Winstead	7
H. L. Wingfield	1
J. H. Workman	3
Southwestern Region:	
L. M. Allison	1
E. W. Ball	1
C. N. Cawlfield	1
C. H. Cavinee	8
W. Combs	5
O. J. Currie	3
E. E. Dent	20
J. W. Dent	23
C. N. Easterling	1
H. Fields	1
J. G. German	1
E. C. Harris	1
E. Heaton	1

Members Sent In	
J. D. Hope	1
O. L. Hope	4
R. E. Larkan	1
P. E. Latsha	3
M. E. Leppert	4
R. F. Maher	1
J. W. McCadden	2
S. W. McClain	1
E. Milkert	1
H. W. Musick	8
G. W. Niemeyer	4
H. F. Richardson	8
M. F. Rister	1
F. E. Ross	1
R. A. Scott	5
J. D. Snodgrass	2
W. S. Shelby	1
J. H. Webb	6
B. W. Wiggans	7
Alaskan, Canadian and Great Lakes Region:	
W. Akers	15
J. Cimko	1
C. R. Buskard	3
T. J. Bradley	7
M. J. Chandler	5
J. A. Chisholm	4
C. H. Derner	30
R. F. Doyle	1

Members Sent In	
H. H. Donaldson	1
J. S. Fadale	3
E. T. Harley	38
J. G. Hoffman	1
W. F. Kelley	2
C. A. Korn	1
W. E. Lehr	3
W. H. Long	1
R. W. Mustard	5
C. A. Nicol	1
R. E. Nurse	4
O. R. Pendy	1
L. Renhall	1
J. F. Rosman	1
N. W. Seip	1
O. F. Vea	6
G. R. Weaver	15
J. C. White	1
H. W. Wittman	1
Central (Chicago) Region:	
G. F. Bachman	1
R. M. Campbell	5
T. M. Hunter	1
R. J. Johnson	35
M. H. Kuhn	21
L. O. Parker, Jr.	5
W. G. Town	1

THE $64.00 QUESTION — Attention All Members

? ? ? ? ? ?

If EVERY Member Worked Just Like Me
Just How Big Would The L. M. O. A. Be?

If YOU haven't gotten your New Member for this year, PLEASE GET HIM TODAY. If YOU have gotten your New Members for this year already, thanks and thanks again, for the part you have played in getting our grand enrollment. HELP US GET ONE MORE TODAY.

Take this book to a friend; tell him two similar books will reach him as a 1968 member:

1. The 1968 Pre-Convention Report, containing the full text of all the Technical Committee Reports, on August 15, 1968.

2. The 1968 Annual Proceedings, containing the verbatim record of the discussion of these reports at the Annual Meeting in Chicago this fall, on April 15, 1969.

WE need HIM as a participating member. **He needs the information** our work has developed.

GET HIS APPLICATION NOW!

1968 Dues are payable NOW. Please give us a lift by paying YOUR own 1968 dues today. (If not already paid, of course. No way to separate in this mailing.) (Check your Membership Card.)

Monday Morning, October 9, 1967

10:00 A. M.

G. M. BEISCHER
President
C. M. O. - Locomotive
C. & O. Ry. - B. & O. R.R.
Huntington, W. Va.

PRESIDENT BEISCHER: Gentlemen, this opens the 29th Annual Meeting of the Locomotive Maintenance Officers Association. We welcome all of you here and trust that, as usual in years passed, the program will be most worthy of your attendance and that it will bring to you many things of lasting value. I will ask that we all rise and remain standing for the invocation, which will be delivered today by the Reverend Carl T. Uehling, pastor of Christ the King Lutheran Church in the Loop, Chicago.

REVEREND CARL T. UEHLING: Let us pray. Eternal God, we praise Thee for this new day and for our coming together in this place, for the gift of life and for the opportunities we have to serve one another, for the skills and talents with which Thou hast endowed us, and for the concern in which Thou dost will that we live together.

Guide now, we pray, the deliberations of this assembly. Give wisdom to all who participate, and cause integrity to be cherished here. So favor these people with Thy spirit that there may be at the close a sense of accomplishment that reflects high purpose and noble effort, and that there also be, we pray, Thy peace and the joy of fellowship one with another. Through Christ our Lord. Amen.

PRESIDENT BEISCHER: There are those who, among us in years passed, have departed.

May we stand in silence for a minute.

PRESIDENT BEISCHER: Rather than to individually introduce the officers of the Locomotive Maintenance Officers Association, each one has a part in our program and will at some time during our program be speaking to you from this rostrum; so I would sugggest that in lieu of a time-consuming introduction you read the Annual Proceedings book

In Memoriam

S. M. HOUSTON (Retired)
(Past President)
Gen. Supt. Mech. Dept.
Southern Pacific Company
568 Superior Ave.
San Leandro, Calif.

B. M. Brown, Retired Chief Mechanical Officer of the Southern Pacific, Palo Alto, California.

Bard Browne, Owner of the Bard Browne Company, Ardsley-on-Hudson, New York.

G. B. Miller, Retired, Superintendent Motive Power and Equipment, Terminal Railroad Association, Webster Groves, Missouri.

T. O. Olson, Retired, Superintendent Motive Power and Equipment, Chicago Great Western Railroad, Oelwein, Iowa.

C. F. Weil, Retired, Secretary, Committee of the Coordinated Associations, St. Petersburg, Florida.

Stanley M. Houston, Retired, General Superintendent Mechanical Department, Southern Pacific Company, Walnut Creek, California.

John Bjorkholm, Retired, Superintendent Motive Power, Chicago, Milwaukee, St. Paul and Pacific Railroad, Milwaukee, Wisconsin.

COMPLETE

CLEANING SERVICE

. . . at the right price

•

C. & H. CHEMICAL CO.

RAILWAY DIVISION

475 North Cleveland Avenue

St. Paul 4, Minnesota

and Pre-Convention Report, which will identify the officers for you.

I do wish to state at this time that the support and work these officers have done is what brings these meetings to you and insures the quality and value of these meetings to you. The work they have done is significant, valuable and time-consuming, and deserves your appreciation at any opportunity you have to express it to them.

Another great group of all-important supporters of our work are the outstanding supply firms shown in our record-breaking 1967 Advertisers Honor Roll shown above us here. This is the largest number of advertisers L. M. O. A. has ever had. We appreciate each and every one of them, we are shooting for two hundred of them, so there is room for just one more, several more, in fact.

Do we have any members of the Federal Railroad Administration with us today? If so, will they stand. I know this group has a special meeting this morning, so they may be with us later in the day.

I understand we do have the Director of Operations of the Canadian Transport Commission, Mr. R. M. MacDonald. I would like to ask if he will stand. With him are several of his staff. Mr. W. R. Rose, Mechanical Assistant. Mr. L. R. Steeves, Mr. W. H. Wiseman and Mr. R. G. Eaton, District Inspectors. We appreciate very much that you gentlemen are with us today in such a fine representation from the Board of Transport Commission of Canada. I am certain many of the things that will take place will be of considerable interest to you, and I am sure Mr. McGregor's remarks will be of

T. J. FLEMING COMPANY
647 SOUTHWEST BLVD.
KANSAS CITY, KANSAS
Westinghouse Air Brake Distribution Center
Brenco Roller Bearings General Radiator, Inc.
Reconditioning Services
AB Brakes & Components Speed Recorders
Fuel Injectors Slack Adjusters
Valve Bridge Assemblies Steam Generators & Components
Miscellaneous Reconditioned Diesel & Car Parts
1-913-AD-6-9000 1-913-AD-6-9001
TWX-910-743-6867

Some people don't give a Nickel Dam like we do.

Only Clevite gives you the patented nickel dam that helps make our EMD* replacement bearings stronger than the conventional kind!

Every Clevite EMD replacement bearing has a patented "Nickel Dam" to help increase bearing life. This exclusive barrier of pure nickel prevents the transfer of tin from Clevite's patented overlay, (5 times stronger than conventional overlays) thus maintaining the controlled overlay composition and the added wear resistance of the bearing.

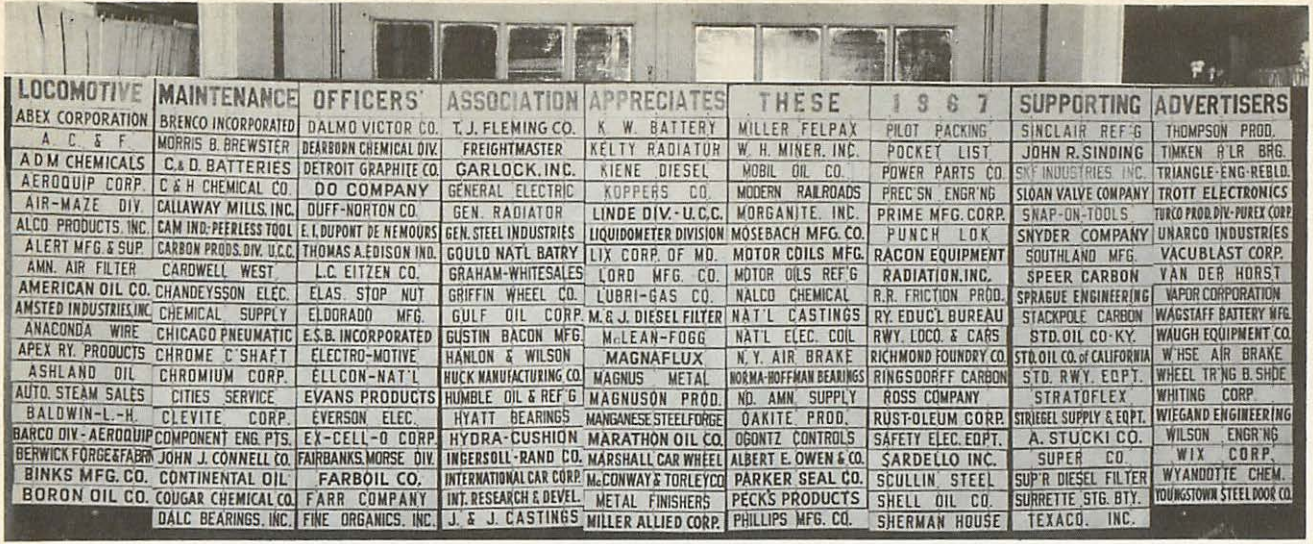
In addition, Clevite premium nine-groove upper rod bearings meet all requirements for both turbocharged and non-turbocharged engines (which very nicely simplifies your inventory control).

Our unique materials, expert craftsmanship and concern for detail make Clevite the name to buy in bearings.

Clevite Corporation, Cleveland
Graphite Bronze Division,
Cleveland, Ohio 44110.

*Trademark of General Motors

CLEVITE



ADVERTISERS HONOR ROLL

ATTENTION ALL MEMBERS:

WE **DO NOT ENDORSE** ANYONE'S PRODUCT; BUT WE **DO APPRECIATE** OUR ADVERTISERS!

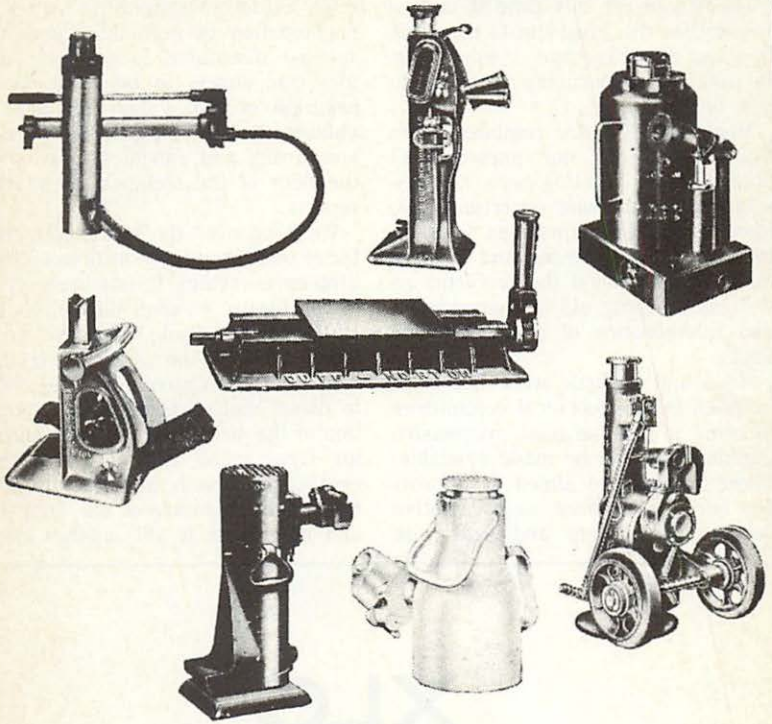
Listed above are the names of the ADVERTISERS whose ads appeared in our PRE-CONVENTION REPORT.

We appreciate the fine financial support that these advertisers provided. **These cards were displayed immediately above and behind the speaker's table during the entire Convention.** They were referred to with appreciation daily, and their attractive appearance drew much favorable comment.

A picture of these cards was displayed in the Annual Proceedings.

We hope to see **these** and **many more** advertisers' names displayed in this fashion at all of our future **Annual Meetings** and **General Executive Committee Meetings.**

Be sure to read their ads in the Pre-Convention Report and Annual Proceedings.



You Get The Economy Of Quality With Duff-Norton Railroad Jacks

For more than 75 years Duff-Norton has been working for and with the nation's railroads to provide the best in lifting power. Each type of jack — ratchet, screw, hydraulic — has been designed with the special needs of the railroads in mind. Specify Duff-Norton railroad jacks for assured performance in any application.

DUFF-NORTON COMPANY

CHARLOTTE, NORTH CAROLINA 28201

The Canadian Duff-Norton Co., Ltd., Toronto 18, Ontario

particular interest to you.

Gentlemen, at this time it is customary for the President to make his opening remarks, and I would like to take this opportunity to speak to you briefly.

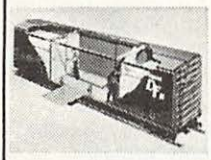
Each year we are reminded from this platform of our purpose and objectives for meeting here. Our Association is the one opportunity we have through our meetings that follow to freely examine and explore on common ground the problems as well as the progress of management and maintenance of our locomotive fleets.

Hard and realistic work has been invested by the technical committees to bring to you the most progressive thinking that can be made available. These reports are aimed at improving our performance as locomotive department officers and deal with our practical problems. All this, however, would be wasted if in turn your participation through intelligent and spirited discussion is not forthcoming. **Our efforts to bring to you a program of real value will only be valuable if you too participate.** I urge your frank and candid discussion on the floor of the technical committee reports.

We have over the years past been faced with seemingly insurmountable problems, certain, in our uncertainty of the future, to spell difficulties for our industry. Some of these problems, such as the almost overnight transition from steam motive power to diesel motive power, the negotiation of the 40-hour work week, spiraling labor rates, have all been successfully met with an outlook of optimism for the future of our industry, and now there is yet another crisis

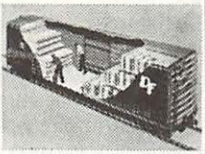
XLO
EX-CELL-O FOR PRECISION
Known to the railroad industry
for precision-made,
hardened and ground
pins and bushings
—the ultimate in quality!
Railroad Sales, Detroit, Michigan 48232
XLO
EX-CELL-O CORPORATION

EVANS DAMAGE-PREVENTION EQUIPMENT CARS • COMPONENTS • LEASING



EVANS DF®-B one-piece bulkhead equipment is today's most popular way to brace unitized lading. Operated by one man, it prevents damage to lading.

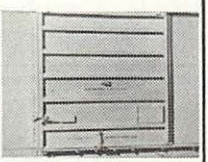
EVANS SIDEFILLERS reduce car width in stages to prevent movement of packaged or unitized lading. Permanently installed. Stores against car wall.



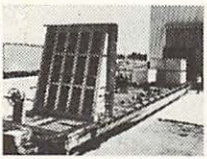
EVANS DF LOADER is a special crossmember device which locks high density or irregular lading for dunnage free, damage-free transit.

EVANS PIGGYBACK DF equipment permits full use of vehicle's capacity . . . often doubling the payload and reducing in-transit damage.

EVANS DF-C COIL CAR, the first car designed from the rails up to transport coil steel, protecting it from the weather. Hydra-Cushion® Underframe equipped.



EVANS-SUPERIOR PLUG AND SLIDING DOORS. One-man operation; tight sealing; trouble-free. Sliding doors in single or double widths.



EVANS MOVABLE BULKHEAD FLATCAR takes heavy loads of various flatcar lading. Hydra-Cushion® Underframe protects both car and lading.

EVANS NEW CAR BUILDING FACILITY at Plymouth, Mich., built to accommodate new freight car construction, upgrading and stretch-out work.

COMPLETE LEASING SERVICE
new and used cars.

EVANS' SUBSIDIARY, United States Railway Equipment Company, will lease to railroads or shippers one or a fleet of almost any type freight car.

EVANS TRANSPORTATION EQUIPMENT DIV., PLYMOUTH, MICH.

of the most severe escalation in wage rates for our labor that we have ever faced. Past history assures us that we do have the capacity and ability to meet again a crisis and to bring about the means to assure that this too will be successfully surmounted. Success will not be easy, and some of the directions for the paths we must take are before us in our opportunities to meet as we do today.

It will take a new outlook, an acceptance of change and a realistic measure of the means to bring about change, if we as locomotive managers, are to fulfill our responsibility to the future. An entirely new field and concept of thinking is opening before us and we must exercise our combined force of ingenuity at our disposal to achieve our goals. What is available to us can best be summed in one word "Cybernetics". An imposing sounding name signifying more mystery to most of us than any practical tool at our disposal. However, as Mr. Wilson of the Canadian National defines "Cybernetics" it is "the science of control of organizations, including men and machines, and the inter-relationships between these". Perhaps as locomotive men we would prefer to recognize this imposing sounding terminology more simply as "common sense". The common sense to use to our advantage the enormous advances in technological progress.

May I remind you that problems we mutually discussed at these very meetings for which solutions were seemingly impractical or even impossible, have today been translated into accomplished fact. We recognized the need to bring about a means to rapidly and accurately and

NORTH AMERICAN
SUPPLY COMPANY

SALES AGENTS FOR:

Great Lakes Supply Company
Metal Fiinshers, Inc.
Ohio Camshaft, Inc.

1860 ILLUMINATING BLDG.
CLEVELAND, OHIO 44113
PHONE: 216-861-5200

COUNT ON GOULD

FOR...
time tested
quality proven

DIESEL STARTING BATTERIES

GOULD INDUSTRIAL

GOULD-NATIONAL BATTERIES, INC.
INDUSTRIAL BATTERY DIVISION
FIRST NATIONAL BANK BLDG. • ST. PAUL, MINNESOTA • 55101

with repetitive reliability determine the "state of health" of a locomotive, and to determine with maximum efficiency the replacement need and continuity of the ever increasing complexity of the electrical circuitry of the modern locomotive. It seemed fantastic to automate this requirement. It is now an accomplished fact and the hardware to practically apply our wishes of yesterday is now at our disposal. You may recall our many discussions of the problems to control the power loss, equipment damaging wheel slips of our locomotives. Our discussions bore palatable fruit and today through the intelligent use of the technological progress available to us the vastly improved control of wheel slip through the rate of change concept is an accomplished fact. We expressed displeasure with the costs to maintain truck brake riggings and the advantages of progress in the field of wheel braking have been intelligently used to bring about vastly simpler and more economical braking arrangements. **Many more developments trace their origins to our mutual examination of our problems and the potential for further advancements has by no means been exhausted.**

We have given critical comment to the bothersome multiple connections between locomotives, with their detrimental contributions to failures of multiple consists. I am certain that we will through our mutual endeavors achieve the day when all physical connections will be entirely automatic and the electrical control of multiple units will be accomplished with no physical connection of any kind. We have condemned the per-

Over 85% of all diesel locomotives in America today are equipped with one or more Farr products

FARR COMPANY

P.O. Box 90187
Airport Station, Los Angeles, 90009

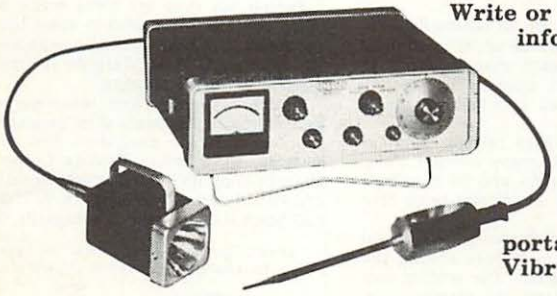
Cut Operating Costs With Vibration Analysis Equipment

You Reduce...on-the-road breakdowns

- out-of-service time
- over-all maintenance

IRD's compact, portable vibration analysis/measurement equipment quickly tells you the mechanical condition of your diesel engines, turbo-blowers, generators, traction motors, compressors and cooling fans. And it pinpoints the trouble. Ideal for use in final check out, periodic checks and on-the-road monitoring. Increased service life is just one of the benefits you get with IRD equipment. Used as part of your regular maintenance program, vibration analyzers, like the Model 330 shown below, spot vibration trouble before it becomes excessive . . . eliminate unscheduled out-of-service time . . . reduce maintenance costs and on-the-road breakdowns. Fast, accurate vibration analysis indicates unbalance, misalignment, looseness, bad bearings, bent shafts and other damaging defects on the spot. Using IRD's versatile equipment, corrections often can be made in-place without disassembly. Free training of your personnel—like that given 10,000 user/customer employees—is provided at IRD's audio-visual training seminars held periodically throughout the country. For immediate help on emergency problems, call on IRD's World-Wide Consulting Service.

Write or call for further information today.



Compact, Lightweight, portable Model 330 Vibration Analyzer

IRD

INTERNATIONAL RESEARCH AND DEVELOPMENT CORPORATION
6174 Huntley Road, Worthington, Ohio
A Subsidiary of H. H. Robertson Company

formance of electrical commutation and it is entirely possible with our continued insistence to engineer the most maintenance free and reliable electrical components in our locomotives that we will achieve an end to these problems. We have expressed our need for greatly improved load control to eliminate damaging shocks to diesel engine components and the capability to produce reliable and uniform and consistent load control is not impossible.

Only last year, Mr. George Weaver of the Pennsylvania Railroad stated in discussing the problems of the high horsepower locomotive that our need was to have engineered into our locomotives a greater "factor of elasticity". That is, we must have incorporated in the design of locomotives a greater ability for the locomotive to live in its environment both economically and reliably. The objective we must obtain is something better in the future giving us a greater margin of safety. We can, objectively and collectively set the course for this end.

You may at this point wonder what all this has to do with you, who as maintenance officers are concerned with the day-by-day problem of keeping our locomotives "healthy". **You are no longer just maintenance officers, for such a narrow limitation will not meet the demands we face that were earlier related. We must be in every sense locomotive managers. The problems of today must be translated to successful resolvement if we are to successfully meet our demands of the future.** It is your problem that must direct the research and engineering design improvement that Mr. Weaver so capably defined.

Hands across the rails

The nation's railroads do an outstanding job — in spite of the handicaps under which they operate. Over the years, management has shouldered enormous burdens in meeting crises and emergencies with better methods and equipment.

Contributing greatly to railroad progress and efficiency are the many railroad clubs, associations and societies, and the industry's suppliers who believe in offering more than product alone.

We of the Railroad Products Department are proud to count ourselves among the leaders of this latter group. Our product contributions — oxy-acetylene and electric welding equipment, ULOK Air Filters, industrial gases, and other equipment — are well known to railroaders. So are LINDE's service, research and development, and technical support. You can count on our service engineers to go out "on the track" with your specialists when you need them to demonstrate and explain new techniques, and to help tackle new problems.

Behind our men are three major laboratories devoted to research in areas that can, and have, improved railroad operations, plus 13 additional Union Carbide laboratories working on related projects.

All these services and resources are at your railroad's disposal—at no expense. Your problems are our problems. For specific answers, write Union Carbide Corporation, Linde Division, Railroad Products Department, 270 Park Avenue, New York , N. Y. 10017, or 230 North Michigan Ave., Chicago, Ill. 60601.

"Linde", "Ulok" and "Union Carbide" are registered trade marks of Union Carbide Corporation

UNION CARBIDE RAILROAD PRODUCTS

ROSS COMPANY

6300 KNOX INDUSTRIAL DRIVE
ST. LOUIS, MISSOURI 63139
Telephone MIssion 5-8262

RAILWAY AND INDUSTRIAL SUPPLIES

Air Brake Hose
Angle Cocks
Blackmer Pumps
Farr Air Filters
Prime Mfg. Co.
Sprague Windshield Wipers & Parts
Ellcon National Hand Brakes
and Slack Adjusters
Atlas Lubricators
Security Journal Stops

Some of you will be privileged to hear the address of Mr. A. Scheffler Lang, Federal Railroad Administrator for the new Department of Transportation before our Coordinated Association Luncheon on Wednesday. Those of you so fortunate, **will have no doubt that the future for our industry holds much change and that we as managers of our locomotive fleets are an important and vital part of that future.**

At this time I would like to call on our Fourth Vice President, Mr. George W. Niemeyer, who will make a General Membership Committee report.

G. W. NIEMEYER
Third Vice President
(General Membership Chairman)
Mechanical Superintendent
Texas & Pacific Ry.
Fort Worth, Texas

MR. GEORGE W. NIEMEYER (Mechanical Superintendent, Texas & Pacific Railway, Fort Worth, Texas): Gentlemen, it is a pleasure to see so many attending the meeting this morning. I know your railroads send you to the LMOA convention to get the ultimate cut of the reports, and it looks like their faith has been well founded. The attendance we have, and the participation, is what makes this convention a success.

As Membership Committee Chairman this year it is my duty to advise you that unfortunately we have not reached our goal, which was originally set at 3,067. We are 217 members short of that goal.

The LMOA is your organization and mine. It is the central meeting ground for the maintenance officers to get together with the supply men and deal firmly with our problems. As President Beischer said in his address, the problems we bring up at this meeting are the result of some of the motive power we have today. I know the supply men are interested in this. **I know each mechanical officer should be interested in it.**

On your chair is an application blank for membership in the LMOA. I know some of you men have railroad friends here who do not belong to our Association. Let's take this cushion off the chair and not just sit on it. Let's put it to work. Let's get these fellows joined up in the ranks of the LMOA so that we can have wholehearted, 100 percent participation.

Our committees have worked hard and diligently preparing their papers for us. **These papers are what we take home so that we can save our railroads money.** We get ideas from them at this meeting. Then we can voice our opinion about some of the things that are going on, and as a result we can improve conditions on our railroads.

At the time you pick up the application blank and contact your brother railroad men, think also of the supply men. I know there are supply men present who do not belong to the LMOA, and we most earnestly solicit their participation. We would like each of you to offer your friends the opportunity of belonging.

It is not difficult to belong. Get

New dimensions in motive power . . . from Electro-Motive

From the home of the Diesel locomotive at La Grange comes a whole new fleet of motive power for America's railroads—all powered by General Motors' new 645 Diesel engine. Nine new models, engineered to meet today's demands and tomorrow's needs.

Electro-Motive's new Six-Forty-Five Fleet brings with it new dimensions in unit capability, horsepower, maintenance reduction and operating economy.

And, it's the most tested and proved fleet of new locomotives in motive power history, with over two years of rigorous laboratory and road testing.

Electro-Motive Division
La Grange, Illinois

GM

hold of them, get $8 out of them, and if you are too busy to take their money to the girls outside give it to Charley Lipscomb and he will be glad to handle it.

Gentlemen, we earnestly solicit each one of you as members of this organization to assist us in this membership drive. We would like to equal the membership we had last year, and we would be happy to reach the goal set for this year. So, take the cushion off the chair, get your pencil in hand, and put our membership over the top this year.

PRESIDENT BEISCHER: Thank you, Mr. Niemeyer. At this time in our program it gives me great pleasure to introduce to you one of our members and one of the great fraternity of locomotive managers for whom I personally hold the highest regard and respect. To me it is an honor that he is on the program with us today. I feel sure that the remarks he will make will be of considerable meaning and great importance to every one of us.

Our principal speaker today is Mr. Leslie Stewart McGregor, Chief, Motive Power and Car Equipment, Canadian National Railways, Montreal. He was born in Edinburgh, Scotland, in 1911. He now resides in Beaconsfield, Quebec. He and his wife have a son and a daughter, both attending university.

Mr. McGregor graduated from McGill University in 1936 with a Bachelor of Engineering and Honors in Mechanical Engineering. During World War II he served overseas with the Royal Canadian Army and returned as Lieutenant Colonel. His responsibilities during his army career were in the maintenance of

• ZYGLO • MAGNAGLO
• MAGNAFLUX • MAGNATEST

Latest Testing methods and equipment to reduce maintenance costs and improve reliability for locomotive and car parts. Newest electronic and ultrasonic instrumentation for metal testing, thickness measure.

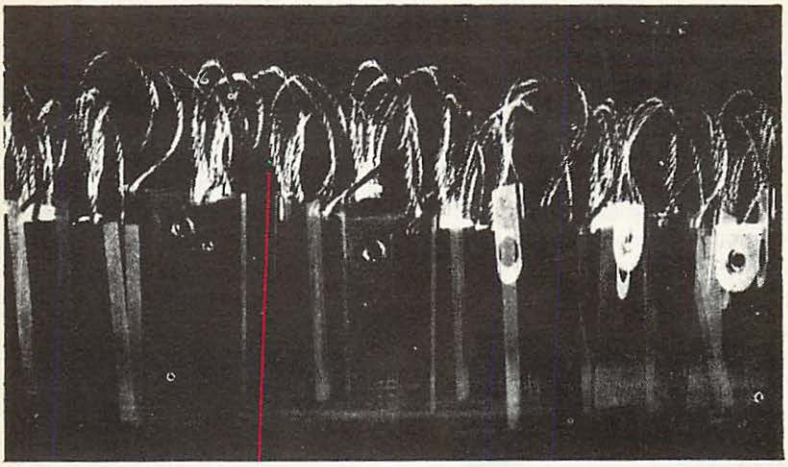
Low cost Magnaflux ($195.00), Zyglo ($125.00) and Spotcheck kits for use anywhere.

Consistently Reliable Testing Materials

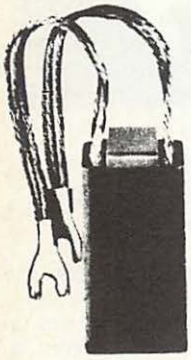
Magnaflux Corporation

7328 W. Lawrence Avenue **Chicago, Illinois 60656**

Offices: New York, 10036, Pittsburgh, 15236
Detroit, 48237, Cleveland, 44125,
Dallas, 75235, Los Angeles, 90022



When this is a problem...



this is the answer

It's that little neoprene pad (red) that takes the shakes. Sort of a buffer that reduces vibration, eliminates uneven wear and lengthens brush life. You get improved commutation, more uniform wear, lower operating costs; no broken hammer plates, no shunt fraying, less flashovers, less commutator threading. You get Speer Red Top Multiflex Brushes, one branch of a large and efficient family of high quality brushes for electrical rotating machinery. To get to know the family better, write for complete details.

SPEER® Carbon Co.

Dept. 190, St. Marys, Pennsylvania 15857
Speer Carbon Co. is a Division of Air Reduction Company, Inc

heavy military equipment, and he had a very large contingent under his direct responsibility.

Mr. McGregor's career has been entirely with the Canadian National Railways, starting in 1926, taking leave of the CNR to attend McGill University, he subsequently served in various supervisory and official capacities in both car and locomotive departments, also in research and development work, with appointment to his present position in 1961.

Mr. McGregor is active in the ASME and is Chairman of the Railroad Division of that Society. He is a member of the AAR General Committee and AAR Research Committee and also various civic organizations.

L. S. McGREGOR
Chief of M. P. & C. E.
Canadian National Ry.
Montreal 3, Que., Canada

G. M. BEISCHER
President
C. M. O. - Loco.
C. & O. Ry. - B. & O. R.R.
Huntington, W. Va.

We are honored to have Mr. McGregor with us. Before he presents his address we wish him to remain with the LMOA from this time on. To insure it, it gives me great pleasure to honor him with an Honorary Life Membership in the LMOA.

MR. LESLIE S. McGREGOR (Chief, Motive Power and Car Equipment, Canadian National Railways, Montreal, Quebec): Thank you, Mr. Beischer. I am overwhelmed with this Association token for my presentation today.

Mr. President and Members of the Locomotive Maintenance Officers Association:

First, I would like to thank Mr. Beischer for his complimentary introduction, particularly his remarks about my abilities, and so on. I find myself in an embarrassing position. You know, great minds think alike. I will have to return the compliments to Mr. Beischer because our two ad-

Do you have a guy in your plant who tells dirty stories?

We can show you how to clean 'em up!

with Blast Cleaning, Dry Honing & Shot Peening Equipment and Systems from Vacu-Blast

Vacu-Blast takes the dirty work out of parts cleaning and finishing. General cleaning, deburring, corrosion removal, weld cleaning, deflashing, matte-finishing — Vacu-Blast performs literally 1001 high-production applications. Dust free operation and unique vacuum recovery and abrasive recycling process assures efficient, economical performance. Choose from a full line of standard machines or Vacu-Blast engineers will create a portable, cabinet or blast room system to match your exact needs.

"New Dimensions in Metal Cleaning and Finishing"

VACU-BLAST CORPORATION

Box 885 · Belmont, California 94002 Also in London and Melbourne

L. S. McGREGOR
Chief of M. P. & C. E.
Canadian National Ry.
Montreal 3, Que., Canada

dresses run along parallel lines, even to the extent of certain words and phrases.

It is an honor and pleasure to have this opportunity to speak to the Locomotive Maintenance Officers Association today. The subject of my address will probably be considered as somewhat offline from your normal technical locomotive papers. However, I believe a few thoughts on our mechanical department management concepts and practices should be of general interest and of particular importance in today's environment of administrative change and complexity.

An experience I had last week in attending the Second World Railway Cybernetics Symposium (and you will note the term Cybernetics has already been defined by your President) in Montreal forcefully impressed me with the timeliness of my topic; in fact, the content of my paper would have been considerably revised had this symposium been held several weeks earlier.

To achieve audience comprehension with my newly acquired vocabulary, I would have undobutedly had to distribute a 1970 edition of dictionaries or had the room taped for instantaneous translation. The new language of the computer age, particularly cybernetics, is quite a strain on our conventional vocabulary.

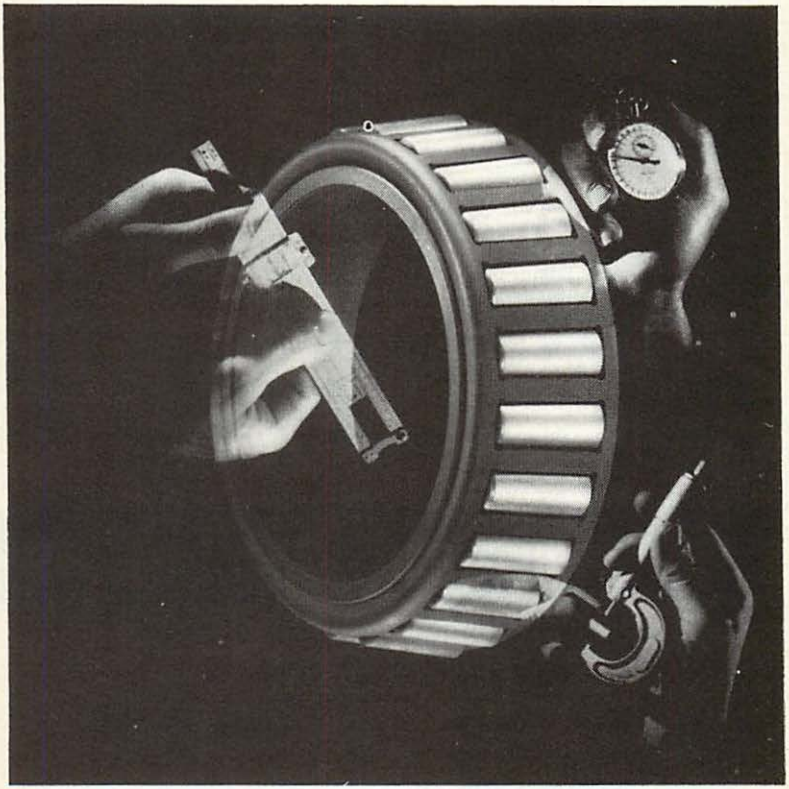
As far as the definition of cybernetics is concerned, Mr. Beischer fully covered that, so I will not attempt further explanation for those of you who haven't heard the word before. I do remember back in the early 1950s reading Norbert Weimer's book and not realizing that some day I would be living with the science of cybernetics. The author did state it in layman's language as "the science of communication". If I remember correctly, he started off by saying, "Such communication in the stone age was a grunt from the Neanderthal caveman, wherein his mate would, in full comprehension, bring a boiled Dinosaur bone or, with two grunts, she would with equal understanding provide some other demanded menial service."

Today cybernetics encompasses computer technology, control systems and advanced methods of transmission; in other words, the push-button management technology of tomorrow.

Following those few introductory words which signify my rather abstract subject, I will get along with my text. I might say that the general direction of my address is to the mechanical department; and again, as Mr. Beischer said, I am looking upon the audience as mechanical officers and not just locomotive maintenance officers.

CONCEPTUAL CHANGES IN MECHANICAL DEPARTMENT MANAGEMENT

Change is the constant factor of our times. Greater technological advance has occurred since 1945 than



Reliability: rigid inspections at every manufacturing step

Brenco *crown-taper* **roller bearings are the most modern of all.**

BRENCO, INCORPORATED
PETERSBURG, VIRGINIA

in the prior ten thousand years of recorded history. In this brief decade we have been sputnicked into the space age and will never look back.

By the year two thousand, a mere three decades away, our world population will double. To transport these six billion bodies and their goods is our problem and our business. Rail transportation will become a critical key to the future and must rapidly adapt. It may well absorb the major load of under 500 mile inter-megalopolis passenger transport. Freight haulage, our basic business, will expand explosively. Motive power from the romantic steam locomotive to the impersonal corporate diesel will change to fuel cell, nuclear fission or even atomic fusion power.

How will we, as railroad management and motive power officers, cope with this future? It is my belief that the principle area of adaptation will be in our managerial thinking, which must greatly expand to meet the changing environment.

The extensive growth in managerial science and concepts during recent years is having a profound impact on our previously accepted railroad organization policies and structures. Corporate philosophies and strategies have been significantly modified, particularly with regard to planning and marketing concepts. Administrative practices have become more complex and flexible with the introduction of the electronic computer and associated information, analysis, and simulation systems. The clear cut functional relationships between departments and with top executive management, which were relatively uncomplicated a few years

Brewster Sand Pipe Nozzles

Furnish Minimum Volume of Sand For Efficient Operation

STANDARD APPLICATION ON MANY LEADING RAILROADS

★ Specially Design patented ★

AVAILABLE FOR ALL SAND DELIVERY PIPES

Order Reference
No. 888—3/4 for 3/4" Pipes
No. 888—1 for 1" Pipes
No. 888—1-1/4 for 1-1/4" Pipes

PROMPT SHIPMENT

Morris B. Brewster Co.
T-Z Co., Inc.

3344 Schierhorn Ct.
Franklin Park, Ill. 60131

exhausting HOT GASES

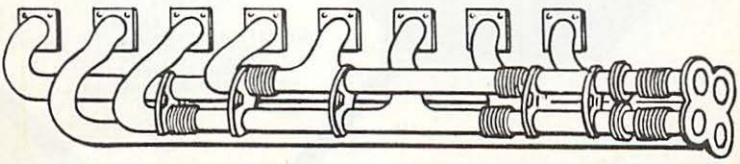
is our business today
has been our business since 1940
will be our business tomorrow

You'll find H&W custom-tailored Manifolds in service on practically every R.R. Line in the country. The reason's evident: GAS TIGHT OPERATION • HIGHER TURBO PRESSURES • HIGHER GAS TEMPERATURES • A CLEAN ENGINE • SAVINGS IN MAINTENANCE

To keep your Diesels on the go, call

HANLON & WILSON CO.
JEANNETTE, PENNSYLVANIA 15644
CODE 412 242-8200

DESIGNERS/FABRICATORS FOR OVER 50 YEARS



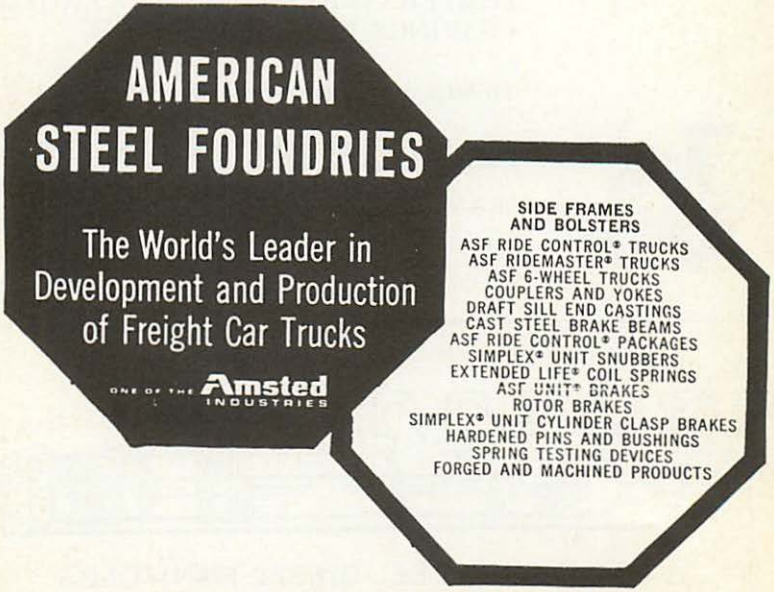
STAINLESS STEEL DIESEL MANIFOLDS

ago, have now become cloudy and uncertain.

These administrative innovations along with extensive technological and socialogical changes are confronting, or perhaps I should say confounding, our Mechanical Officers and are undoubtedly having a disturbing effect on our established department policies. As a result, I think our greatest challenge today is to understand and appreciate the significance of the change and to reorient our functional activities and attitudes to meet the new conditions.

The day when we could administer our department affairs in relative isolation and make decisions based on personal experience is past. Today, we must actively cultivate close working relationhips with other departments. We must react positively to new technology and management techniques. We must realize that our established administrative practices, our traditional responsibilities and even our organization structure are all affected and must adjust to today's management requirements.

What are the new elements influencing our previously accepted management principles? What action should be taken to ensure effective response and understanding? In my opinion, the answers to these questions are of paramount importance to our Mechanical management. The magnitude of the task and the variables to be considered are such that I could not hope in my allotted time to present more than a cursory coverage of the subject. However, I would like to express some of my thoughts on the more significant elements and present some suggestions as to the course of action we should take.



For strength-**Vanderloy**
For wear-**Porus-Krome**

The Van der Horst formula for restoring cylinders and other worn parts to standard size. For strength, we use Vanderloy, our dense, tough 99.9% pure electrodeposited iron with a tensile strength of 95,000 psi plus other properties similar to low carbon steel. As an underlay for chromium it forms an almost indestructible bond with the base metal and a near perfect surface for chromium plating. And, it can be deposited from flash thickness up to .250" with complete physical conformity. After adding Vanderloy for strength, we deposit a uniform thickness of Porus-Krome for wear. Porus-Krome outwears the original cast iron at least three times.

Economics are good, too. For example, after a cylinder is restored to standard size with Vanderloy and Porus-Krome you never need to go to a large oversize again. You can stay with a small oversize no matter how many times your cylinders are reclaimed.

Remember: for strength—Vanderloy; for wear—Porus-Krome and for every plating need—your one dependable source . . .

VAN DER HORST CORPORATION
OLEAN, NEW YORK • TERRELL, TEXAS • CHICAGO, ILLINOIS
Subsidiary: Spar-Tan Engineering, Los Angeles, California
National Distributor for Hunt-Spiller Manufacturing Corporation

VAN DER HORST

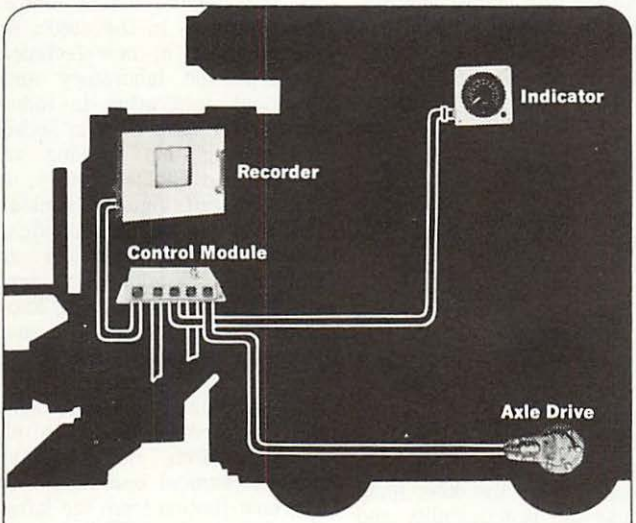
The decade of the 1950's, which could be termed the diesel era in the railroad industry, was a period of major technological transformation. The impact outside the mechanical department was confined for the most part to operating activities. This was reflected in extensive changes in the pattern of train schedules, centralization and redistribution of terminals, and renovation of plant facilities. Service to the customer, on the other hand, was still dictated by the operating department offering standard types of freight cars and transportation schedules based on operating expediency.

Although dieselization slowed the erosion of the railroads' share of the transportation market, it was obvious in the early 1960's that a major revision in organization concepts would be needed to rescue us from a further deteriorating position. Strategies were revised and, among other managerial changes, the sales and marketing functions were organizationally strengthened and given a prime place in policy decision making. Integrated marketing-operations planning was born. As an immediate effect, our operating attitudes became customer oriented. Gone were the rigid parameters of the past related to standardized rolling stock design. Recognition dawned that train schedules should be directed to service the needs of shippers and consignees. At the same time the concept of total transportation costs was introduced to provide an economic sales tool in persuading customers to ship by rail.

The impact of this new approach on our Mechanical Department managerial practices must not be underestimated. Under the new strategies, railroad equipment design limitations are being continually changed and stretched. The new vintage of high horsepower diesel locomotives, the expanding family of special freight car types, and for some railroads, radical designs of high speed passenger equipment have produced a formidable increase in technical problems. In addition, more comprehensive cost information related to special service and equipment must be produced for economic decision on new traffic prospects. These demands not only require a larger engineering capacity, but also greater flexibility in planning and more imaginative development talent. A more significant effect is the increased demand on Mechanical Officers' ingenuity and time.

We must admit that in the Mechanical Department, as in other functions, the rate of change in some areas of operation has stretched the ability of many officers and employees concerned to adequately comprehend and implement the changes, resulting in some frustration and waste of resources. Further, the transition from unilateral decisions and action has not been painless and great steps are still to be taken in developing integrated information for corporate decisions. This calls for a critical reassessment of our administrative and technical capabilities followed by adjustments necessary to cope with the new environment.

To process the increasing number of problems and priority projects, it is essential that we organize and plan for rapid diversions in scheduled activities and that we create a management attitude which effectively and quickly responds to new demands. This applies to changes in budget targets, equipment design schedules, main shop programs, running shop work loads and many other functional areas of responsibility. We must accept this challenge



Thinking modern?
Think Barco Speed Information System

Barco's SIS indicates and records speed, plus 8 additional events such as brakes, horn, etc. For neatness, only the indicator is located in the cab. For complete information, call your Barco representative. Or write for Catalog 1112, Aeroquip Corporation, Barco Division, 500 Hough St., Barrington, Ill. *Aeroquip products are protected by patents internationally.*

SIS

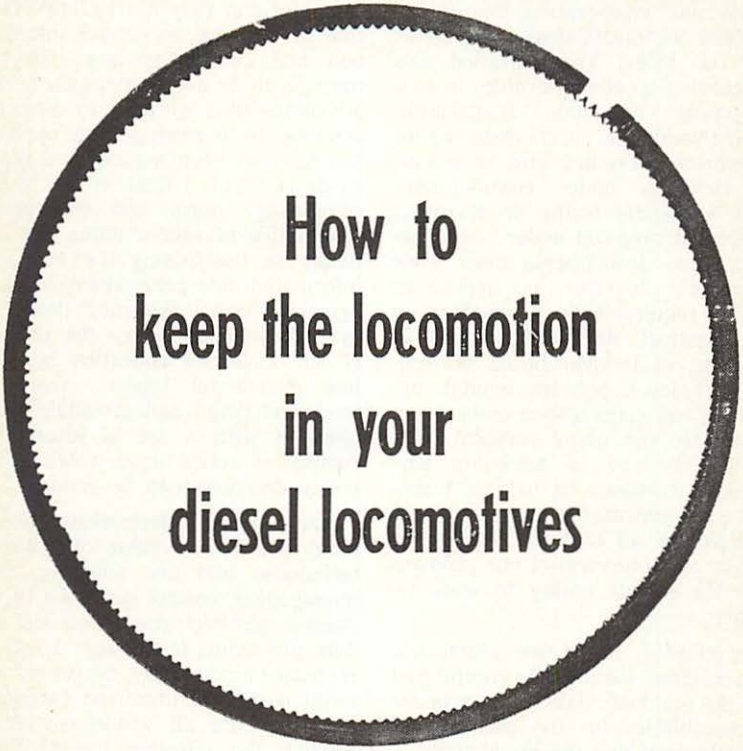
Aeroquip
BARCO DIVISION

if we are to play our part in the revitalized railway industry. We should ensure that all levels of our mechanical department management recognize the department's service function and the importance of quickly adapting to operating and customer oriented demands. Our objective should be to respond to the variables with optimum effectiveness.

With changes in corporate strategy wherein the Sales or Marketing functions have been given a lead position in determining requirements for special equipment and service, it is essential that Mechanical Officers coordinate their activities with those responsible for marketing and customer research development. One of the Marketing staff objectives is to gain a competitive advantage in meeting shippers' demands for specialized equipment; the Mechanical staff responsibility on the other hand is to appraise the practicability and provide the cost of such proposals. Mechanical Department experience and knowledge of physical and economic limitations in railway equipment design and maintenance must be combined with speculative ideas produced by those studying current transportation market requirements. In this area of communication it is essential that a receptive attitude be displayed to new concepts and every effort made to transpose the ideas or themes into practical transportation parameters. I should warn you that, insofar as railway rolling stock is concerned, the marriage of marketing creativity and practical design is fraught with misunderstanding and frustrations, but it is nevertheless an essential and profitable course of action.

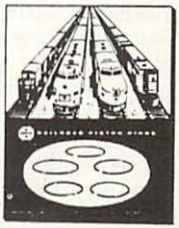
In this age of technological growth, we must more than ever before be in the foreground of current developments. Government and industry research is producing at an increasing rate a multitude of technical breakthroughs in the field of materials, power sources and electronic engineering. It must also be realized that the time gap in the 1960's between the inception of new technical concepts in the laboratory and their practical application in industry is far shorter than even a decade ago. Recognizing this speedup and expansion in technical change, our mechanical staffs must be constantly on the alert for possible application of advanced technology to railroad equipment. In addition to expanding our inventory of technical knowledge from scientific publications and other available sources, I am of the opinion that an urgent and necessary organizational step is to synthesize the development activities of technical research, design engineering and mechanical operating functions. The contribution from the latter functional group is current feed back of field experience on new equipment designs, especially operating and maintenance inadequacies. Being fully aware that the same technological intelligence is available to competitive modes of transportation, it is vital that we team all our resources to quickly appraise and harness the potential benefits of evolving scientific developments to railroad motive power and car equipment.

Another area of concern to mechanical men is the increasing cost of new railroad equipment. This is of particular significance today in view of our large scale current purchases of new vintage locomotives and special car equipment. Capital investment in equipment has a substantial influence on the cost-revenue relationship and is therefore of significance in setting attractive rates to shippers. It is of the greatest



How to keep the locomotion in your diesel locomotives

We do it three ways with one product. Koppers piston rings, designed to meet the specialized replacement needs of railroad diesel equipment, will give you longer ring life, less cylinder wear and the special wearing qualities of Koppers' exclusive materials. Add to this the specialized railroad experience of Koppers technical representatives. Now you see how we can be a valuable source for service and ring maintenance on diesel locomotives. Why not call us?



SEND FOR OUR RAILROAD RING BROCHURE. Yours for the asking.

KOPPERS®

PISTON & SEAL RINGS

Engineered Products Sold with Service

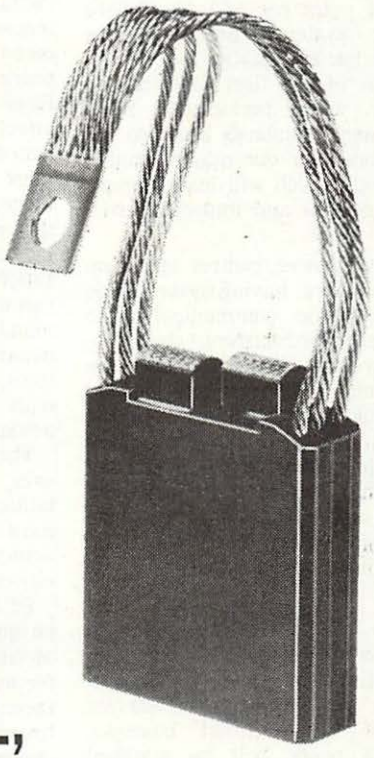
importance that maximum communication and co-operation take place between the Mechanical Department and the Sales, Transportation and Purchasing functions involved in new equipment decisions. Engineering staff should also participate where equipment exceeding size or weight standards is under consideration. With a specific traffic or operating equipment proposal under consideration, these departments must work objectively together in appraising service requirements, in weighing up all practical alternatives, and in reaching a decision based on economic balance between capital, operating and maintenance costs. I can appreciate the many personal difficulties involved in achieving harmonious relations in today's turbulent environment, but it must be fully realized by all that the success or maybe even survival of our railways depends on our ability to work together.

In adjusting to the new administrative medium, we must be careful that we do not lose sight of our prime responsibilities for the performance of equipment and the productivity of mechanical department employees. The flexibility which we must build into our operations to respond to changing demands, the need to continuously update our management technological and socialogical skills, the impact of complex and variable designs of equipment, the pressing demands for improved availability and reliability, along with more restrictive and costly labor agreements are creating greater problems than ever before. Yet we must solve these problems, and for competitive reasons also find ways to reduce costs.

To cope with this management overload, we must take full advantage of the possibilities of computer technology and associated management control systems. The electronic computer can play a very important role in creating successful information and control systems, but we must learn to use it to much better advantage than we have to date; its potential as a management decision tool has only been realized to a limited degree. This I think is due to the complexity, mass and widespread distribution of source data, and difficulty in transposing the available information into comprehensive management terms. We must learn to pyramid and synthesize the product of our elaborate collection systems into meaningful reports, shorn of irrelevant detail and providing management with a set of alternative courses of action upon which sound policy decisions can be made.

Many railroad Mechanical Officers today realize the value of the new techniques and are adapting their management control activities to advanced administrative methods and data processing technology. I believe increased productivity, decreased material costs and improved functional reliability are all within our grasp through the effective use of these new management tools. This offers us a positive means to achieve essential reduction in equipment operating and maintenance costs.

On the Canadian National Railways, we are presently in the process of laying a sound foundation for effective management controls. Production planning and control systems have been installed in our main shops wherein work programs are planned, scheduled and progressed on the basis of pre-inspection or detailed working drawings. Manpower is assigned through the use of a comprehensive system of work measurement standards. Material is delivered to jobs in accordance with planned shop schedules. The computer plays a



OVER THE
LONG HAUL,
DEPEND ON TRI-POWER®
DIESEL-ELECTRIC
BRUSHES

STACKPOLE
CARBON DIVISION
St. Marys, Pa. 15857

major part in the success of these controls.

Our line point car and diesel data collecting systems are providing more precise information on the repair needs of the fleet and specific items of work performed. Work measurement standards are also being developed for our major running repair shops which will lead to more effective control and improved efficiency.

A motive power control operation at Headquarters, having system wide direct telephone communication to dispatchers, yardmasters, and locomotive foremen, functions under the joint direction of Transportation and Mechanical Officers to optimize the utilization and availability of diesel units. This control group plans and directs movements of individual diesels in accordance with inspection and shopping requirements, the maintenance intervals being based on mileage.

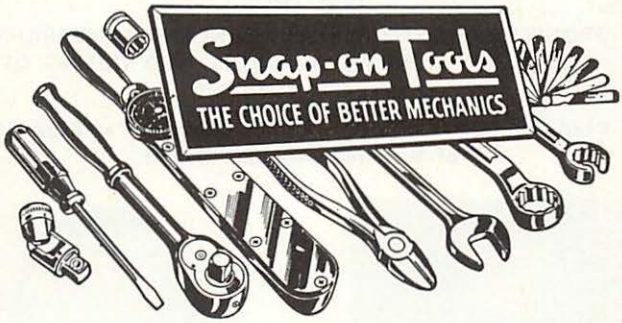
We are also actively engaged in adapting computer control systems to ensure integration of the repair process with the transportation service aspect of the railroad business. Equipment needs will be matched with traffic forecasts by volume, location and seasonability. Again, it is planned that information developed by Sales, Transportation and Mechanical Departments will be combined into meaningful reports which will provide decision making information for the marketing-operation requirements of the Company.

Gentlemen, I believe that we are living, today, in one of the most challenging and exciting eras experienced by the Railroad Industry. Our technical and administrative competence is being strained as never before; our ability to react quickly and effectively to change is being severely tested. We, as Mechanical Officers, must recognize and accept this challenge. This we can do by ensuring that we are in the forefront of technological development, that our organizational structures are such that we can effectively respond to service demands, that we develop an interdepartmental team approach to problems, and that our management controls utilize to the fullest extent the advances in computer technology.

The task is not an easy one. However, if we recognize our responsibilities and react positively, we can most effectively contribute to the achievement of Corporate goals and objectives.

PRESIDENT BEISCHER: **There is no question that the remarks of Mr. McGregor and the message he has for us set the challenge that we must face. The thoughts Mr. McGregor has brought to us today are not just mere rhetoric. They bring to us, with unquestioning clarity, the fact that we are managers within our areas of responsibility and that we are the managers who must bring about the changes that insure that our industry remains, progresses, and has its rightful place in the future.**

Mr. McGregor, I wish to thank you on behalf of all of us.



☆

HAND, POWER AND
SPECIAL TOOLS
FOR ANY
RAILROAD JOB

☆

SNAP-ON TOOLS CORP.

KENOSHA, WISCONSIN

REPORT OF THE COMMITTEE ON DIESEL FUEL AND LUBE OIL

1967 TOPIC:

"PROGRESS REPORT ON PERFORMANCE, COMPATABILITY, ECONOMICS, IMPROVED HANDLING AND TESTING OF FUEL AND LUBE OIL"

Read the Full Text of this Report beginning at Page 41 of the Pre-Convention Report

W. H. BRUENING, President
Southwestern Railway Club
Master Mechanic
Kansas City Southern Ry.
Shreveport, Louisiana

T. A. TENNYSON, Chairman
Committee on Fuel and Lube Oil
Asst. Manager Maintenance
Southern Pacific Co.
San Francisco, Calif.

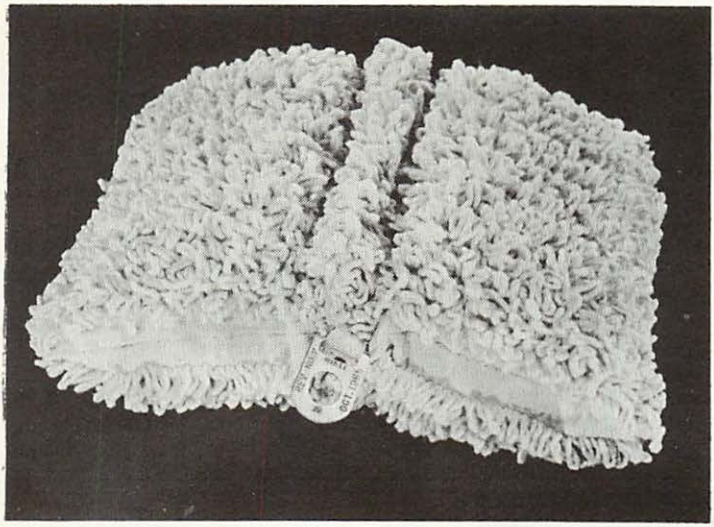
I will now call on Mr. Niemeyer, Chairman of the Day.

CHAIRMAN NIEMEYER: It is my pleasure to introduce to you the chairman of the first technical committee to report. This is the report of the Committee on Fuel and Lube Oil. The 1967 topic of this Committee is "Progress Report on Performance, Compatibility, Economics, Improved Handling and Testing of Fuel and Lube Oil."

I don't know of anyone who is better qualified than the Chairman of this Committee and all the Committee members whom he has to bring us their paper. I know we will all get a great deal out of it. I want to introduce to you Mr. Thomas A. Tennyson, Chairman of the Committee.

Thomas Alfred Tennyson was born in Arkadelphia, Arkansas, on September 15, 1912. After graduation from Arkadelphia public schools he attended Henderson State College in that city and received the B. A. degree with major in chemistry in 1932. After attending the Graduate School of the University of Arkansas, he attended the Graduate School of Louisiana State University where he received the M. S. degree with major in physics in 1935.

Mr. Tennyson's professional experience has included a season of teaching at Appalachian State Teachers College, Boone, North Carolina,



WIKIT...

the quality lubricator!

Callaway Mills, Inc.

RAILWAY PRODUCTS SALES • LAGRANGE, GEORGIA

1935-36, followed by a year of seismographic exploration, and from 1937 through June 1941 he was employed by the Lion Oil Company of El Dorado, Arkansas.

He joined the St.Louis - Southwestern Railway as Fuel Oil Inspector at Mt. Pleasant, Texas, on June 15, 1941, and held various positions with that railroad until his transfer to Pine Bluff, Arkansas, as Engineer of Tests in July of 1957. He remained in this assignment until transfer to the Southern Pacific Company on June 1, 1965, where he is now Assistant Manager Maintenance Engineering in the Mechanical Department.

Mr. Tennyson has been active in a number of organizations, including the Locomotive Maintenance Officers Association, American Railway Engineering Association, National Railroad Lubrication Council, National Association of Railway Engineers of Tests, Society of Automotive Engineers, American Society of Testing and Materials, and the American Chemical Society.

He was married to Jane Chadwick of Carthage, Texas, on June 5, 1937, and they have three sons and a daughter.

MR. TENNYSON: It is my privilege to introduce Mr. W. H. Bruening, President of the Southwestern Railway Club.

MR. W. H. BRUENING (Master Mechanic, Kansas City Southern Railway, Shreveport, La.): Thank you, Mr. Tennyson. Gentlemen, we had a very good program at the Southwestern Railway Club in Dallas last April. We appreciate Mr. Tennyson and his Committee bringing us that program. Mr. Tennyson read his fine

NOW! AVOID EQUIPMENT DOWNTIME AND COSTLY REPAIRS CAUSED BY MICROORGANISM-CONTAMINATED FUEL!

BORON

MICROB MONITOR(™) TEST KITS

. . . let you check fuel storage, truck transports and diesel locomotive tanks . . . simply and inexpensively in the field . . . to positively determine the presence of microorganism contamination in fuel systems.

Detect contaminated fuel BEFORE it costs you time and money! For complete information, write or call:

BORON OIL COMPANY
Room 1004-A
Midland Building
Cleveland, Ohio 44115

Area Code 216
621-7400
Ext. 1464

RPM DELO Custom Plus RR Oil keeps more of your power in action more of the time because it provides highest control of engine deposits, lowers wear rates, extends oil filter life and triples time between oil cooler cleanings.

RPM DELO Custom Plus RR Oil is accepted by all major American locomotive manufacturers and has more service miles of experience than any other oil of its kind.

Standard Oil Company of California

T.M.'s: "RPM DELO" AND CHEVRON DESIGN ®

paper and it was then followed by a lively discussion. I hope we can have a good discussion here this morning. I would like to start the ball rolling by asking the first question; does it appear that diesel fuel might be processed into jet fuel and result in a shortage of diesel fuel?

1. Diesel Fuel Supply:

MR. C. A. PHALEN (Engineer, Shell Oil Company, 100 Bush Street, San Francisco, Calif. 94106): I think Tom's original statement is correct — that it is going to affect the supply of diesel fuel. I read just a few days ago that currently jet fuel is consuming about 3 percent of the national crude oil barrel and that by 1980 it will be somewhere around 15 to 17 percent of the national crude oil barrel.

When you stop to consider that jet fuel is part of the so-called middle distillate cut of the crude oil, even as diesel fuel is, the greater offtake of jet fuel is bound to cut into the diesel fuel supply. This is going to affect price. I believe it is a matter of value. The jet fuel distillation ranges run perhaps from 340° F up to 550° F. Diesel fuel now runs about 375 to 385° to 675° F, so we are going to be taking the bottom cut from the diesel fuel barrel for jet fuel. There is no other way around it. We are going to lose some of our diesel fuel supply as we currently know it, as long as the price structure remains as it is.

It is perhaps not as bleak as it looks however. We will have to look to the future as to how this evolves, because by processing, a lot of this could be changed. Currently, you can get 60 percent of the crude oil barrel going into gasoline and 16 percent

SCULLIN STEEL CO.

A Division of Universal Marion Corporation

6700 Manchester Ave., St. Louis, Mo. 63139

Truck Side Frames Truck Bolsters
Coupler Yokes
Freight Car End Castings

Philadelphia • Chicago
Baltimore • San Francisco • Richmond, Va.

RPM DELO Custom Plus RR Oil keeps more of your power in action more of the time because it provides highest control of engine deposits, lowers wear rates, extends oil filter life and triples time between oil cooler cleanings.

RPM DELO Custom Plus RR Oil is accepted by all major American locomotive manufacturers and has more service miles of experience than any other oil of its kind.

Chevron Oil Company

T.M.'S "RPM DELO" AND CHEVRON DESIGN ®

going into jet fuel, which leaves maybe one-quarter of the barrel for asphalt, lubricating oil, et cetera. Price and new processing technology can change that picture.

MR. TENNYSON: I don't think that quite answers the question. Possibly someone in the audience would like to continue the discussion with regard to fuel.

I think there has been some interest in the hydrocracking process and the fact that it will use diesel fuel as a charging stock and thus remove this distillate from the market and permit you fellows to more or less control the price. Up to now you have not been able to make more gasoline or more diesel fuel without making more No. 2 distillate. This is not in the future.

MR. PHALEN: That is definitely the case. That middle distillate cut often has more value as a cat cracker feed and hydrocracker feed for gasoline production that it does as distillate fuel.

MR. JAMES J. BUTLER (Chief Mechanical Officer, Reading Company, Reading, Penn.): I would like to ask Mr. Phalen a question. With the advent of electric heating for homes, will there be a cutback in the use of fuel for homes? What will the result be?

MR. PHALEN: The market for home heating oil is gradually declining. We are projecting that it will be a couple of decades or more before this market dries up. It won't really dry up; it will become minor, like the stove oil business. However, today home heating fuel is largely a No. 2 fuel and is generally a re-brand of diesel fuel. Not everybody does this, but a number of the major com-

you can rely on . . .

EQUIPCO LOAD DIVIDERS
EQUIPCO HAND BRAKES

Equipco

"Supplying Railroad Equipment Specialties for Over 40 Years"

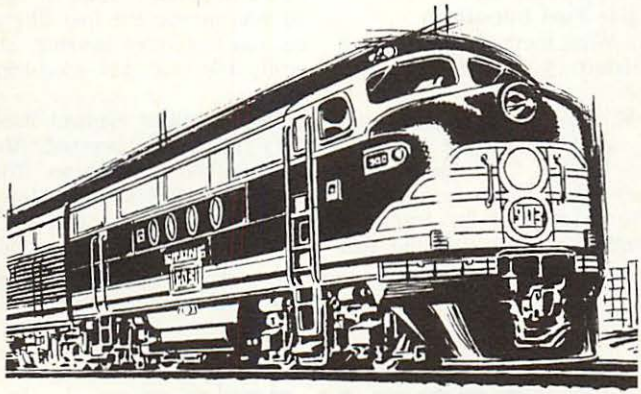
EQUIPCO HAND BRAKE DIVISION

104 South Michigan Ave.

Chicago, Ill. 60603

UNARCO INDUSTRIES Inc.

CITGO – *on the move!*



A complete line of the highest quality petroleum products for the Railroad Industry

Call or write

CITIES SERVICE OIL COMPANY

NATIONAL ACCOUNTS DEPARTMENT
BOX 300 TULSA, OKLAHOMA 74102
TELEPHONE 918 LU 2-1531

CITGO

panies do this, including us. We actually re-brand our diesel fuel to furnace oil because it meets the requirements. So, we are talking about the same part of the barrel. To answer the question specifically, we expect electricity to become a larger factor in home heating but it probably will not displace oil where oil is now used. Electricity will likely become a factor in new home construction.

2. Diesel Fuel Filter Life:

Trackside Fuel Filtration:

VOICE: What methods have proved most satisfactory for sidetrack fuel filtration?

MR. M. L. SPARKS (District Chemist, Missouri Pacific Railroad Company, Kansas City, Mo.): First let me say that I think we all agree that there is a need for trackside fuel filtration even though the fuel may have been filtered when it was delivered to the storage tank and may have been of good quality. Filtration surely plays a big part in the physical quality of the diesel fuel, and without good diesel fuel the locomotive will not run very far.

First, I think you need to check your system to see that it is up to date as far as pumping capacity, the number of fuel filters you use, and then you should check your maintenance schedule — that is, how often do you change the fuel filters, clean out the fuel filter housing, and, generally speaking, just good housekeeping.

The fuel filter element itself could vary from the pressed fiber, the string-wound, and so on. There are many fuel filters available, as outlined in paragraph 13 of the report. I think if you do these things, up-

GULF OIL CORPORATION OFFERS A COMPLETE LINE OF QUALITY PRODUCTS FOR RAILROADS, INCLUDING:

FUEL OILS
LUBRICATING OILS
LUBRICATING GREASES

Gulf Oil Corporation,
Gulf Building, Houston, Texas 77002

date your system if needed, set a schedule and stick to it for changing the filters, and have generally good housekeeping, you will have satisfactory trackside fuel filtration.

MR. TENNYSON: I would like to add to Mr. Sparks' remarks. As all of you know, the filtration of fuel oil on the ground does not often come under our jurisdiction; but the ground or trackside filtration can play a very large role in the success of filtration of fuel on the locomotive, and it should be obvious that the better job we can do at the ground level, the longer the filters will last on the locomotive.

The report points out the value of extending fuel filter life on the locomotive; so, any change in design or media that can give us better ground filtration helps us in direct proportion in our locomotive operation.

MR. C. F. GANZLEY (Engine Rebuild Foreman, Chicago, Rock Island & Pacific Railroad, East Moline, Ill.): Some roads use relief valves around fuel filters, and some use relief valves at the discharge of the fuel pump. My question is this: Which system is considered least harmful — to starve the engine for fuel or bypass a foreign material into the injection system?

MR. W. E. SEAGRAVES (Assistant General Supervisor Diesel Engines, Atchison, Topeka & Santa Fe Railway, Chicago, Ill.): I think the system which is considered the least harmful would be the one with the relief valve at the discharge of the fuel pump. That will protect your injectors and fuel pumps. However, that would not get the train over the railroad, and you would not want to be stopped out in the country, so for

CHICAGO PNEUMATIC

TOOL COMPANY

From Your Friends

Will FREIGHT LINER 510 fight corrosion? abrasion? weathering?

You name it and FREIGHT LINER 510 fights it. This two-coat 100% vinyl is excellent for the interior or exterior of cars in corrosive service that have to take heavy abuse . . . covered and open-top hoppers and wood chip cars. Permanently resilient and nonporous, FREIGHT LINER 510 lasts and lasts year after year.

ADM

FREIGHT LINER PRODUCTS
DIVISION OF ASHLAND OIL & REFINING COMPANY
109 SOUTH 7TH STREET, DEPT. 71
MINNEAPOLIS, MINNESOTA 55440 FL-3

all practical purposes I think you should have a bypass and then set your maintenance schedule to changeout the fuel filters more often so you won't be putting foreign material into the fuel system.

MR. J. G. HOFFMAN (Diesel Engine Engineer, General Electric Company, Erie, Penn.): I think really the case of "druthers" that you offer here is whether you want to take cyanide or shoot yourself. Either case, that of starving the unit for fuel or shoving junk into the injectors, is harmful to the engine. When you run out of fuel and literally start starving some cylinders and feeding other cylinders on the engine an excess charge of fuel relative to the air that is going to be available, you are doing the engine harm too.

I think the ultimate solution is the maintenance that was suggested to prevent on-line filter plugging, and thus the engines do get over the road and you don't harm the engine by either method.

MR. W. C. GAGE (Superintendent Motive Power, Chicago, Milwaukee, St. Paul & Pacific Railroad, Paul Avenue, Milwaukee, Wis.): Certainly we are in the business strictly for service, and we can't give service if we have a locomotive on the railroad dead from starving for fuel. I agree with both Mr. Seagraves and Mr. Hoffman that we should have the bypass system, in the event our fuel filters should be plugged from ice or wax, so that the locomotive can continue to run.

MR. TENNYSON: In summary it seems that, unless we have an argument from the audience, our people favor a form of bypass rather than

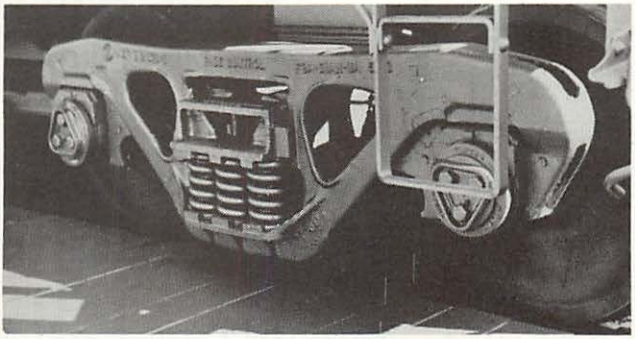
APEX RAILWAY PRODUCTS CO.

Locomotive Footboards and Step Treads
Running Boards — Brake Steps
Caboose Steps and Platforms

Boxweld Brake Beams

Hydra-Buff End-of-Car Cushioning
C-R Cushioned Underframe Device

332 S. Michigan Ave. Chicago, Ill. 60604



Making roller bearing greases that stay put is just one of the ways Humble helps you improve railroad efficiency. Call us for technical assistance and petroleum products from A to Z. For instance:

AIRFIL®: air filter coating oil
ANDOK® BR: anti-friction bearing lubricant
ARAPEN® gear lubricant: traction motor gears
ARAPEN pressure gun grease
ARAPEN RB: journal roller bearing greases
Aromatic Solvents
AROX® EP: pneumatic tool lubricants
Asphalt: various grades
BEACON® Q2: molybdenum grease
COBLAX®: gear lubricant
Cutting Oils: sulphurized and soluble
Diesel Fuels
DIOL® RD: diesel crankcase oil
Multi-Purpose Gear Oils: hypoid gear lubricants
Heavy Duty Lubricating Oils
LIDOK®: multi-purpose grease
NORVA® EP: graphite grease
RUST-BAN®: rust preventives
Semaphore Oils: for signals
VAN ESTAN® 10: rail curve lubricant
VARSOL®: Stoddard solvents
Weed Killers
ZERICE®: refrigerating equipment oils

Humble Oil & Refining Company
America's Leading Energy Company
First in Resources . . . First in Capability

TRADE VISGAGE MARK

Reg. U. S. Pat. Off.

Pocket Type VISCOSITY COMPARATOR Style BA Improved

Pat. No. 2,439,287, No. 2,609,682 & Patents Pending

TO CHECK QUICKLY THE VISCOSITY OF ANY OIL

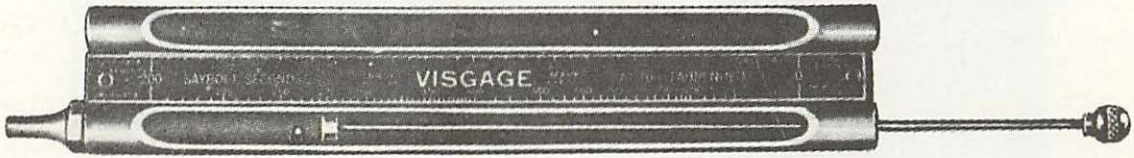
UPON RECEIPT—PRIOR TO USE—DURING USE—EXTENT OF DILUTION

For quick on-the-spot check of oil viscosity under all conditions.

Extensively used on Locomotive – Marine – Stationary Diesels – Aircraft Engines and Hydraulic Equipment

At any normal room temperature—indicates viscosity of test oil DIRECT at which it was rated, in Saybolt Seconds at 100°F. Simple to operate — quick filling — self cleaning — less than ½ ounce needed for a test — No stop watches, thermometers, graduates or bulky equipment required. Weighs about ¾ lb.

MODEL "2" REFERENCE TUBE APPROXIMATELY TWO-THIRDS SIZE



TEST TUBE

Improved Style BA Visgages supplied with scales in the following models:—

Model "2" for light oils used on medium size equipment, marine and stationary diesels. Range for close reading 200 to 800 Saybolt Seconds.

Model "4" for heavy oils used on heavy equipment, marine, stationary and locomotive diesels. Range for close reading 400 to 1400 Saybolt Seconds.

The VISGAGE is a Viscosity Comparator for the quick and accurate check of lubricating oils as they are received from storage — as they are drawn for application in an engine, compressor or machine tool — to determine the degree of DILUTION or OXIDATION of oils after a period of time.

Lubricating oil of many Diesel engines, like automobile motors, gradually becomes DILUTED with fuel oil or its lighter constituents and must be replaced with new oil when the viscosity falls to the point where bearings are subject to the danger of overheating and possible burnout and with attending possible crankcase explosion.

The principle of operation is simple and is based on comparing the viscosity of a sample of oil with an oil of known viscosity. It indicates the viscosity of the sample oil DIRECT at which it was rated in Saybolt Seconds at 100°F. and to an accuracy of 90% or better. It operates at any normal room temperature — no heating necessary.

Oils with their attending peculiar properties, especially used or compounded oils, even when carefully tested for viscosity with the conventional laboratory type Saybolt Tester, are usually calculated from 92 to 97%.

HOW IT WORKS

The VISGAGE is filled by means of a patented syringe. Insert the nozzle in the oil to be tested. Then withdraw the plunger to fill the test tube. Tilt the right end of the VISGAGE down to bring the spheres in both tubes to the zero position at the right. Then tilt the left end down so that the spheres move through the oils. As the leading sphere approaches the line, (at extreme left end of scale) decrease the angle of tilt to slow up the movement of the spheres. On the instant that the leading sphere reaches and is stopped on the line at the left of the scale, read the position of the other sphere on its scale. That reading will indicate the viscosity of the test oil DIRECT at which is was rated, in Saybolt Seconds at 100° F.

The VISGAGE is supplied with a combination glass-paneled draft-proof carrying case in which the Visgage is nested to equalize the temperature of the oils, operating instructions and fuel oil dilution table. The instructions are briefly etched on the back of the scale. **The cost of five (5) determinations of viscosity of oils by a Laboratory is more than the price of a Visgage.**

The VISGAGE is designed and constructed to be used under all conditions on land, in the air, and on the sea. It can be used indoors or outdoors in any temperature, hot or cold, as long as both the oil in the master tube and the sample oil are of the same temperature.

After a few trials, any operator can check viscosity of oils constantly. Thousands of satisfied users.

LOUIS C. EITZEN CO.

ENGINEERS — DISTRIBUTORS

Oil Testing Instruments and Appliances

Inspection, Testing and Metallurgical Accessories

Leonardo, New Jersey, 07737 Phone 201 - 291 - 1089

We maintain a Service Department for the repair, reconditioning and recalibration of Visgages.

starve the engine for fuel and have engine failures or delays. Are there any arguments on that? This is an agreeable audience. It is rather an awkward position to be 100 percent right. Does anyone else have anything to add?

MR. ELMER J. LIBERT (Assistant Supervisor Maintenance, Chicago, Milwaukee, St. Paul & Pacific Railroad, Milwaukee, Wis.): Would there be any objection to putting an additional fuel filter in the bypass line?

MR. J. A. McGOWAN (Chief Chemical Engineer, Alco Products, Schenectady, N. Y.): No; if it is possible, there would be no objection at all. In essence, then, you would have a duplex filter which would enable you to get back to the terminal without trouble.

MR. J. G. HAYDEN (Senior Technical Engineer, Electromotive Division, General Motors Corp., LaGrange, Ill.): The problem with any type of alternate system of this kind is that we take full advantage of it. When we put a filter in the bypass line, it becomes less important to change the primary filter, until the secondary filter is plugged also.

One of the problems with having a bypass, as such, is that if the engine came in running and we are short of time, it can go out running because there is now a way to do it.

As Jack pointed out, it is a question of taking cyanide or shooting yourself. When you are starving an engine for fuel, and it comes in shut down, the chances are something will be done about it, whereas if you have a bypass and you are allowing dirt into the injectors, (forgetting about this extra filter) this could go on undetected for a longer period of time. It all depends on you. You have your own maintenance forces and you know what they are capable of. It is your own choice to make.

Not knowing your maintenance, I would say that a fail-safe system would be to starve the engine for fuel. If it is shut down, although this is not desirable, it seems to be more desirable than continuing to feed dirty fuel.

I really don't think the second filter in the bypass line is the solution either. I think the engine will be run until the filter is plugged also. So, neither system is desirable.

I would say that you have less chance of determining your filter life if you put in a bypass, because the unit will come in running. If an engine shuts down, it is reported and gets action. If you have too long a filter life scheduled, then shutdowns will happen too often and action will be taken. Consequently, you will cut down your scheduled filter life and you will change filters when necessary. When units are shut down, the dirt becomes less of a problem than stuck injectors. With a proper filter maintenance schedule, if a shutdown does happen, it will happen rarely. I think the shutdowns would be preferable to a bypass system.

MR. J. J. DWYER (Chemical Engineer, C. & O. Ry. - B. & O. R.R., Huntington, W. Va.): I would be interested in knowing how the pore size of the filter on the ground should compare with the pore size of the filter on the locomotive.

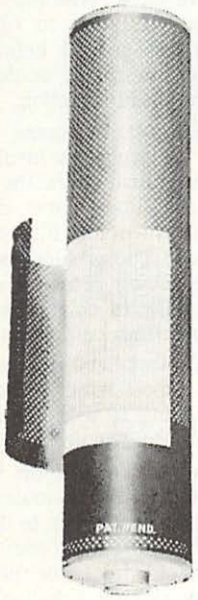
MR. K. D. REED (Chief Chemist, Pennsylvania Railroad, Altoona, Penn.): I won't answer the question but I will throw out something that perhaps will lead to some discussion.

I believe it would be best to take the dirt out on the ground, leaving the locomotive the job of just cleaning up. Maybe this is ideal, but I would suggest a 5 micron filter on the ground and 10 on the locomotive. See what people think of that.

MR. TENNYSON: Any arguments?

M AND J

announces



The Entirely New Concept in Pleated Paper Diesel Filters with Patent Pending

The new filter is constructed so that the pleats are mechanically ganged and connected to a flexible mesh in such a way that all pleats are free to move in unison and maintain pleat separation at all times under varying oil pressures.

THE ORIGINAL DIESEL LOCOMOTIVE FILTER

PATENT PENDING

• No More Pleat Collapse • Major Breakthrough in Filtration • Pressures and Temperatures No Longer a Problem • Longer Engine Life and Less Maintenance • Full Flow Action at All Times—No By-Pass Problem

The new M and J Pleated Paper Diesel Filters represent the first major breakthrough in filtration since the conception of paper filters. The problem of pleat collapse which has plagued the railroad industry for so many years has been eliminated. The new design withstands the severest operating conditions without affecting filtering capabilities. Oil pressures or temperatures are no longer problems as the filters are designed to withstand greater pressures and temperatures than will ever be present in any diesel locomotive.

The new M and J Filters with patent pending will result in longer engine life and less maintenance. The filter assures Maximum Surface Area for Maximum Dirt Loading, Maximum Filtration for Full Flow Action and eliminates by-pass problems, resulting in Maximum Service Life.

For complete information on this New Concept Filter, write or phone

M AND J

DIESEL LOCOMOTIVE FILTER CORPORATION

200 South Michigan Avenue • Chicago, Illinois 60604
Telephone: Area Code 312/939-3438

This sounds like a logical solution. In other words, leave the filter on the locomotive to take care of emergencies. Use a filter on the ground of smaller porosity than the one on the locomotive so that you insure clean fuel except for the contamination in the vent or in the handling of the hose.

MR. DWYER: I don't want to comment on it any further, but I would like to ask the question: How small can we go, then, on the pore size on the one on the ground and still be practical about it?

MR. TENNYSON: Most of the locomotive systems require something of the order of 5 to 10 microns on board a locomotive. There have been some projects around the country that I know of which have attempted to use smaller pore size for wayside and locomotive filtration, down to as low as 3 microns. Obviously, the smaller the pore size the more often you are likely to change the wayside or locomotive filter.

I wonder if there is anyone from the Farr Company here who would care to comment on fuel oil filtration.

MR. R. V. SOUTHWORTH (Farr Company, Los Angeles, Calif.): We have experiments currently around the country where we are running down as low as 3 microns on the ground and taking out a good amount of dirt. I think it would be the opinion of those of us who have watched the experiments thus far that the place to take the dirt out is before you put it on board.

It would appear that on some railroads we can get down to where we can really deliver almost absolutely clean fuel to the locomotive. The net result is that the filters on the locomotives then have less work to do and obviously can run substantially longer than in the past. **So, I think the conclusion to get a large portion of the dirt out of it before it goes on board in one location has to be the smart way to do it in the long run.**

I would feel that depending upon the dirt load of the various railroads, we have tested samples of fuel at the outlet all over the country and have found a wide variance; so you can't say one railroad has no problem and another railroad has a problem.

Peculiarly enough, the problem varies seasonally, also. I think the conclusion we have come to, at least based on our tests, is to take out the dirt on the ground before you put it on board, and that would mean improved trackside filtration.

MR. FREMON: It seems to me that one of the problems involved in on-the-ground filtration is the maintenance of the filters. How are you going to tell when the filters ought to be changed? The problem is largely one of checking pressure drop — but who is going to do it? This is a question more than an answer.

MR. DWYER: I have no comment, but that is almost exactly the question I was going to ask. In a sense I agree with Ed 100 percent.

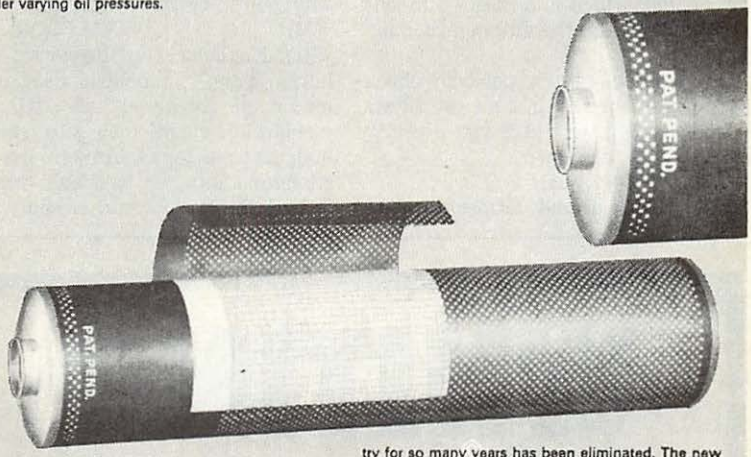
What I would like to know is this: Have any of the filter manufacturers come up with a solution to this, in the sense of making this filter change automatic or at least the need for it known, by ringing a bell or turning on a red light or something of that sort?

I am thinking that the most practical solution would be to have a filter that would automatically switch from a dirty filter to an adjoining clean filter and another cell, should it happen to occur at 3 a. m. or in the middle of the night on the third trick, or on a Sunday morning, because otherwise this would become quite a problem.

SUPERIOR announces

The Entirely New Concept in Pleated Paper Diesel Filters with Patent Pending

The new filter is constructed so that the pleats are mechanically ganged and connected to a flexible mesh in such a way that all pleats are free to move in unison and maintain pleat separation at all times under varying oil pressures.



- No More Pleat Collapse
- Major Breakthrough in Filtration
- Pressures and Temperatures No Longer a Problem
- Longer Engine Life and Less Maintenance
- Full Flow Action at All Times— No By-Pass Problem

The new SUPERIOR Pleated Paper Diesel Filters represent the first major breakthrough in filtration since the conception of paper filters. The problem of pleat collapse which has plagued the railroad industry for so many years has been eliminated. The new design withstands the severest operating conditions without affecting filtering capabilities. Oil pressures or temperatures are no longer problems as the filters are designed to withstand greater pressures and temperatures than will ever be present in any diesel locomotive.

The new SUPERIOR Filters with patent pending will result in longer engine life and less maintenance. The filter assures Maximum Surface Area for Maximum Dirt Loading, Maximum Filtration for Full Flow Action and eliminates by-pass problems, resulting in Maximum Service Life.

For complete information on this New Concept Filter write or phone

SUPERIOR DIESEL FILTER CO.

SUPERIOR FILTERS ARE SUPERIOR

200 South Michigan Avenue • Chicago, Illinois 60604 **Telephone: Area Code 312/HA 7-4626**

MR. W. F. LIEBENOW (Lubrication Engineer, C. & O. - B. & O. Railroad, Huntington, W. Va.): The by-pass filter on the pump makes the fuel hoseman notice the difference when the filter begins to load up by not delivering the fuel, and the stream gets weak so that he knows he is not getting fuel, and therefore he knows the filters are plugged. This system is a by-pass system on the pump, so that when the pump has to push a heavy load it pushes it back into the tanks instead of into the engine, which is a positive means of knowing that the filters are plugged.

This, along with a periodic check by a time schedule in case the filters are broken up, will give you a pretty fair control anyhow.

3. Clean Diesel Fuel:

MR. C. R. Bland (Superintendent Motive Power, C. & O. - B. & O. Railroad, Huntington, W. Va.): I would like to hear an expression from anyone on the Committee relative to the merits of buying cleaner fuel. When I take my car to the filling station to get the gas tank filled I have a right to expect the fuel to be acceptable for use in that car. I wonder why we should do all the filtering. I wonder why we can't buy cleaner fuel. Why can't the refiners and suppliers furnish cleaner fuel than they do? Instead of buying fuel and dirt, why can't we buy clean fuel?

MR. H. H. DONALDSON, JR. (Staff Engineer, Gulf Research, Pittsburgh, Penn.): I believe most of the major oil companies are delivering essentially clean fuel into railroad bulk storage tanks. Any time a fuel changes hands, so to speak, whether it is from a ship into a shore tank

WHITING

SUPPLIERS OF A COMPLETE LINE OF RAILWAY MAINTENANCE EQUIPMENT

- Ripjacks
- Drop Tables
- Cranes
- Turntables
- Car Washers
- Trackmobile®

WHITING CORPORATION
Harvey, Illinois

Assure lower maintenance costs,
better performance with...

TEXACO

Railroad Lubricants and Systematic Engineering Service

TEXACO INC.
RAILWAY SALES DIVISION
135 East 42nd St., New York 17, N. Y.

NEW YORK • CHICAGO • SAN FRANCISCO • ST. LOUIS • ST. PAUL • ATLANTA

or from a pipeline into a storage tank or from a storage tank into a transport, or a transport into a customer's storage, there is a potential source of contamination of that fuel introduced at that point.

The oil companies can control this only up to the point that it is delivered to the customer. It is quite important that fuel storage tanks be properly maintained and that adequate filtration systems be installed to guard against any lack of maintenance of the storage facilities.

So, I don't really think it is as much a matter of buying cleaner fuel as it is insuring that the last source of contamination has been adequately controlled before that fuel is delivered into the locomotive.

MR. B. E. GREINER (Technical Specialist, Humble Oil & Refining Co., Houston, Texas): Tom, I think Hal has spoken very eloquently. I can't add a great deal except to emphasize again that we think the most important thing in using a clean fuel is housekeeping. Our refiners do everything they can to put out a clean fuel, and indeed they are putting out clean fuel.

We also impose controls at every level along the way where the fuel does change hands, and we control as tightly as possible. Again, I think Hal has spoken very wisely. Housekeeping is the most important thing.

4. Fuel By-Pass Systems:

MR. WILLIAM O. BROWN (Superintendent Mechanical Department, Southern Pacific Company, Sacramento, Calif.): I would like to comment on the fuel by-pass systems and relate some of our recent difficulties.

We have had some serious fuel contaminant problems in Oregon with one of our newer locomotives with a by-pass system and also another locomotive without a by-pass system. I can't help but agree with Mr. Hayden that if you have contaminant troubles, such as bacteria, you are sort of in between the devil and the deep blue sea. When fuel filters are plugged, the by-pass system is going to by-pass on you, and non-maintenance terminals are going to continue to operate the locomotive. If you don't have the by-pass system you will burn up fuel pump motors.

It seems to me that if you keep your fuel clean entering the locomotive, the non-by-pass system is a superior arrangement. In all cases the fuel must be kept clean entering the locomotive fuel tanks.

5. Ice and Wax Formation: Flow Improver:

MR. J. G. TURVOLGYI (Superintendent, Mechanical Equipment, Canadian National Railways, Champlain, Quebec, Canada): I would like to know if anyone has had any experience with the operation of filters on the wayside or on the locomotives in extremely cold temperatures when you have the problem of ice crystal formation and wax formation; also, when you have a very rapid drop in temperature from one hour to the next.

MR. TENNYSON: We have had a good deal of experience with that problem. Within the past year one of our suppliers has added what they call a flow improver, not a pour point depressant but a flow improver, to the fuel. This seems to depress the pour point also.

Its main function is to control the viscosity of the oil in between the wax crystals, so to speak, and the oil company has been able to use the same blend of fuel that they supply us in the summertime when they put the flow improver in it. We operated through last winter without a single one of the problems you mentioned.

I would like to ask Mr. Relyea of

3 facts you should know about Shell's service to railroads

Fact 1: There's a trained Shell Service Engineer in your area. Experienced Service Engineers staff Shell's 8 railroad sales offices, located in major rail centers.

Fact 2: Shell offers a *complete* line of products for railroads. You get what you want *when* you want it.

Fact 3: Shell products are stocked where they're most convenient to railroads. There are more than 1350 Shell supply depots in the United States. You get what you want *where* you want it.

Texaco if he has had any experience along these lines.

MR. K. D. RELYEA (Technologist, Texaco, Inc., Beacon, N. Y.): Tom, we have found that these have a dual function. They are pour depressants and flow improver. I believe their basic function is to keep the wax that would be formed at these low temperatures in a much more microscopic shape than it would be otherwise at these operating temperatures. It overrides cloud point in some cases, but I imagine it probably is good for about 15 degrees below the normal pour point of the fuel as it would exist. Is that what you have found, Tom?

MR. TENNYSON: Yes. Where the normal pour point is in the neighborhood of 5° F. we have seen it as low as −25° F. with the addition of the flow improver. Of course, if moisture and the formation of ice crystals is a problem, the old method of adding a little bit of isopropyl alcohol will usually control this.

MR. GEORGE F. BACHMAN (Chief Mechanical Officer, Elgin, Joliet & Eastern Railway, Joliet, Ill.): I am a little embarrassed to ask whether or not any railroads put alcohol in their tanks to prevent the formation of ice crystals; but now that you have mentioned it, how do you do that, and what is the general practice? Do you just pour the alcohol in early in the winter season, or do you keep adding it all winter? What action do you take to prevent ice crystals from forming?

MR. TENNYSON: If you are in a territory where the temperature changes quite frequently and you get condensate in the storage tank, the condensate will leach the alcohol out

MacLean-Fogg Lock Nut Co.

1000 Allanson Road Mundelein, Ill. 60060

Manufacturers of

Railway Load Securement Systems,

Lock Nuts, Special Bolts,

Floor Clips.

BIG WHEEL ON U.S. RAILROADS

More than 100 U.S. Railroads use Sinclair Gascon® Diesel Lubricating Oils for longer engine life and trouble free operation.

Specially-formulated oils for railroad service include:

Sinclair Gascon GL-XD—a dependable, long-time performer—with high lubricating ability, resulting in very low wear rates and lower maintenance costs.

Sinclair Gascon GL-Supreme—a highly dispersant oil with a "superior" rating. Gives cleaner engines and longer filter life. For less care and less wear—USE SINCLAIR. For additional information, contact:

SINCLAIR REFINING COMPANY

Railway Sales, 600 Fifth Avenue, N.Y.
Chicago—Houston.

Drive with care and buy Sinclair

of solution in the diesel fuel, and this is not a very desirable place to add the alcohol. The preferable thing is to proportion it into the fuel just before the fuel is delivered to the locomotive.

However, if you do have a relatively uniform temperature and no moisture in the tank to speak of, the alcohol can be added as the fuel is delivered to storage. We do it in several ways. In one case the alcohol is put into the pipeline.

MR. BACHMAN: How many gallons do you add for each 1,000 gallong of fuel that you put into the storage tank?

MR. TENNYSON: It would be approximately 200 parts per million. I think this works out to something like 1/2 gallon in 1,000 gallons of fuel.

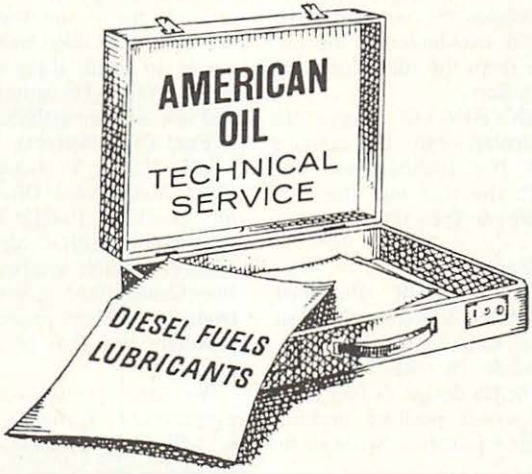
MR. BACHMAN: Do you add that in the beginning of the winter season, or do you keep adding it all winter?

MR. TENNYSON: We use it throughout the low-temperature trouble season. You don't have to add it much before then unless you accumulate an awful lot of fuel. In fact, it is best to add the alcohol as you deliver the fuel to the locomotive; then you don't lose it.

MR. J. A. CHISHOLM (Supervisor of Diesel Equipment, Canadian Pacific Railway, Toronto, Ontario): On certain sections of our railroad when refueling diesel locomotives during winter months, we add a ratio of one gallon of Isopropyl to 1,000 gallons of fuel oil. As temperatures can vary from 30° F. below zero during nighttime to 30° F. above zero during daytime, this can cause water condensation to form and freeze in the main fuel tanks, fuel

Morganite can make:

Carbon brushes to meet the needs of modern railroads: For over 60 years Morganite superiority has been acknowledged by railroad men the world around. To meet the operating requirements of your traction motors and generators, call the man from Morganite. **Morganite Incorporated,** 60 East 56th Street, New York, N.Y. 10022 (212—421-7910)



For progressive railroads American Oil supplies: Service by experienced railroad lubrication specialists . . . products backed by one of the industry's largest research programs . . . on-time deliveries assured by trained expediters and 12 refineries linked to *thousands* of American Oil bulk locations through the U.S.

AMERICAN

AMERICAN OIL COMPANY

910 South Michigan Avenue, Chicago, Illinois 60680

piping and fuel oil filters. The isopropyl application appears to prevent fuel line blockage and loss of fuel oil pressure.

These instructions apply only to diesel locomotives not equipped with a fuel oil heat exchanger in the fuel delivery line from the main fuel tank to the fuel pump.

MR. TENNYSON: Of course the isopropyl alcohol can be actually poured into the fueling hose and squirted with the fuel into the locomotive where a few units are involved.

6. Fuel Oil Tank Design:

MR. R. R. POOLER (Physicist, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.): What progress has been made by the locomotive builders toward a design of fuel tanks which will permit positive draining of all collected moisture without the use of special tools or excessive loss of fuel oils?

MR. HAYDEN: The only comment we have at this time is that we recognize the need for it, and we are looking at the areas of positive draining of tanks that are a little easier to drain than those we have today. We do recognize the problem, and we are investigating it.

7. Fuel Oil Additives:

MR. PAUL V. GARIN (Assistant Chief Mechanical Officer - Engineering, Southern Pacific Company, San Francisco, Calif.): Mr. Tennyson, I am very much impressed with your fine Committee. I would like to introduce another aspect of the fuel problem, and that is the question of additives.

We are approached (as I guess every other railroad is) by a number of additive suppliers about different

APEX RAILWAY PRODUCTS CO.

Locomotive Footboards and Step Treads
Running Boards — Brake Steps
Caboose Steps and Platforms

Boxweld Brake Beams

Hydra-Buff End-of-Car Cushioning
C-R Cushioned Underframe Device

Smith-Plastics Fiberglass Reinforced Plastics
Harnischfeger Welding Machines and Electrodes

332 S. Michigan Ave. Chicago, Ill. 60604

What's New with Conoco?

1. DIESEL LOCOMOTIVE LUBE OILS

Complete new line containing latest additive packages designed to meet requirements of all locomotive builders for use in latest design engines.

2. TRACTION MOTOR GEAR LUBRICANT

Greatly increased extreme pressure characteristics. High oxidation stability. Excellent gear shielding.

3. PELLETIZED FREIGHT CAR CENTER PLATE LUBRICANTS

Containing Molybdenum Disulphide or Graphite. Easy to apply. Provides long lasting film. Greatly reduces wear.

For information on Conoco Railroad Lubricants contact:

CONTINENTAL OIL COMPANY
Transportation Sales Division
Room 1333 Riverside Plaza
Chicago, Ill.—FI 6-6122
or
Transportation Sales Division
1300 Main St.
Houston, Texas—CA 5-1511

Hottest Brand Going®

©1966 — Continental Oil Company

advantages to be gained from their products, such as anti-pollution, better combustion, anti-smoke, and so on.

What is the opinion of your Committee on the general subject of additives? Is it the responsibility of the oil company to put these into the fuel, or should each railroad dope up its own fuels?

MR. E. C. POLK (Research Engineer, New York Central Railroad, Cleveland, Ohio): The question deals with the need for additives of various types to control air pollution. Dispersant additives to keep filters clean, and so on, is also included in the question.

I am of the opinion that you have to go a long way to really find an absolute need for fuel additive. Any time you start putting in any kind of additive, of course, the fuel price goes up; and if you put somebody's additive in for air pollution control, and another person's additive in for fuel dispersant, and so forth, and you try to analyze and determine the absolute benefit of these additives you will find it is most difficult indeed.

I was going to say we have had hundreds of these additives proposed, but there aren't quite that many. It is a most difficult thing to develop a benefit for an additive, and until such time as I see an absolute benefit for some of the additives that are proposed, I intend to discount many of the claims made for them.

I also think it depends on the area. If there is a severe air pollution problem, for instance, on Budd cars with the GM 110 engine idling for a long period of time in stations, we get a lot of smoking and fumes.

• DON'T THROW GOOD BEARINGS AWAY!!! •

"TRACTION MOTOR BEARINGS PLUS"

A man to educate your employee, to properly judge a bearing's condition. He has had thirty years experience inspecting traction motor bearings.

A man to assist in your service and repair program. Benefit from the experience of other railroad men.

A man to help lay-out bearing procedure, proper removal, cleanliness, proper inspection, greasing and reinstallation.

A man to help you save money on your traction motor program. Ask any Eastern railroad company's Diesel Equipment Supervisor.

Ask about this man. There is no charge — you be the judge — and at no extra cost to your purchasing department.

TRACTION MOTOR BEARINGS ARE IN STOCK

BEARINGS — BELTS — SHEAVES — SEALS

DALC BEARINGS, INCORPORATED

888 TENTH AVE. (WEST 58th ST.) PHONE 212 - 245 - 1600
NEW YORK, N. Y. 10019

Frankly, we think it's a super superior oil.

Will you be the next one to help us prove it?

Mobilgard® 440 is a new, "superior"-type, high-dispersant diesel engine lube oil. And it has engine builders' approval.

We didn't want to market another oil that just met industry requirements. We wanted to offer a better one. It took longer; but now we think we have it.

We're certain Mobilgard 440 will mean cleaner engines, longer filter life—greater locomotive utilization. In filter-life tests, for example, filters lasted three times as long on Mobilgard 440 as on the most widely used competitive superior-type oil. And, of course, superior-type oils provide significantly longer filter life than do conventional lube oils.

So why don't you join the others who are trying Mobilgard 440—to help prove that it is a "super" superior oil. Mobil Oil Corporation, 150 East 42nd Street, New York, N.Y. 10017; 59 East Van Buren Street, Chicago, Ill. 60605.

Mobil®

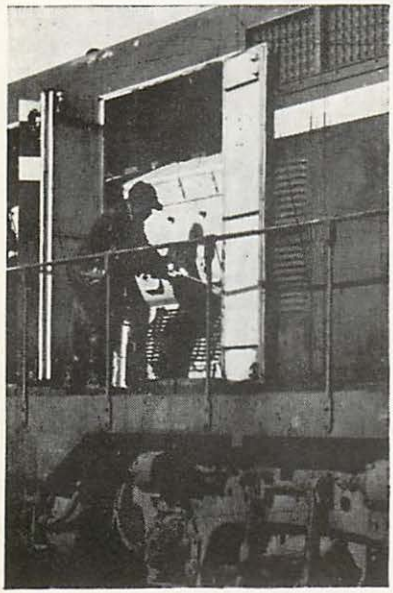
Something can be said along these lines because there is an absolute need to prevent some of this trouble. By and large, however, the New York Central would stay away from fuel additives.

MR. REED: I agree with most of what Mr. Polk said. One important aspect of fuel that I would like to go back to is a question asked a while ago — whether the oil companies should supply cleaner fuel. I think we all should visualize the probable condition of the fuel tanks on our locomotives. I think the best "additive" would be a little more effort here to try to get them cleaned up. In almost any case where we have run into trouble it has gone back to the poor condition in the fuel tank.

Concerning additives, we have tested a variety of additives through the years, and we see some small benefits which vary from one additive to another. You have to combine additives to get all the benefits you want. These benefits have been so small that we have not gone the additive route on the Pennsylvania.

The cost has already been covered. This is another thing you have to look at. I think we all know that we would use additives like medicine — to keep injectors in good shape, to make sure the fuel is clean, to keep the water out of the tanks, and so on. Maybe I am old-fashioned, but I do believe the cheapest way to cure any illness is to go to the root of the trouble rather than to try to doctor it with some medicine.

MR. GARIN: I think the opinions expressed are generally those you would find among the railroad people. The question I had specifically in mind was this: Where does the oil



Announcing . . .

The arrival of F.O. 353-M, the latest in Fine Organics' line of heavy-duty degreaser concentrates. Designed for both interior and exterior diesel use. Contains no petroleum solvents! Simply dilute with water and let it go to work. Surfaces remain wet throughout spraying operations. And – the detergent portion is bio-degradable.

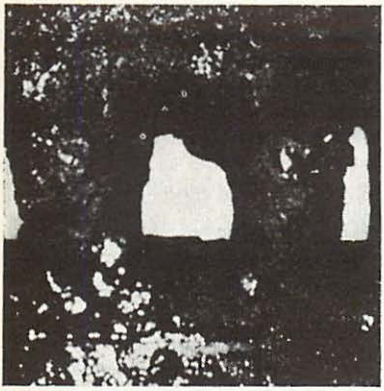
Departures . . .

Heavy build-ups of oil and grease
Petroleum solvent stains and residue
Flammability hazards

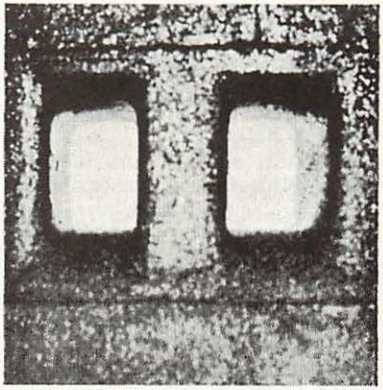
Protect your equipment and personnel. Send for our brochure today.

You're always on the right track with:

FO Fine Organics, Inc.
205 Main Street, Lodi, N.J. (201) 472-6800



Typical deposits on intake ports of critical back side of cylinder liner after 1 year on the leading competitive railroad oil.



Typical deposits on intake ports of critical back side of cylinder liner after 1 year on RPM DELO Custom Plus RR Oil.

New railroad oil promises cleaner engines, longer filter life, extended overhaul periods.

Revolutionary RPM DELO Custom Plus RR Oil after a full year of severe service testing against leading competition sets new standards for locomotive lubrication!

The entirely new formula of "RPM DELO Custom Plus," including a new ashless detergent, proved it keeps locomotive engines cleaner from sump to combustion chamber than the finest lubricating oil available up to now.

This is what the comparative tests in identical, measured engines showed after 12 months and 180,000 miles on the hottest, dustiest run in the country:

The competitive oil left 20% more deposits in ring grooves than "RPM DELO Custom Plus," 4 times the deposits in oil control rings, 7 times the piston skirt deposits. Top decks with the competitive oil were 100% black; with "RPM DELO Custom Plus," 60% clean.

Exhaust valves in the "RPM DELO Custom Plus" engine were clean. The competitive oil left valve stem surfaces 25% black. "RPM DELO Custom Plus" kept oil filters much cleaner, indicating longer filter life.

Without doubt, "RPM DELO Custom Plus" is setting new industry standards. For cleaner engines, longer filter life, extended overhaul periods, see your local representative.

STANDARD OIL

STANDARD OIL COMPANY (KENTUCKY)

company's responsibility end and where does the railroad's responsibility begin on the performance of fuels? In other words, the oil company puts stabilizing additives into the fuel to stabilize it until it is delivered to us, and then we take it from there. Does our responsibility begin when the fuel is delivered to us, or should the fuel be suitable until it is finally consumed in the locomotive?

MR. PHALEN: I think what you are saying, Paul, is that when the oil company delivers the fuel it should be fortified against rust, oxidation and that sort of thing against quite a long period of storage. You are entirely right. That is our responsibility, and we do just that.

I don't want to say here how long the fuel could stay in storage. There are many factors involved, such as water contamination, temperature, and so on. Your responsibility, after you get the fuel, is that it does not become contaminated with rust or water or what-have-you. So, we can say, on the one hand, that the petroleum company sees that the fuel has the proper dispersant and inhibitors and the rest of the stuff; pour point depressant if it is required, and so on. On the other hand, the railroad should protect the fuel from contamination and conditions conducive to deterioration.

I think one of the factors involved in your question as I understand it was the possibility of using anti-smoke type additives in those applications or areas where they might be required by air and water conservation practices. My personal opinion on this is that where an individual locomotive for some reason or other is prone to smoke because of the operation you are putting it to, that individual unit might well be "doped" — that is, the fuel tank or fuel going into the tank might be "doped" with an anti-smoke additive. We know anti-smoke additives are effective and can do a job in many cases where you have a smoking unit, but as a general thing I don't believe we would want to deliver fuel with the anti-smoke additive added to it.

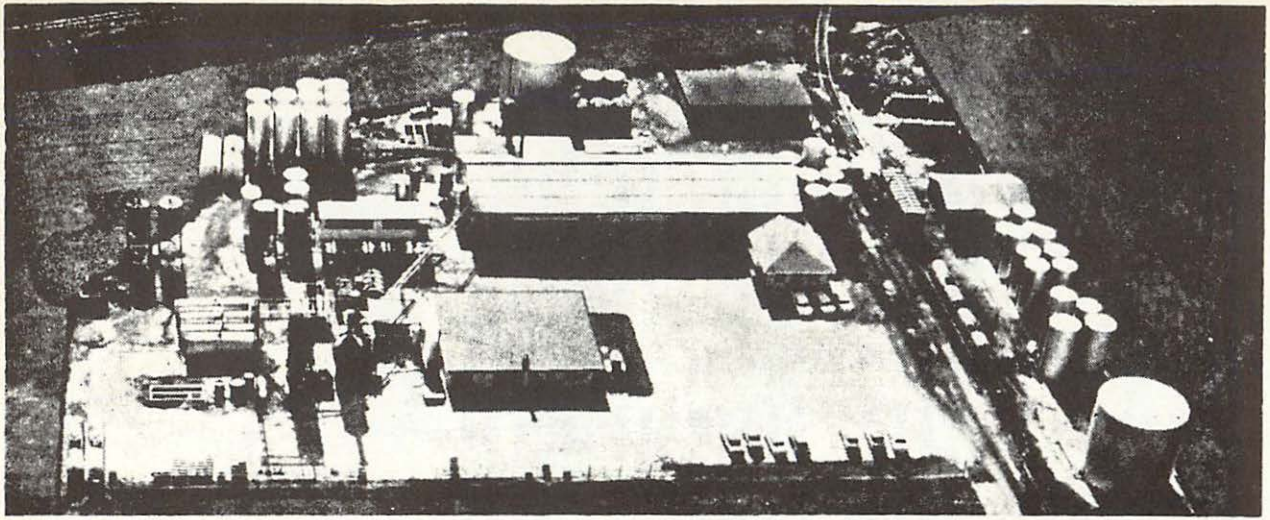
MR. TENNYSON: Our time is up. I will now call on Mr. Ky Pruchnicki, West Coast Regional Executive.

WEST COAST REGIONAL EXECUTIVE

K. PRUCHNICKI
Supvr. Locomotive Maint.
Southern Pacific Co.
San Francisco 5, Calif.

MR. K. PRUCHNICKI (Supervisor Locomotive Maintenance, Southern Pacific Company, San Francisco, Calif.): Sitting out in the audience during the discussion period, some unusual whispering was going on, and here are some of the things that were overheard: **"This fellow Tennyson and his Committee have certainly prepared an excellent paper, something for the manufacturers and supply people to take another good look at."**

In listening to the lively discussions



RE-REFINING

DIESEL LUBRICATING OIL IS OUR SPECIALTY

Conserve your oil and save money by having us properly re-refine your used diesel lubricating oil. Our modern plant is especially designed to custom re-refine diesel oils and to reproduce original specifications. We are also equipped to properly blend into the oil Heavy Duty Additives.

We are serving many railroads, who will attest to the quality of our work.

Our engineers will be glad to council with you regarding the re-refining of your oils.

MOTOR OILS REFINING CO.

7601 WEST 47th ST. **LYONS, ILLINOIS**

(Railroad Address)
(McCook, Ill.)

(Chicago Telephone)
(Bishop 2-2306)
(Lyons,. Hickory 7-2020)

and in summarizing them, 50 cetane fuel or better, low sulfur contents and better trackside filtration and supply of clean fuel will help keep locomotives in service longer with reduced maintenance. Ashless detergent dispersants, metallo-organic additive lube oils are doing a very good job of reducing maintenance, but mixing of different brands of lube oil for high horsepower units is still a debatable problem. Maybe the computer will tell us what to do about mixing lube oil one of these days. If the computer tells us wrong, then no one will get fired and we should be able to buy another computer.

We have been in the talking stages of standardizing on diesel locomotives for some time. I can remember when we tried to standardize on steam locomotives and they finally were retired before they were completed. I hope we won't wait that long for standardization of diesel locomotives.

We urge that you take these ideas and recommendations home and put them to use so they will save money and improve diesel locomotive performance for your own railroad, and in this way demonstrate to your management that it has been well worthwhile to send you to this meeting.

PRESIDENT BEISCHER: One comment in regard to next year, for those of you who may not have an opportunity to hear it later: The meeting next year is scheduled for September 30, October 1 and 2 at the Sherman Hotel. The Railway Supply Association will have exhibits next year at the Sherman Hotel which will include an outdoor track exhibit on the Illinois Central Railroad at their Water Street Yards.

Now I would like to say that I think we have had a very informative and useful morning session. The work of Mr. Tennyson's Committee is evident in the quality and content of the subject matter they have brought to us. I personally would have liked to have gone on with the discussion period much longer and gotten into the subject of lube oils.

At this time I would like to have you express your appreciation with a rising vote of thanks to Mr. Tennyson and his Committee. We will recess and reconvene at two o'clock promptly, please.

Where can you invest to get a 23% return?

Right here.

Invest in a Standard Wheel Truing Machine —then watch your savings mount up!

Where do the savings come from? Less time. Less labor. Less out-of-service time. The Standard Wheel Truing Machine permits four or five reconditioning operations per wheel, not three. A true milling machine, it need not cut as deeply as lathe tools. One railroad that kept careful records found the Standard Wheel Truing Machine returned 23.64% of its cost in the first year on the job. Perhaps you can do better! One thing sure: You can do no better than to talk with your Standard representative.

STANDARD RAILWAY EQUIPMENT
division of STANRAY CORPORATION
Hammond, Indiana • Chicago

Monday Afternoon, October 9, 1967

2:00 P. M.

REPORT OF THE COMMITTEE ON NEW DEVELOPMENTS IN MOTIVE POWER MAINTENANCE

1967 TOPIC: "NEW CONCEPTS FOR MAINTENANCE CONTROL OF TODAY'S LOCOMOTIVES"

Study the Full Text of this Report beginning on Page 85 of the Pre-Convention Report

A. A. ENDERS, President
Chicago Railroad Diesel Club
Gen. Master Mechanic
C. & N. W. Ry.
Chicago, Illinois

E. T. HARLEY, Chairman
Committee on New Developments
In Motive Power Maintenance
Asst. C. M. O. - M. P.
Pennsylvania R.R.
Philadelphia, Penn.

PRESIDENT BEISCHER: I would like to suggest to you that any question you have of importance may possibly be covered in the What's Your Problem session Wednesday morning under the leadership of Mr. Dwyer. Funnel your questions either through the Regional Executive or to Mr. Dwyer personally. Jack, stand up so everybody can see you. If anyone has a question on lubricating oil that will fit well into the What's Your Problem session on Wednesday, see Jack. I know he will welcome them. I know I have one.

Gentlemen, the Chairman of the afternoon is Mr. George R. Weaver, Manager of Mechanical Engineering and Tests, Pennsylvania Railroad, Philadelphia, Pennsylvania.

CHAIRMAN WEAVER: Gentlemen, this morning you had the privilege of hearing Mr. Beischer and Mr. McGregor. They talked about the problems that we have to look forward to in the years ahead. I think Mr. McGregor talked about growth, managerial changes, and also the

G. R. WEAVER
Second Vice President
Mgr. Mech. Engr. & Tests
Pennsylvania R.R.
Philadelphia, Penn.

need of doing something about operating and maintenance inadequacies. I would like to say one thing in that connection.

The only way we are going to solve a majority of our problems today is through cooperation. I like to look at the word "cooperation" and tie it in with the word "communications". Believe me, it is only by communications which you feed back to this Committee and our other committees as we go through the program this afternoon that we will be able to take home some of the answers to our problems. So, let's communicate with one another by using the microphones.

The technical committee that has the program this afternoon is the Committee on New Developments in Motive Power Maintenance. The topic assigned to this Committee this year is "New Concepts for Maintenance Control of Today's Locomotives". I am sure they have a very interesting report and that it will provoke a lot of discussion.

The Chairman of the Committee is Mr. E. T. Harley, of our own railroad, whom I have seen move along very fast on the Pennsylvania. Edward Thomas Harley is the son of John E. and Myra Thomas Harley and was born in Evanston, Illinois, on July 18, 1927. Tom, as he is known on our railroad, comes from a railroad family. His father worked on the Erie Railroad, Union Pacific, Railway Equipment and Publication Company, and was Vice President of the Union Tank Car Company of Chicago prior to his retirement in 1953.

Mr. Harley attended public schools in Evanston and then entered the Technological Institute of Northwestern University, where he received a Bachelor of Science degree in Mechanical Engineering in 1949. He is a member of Tau Beta Pi, the honorary Engineering fraternity, and Pi Tau Sigma, an honorary Mechanical Engineering fraternity.

About that time someone sold him on the idea of going with the Pennsylvania Railroad. He entered the service of the Pennsylvania on May 3, 1949, as a junior engineer, and after three years of getting acquainted with the ins and out of the Pennsylvania he was told, "Now face the facts of life." He was made a gang foreman on May 1, 1952, at our Crestline Enginehouse.

Then, through a period of about six years Tom moved from gang foreman to assistant foreman, to enginehouse foreman, to special duty assignments, and so on, and finally he reported to me in Harrisburg on November 1, 1958, as Assistant Master Mechanic.

In 1961 he was made Assistant Manager of Cost Control of the Pennsylvania, and finally, on March 14, 1962, he was promoted to Master Mechanic of the New York Division.

Radiation's Locotrol offers complete remote locomotive control

Locotrol® allows you to place slave units anywhere in the train. Provides positive and virtually instant control of—full dynamic braking range • all air brake functions • full throttle range • direction of travel

Take a look at the control console. You'll discover outstanding features offered exclusively by Radiation Locotrol®—the only system proven in revenue service for automatic slave locomotives. The system also allows independent control of lead and slave locomotives. It continually monitors all remote warnings, and permits emergency shut-down of boosters from the lead.

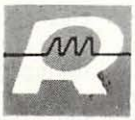
Positive control of remote locomotives helps . . .

- increase tonnage in a train
- broaden marketing potential
- protect lading through smoother operation
- increase acceleration

In addition, Locotrol improves unit train operation, saves time, fuel and drawgear.

Proof of superiority: 67 new Locotrol systems are now under construction for a major railroad. Locotrol can improve *your* operation too! Our new brochure contains details. We'll be glad to send as many copies as you need.

Write or phone today.



RADIATION INCORPORATED

CONTROL AND COMMUNICATION DIVISION
DEPARTMENT LM–06 • P.O. BOX 430 • MELBOURNE, FLORIDA 32901. PHONE: (305) 727-0990

It was on April 24, 1963, that I had the pleasure of bringing Tom into my office as Superintendent of Locomotive Equipment in Philadelphia. On December 30, 1964, he was made Assistant Regional Mechanical Officer in Chicago, and on July 15, 1965, he succeeded me as Assistant Chief Mechanical Officer - Motive Power, the position he holds today.

Mr. Harley served for one year following World War II as a U. S. Army photographer in the Signal Corps. Subsequently he was a Major in the U. S. Army Reserve and was Railway Equipment Superintendent in the 706th Transportation Group, sponsored by the Pennsylvania Railroad.

Mr. Harley was married to Rosemary Sharp on December 10, 1949, and they have three children, Linda, Robert and Brian.

I am sure this Committee is in good hands, and we look forward to a fine report.

MR. E. T. HARLEY (Assistant Chief Mechanical Officer - Motive Power, Pennsylvania Railroad, Philadelphia, Penn.): I would now like to call on Mr. Enders, President of the Chicago Railroad Diesel Club. We presented our paper on April 3 to the Chicago Railroad Diesel Club and were very pleased with the reception we received and the hospitality which Mr. Enders and his people showed our Committee.

1. Ex Parte 243:

MR. A. A. ENDERS (General Master Mechanic, Chicago & North Western Railway, 400 West Madison Street, Chicago, Ill. 60606): Mr. Weaver, Mr. Harley and Gentlemen:

The Chicago Railroad Diesel Club expresses its deep appreciation for the fine job done in presenting your paper to our Club. We had a very fine response as far as the question and answer period was concerned, and I am sure we will have the same this afternoon. It shows that this paper has taken a lot of time and a lot of serious thought to get the ideas together as to what the various railroads throughout the United States are trying to accomplish.

I am sure through an organization of this nature we will be able to come up with a better way of doing the job. There are a lot of improvements, and after Mr. Harley's paper we can sit back and analyze whether we are doing our job properly.

Through the cooperation of you people and through committees of this nature our job is a lot easier and better, and financially more successful for the company we represent.

In order to get the question and answer period under way, I would like to ask Mr. Harley and his Committee a question. At a time like this, what will be the effect of Ex Parte 243 for locomotive maintenance?

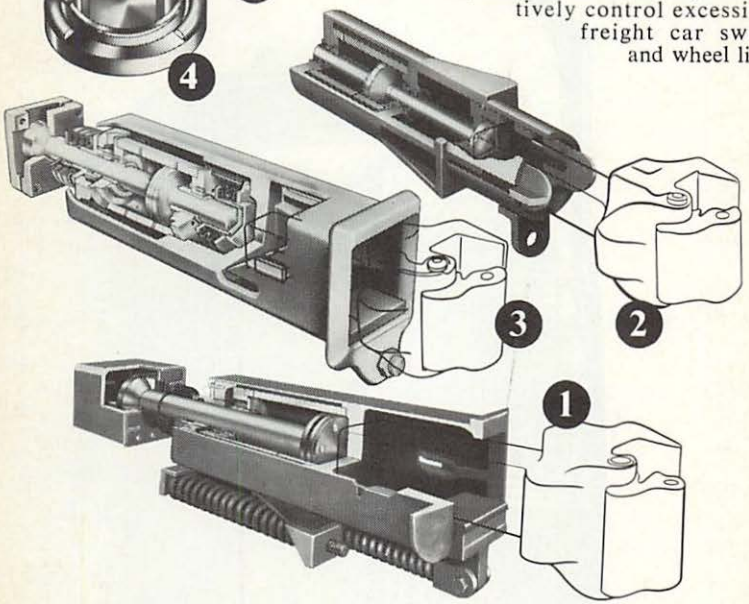
MR. V. L. SMITH (Superintendent Motive Power, Belt Railway of Chicago, Chicago, Ill.): I am certain most of the gentlemen here have had an opportunity to see the new rules that have been finally approved by the Department of Transportation as a result of the AAR committees' efforts to get the modifications made.

I am sure a great many of you have received the paper that the AAR has put out with some explanations of the new rules and also the sheets containing drawings showing logical and proper ways of drilling the drums, in case you want to take advantage of the relief you get from hammer-testing and hydro-testing of air reservoirs.

I am not going to go into any detail. There are a couple of things that seem to be apparent. One is, the relief from some of the older rules is going to permit us to put

NEW CONCEPTS OF INCREASED PROTECTION FOR CARS AND CARGO...THROUGH RESEARCH

1. **Type HD FreightMaster** Superior cushioning capacity unit provides 15" hydraulic stroke in each end of car.
2. **Type SP-E FreightMaster** Proven end-of-car cushioning concept with 7" of travel. Installs easily in standard 24⅝" draft gear pocket.
3. **Type E and F FreightMaster Units** Started modern end-of-car hydraulic cushioning . . . 25,000 car sets now in use.
4. **FreightMaster SWAY ARRESTOR** Economical, easily installed solution helps effectively control excessive freight car sway and wheel lift.



FreightMaster®
A DIVISION OF HALLIBURTON SERVICES

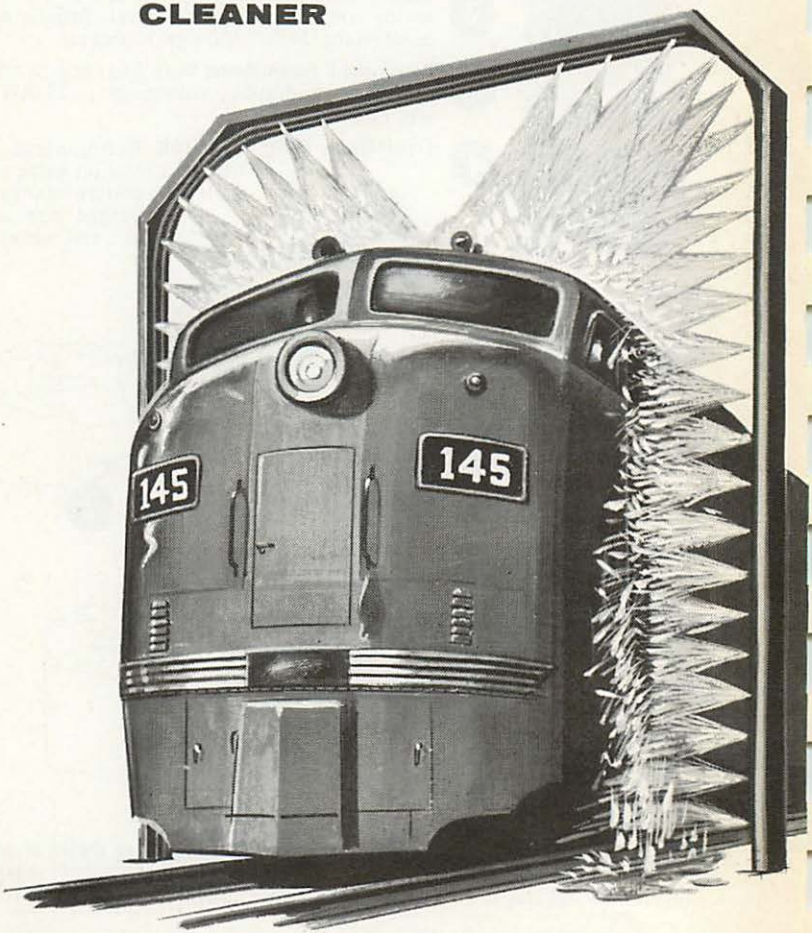
NEW CONCEPTS OF INCREASED PROTECTION FOR CARS AND CARGO THROUGH RESEARCH

424 W. Vickery Boulevard • Fort Worth, Texas 76101 • Canada: Hawker Siddeley Canada Ltd., Montreal • Mexico: Materiales y Servicios Ferroviarios, S. A., Marconi Numero 2-37, Mexico 1, D. F.

PECK'S

SPRAY 145

RAILROAD DIESEL, CAR & TRUCK CLEANER



CLEANS BETTER—FASTER AND AT LESS COST!
...YET IT IS MILD AND SAFE TO USE.

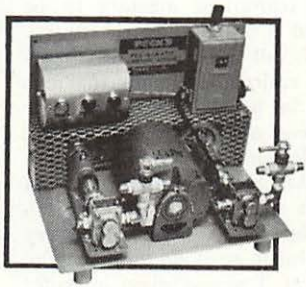
SPRAY 145 DOES THE COMPLETE JOB!

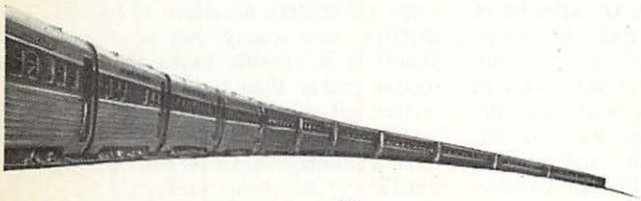
Guaranteed Results

- Based on actual railroad experience even under adverse conditions such as— Short spray time
  Extreme soil conditions Insufficient temperatures
  Extreme water hardness Low spray pressures
- Eliminates multiple products such as—
  Caustic Rosin Soaps Acid Cleaners Neutralizers
- Reduces number of Spray Arches—
  No pre-wetting arch No neutralizing arch

SPRAY 145 is customed for your specific conditions

PEX-O-MATIC CONTROL SYSTEM
Automate your washer with our Pex-O-Matic system. Automatically charges, and electronically tests concentration and adds material as needed. Assures constant solution strength and top results.





PECK'S PRODUCTS CO.
MAIN OFFICE • • • • • 610 E. CLARENCE • ST. LOUIS, MISSOURI 63147
LAKESEAL DIVISION • • 969 E. SHORE DRIVE • ITHACA, NEW YORK 14850

these men on work that is a little more useful in maintaing a locomotive. The hammering of drums, for example; am sure all of you have felt that you are knocking the drum lining enamel to pieces when you hammer-test it. The relief from this operation can be put to better use on maintenance of the engine.

As Mr. German indicated at the luncheon today, the air compressor is a good place to spend some of our time on, because that will help us on cleaning up the air and general performance of the brakes.

On our particular railroad I see a great relief from the requirement of stamping of pins between units. We have a number of locomotives with drawbars in between, and it is costly to take them down. In many cases in the past it was unnecessary to take them down, and the measurement by tramming appears to be logical and a proper direction to go.

So, all in all, I see savings accruing to the railroad company that can be spent in better places, and we should have a little higher quality repaired locomotive.

MR. HARLEY: I think many of you in this room are aware that officers of the LMOA have been very instrumental in working with the Department of Transportation on rules that the railroads and Department of Transportation can mutually agree on. Two of the people in the room today who have been very much in the forefront in this work are Mr. John German, of the Missouri Pacific, who has been chairman of the group, and Mr. George Weaver, who has been vice chairman of the group. I don't think many of you have any idea of the number of hours these men have put in working on rules.

This is an item that has been going along for several years. **It represents a great deal of work over a long period of time, and it looks like the railroad industry is now getting to the point where we will be able to enjoy some of the benefits which should come inherently with the diesel locomotive.**

2. Oil Cooler Cleaning:

MR. DWYER: In Item 28 on page 100 of the report you mentioned a while ago on the oil coolers that two-thirds of the railroads remove the oil coolers for cleaning and one-third clean them in place on the locomotive. Is there any relationship between the brand of oil cooler and the decision to clean it in place or to remove it?

MR. HARLEY: The analysis of course was made strictly by railroad and not on the basis of any particular type of locomotive. We might start with someone on the Committee. Does anyone on the Committee have a comment on lube oil cooler by make of locomotive?

MR. J. F. FINNEGAN (General Master Mechanic, Chesapeake & Ohio Railroad, Grand Rapids, Mich.): On the C. & O. and B. & O. there is a specific time set up for cleaning of oil coolers. It may vary with the type of locomotive, but cleaning in place we do not do. I can remember a few years ago when we used to clean oil coolers on Alcos every six months; now many run over two years. It is specific as to the locomotive rather than the type of locomotive oil cooler.

MR. HARLEY: Mr. Smith, you have a number of Alcos. How do you handle the oil cooler problem?

MR. V. L. SMITH (Superintendent Motive Power, Belt Railway of Chicago, Chicago, Ill.): We are getting down now so that there aren't too many of the 244s, I think that is the class that you have in mind. On those, we have arranged so that you

PEACOCK

Quality

HAND BRAKES and REGULATORS

Proven

Safe ★ Positive ★ Dependable

—on—

Freight and Passenger Cars
Diesel Locomotives

H & L Peacock Brake Regulator

Now Installed

—on—

Over 170,000 Freight Cars

ELLCON-NATIONAL, INC.

30 KING ROAD, TOTOWA, NEW JERSEY 07512

can pump through the cooler by blanking off the flanges on this heat exchanger; you can pump up the cleaning solution through them and clean them in place.

On the EMD, GP 7, GP 9, and so on, we have always pulled the lube oil coolers out, because particularly on the GP 9 you can't clean them otherwise. That is our experience.

MR. HARLEY: What about the experience of the New Haven on lube oil coolers?

MR. J. J. PFISTER (Assistant General Mechanical Superintendent, New York, New Haven & Hartford Railroad, New Haven, Conn.): Our experience is similar to what Mr. Smith just stated. On the 1500 horsepower Alcos road switcher type we have cleaned them in place, but on the EMDs we remove them.

MR. HARLEY: We had expected on that particular question to get a much more definitive answer, particularly with the number of railroads that are now operating on high dispersant oil. It was our feeling that high dispersant oil has a large effect on the cleaning frequency of an item like the lube oil cooler. However, apparently it is a little too early in the game to nail something down definitely as to the benefits which might accrue in this area.

A good many roads, partly as a matter of protecting their existing power, are continuing to maintain them on somewhat the original schedule they had set out for the lube oil coolers in the past, **but it is an item that we certainly hope to see extended. In fact, sometimes we would hope to not have to clean them at all except at heavier repair, although this has not been definitely proven to date.**

MR. DWYER: I wonder if this is really a true poll or a true indication from the poll, that one-third of all oil coolers were being cleaned in place.

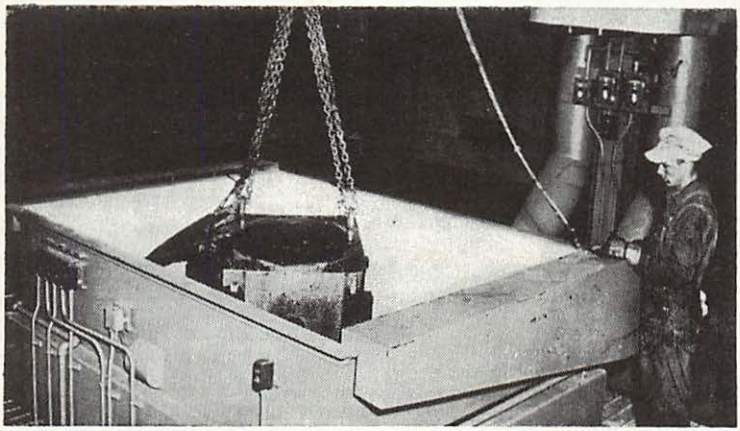
I have another question: If you do clean it in place, how do you know when the cooler is clean?

MR. M. M. EARLY (Mechanical Supervisor - Locomotive, Norfolk & Western, Roanoke, Va.): On the Norfolk & Western we used to clean the Alco lube oil coolers in place. We were taking down the EMD lube oil coolers and applying a modification kit to get the baffle in. Then, as we went through the overhaul we started weighing the lube oil cooler core before and after cleaning, and after a period of several years we have determined that with the conventional type oils we can go 3½ years between periods of cleaning.

This 3½ year period is what we call a No. 1 overhaul, and the coolers on the Alcos and EMDs are both removed and cleaned. To see the effectiveness of the cleaning we do weigh before and afterwards.

In regard to the question by Mr. Harley as to what effect the high dispersant oils have had, we have some GP 35s coming through now for what we call a 3½ year, No. 1 overhaul, and the lube oil coolers we are removing from them have just about the same amount of sludge removed as GP 30 units on the conventional type oil. The GP 35 units have been a year on high dispersant oil and there was no material change in the amount of sludge removed at a cleaning period.

MR. HARLEY: Jack, it would be a backward way of answering your question, but I would think if the lube oil cooler was not effectively cleaned in place we would certainly notice a return to oxidation of the oil very quickly, assuming we make a lube oil change at the same time we clean the lube oil cooler.



PHILLIPS DEGREASERS SERVE THE NATION'S RAILROADS

Diesel locomotive traction frames, motors and components are cleaned in minutes with a Phillips Vapor Degreaser. Cleaning of traction motors has been reduced from 8 hours to 30 minutes, and traction unit armatures are degreased in 3 minutes. After vapor degreasing of motor parts, a highly acceptable Megohm test is produced – virtually equivalent to new. 20 to 36 hours of oven drying used previously can be eliminated.

THERE IS THE RIGHT **PHILLIPS** EQUIPMENT FOR YOUR PARTICULAR CLEANING PROBLEM!

PHILLIPS MANUFACTURING CO.

7334 NORTH CLARK ST., CHICAGO, ILLINOIS 60626

PHONE: 312 - 338 - 6200

It isn't a well-defined way of answering your problem, but certainly we would expect to see the same problems, which cause the requirement for the lube oil cooler to be cleaned in the first place, to be repeating themselves rather quickly if we did not do a reasonable job of cleaning in place. Our railroad is one that does not clean them in place, so I can't answer from the standpoint of the Pennsylvania.

MR. DWYER: One real short question, then: What is the recommendation of your Committee — to clean them in place or to remove them?

MR. HARLEY: We had no determination from that standpoint. We were merely taking a survey to see what was done.

My own personal recommendation is to take them out. Again, as you can see from the results of this study, all railroads do not agree on the same procedures. What we would like to be able to do would be to have standard procedures, but I think somebody mentioned this morning that in the case of steam locomotives they were busily standardizing them when they scrapped them all. **I hope we can come to conclusions based on engineered studies long before we get to the day when we have to scrap all diesel locomotives, which seems to be sometime in the future.**

3. Use Of Computers In Maintenance Studies:

PRESIDENT BEISCHER: In the audience today there are people who are not primarily maintenance officers, and many of your comments have hit home. You have in your audience today people who are involved in computers and costs and budgets. One individual here is Mr. Harold Meeker, Assistant to the President of the Western Pacific Railroad. His question to you is this:

"How representative is the survey you mentioned? You spoke of polling fifteen railroads or something of that sort."

Mr. Meeker would be interested in some discourse on your part as to how representative this is of the policies, concepts of maintenance, and problem areas insofar as the railroad industry is concerned.

MR. HARLEY: As I said at the beginning of my remarks on computers, there is no one railroad that has entered into all of the thirteen areas of computer effort where something desirable could be brought forth. No one railroad is working in all of those areas. Some railroads have not done anything in this respect. Some railroads have gone farther than others. One railroad that has done quite a bit in this area is the Norfolk and Western. Mr. Early might give us a rundown on what his railroad has done in the area of using computers.

MR. EARLY: In the Locomotive Department we have had rather small beginnings. We haven't had the use of the computer itself, but we do have an 026 keypunch machine and an 082 card sorter, and access to a 402 accounting machine with 100 lines a minute capacity. We will have our own leased 402 printer that will print 50 lines a minute.

In the past four months we have been putting everything through our keypunch that we can which in the past has taken hours and hours to compile information. **If someone wanted to know something "yesterday" it took a long time to tabulate our historical records and get it to him in time when he could use it effectively.**

One of the things that the locomotive maintenance people have to do is to recognize that we are providing an auxiliary service to the people

NO . . . not even an armored knight, a bald genie and a white tornado could clean a locomotive like an Upgrader!

The Vapor Upgrader is unmatched when cleaning a locomotive. Its hot hydraulic-cleaning action is fast and thorough in getting rid of the heavy, hard-to-get-at grease and dirt on undercarriages and trucks.

Upgrades freight cars to their highest potential revenue in minutes at a minimum of cost. Also used for cleaning construction machines, buildings, bridges and other structures.

Specify Vapor Upgrader: ask for the best in Hot Hydraulic Cleaning.

VAPOR **UPGRADER**

HOT HYDRAULIC CLEANER

RAILROAD AND TRANSIT DIVISION VAPOR CORPORATION 6420 WEST HOWARD STREET • CHICAGO, ILLINOIS 60648
A Subsidiary of General Precision Equipment Corp.

who provide service to the customer. One of the things that the operations people want to know is this: When we have failures, what will we do about them? Of course we want to know the cause of those failures for our own information.

Some of the data we have started collecting on failures is to try to take the various factors that might have a bearing on them, such as the class of power, unit number assignment point, train number, the division, the delay time, failure point, days off inspection, and then the cause of failure itself. Quite often we will see immediately the predominance of a class of power involved. **Disappointingly it is quite often that it is the newest power that is giving us a lot of trouble on our line of road.**

When we take the failure code and run it down we can see that it is quite often a part that is commonly failing on all of our new type power. We get to the locomotive builder quickly and show him the tabulation of the failures that have been printed out, and he gives us relief in some of our component failures by recommending modifications or campaign authorizations.

In going beyond the failure itself and its effect on operation; quite often it involves locomotive components, and we are trying to determine the service life of the components. The keypunching of all of our component failures has been very valuable. We are going to have something like a historical record that does not take a lot of work to get information out. We are collecting important data, and we want to have it keypunched so it can be available any day it is needed rather than have to wait a long time for the compiling of it from posted records.

There are items such as traction motor costs that are a very large part of our budget. Management wants to know what you are going to spend on your budget next year. We know a large part of it will be traction motors. How old are the traction motors in the units you now have running? How many traction motors will require rework next year? **This information is instantly available. It has been keypunched.**

We are just now beginning to scratch the surface of the potential benefits that are going to come from that data processing equipment; and we feel that while we are quite new in using it, we realize it is going to be very beneficial to us; and I am sure other railroads that have looked with reluctance on it in the past will join us in recognizing the benefit to themselves.

MR. F. A. DANAHY (Chief Mechanical Superintendent - Locomotives, New York Central, New York, N. Y.): The majority of our experience to date has been on the punch card IBM type of computations, keeping historical records and using the historical records we have in an effort to predict failures and to predict the cost of maintenance for the next year.

The first week of November we are starting to swing over our IBM punch cards to a computer service. At the same time we are beginning to use a computer at one of our major terminals to keep track of our newest class of high horsepower locomotives. We will have some 105 of them by the end of next month.

We hope that by keeping a 24-hour, 7-day surveillance on the failures of this type of power we can develop records which will anticipate wholesale failure on various components.

The majority of our historical records, as I said, have been on punch cards. **This will be converted, and we hope to be able to program this with**

At temperatures as low as —65°F. and pressures to 300 psi, new Aeroquip Air Brake Hose is fully reliable for exposed or unexposed railroad air brake applications. This low temperature hose is specially built to withstand the severe conditions encountered in connection and disconnection of air brake hose lines. And Aeroquip Reusable Fittings plus a small stock of bulk hose permit quick and easy replacement of any length of hose line.

Constructed with a rugged Neoprene inner tube, steel wire braid reinforcement, and a synthetic rubber cover, this new hose is available in sizes from ½" to 1⅜" I.D.—with a variety of gladhands and swivel pipe thread adapters.

For more information, contact your Aeroquip Distributor. Or write for your free copy of Railroad Engineering Bulletin REB-21. Aeroquip Corporation, Industrial Division, Jackson, Michigan. *Aeroquip products are protected by international patents.*

Aeroquip

INDUSTRIAL DIVISION

our day-to-day failure records to anticipate these failures before they occur.

MR. W. STONE (Engineer of Tests, Louisville & Nashville Railroad, Louisville, Ky.): **On the question about data processing, unfortunately some of these lubricants and equipment become obsolete before you can ever collect enough data to get an authentic answer. That would include the problem about the relation between highly dispersant lube oil and lube oil cooler.**

On our railroad, where we have been using this oil for about three years, and it has been in the engines ever since they were new, there is a dramtic difference in the appearance of the lube oil coolers. We feel probably you can go from shopping to shopping if you start out with it. The information that you gather when you start with one oil and then change to another isn't authentic enough to feed into the data processing anyway.

MR. HARLEY: Is there anyone here from the Southern Railroad who is familiar with the system which they use for programming locomotive repair work to be done at monthly inspections?

MR. ROBERT F. TUVE (Manager Quality Control Engineering, Southern Railway, Atlanta, Ga.): I am Quality Control Engineering Manager. As such, I report to the Vice President of Engineering and Research rather than to the Mechanical Department, but I have been working very closely with the Mechanical Department.

We have a variety of programs going. One is, as you said, the periodic scheduling of locomotive maintenance including automatic cab carding, as we call it. We have gone very extensively into traction motor performance, setting up a series of computer reports to tell us what components on traction motors are failing. We are in the process of developing this same approach or concept on other locomotive components, but this takes quite a bit of time. **We are not much further along than other railroads, but we are setting up the system with which we can analyze the data.**

MR. HARLEY: Is there anyone here from the Canadian roads? I noticed from reading some reports that the major Canadian roads have been doing something in this area. The latest thing I saw from one of the Canadian roads was a road failure analysis of the type the people have been describing — quite an elaborate system using a coded numerical system to represent different types of failures.

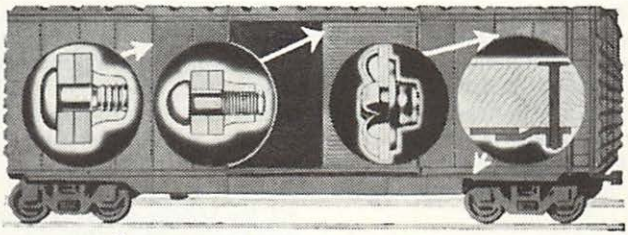
Every time they have a failure on the line of road the failure is coded by number into the system, and a rather complete and quick analysis is furnished to the operating people so that they may use real time-failure data in order to reduce current failures. This is similar to what some of our people on the Committee have been discussing.

MR. TUVE: The Southern is doing the same thing. We have not really a real-time system (although failures are reported immediately by phone to the Mechanical Department for appropriate action), but we are operating about 30 days behind on a three-month running basis. We have a coded system also which consists of a coded symbol plus a 45-character description of the problem, and then the actual failing component in a fair amount of detail. **This is sufficient so that the Mechanical Department can determine exactly where their current problems are.** The report comes out on the 21st of the month, so they are not too

For Railroad Fastening Applications

QUALITY HUCK FASTENERS

- FASTER UNIFORM INSTALLATION
- LOWER INSTALLED COST
- POSITIVE MECHANICAL LOCK
- SIMPLE OPERATION



CL—Huckbolt® Fastener—High clinch, high shear, foolproof fastener for general fabrication. C50L meets ASTM A325 for high-strength riveted and bolted structural applications in rolling stock and right-of-way.

DR—Blind Fastener—Large blind head formation. Swage lock. Steel or aluminum repair fasteners.

Floor bolt/clip—2-piece positive lock, wide grip range, simplified floor-to-frame fastening.

HALLMARK OF FASTENING RELIABILITY

PRI MEMBER

The versatile Huck Fastening System has been used extensively with excellent results by modern car builders and repair shops—it can work for you too! Write for detailed information and samples.

HUCK FASTENING SYSTEM

MANUFACTURING COMPANY
2500 Bellevue Ave. • Detroit, Michigan 48207
Telephone: 313-923-4500
130 Skyway Avenue • Rexdale, Ontario, Canada
Telephone: 416-677-2800

far behind what actually is taking place.

MR. L. L. LUTHEY (Manager Mechanical Department, Atchison, Topeka & Santa Fe, Amarillo, Texas): It seems we have all heard a lot about the computer. We talk about computerizing data and developing how many failures we have. **It seems to me we haven't said too much here today about using a computer to prevent a failure.**

I realize as long as we know what we are in trouble with, we will go to work on that part — at least I hope we will. There are a lot of things we know we are in trouble with now.

I wonder of what use the computer is going to be in trying to be a benefit in that area. On a mileage inspection are you going to keep real time or real mileage on these units? We know when they are due, getting them in is another thing. **The computer will only tell us what we already know.** Who is going to get the unit to the enginehouse to get it fixed?

MR. HARLEY: I don't think any of us has reached the point where the computer reaches out and hauls in the unit. **It still has to be done by people.**

We have several representatives here from the locomotive builders. You have to remember one thing — that the locomotive builders have a far bigger cross-section of new locomotive problems than any one railroad could have, because naturally the locomotive builder has supplied them to a number of railroads.

Perhaps some of our locomotive builder representatives here would like to comment on methods they use to run down incipient problems which may appear on one railroad before they appear on another railroad. Mr. Gardner, would you like to comment for EMD?

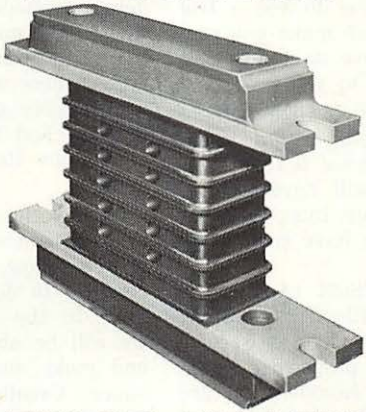
MR. W. A. GARDNER (Assistant General Service Manager, Electro-Motive Division, General Motors Corp., LaGrange, Ill.): Tom, we are using a computer to help us do this. We have of course done it by hand for many years. **We find that a computer is far more accurate than people, and obviously a lot faster. Our biggest problem is getting the input. Our information that a piece has failed is sometimes two months old, which is a very serious defect in the system and one which we are trying to find a quick and easy remedy for, and we haven't found it yet. We welcome any help from any of you people to tell us how to do that better.**

On the tenth of the month we get a report from the computer which gives us in detail all of the warranty failures that have occurred that have been reported in the previous month. In other words, the computer takes ten days to think this over and tell us what it has found out. That is not too serious a loss. **But when you are faced with waiting one to two months to get the information into the computer, this is serious.**

We have probably compiled the most complete records on our turbochargers. The reason obviously is that, as far as I know, we get back all of the failed turbochargers and repair them ourselves. To our knowledge no railroad is repairing our turbocharger, and therefore we not only know that a failure has occurred but we know the reported reason for the turbocharger being removed. When it comes back to our shop we tear it down and make up a report on what we actually find, and we see whether the findings of the teardown report agree with the reported failure or not. If they do not, the computer corrects this for us.

We are shortly going to be able to

THIS IS THE ELASTOMERIC MOUNTING



THAT HALTS TRACTION MOTOR DAMAGE

LORD MANUFACTURING CO. LORD® ERIE, PENNSYLVANIA 16512

DIVISION OF LORD CORPORATION

tell within a matter of, I would guess (and this is a guess), about four months after a design change has been made, just what the effect will be — whether it will be good, bad or indifferent.

We have built into this program a means of predicting failures. Unfortunately the computer does not have any sense, as has been mentioned several times today. "Garbage In — Garbage Out", and so on. It does not have any sense. **You have to tell it how to think.** It has to see a few failures before it can make any predictions. If you have no failures at all, it is worthless to you.

Of course we would like nothing better than to come up with a design that never would have a failure. If that happens we will have to turn to some other means than the computer to tell us we have such a design.

MR. E. A. HANSEN (Application Engineer, General Electric Company, Erie, Penn.): We have a service engineer on most properties where General Electric Locomotives are running. We receive a weekly report from these gentlemen on the failures that have occurred. There is an organization that takes these reports, compiles them and issues regular reports, so we are pretty well kept up to date.

I am in product planning, not product service. I see the report about two weeks after the weekly report comes out. **So, we are kept on top of what is going on.**

Our Manager of Product Service, Don Wonderly, is in the audience. I wonder if he would like to add anything. He would.

MR. D. T. WONDERLY (General Electric Company, Erie, Penn.): I'm sure that most of you gentlemen here have heard of Alexander Graham Bell. **Those situations that are real panics — well, you don't need a computer to tell you what is going on, a few phone calls will do it. If you waited until it went through the computer the locomotive would be out of service so long that none of us could stand it.**

For the long run we take this data and put it into punched cards and get IBM runs. A couple of weeks ago we hadn't had any failures of one item, and in less than three days there were six failures of that one item. Immediately we looked at where we stood on our fleet, and there had been only a couple of properties where we had had some random failures, and they didn't indicate that we had to go into a program across the fleet for that particular design.

We have been putting this information on punched cards for a couple of years now, and we are going to continue to do so and progress the thing to the point where hopefully we will be able to look at an item and make some predictions in advance. **Usually, when it looks like something is beginning to get out of hand, you have to jump in very fast and do something.**

One other point in this general area is that we had a problem with scored liners on our fleet about two years ago that was very serious. There are many variables that can be factors in producing a scored liner. We put many variables or changes into the engine to overcome this, then we plowed all these into the computer setup, hopefully so that we could pinpoint with time precisely what was the one or more factors that did help to overcome the problem. We got some help there.

MR. HARLEY: Mr. Wonderly, I don't mean to pick on GE as an individual company, because we get this from all builders. I know George

9 WAYS BLH CAN HELP YOU OPERATE MORE PROFITABLY

1. Locomotive and engine renewal parts. 2. Modernization kits for diesel locomotive engines. 3. Rolled steel wheels, tires and rings. 4. Axles. 5. Steel forgings. 6. Hydraulic cranes (on-off track type). 7. Rock crushing plants. 8. Asphalt plants. 9. Load cells.

Executive Offices: Chicago, Ill., 60690 • *Construction Equipment Division:* Austin-Western Plant—Lima Plant *Electronics Division* • *Industrial Equipment Division Standard Steel Division*

BALDWIN·LIMA·HAMILTON
A subsidiary of Armour and Company

BLH
CORPORATION

Weaver is familiar with this type of thing. **We have something fail, and the story we get from the service engineers is, "This is the first time this has ever happened. Did it ever happen any other place?"**

MR. WONDERLY: If there is one thing I try to avoid when I talk to customers, it is the lead-in line, "This is the first time it ever happened", because I know most people get rather violent when you say that. However, you must recognize that there is a first time for everything to happen.

MR. HARLEY: There is one event that happens for the first time in any industry; that's right.

MR. WONDERLY: You're right. It seems like an old cliche. Truly, you would be surrpised, on our fleet, where a particular problem for some reason — sometimes you can pinpoint it and sometimes you can't — seems to be selective, and it may choose two or three railroads to show its face to. Oftentimes we can't tell the difference between those particular two or three railroads and the rest of the fleet.

Sometimes you have to do special things to that particular railroad; or, maybe time passes and eight months later it starts showing up on another property. When it starts showing up on the next property the customer raises all kinds of questions, and says, "Why, you had this eight months ago on that other railroad."

That is a good point to think of, too. You just have to measure the situation as you go along, and surround it the best you can. We are working awfully hard on it. We have a number of people in Product Service whose sole job is to take this information that comes from the field and document it and analyze it.

We review last months' failures, the last three months' failures, this year's failures and last year's failures, and in combination, hopefully to see what the trend is; so if it is getting out of hand we can see it very quickly.

MR. C. G. MacDERMOT (Assistant Manager, Alco Products, Inc., Schenectady, N. Y.): At Alco, warranty claims and other failure reports are monitored by our Service Department and analyzed jointly by Service, Engineering and Quality Control. Data processing equipment has not been employed in this work up to the present. During the past year, our data processing capability has been greatly increased by the installation of new equipment, **and it is hoped that within the next twelve months we can begin to take advantage of this new equipment to store and analyze failure data.**

I am impressed by the work done by some railroads in storing failure data on machines. It occurs to me that it would be useful if we could agree, as an industry, on such aspects of this effort as what codes could be used for each type failure. Possibly this is a subject which an LMOA committee might consider.

MR. HARLEY: Chris, I have one question for you: **At what level of failure do you people push the button marked "Corrective Action"?** In other words, what do you use as a triggering level to start doing something about something that shows up as a repeated failure?

MR. MacDERMOT: I wish I could give you a precise mathematical answer to your question but I can't. **We initiate a correction program when we become convinced that a high percentage of a particular component is going to fail, or be unable to function properly without attention between scheduled maintenance intervals.**

ROL-MAN

rolled and forged high carbon
11% to 14% MANGANESE STEEL
WEAR LINERS
for truck center plates and pedestals

FIRST
FOR

- wear resistance
- impact strength
- better "rollability"

Extensive tests and regular service on many major railroads prove that wear liners of ROL-MAN manganese steel outlast all other steels up to 6 times in center plates, pedestals, bolsters, journal boxes and other truck applications . . . give freight cars improved "rollability" and increased availability . . . reduce maintenance. Send for illustrated technical bulletin of ROL-MAN railroad wear parts.

MANGANESE STEEL FORGE CO.
Richmond St. & Castor Ave.
Philadelphia, Pa. 19134

ROL-MAN

I'm afraid you asked your question because of what must seem to railroads like an agonizingly slow response to problems. Actually, it is not the response but the mechanics of problem correction which take so long. First, the possibilities of improper assembly at our plant or material other than that specified must be ruled out. If periodic maintenance was involved, the posibility that this was performed improperly, or not at all, must be explored. If design is finally pinpointed as the culprit, a new arrangement must be devised and tested. Not surprisingly, the first attempt to solve the problem is often unsuccessful; if the design requirements had yielded easily to solution, the original design would probably never have given trouble.

While the engineers are struggling with the new design, Service must work out customer eligibility and estimated cost in order to present an economic justification of the program for Management approval. In the hopes the "fix" will prove effective, modification instructions based on the proposed change will be prepared so as to be ready when the new design is released. But if the first attempt is a failure, these must be torn up and done over. With luck, the last change in the modification will come to light before the bulletins are finally put in the mail.

Finally, Production has to cope with the problem of cutting over to the new design for all locomotives in process, at the same time producing enough modification material to convert all models built to the old design. We do not allow any new locomotives to be shipped with an "obsolete" design after a modification has been formally released to the field, so, considering the pent-up demand for materials created by failures when a serious problem has existed, a mammoth effort on the part of Manufacturing is required at these times.

As a manufacturer, we recognize the critical importance of prompt correction of product problems, and a continuing program to find ways to speed up this process is in operation.

MR. HARLEY: This is determined manually from looking at your failure records?

Mr. Wonderly, does GE have any particular system they use for triggering corrective action when they run into repeated failures?

MR. WONDERLY: To a degree. As Mr. MacDermot said, there isn't a finite number put on it. A lot depends upon the item and what your exposure might be. For example, if you break a crankshaft anywhere on one unit you get pretty excited about it, and you are really excited if you have five or them break on one property or on one vintage of locomotive. For example, if you had five crankshafts break on engines that were shipped during a three-month period, you would be really excited in a hurry.

On the other hand, some of these more isolated situations, where maybe you have a failure of a drive coupling on this property and one on that property and two on another property, sometimes before we can marry that information and find there is something significant about it, maybe a little time will have gone by, possibly more time than is acceptable to the railroad. By constantly monitoring these situations we take action accordingly.

MR. HARLEY: Does EMD have any particular process for triggering action?

MR. MAX EPHRAIM (Electromotive Division, General Motors Corp., LaGrange, Ill.): No, we don't, Tom,

CRODON
The Chrome Plate

Sparkling, Clean and Ready
FOR YOUR POWER ASSEMBLY

Cylinders reconditioned by CRODON® plating to *better than new* condition are shipped to you boxed and wrapped in plastic containers. This extra service was started three years ago at no additional cost to you -- another reason why your demand makes us the leader in the reclamation field.

CHROMIUM CORPORATION of AMERICA

WATERBURY, CONN.	CLEVELAND, OHIO	CHICAGO, ILL.	STICKNEY, ILL.
P.O. Box 1229	8701 UNION AVE.	4645 W. CHICAGO AVE.	6410 W. 51 ST.

not in terms of numbers. Hindsight is wonderful, of course, and we have looked back on some of our more serious problems. In doing so we find a 1 percent failure rate in a year's time on almost anything. This is in general terms. **One percent is very serious; 2 percent is a catastrophe.**

MR. HARLEY: What about items that are not warranted? For instance, if you are using traction motor brushes like mad, which would not show back in the plant as a warranty claim because it is a consumable item, how do you handle something like that, which could be a serious problem to a railroad and is a serious problem on a good many railroads?

MR. EPHRAIM: There we have to depend on our field people to let us know that the problem exists, so that we can get started on it. We have to come back to the first guy who reports this, and say, "You are the first one who ever had this trouble." Our first effort is to dig into it and learn as much as we can.

MR. L. S. McGREGOR (Chief of Motive Power and Car Equipment, Canadian National Railways, Montreal, Quebec): You requested a while ago that one of the Canadians speak about our activities in Canada with regard to motive power information systems.

On the Canadian National I am at present working with a programmer and several analyzers from our data processing department to have defect and associated information placed in the machine. Our objectives are much along the line to those which have been mentioned already — to record the life of parts, to track down warranty items, and to provide us with a yardstick covering the quality of our locomotives.

The aim, of course, is to be able to develop a plan for the shopping of locomotives on condition rather than mileage, as we are at present doing. This procedure, I expect, will be introduced during next year, and possibly we will be in a position to give you full details in 1969.

There is one other record of interest which we are maintaining at the present time, and that is a report on all reported in-service defects on locomotives. Through our Power Control there is a feedback from enginemen via dispatchers of equipment troubles affecting operation, a daily record of incidents being delivered to my office. We summarize this information into categories of associated defects. This is not limited to failures, that is train delays. Failures only give a very small percentage of the total troubles that are experienced on the road. Particularly when one considers that a locomotive can be isolated and a train still makes the scheduled time, or that unscheduled drags and way freights are not normally assessed with delays. This is recognized as only a rough yardstick of motive power reliability insofar as transportation is concerned, it is an indication of the quality of service provided by the motive power department.

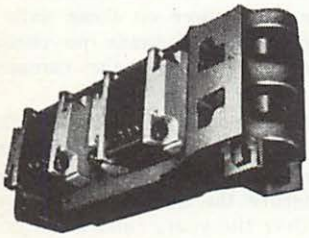
Our information system also covers diesel maintenance points themselves. Defects, parts used and other work performed is extracted from work sheets along with Stores issue of parts. This information is presently being developed into a practical form for decision making related to maintenance schedules and regulations.

MR. R. P. TURNBULL (Manager of Mechanical Engineering, Long Island Railroad, Jamaica, N. Y.): You mentioned a while back in your data something about wheel performance

Standards of the Railroad Industry

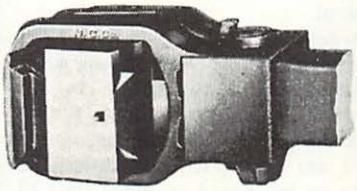
National Rubber Cushioned Draft Gears for Diesel and Electric Locomotives

NATIONAL MS-485-5A



Multi-pad gear used where structural or other considerations prevent use of National M-380-A gear. Recommended for application to switch locomotives in multiple unit service. Other designs available for applications where continuous tractive effort is below 100,000 pounds.

NATIONAL M-380A



For heavy diesel passenger locomotives and diesel and electric freight locomotives. Especially recommended where total continuous tractive effort exceeds 100,000 pounds, either in single locomotive or multiple unit service.

NC MR

NATIONAL CASTINGS DIVISION
Midland-Ross Corporation

10600 QUINCY AVENUE, CLEVELAND, OHIO 44106

and wheel life being about 150,000 miles.

MR. HARLEY: Eighteen percent had less than 150,000 miles. That was not the median point. The median point certainly was greater than that; it was up in the 200,000-mile area.

4. Diesel Wheel Performance:

MR. TURNBULL: **You stressed the fact that there is a wheel problem. I agree, and we don't need a computer to tell us. The computer has told us now is the time to do something about the problem. There is a problem.**

I would like to ask what is being done about the problem of poor wheel performance. I would like to editorialize for just a moment. I don't know whom to ask the question. I feel I am asking it in a vacuum because on the board of supporting advertisers I do not see U. S. Steel, Bethlehem Steel, Edgewater Steel Wheel Company. There may be some others who do make steel wheels, like Apex. The real giants are not on that list. Therefore, to whom do I address the question — the Committee, the builders, or just whom? Something should be done about it.

MR. HARLEY: There might be some representatives here from the major wheel manufacturers. Is anyone here from U. S. Steel?

MR. MALCOLM S. RIEGEL (Consulting Engineer, American Iron & Steel Institute, 230 North Michigan Avenue, Chicago, Ill.): I have been waiting for the discussion to change. I didn't want to interrupt the computer discussion.

I am Malcolm Riegel, of the American Iron & Steel Institute. I am a member of the Technical Committee on Railroad Materials; that is composed of representatives of all the manufacturers of steel wheels, axles and rails.

You mentioned 150,000 miles in your report. I just couldn't believe it when I read it. I thought surely that was the mileage for the first turning, but apparently that is not so.

You buy wheels to the specification of the American railroads, and the manufacturers have to furnish wheels to that specification. **You mentioned 150,000 miles and in the next few sentences you went on to give the reasons why you are not obtaining better mileage. The most significant reason to me is the increased horsepower. You have more than doubled the horsepower on these units over the years and made no change in the wheel design, the composition, or the heat treatment.**

I am not trying to avoid the responsibility of the manufacturers, because they are the ones who should improve the quality of the wheels.

Over the years (and I can go back more than 30 years) alloy wheels have been tested. Manufacturers have thought of all the possible alloys they could, and have made some of them into wheels, and whenever they did you railroads have tested them. Generally the performance has been that they have been more susceptible to thermal cracking, and instead of improved performance the mileage has been less.

Then you are faced with the situation that if you do come up with an alloy that performs well, you are dealing with a more expensive material. I think that is of relative insignificance at the moment. The thing to do is to obtain the best wheel you possibly can, and worry about the cost later. If you will talk to your individual wheel suppliers you will find that they are thinking about alloys, and possibly one or two of them may be ready to have something for you to test.

Finally, over the past three years

WHICH LINER COSTS LESS

?

☐ Unplated Liner ☐ Mecrome Liner

The unplated liner? Yes, in first cost . . . but definitely not in end cost! The Mecrome Liner on the right will last five times as long as the unplated liner . . . and much longer than other-type plated liners.

It's the reason why major railroads and diesel engine users insist that new liners be Mecrome plated, even before they go on the line . . . and that old liners be returned to one of Metal Finisher's modern plants for renewing.

Send us a trial order today. Let us prove to you Mecrome liners, built for the long run, cost less in the long run!

TIPS ON INCREASING LINER LIFE . . . Write for free MECROME bulletins.

MECROME

FIGHTS FRICTION TO THE FINISH

METAL FINISHERS, INC.

1725 East 27th Street, Cleveland, Ohio 44114
Tel. MAin 1-0511 (Area Code 216)
3125 Brinkerhoff Rd., Kansas City, Kan. 66115
Tel.: DRexel 1-8501 (Area Code 913)
In Canada: National Hard Chrome Plating Company, Ltd., Toronto, Ontario

the manufacturers have spent a lot of money and employed the facilities of the General Electric Company and their computers and some of their brains. We are presenting a paper at the annual meeting of the Railroad Division of the ASME next month, giving the conclusions of that work.

MR. T. H. TEMPLE (Superintendent Motive Power, St. Louis - San Francisco Railway, Springfield, Mo.): Mr. Riegel, I believe the steel industry can do a lot for our wheels if they will watch their Brinell. I know the AAR and A, B, and C wheels are, but so many times the locomotive builders will give us a locomotive with a wheel on one side of 270 Brinell and the other wheel on the same axle will be 371. We wear out wheels and then we have to go in and cut the wheels.

We on the Frisco know there are some new heat treatment processes going on. We have a test going on right now in that area, and we are also working with the wheel builders to hold Brinell tolerances a lot closer. Also, rim thicknesses. There is a lot going on.

I do believe the builders are not watching wheels as closely as the railroad people are. We are continually having to turn wheels prematurely on account of a soft wheel on one side.

MR. HARLEY: Mr. Riegel, what kind of tolerances on hardness are you normally working to?

MR. RIEGEL: They are in the specification, and there are three different types of heat treatment. Class A is the softer wheel; B is a little harder, and C is a little harder than that. There is a range for each one. The wheels should meet the specification requirements. You should get what you order and what you are paying for.

MR. HARLEY: Would there be as much range in the specifications for a Brinell or whatever Mr. Temple is talking about? In other words, do we have too much range in the specification?

MR. RIEGEL: No. You have to have a range as a practical matter for a manufacturing process, but I cannot visualize how you would get a Class A wheel on one end of an axle and a Class C on another.

MR. HARLEY: You aren't doing that, are you, Mr. Temple?

MR. TEMPLE: I disagree with Mr. Riegel. We get wheels in the B range. You know tolerance is allowed to go down to 297 and up to as high as 347. There is an overlap from B and C, and B and A. We on the Frisco match Brinell and tapes, but it becomes quite a laborious process because we are continually having to check our wheels. We have to buy them from vendors. You have a few Edgewaters left over, and a few U. S. Steels coming in, and it is difficult to match wheels. We are holding Brinell and holding tape. It is hard to deal with.

I will say another thing for locomotive builders: They are going to have to start matching Brinell and tapes also to make the locomotives run properly.

MR. EARLY: **We have been faced with this problem for the past several years.** We have been keeping accurate records on the wear life of a pair of wheels, and we have noticed that in locomotive sets there has been a gradual tendency for the mileage to be less and less each year, even for the same type of power.

This began to show up particularly after we installed our wheel truing machine. The wheel truing machine became a factor. The operator might be left to his own devices. If you don't check behind him you are going

MAGNUS Products—for Extra Quality and Top Performance

- JOURNAL BEARINGS
- TRACTION MOTOR SUPPORT BEARINGS
- BRASS & BRONZE CASTINGS

MAGNUS METAL CORP.

NEW YORK — CHICAGO

to find that he may be cutting away metal that should not be removed.

If there is a slight hollow wear in the tread itself after the operator has a full contour on the flange, he will want to clean that up too. Within one month the tread contour is right back to where it was before he took the 1/16th off to remove the slight hollow wear.

We have encouraged our wheel machine operators to use horse sense when using the machine, and to make sure they do use horse sense we insist that the supervisor in charge of the wheel machine have wear measurements of the tread before the wheel truing, and afterwards look for a witness mark; and if he finds the man cut out the witness mark, or if there is a lot of metal taken off, the supervisor will be in a position to correct the situation.

We suspect (and I think a lot of you might do some investigating too) that the wheel operator may be sometimes wearing the wheels a lot quicker than the locomotive does.

MR. HARLEY: Mr. Derner, maybe you can shed some light on this subject.

MR. C. H. DERNER (Master Mechanic, Pittsburgh & Lake Erie Railroad, Pittsburgh, Penn.): We purchased twenty-two of the new U 28-B General Electrics, and we were going to try to save on reducing high flanges by not having to cut them, by the application of a flanged composition shoe. The first unit was delivered in February 1966; in April we were in trouble with flange, thermal cracked wheels. By December 1966 we removed the flanged composition shoe and went to a non-flange shoe. Since December 1966 we have not cracked a wheel.

What have we done? The wheel is a simple machine. When the heat input to the wheel exceeds its ability to get rid of heat, you are going to have a thermal crack. We went to the source of the heat to the wheel. We applied to our speed recorders a simple piston, and we recorded on our speed tapes the use of the independent brake on the lead unit. On the trail units of a consist any application of the brake is indicated, and therefore we analyzed tapes by consists. We turn in as a violation to the road foreman anything in excess of 1/8 inch on the tape or exceeding 15 lbs. pressure. The road foreman has to gather his train consist tonnage, go to the profile chart, and list this as a proper or improper use of the independent brake. In other words, you are either living up to the railroad's braking rules or you are not.

This has changed the operation of our railroad. We have train crews, now, who are using the load of the train behind them to slow them down instead of grabbing hold of the independent. **This has improved operations and reduced drastically our thermal checking of wheels to none in nine months.**

We went to the four suppliers of a B 40 inch wheel and found that the manufacturer in the lowest range of that hardness gave us the longest life. **In fact, that manufacturer has three units still running, through all this, that have not cracked a wheel.**

So, we still think a better wheel can be made. One of the vendors of the wheels told us that if he had known we were going to flanged composition shoes he would have supplied us a different wheel. **We still ask what wheel that would be. We don't know.**

We are trying to upgrade the operation of our railroad and the men who run the units. If you don't have to grab hold of the independent — and, by the way, we didn't buy any

THE STEAMRITE METHOD

For Heating Long Trains

AS-171 Main Steam Valve —

To deliver full steam generator output into trainline with negligible pressure drop.

AS-181 Steam Generator Regulator —

To hold steam delivery pressures above 275# from low fire to high fire.

TDA-45 Electronic Outfire Relay

Pilot light gives visible witness of safety circuit.

AST-10-5 Electronic Blow-down Timer —

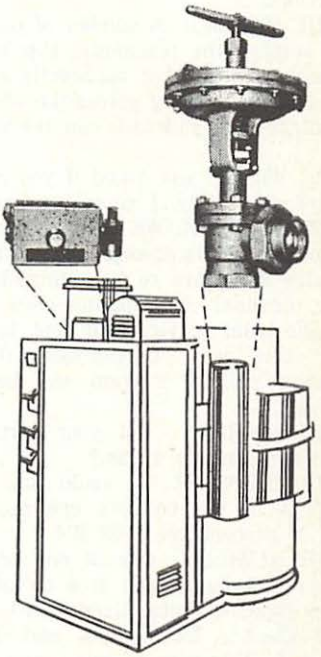
To blow down generators at accurate time intervals.

Durabla Check Valves

To hold water ratio in generator.

Steamrite # 14 —

For quick, safe de-scaling of steam generators.



AUTOMATIC STEAM SALES CO.

80 EAST JACKSON BLVD., CHICAGO, ILLINOIS 60604

dynamic brakes, which could have gotten us out of this trouble — but we are changing the method of operation of the trains that are going along with the newer high horsepower locomotives.

MR. HARLEY: Did you retain the pneumatic slip suppression?

MR. DERNER: We did not remove the pneumatic slip suppression brake, and we use a pencil on the tape to let us know each and every time the wheel slip suppression brake is activated.

MR. HARLEY: A number of roads did remove the pneumatic slip suppression feature, but apparently it is not a uniform thing across the whole country. Some railroads can live with it.

Mr. Weaver just asked if you mix power. Obviously, I guess you can't.

MR. DERNER: We use U 28's, and all of our GP 7s downgraded to yard service and have to be returned to the terminal for maintenance in freight train service and sent back the other way. Occasionally they operate pulling a train by themselves.

MR. HARLEY: But your normal consist is purely U 28s?

MR. DRENER: I would say 70 percent of the consists are mixed and 30 percent are U 28 B's.

MR. HARLEY: One of our problems did occur in the area of using other types of units mixed with General Electric locomotives, and certainly in the case of some consists we were perhaps asking for 14 percent adhesion on older low horsepower units, while we might be asking for 24 percent adhesion on a GE locomotive back in the consist.

What obviously was happening was that the GEs under bad rail conditions naturally could not hold 24 percent rail adhesion, and we were operating the pneumatic slip suppression system continuously and raising the temperature of the wheels to the point where we did get thermal cracking. We discontinued the system, and we are currently using a system more similar to other locomotives.

MR. GARIN: **We are certainly very much interested in the wheel problem, and in defense of the wheel industry I am continuously amazed at how the wheels can take the added punishment we are constantly putting on them with as good results as we get.**

However, we certainly hope there will be improvements in the future. When we first got our high output locomotives we were rather distrubed at the short calendar life on wheels. Then we started looking behind the scenes, and correlating our horsepower miles per wheel compared to our old 4-axle low horsepower units, and if you look at it from that angle I think you will find that you are not as bad off as you might think when you look at calendar life alone.

Our new units are making more miles. The torque put through the wheels is much greater, and there are other aggravating factors, including the use of 6-axle versus 4-axle units.

One question I would like to ask is this: I know the Chicago & North Western's Mr. Barth has been doing some work on evaluating heavy flange versus thin flange diesel wheels, which seems to us like a step in the right direction, in that flange wear is one of our particular wheel problems on mountainous territory.

Is there any other railroad that has information available on wide versus narrow flange diesel wheels? Mr. Barth is here, and he may care to comment on his work.

MR. TEMPLE: The Frisco is the

SLOAN BRAKE PIPE ANGLE COCK

EFFICIENT OPERATION • LONGER LIFE • REDUCED MAINTENANCE COSTS

The SLOAN Brake Pipe Angle Cock, designed to meet the needs of modern railroading, has established a completely new set of angle cock standards through its many new and exclusive features.

1. A synthetic rubber seal is held against the cast brass ball by spring washers. This design automatically compensates for wear and maintains a positive seal to prevent leakage.
2. Handle operation is smooth and positive for efficient control.
3. Handle pivots on a stainless steel roll pin and is held firmly in place by a stainless steel spring in some models.
4. The Body and Handle of Sloan's Angle Cock are made of tough malleable iron for greater strength—and, together with the locknut, are completely Parkerized for protection against rust and corrosion.
5. The universal connector can accommodate either an *unthreaded* air pipe or a *threaded* air pipe. Threaded air pipes are flexibly connected, yet locked in so that they cannot blow out nor crystallize and crack from vibration.
6. Exclusive of the body which never wears out, all operational parts can be easily and inexpensively replaced on a bench. No machining, grinding or lapping required.

The SLOAN Brake Pipe Angle Cock is approved by the AAR for interchange service and more than 100,000 are already installed on cars of Class I railroads. There are four models available to meet all installation requirements.

SEND FOR CATALOG SC-200

SLOAN RAILWAY PRODUCTS DIVISION

SLOAN VALVE COMPANY

4300 WEST LAKE STREET • CHICAGO, ILLINOIS 60624

National Sales Representative • HARBIL, INC., 224 S. MICHIGAN AVE., CHICAGO, ILL. 60604

one that started that project, not the North Western. We have possibly ten units with the one-wear wheel flange on multiple wear wheel. I think you will find that the first locomotive we turned out gave us 240,000 miles prior to turning on a new wheel on this particular consist. **We are finding that the high horsepower has not affected the mileage of our wheels at all. We are still doing the same that we did before.**

With this new wide flange wheel on our railroad we see possibly 500,000 miles from new to scrap. That is our goal. That is a certain number of truck changes along with refinements in the total truck.

My remarks a few moments ago weren't critical of the steel industry, but we will have to work with them and they with us to keep wheels. **If we match wheels, Brinell and tape, you will find you will have a good operating locomotive. That goes for the supplier as well as the builders of our locomotives.**

We had a very disheartening thing take place recently. One of our new units had a real soft wheel on one side of the axle and a hard Brinell on the other side. If a railroad has high torque you will naturally wear the soft wheel down much more rapidly than you will the harder one. As a result a sluing takes place in the truck and then you start cutting a flange. This was very evident.

I will say that we ought to start talking about matched wheels and tape and Brinell. You don't always get the wheels the way you like them. We put the softer ones on the switch engines and the best wheels on the road engines.

MR. TURNBULL: **I still think the monkey belongs on the backs of the manufacturers of the wheels, and I will insist on it until they begin to do something about it.** They will give you Class A wheels, Class B wheels and Class C wheels. Henry Ford would give you any kind of Ford you wanted provided it was black, black, and black.

The men say that if you have thermal cracks, use a composition shoe. Then you get wheel grooving. They still give you Class A, B, or C. Then they tell you to go to disk brakes. If you do that, or if you go to dynamic brakes, one or the other, you begin to get some wheel spalling, and the wheel manufacturers will still give you Class A, B, or C. I still think it is getting hot in the kitchen. **We want better performance.**

MR. HARLEY: You have had wheel problems on MUs, haven't you?

MR. TURNBULL: Sure. It is getting to be more emphasized in MU cars and electric cars. Here we have a greater tendency for the wheel to turn in relation to the rail, both in dynamic braking and in acceleration. We have acceleration above 2 mph per second and closer to 3 mph in many cases. Dynamic braking is the same. **Wheels cannot take what we want to give them. Performance is really down. I think the steel companies have to come out and help us.**

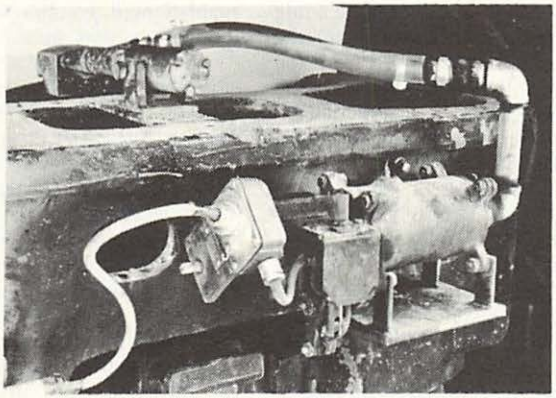
MR. A. N. BISGARD (Assistant Chief Mechanical Officer, Denver & Rio Grande Western Railroad, Rio Grande Building, Denver, Colo.): Can wheel life be improved by better operating procedures?

MR. HARLEY: I think Mr. Derner has largely answered that question. Yes, there is no question that wheels can be abused by poor operating procedures. Apparently what they have done, by using pens on their speed recorders to indicate abuse, has paid off. **At least the impression I got was that they have just about put out the fire.**

RAY FLANGE LUBRICATORS

Puts the grease . . .	*And is always . . .*
WHERE YOU WANT IT	**DEPENDABLE** — Always works under any and all conditions.
WHEN YOU WANT IT	**RELIABLE** — Will not break down or get out of adjustment.
HOW YOU WANT IT	**SAFE** — Is welded solidy to the Wheel Housings.

THE RAY FLANGE LUBRICATORS ARE THE ONLY FLANGE LUBRICATORS SOLD OR LEASED WITH AN UNLIMITED THREE YEAR GUARANTEE FOR PARTS AND PERFORMANCE.



ALBERT E. OWEN & CO., INC.

3431 S. E. Franklin Street
Portland, Oregon 97202
Area Code 503, Phone 236-4513

MR. DERNER: **Since December we haven't cracked a wheel.** We are still crossing our fingers as we go on with the wheel performance study.

5. Diesel Sanding:

MR. EARLY: This operating procedure, particularly with the sanding; early in the days of dieselization we had the latching type sand valve or sand switch, and the operator could sand the whole time on a grade and lay a lot of sand on the rail, which made a heavier load on the train being drug up the mountain. To overcome this we standardized on the non-latching type of sanding valve or switch. Even then the operators will carry pegs with them so they can peg the sand in forward or reverse as the case may be.

In order to get a control on that, we have put a device on our speed recorders to indicate on the tape how long sanding is on. We are not telling the people which speed recorders have these devices on them. If we get a tape that shows the sanding has been put on all the way up the mountain, which we can tell from the profile, we will handle this with the appropriate parties for correction.

6. MU Car Maintenance Costs:

MR. ROBERT M. STACY (Assistant City Transit Engineer, Department of Public Property, Philadelphia, Penn.): I might explain first that I represent some of the sometimes termed "encroachment" of government into the private transportation industry. **The City of Philadelphia is putting many millions of dollars into rail commuter service in preference to building highways at much greater expense, so as to transport large numbers of people. This has led us straight into the railroad business.**

We own 113 MU cars which are classed by the Department of Transportation as locomotives. Mr. Harley, and Mr. Weaver here of the Pennsylvania, operate 58 of them, and Mr. Butler, of the Reading, operates the remaining 55.

We are also billed on a monthly basis for the cost of operation of this equipment. **One of the most embarrassing things facing us is that a large group of cars built new in 1963 are operating at a much higher cost per mile than another group of cars which were built in 1931 and modernized in 1964.**

Thus we encounter the same problem you fellows do with railroad management: How do we justify the money for new equipment if it is going to cost two to three times as much per mile to run it? That is what the city council will ask you, and it also is what the railroad general manager, presidents and boards will ask you.

Believe me, gentlemen, this is growing into a real problem. We are getting some of this newer and more sophisticated equipment far less reliable than that built 30 years ago.

One remark on the accounting situation: Striking us recently in line with this business of keeping up to date on costs was the billing of work done in the manufacturer's service shop for some 55 traction motors which were damaged winter before last. Railroad costs were not tabulated until almost a year later. We are still trying to untangle that mess, because it indicates that the cost of operation skyrocketed the second winter, which actually was not true. The problem here involves timing, computers, and accounting, and I suspect it is more widespread than this particular instance.

I am glad the subject of wheels has come up, because that is one of the questions into which we really have our teeth.

POWER PARTS COMPANY

Distributors for

UNITED STATES RUBBER COMPANY
VICTOR MFG. & GASKET COMPANY
IDEAL INDUSTRIES, Inc. SPRAGUE DEVICES, Inc.
SIOUX TOOLS ALBERTSON & CO., Inc. STRATOFLEX, Inc.

All orders are shipped the same day as received.
Our motto is "FIRE WAGON SERVICE" on all orders.

1860 No. Wilmot Avenue, Chicago, Illinois 60647
Telephone: (312) SPaulding 2-4600

Emergency service and delivery available any time of day or night.

US RUBBER

Distributor for United States Rubber Co.

Alert Mfg. & Supply Co.

1848 Wilmot Ave., Chicago, Ill. 60647
HUmbolt 9-7055

We Can Serve You On

SHOCK, IMPACT AND VIBRATION PADS
INDUSTRIAL ADHESIVES & COATINGS
RAIL ANCHOR SHIMS
SHORT OR LONG RUN FABRICATION OF
RUBBER - COMPRESSED ASBESTOS - BELTING
ALL NON-METALLIC GASKET MATERIALS
ALSO
HOSES • COUPLINGS • ASSEMBLIES

We have cars which have both on-tread and off-tread brakes. We also have the same type car in the same service with both types of brakes. The cars with the tread brakes have Class C wheels with composition shoes, and if you look in the Wheel and Axle Manual you will find it says "Don't ever do it." However, the Wheel and Axle Manual was built around experience with cast iron shoes.

We are trying to write a new chapter. We don't know yet how it will work out. We have our fingers crossed. So far, for 30,000 or 40,000 miles, so good. We have to wait until the wheels get worn and the rims get thin to see whether they will remain intact or tend to thermal cracking.

The one says "composition shoes," one is not talking just about one type of shoe; one may be talking as many as 100. There are composition shoes which will groove wheels badly. There are some that are in between, and there are some that do an all-around good job. We are starting with some now that seem to be doing well.

There are also flanged and flangeless brake shoes. This has already been mentioned. Flanged shoes of the cast iron variety have been known to cause much thermal cracking. The advantage of the flanged shoe of course is that it stays in line with the wheel.

MR. HARLEY: George Weaver has been doing quite a bit of work in this area, as you know. Maybe we ought to ask him to make a few comments.

CHAIRMAN WEAVER: We are very cognizant of the problem we have with the PSIC cars, as we call them, and also the bone of contention between the Pennsylvania Railroad and the wheel manufacturers and a few others as to whether we should run a Class C wheel with an on-tread brake and a composition shoe.

I think you have to recognize that the interchange rules say you do not take a Grade C wheel and an on-tread brake. However, these cars do not run in interchange, so we can forget that aspect of it.

We have run numerous tests through the years trying to prove a point of increasing our wheel life with our commuter cars, and I doubt if there is any place in the country that has any more severe braking than we have on our main line between Paoli and Suburban Station.

Our series of tests proved conclusively that, first of all, we were not confronted with thermal cracking from the standpoint of on-tread composition shoes with the Grade C wheel. We also found that you can run a flange brake shoe on those wheels without getting into any serious trouble.

There is no question that there are all kinds of composition shoes. We learned the hard way, even to the point of getting some very unusual tread patterns and turning wheels at about 25,000 miles.

I think our biggest problem at the present time is with the spalling that we get. I, for one, feel that this is a matter of acceleration. We are attempting to overcome this by going to the on-tread brake, utilizing the grinding action, for want of a better word, that you get with the composition shoe — in other words, dressing that wheel as the brakes are applied. We feel that we are going to reduce this spalling effect.

I am satisfied in my own mind that is one of the advantages that we will gain by going to on-tread brakes rather than operating with the disk brake particularly in this type of service.

I think I made the comment here last year that I observed on the

PEERLESS TOOLS

Now a DIVISION Of CAM INDUSTRIES, INC.

HANOVER, PENNSYLVANIA

For many years PEERLESS Tools have served railroad repair shops throughout the United States and many foreign countries. Formerly produced by Electric Service Manufacturing Company, Philadelphia, they are now manufactured by CAM Industries, Inc., Hanover, Pennsylvania. Our engineers are equipped by training and experience to help you select the proper tools for every job. They also offer you expert assistance in shop planning and layout as well. Please feel free to call upon us for suggestions and recommendations without any obligation.

CHARLES A. McGOUGH, JR., President

Announcing — New Tools For The Motor Shop

SINGLE PURPOSE TOOLS

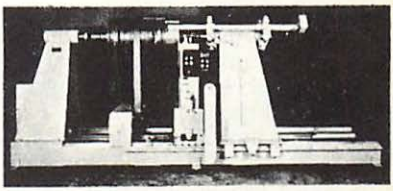
The PEERLESS Line includes fully automatic and semi-automatic Undercutters, Banding Machines with glass tape and wire tension devices, Seasoning and Grinding Machines, Coil End Brazing Machines, Armature Winding Stands, Traction Motor Up-Enders and Motor Frame Stands. Low cost, medium duty, hand operated Undercutter and other tools for general shop use also available.

MULTI-PURPOSE TOOLS

An amazingly versatile machine, the EHP will handle a variety of repair work for large and small armatures. Equipped for banding, undercutting, turning and grinding. New type tension device will handle glass tape as well as wire.

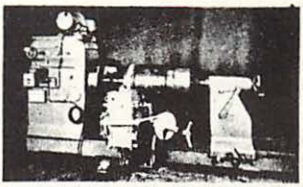
LATHE ATTACHMENTS

Abrasive Cut-Off Machines, Undercutters, Commutator Grinders, Glass and Wire Tension Banding Machines, Coil Winders and many other tools are included in the PEERLESS Line of equipment for small shops.



DS Undercutter

Fully automatic Peerless Type DS Heavy Duty Commutator Mica Undercutting machine will handle complete range of traction motor and generator armatures.



TS Banding Machine

New Type TS Peerless Banding Machine with Type TSC Peerless Combination Glass Tape-Wire Tension Device — rated 800 pounds tension also available attachments for re-rolling wire bands and power operation of carriage.

British railways that they ran into the same general type of wheel problem with spalling with the disk brake operation, and they did not have quite as high an acceleration rate as we have over on the Pennsylvania.

I would like to make another comment if I may, Tom. I notice Mr. Longhurst just came in. We are certainly happy to have you with us, Howard. Mr. Longhurst is from the Department of Transportation.

Do you have any comments, sir, about this or any other area we have been discussing?

MR. HOWARD R. LONGHURST (Acting Director, Bureau of Railroad Safety, Federal Railroad Administration, Washington, D. C.): Thank you, no. I came in just a few minutes ago. I am enjoying listening.

7. Oil Cooler Core Mileage:

MR. LUTHEY: In setting up your oil cooler core mileage, do you have any special stipulations or instructions about changing out the oil cooler core any time or in the event the engine burst or cracks a liner, loses its water and overheat?

MR. HARLEY: On our particular property (and I want to check it out with some of the other properties represented here) we will clean the oil cooler when we make a power assembly changeout. We will also clean it if we experience oxidized oil at high temperatures.

There is no rule in effect for cleaning the lube oil cooler in the event of a failure of an individual power assembly. How about some of the other members of the Committee commenting on this question?

MR. EARLY: If we have a piston failure we remove the assembly. If we see metal imbedded in the bearing, we will pull the lube oil cooler and clean it, because we have the complete lube oil system cleaned up after a parts failure.

MR. LUTHEY: We don't have it quite tied down like perhaps we should. There is a little difference of opinion. If I say an engine works water, I particularly have reference to some water leak whereby you either have had main bearing failure or a near failure, where you have to go through your mains. If the engine has been in service for quite a while, you break loose quite a bit of carbon or oxidation. I have found that you will get a lot of deposit going out of the engine into the oil cooler core. That is where the mileage figures get off, as to how long a core will go.

As a general practice, if an engine works water — of course some of the steam evaporation will loosen up the carbon, and you then should change the oil cooler core.

MR. HARLEY: It is just the fact that you have water in the system?

MR. LUTHEY: We say the engine worked water.

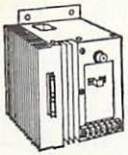
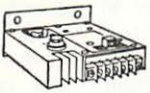
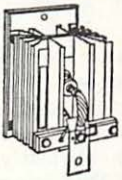
8. Engine Air Filtration:

MR. HARLEY: Are there any comments on the subject of engine air filtration? This has been a real hot subject in previous Committee meetings. I am sure it is not a completely dead subject.

VOICE: How much better performance can be expected from oil bath engine air filters, and how do the tests of different people compare the oil bath with the paper and the disposable or old type impingement?

MR. GARDNER: We have done quite a bit of work on that subject. From what we can see, the comparison between the oil bath and the paper is that the difference is insignificant, almost unmeasurable. We have seen the results go either way because the difference is so slight.

Both of those filters — and I am guessing at the figures now, and I

Now

YOU NEED LOOK NO FURTHER THAN

General Systems

for any type of generator or auxiliary generator control equipment for any railroad application.

This brief listing is indicative of the wide variety of standard General Systems components and control systems presently available. It is equally indicative of our capability to design whatever similar, special equipment you may need.

MODEL 101 SERIES
(completely solid state)
Voltage Regulators
Current Limit Controls
Reverse Current Rectifiers
for standard systems
to 335 volts and beyond

LVR SERIES
Lamp voltage regulators
for 12 and 32-volt
applications, primarily
railway cabooses and
baggage cars

EVR SERIES
8 standard models
separate or inclusive
control functions in
one package for 37 and
75-volt applications

TVR SERIES
2 standard models
single control units for 12
and 37-volt applications

COMPLETE
FACTORY PRE-WIRED
CONTROL PANELS

AUXILIARY EQUIPMENT
AS NEEDED—
Rectifier Bridge
Train Control Converter
Pole Changer
Current Splitting Shunt

PRODUCTS OF *General Systems, Inc.* ARE DISTRIBUTED BY

THOMAS A. EDISON INDUSTRIES
PRIMARY BATTERY DIVISION • BLOOMFIELD, N. J. 07003
IN CANADA 75 BROWN'S LINE, TORONTO 14, ONTARIO

McGRAW EDISON

We welcome your inquiries

don't remember them exactly, but it seems to me they are both over 90 percent efficient, using the test methods we use. This does not mean that you will find them 90 percent efficient in actual service, because you get kinds of dirt that we did not test with, obviously; but it is a comparison. This compares to around 72 or 73 percent with the older type filters.

MR. HARLEY: Don't you also have an advantage in the event of a bleed blower failure?

MR. GARDNER: Yes; you are not dependent on a bleed blower at all.

MR. HARLEY: I think this has been the trend. Certainly it looks this way, from what the builders have been producing lately. They are not depending on the bleed blower any more to protect the engine.

How about the other builders?

MR. E. A. HANSEN (Application Engineer, General Electric Company, Erie, Penn.): We have used oil bath filters in all of our locomotives so far, so we don't have any comparison with anything other than that. There are some paper filters on test on one group of locomotives, but I don't think they have run long enough for us to get any evaluation on their effect on the performance of the engine.

MR. C. G. MacDERMOT (Assistant Manager, Alco Products, Inc., Schenectady, N. Y.): For engine air filtration, most of our Century line locomotives have been built with a two-stage system using inertial type elements as the primary filter and four panel type oil bath elements as the secondary filter. We feel this arrangement has provided excellent engine protection, with satisfactory overall performance as a system.

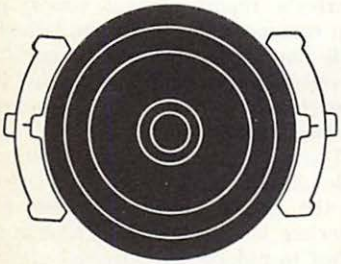
On a test basis, we have equipped a few locomotives with paper filters, using the same configuration as above, except that the panel bath elements were replaced with special units containing many pleated paper elements. Our experience with this test is insufficient at this time to draw any conclusions about the relative merits of this type of filtration. It may be in order, however, to discuss some reason why paper filtration would be attractive if it can be made economical.

First, with oil bath cleaners, there is always the liability of oil carryover due to overfilling or careless reassembly of the filter at time of cleaning. Oil carryover is undesirable on a turbocharged engine as it tends to encourage the build up of dirt on the turbo's inducer, impeller and diffuser, and on the after-cooler, if one is used. Paper filters would eliminate this hazard.

Secondly, with a turbocharged engine, it is not unusual to have a surge in the air induction system if engine speed is reduced suddenly from full power condition. This is because the engine's ability to consume air has been reduced more quickly than the turbo's capacity to pump air: the result is a "surge" or puff of air back through the intake system. Such a surge may blow oil out of the panel bath filters into the intake plenum, creating an unsightly mess and necessitating addition of oil to the filters. One can theorize that with paper elements such a surge might actually blow some dirt off the elements and thus be beneficial.

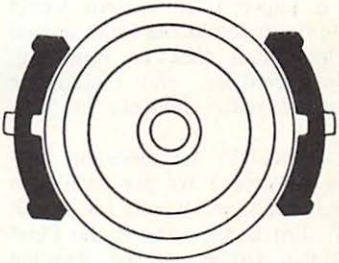
On the negative side, present indications are that maintenance of paper filters would be more expensive due to the cost of replacing disposable elements. In all but a few applications, the panel bath filters in our two-stage system perform satisfactorily on a six-month cleaning cycle. To be economically attractive

The Griffin® pressure poured steel wheel



Lasts longer . . . . tougher flange and tread . . . . only two tape sizes . . . . 100% ultrasonic and magnaglo inspected.

The Anchor® composition tread brake shoe



Longer shoe and wheel life due to more stable frictional characteristics . . . . less braking force required . . . . lower maintenance per train mile.

GRIFFIN® WHEEL COMPANY

445 NORTH SACRAMENTO BOULEVARD, CHICAGO, 60612

ONE OF THE Amsted INDUSTRIES

CENTRAL REGIONAL EXECUTIVE
F. G. FISHER
Gen. Mgr. Oper.
Reading Company
Reading, Penn.

J. J. BUTLER
Chief Mech. Officer
Reading Company
Reading, Penn.

then, a paper filter system would have to be maintainable at an annual cost less than that of removing, cleaning, refilling, and re-applying four panel bath elements twice a year.

MR. HARLEY: Are there any last-minute questions? We are running a bit short on time. If not, I will call on Mr. Jim Butler, who is the Chief Mechanical Officer of the Reading Company, substituting for Mr. Fisher.

MR. JAMES BUTLER (Chief Mechanical Officer, Reading Company, Reading, Penn.): I am sure Frank Fisher is very disappointed not to be here to make this summation. This is the first time since 1938 that he has missed giving a speech. He did give me a few words to say about Tom's report, and I condensed it into a page and a half.

9. Standardization:

Having the benefit of the preliminary report several weeks prior to the printed annual Pre-Convention Report, **I was able to review Mr. Harley's report several times and am convinced that we as an industry still have a great deal of work in developing standards, both in approach and methods for our diesel maintenance.**

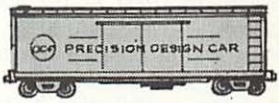
The report reminds us, under the title of standardizations, that many of the railroads will be faced with interline locomotive operations in an effort to reduce their over-all operating ratios in an effort to survive.

The interchange of locomotives will force us to analyze our procedures so that we conform with maintenance standards beyond those we ever dreamed of between steam locomotives and the early dieselization. As individuals we naturally value our opinions and beliefs; **but costs are skyrocketing, and every avenue must be analyzed to keep the costs at the lowest level possible.**

Mergers have proven the point that individual modifications have cost a lot of undue expense of conversions for multiple unit operation when various railroads merged, and I am

If it's

you can carry it better in

, and if it's in a or something like that, our 

gives you more payload by eliminating up to

. Cushioning? Save more weight with the no-springs

. And in -back operations you can secure the quickly and safely with an ACF

. In fact, just about anything that rides the rides them better with products from acf ACF INDUSTRIES . Any ?????

certain that many merger studies have indicated that additional expense would be necessary as mergers proceed.

The survey reported on in the report indicates that a majority of the railroads do follow general and similar procedures. Specifically, it is noted that the use of wheel truing machines has effect on the majority of railroads. The disturbing thing, however, is the mileage we are obtaining on our wheel life. **I have heard many contributing factors to this loss in wheel life, and am of the personal opinion that the technology of wheel design must be accelerated because it is getting worse rather than better.**

The report touches on computer control, and I am certain that most of us realize that only the very large railroads are in a position to put their locomotive maintenance on their computers. Programming locomotive servicing and maintenance will take a considerable amount of time, and most railroads are presently concentrating on car service, car distribution, car utilization, and many other operating aspects other than maintenance. **The time will come, however, when we will be required, from an efficiency standpoint, to program diesel maintenance with historical data.**

The Committee is to be commended for this report because it is another step in the valuable aid that the Locomotive Maintenance Officers Association provides to the mechanical departments of the railroads to identify the general scope of thinking of locomotive maintenance. Therefore, I recommend that each mechanical department officer re-

For Outstanding Quality and Performance . . .
Standardize with "SAFETY" Equipment!

Genemotors
Generators
Caboose Generators
Regulators
Relays
Switchboards
Air Conditioning Equipment
Motor Alternators
Motor Generator Sets
MOTORS
Dual Voltage MG Sets
Dynamotors
Traction and Generator Drives — Drive Shafts — Clutches

SAFETY ELECTRICAL EQUIPMENT CORP.

NEW YORK • CHICAGO • PHILADELPHIA • RICHMOND
ST. LOUIS • SAN FRANCISCO • NEW HAVEN • MONTREAL

4400 HORSEPOWER MODULAR LOAD BANK

Mosebach Manufacturing Company Now Applies Its Dynamic Braking Resistor "Know-How" To The Problem Of Railroad Locomotive Stationary Load Testing.

We now offer the following features to the Railroad Industry:

1. A Unit designed for a single 4400 H.P. Test or two simultaneous 2200 H.P. Tests.
2. Future additions of 2200 H.P. Modules eliminates Obsolence.
3. Optional Automatic Circuit Finder and Alarm System to insure proper switching sequence for selected point.
4. Optional Remote Load Indication.
5. Thirty-six test points at 4400 H.P., Nineteen test points at 2200 H.P. insure workable range for any test.
6. Continuous-Duty Resistors and Constant Speed Heavy-Duty Fans delivering up to 90,000 CFM Continuous Air flow insures maximum resistor life.
7. Force Ventilated Switch and Bus Return.
8. New Design Metal Supports for Resistor Coils to increase service factor and lengthen Resistor Life.

For The Ultimate In Load Bank Performance And Value, Call First On

MOSEBACH MANUFACTURING COMPANY

MANUFACTURERS OF INDUSTRIAL MINE AND RAILROAD EQUIPMENT
1115 ARLINGTON AVE. • PITTSBURGH, PA. 15203 • (412) 431-0575

view this report thoroughly and determine the areas in which they are operating their particular maintenance programs.

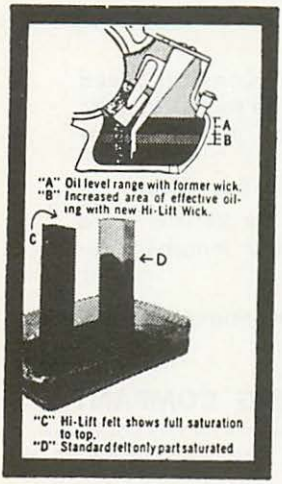
There are so many variables between railroads as to their ownership and outstanding characteristics of the railroads, areas in which they provide the service and many other demands that make it difficult to say that what works on one railroad will work on another. **But as a whole, there are many areas that should be similar and the report does indicate that as an industry we are moving toward this level.**

PRESIDENT BEISCHER: Thank you very much, Jim. And thank you, Mr. Harley, for this most informative and worthwhile presentation on the part of yourself and your Committee.

I have asked that we terminate our discussion period just a little bit early today because we are most singularly honored. We have with us in our audience today (and I will ask him to come forward for a moment and speak from the rostrum) Mr. Howard R. Longhurst, Acting Director of the Bureau of Safety for the Federal Railroad Administration.

You have heard earlier in our program today of the change that is coming about through the revision of the rules for locomotive inspection which become effective at 12:01 a. m. on October 15 — not very far away. I don't believe very many of you are aware of the tremendous work that has gone into the changes represented in these rule changes that we will now live under.

Without the leadership, the intelligence, knowledge, and years of experience of Mr. Longhurst in the interpretation and application of these



How Miller Hi-Lift Wick Lubricators cut maintenance costs

Here's a locomotive traction motor lubricator that offers 40% greater oil lift and doubled oil capacity. *Upper* picture shows increased oiling efficiency provided by Miller *Hi-Lift* wick lubricator. *Lower* picture illustrates simple test that proves greater oil-lifting ability of *Hi-Lift* felt. *Hi-Lift* felt segment ("C") is completely saturated to top with oil. Standard felt ("D") has unsaturated, white area at top. Both are same size and were placed in tray before oil was added. Details available from your locomotive builder or write direct to:

MILLER FELPAX, CORP.
Winona, Minn., Telephone 2381

HŌ-TEL'

AN ESTABLISHMENT PROVIDING
BEDROOMS, BATH, ETC., AND USUALLY FOOD,
FOR THE ACCOMMODATION OF TRAVELERS.

OUR ETCS. ARE FABULOUS

The first great etc. you notice at Sherman House is *where we are.* Right smack in one of the most exciting places in the world—ever-changing downtown Chicago. Then there are etcs. like our Well-Of-The-Sea, world renowned sea-food restaurant . . . College Inn, America's first supper club . . . Celtic Room, meeting place of politicians and celebrities . . . 1500 rooms and suites from $10, etc.. But so much more than just a hō-tel!

SHERMAN HOUSE

Downtown Chicago's Only *Drive-in* Hotel—Randolph, Clark, LaSalle
Gerald S. Kaufman, President
Joseph L. Osajda, General Manager
Daniel Amico, Sales Manager
For reservations: 312/FR 2-2100 TWX 312/222-0631

rules, I am certain that we as maintenance officers would not be as well off as we are. I think we are more than just honored. It is indeed beyond anything that I had hoped we would have the opportunity to be treated to, and at this time I would like to ask Mr. Longhurst if he will come up here and speak to us — not too briefly, I hope — and give us some of the highlights of things that are taking place not only in the area of rules but also within the Federal Railroad Administration, and what they may mean to us as locomotive maintenance officers. Mr. Longhurst.

MR. LONGHURST: Mr. Beischer, I came in here to listen and to learn. After I heard you talking about someone by the name of Longhurst I began to look around. I wondered who that fellow was and where he was sitting.

Those are very kind words, and all I can say is thank you, even if they are not all true.

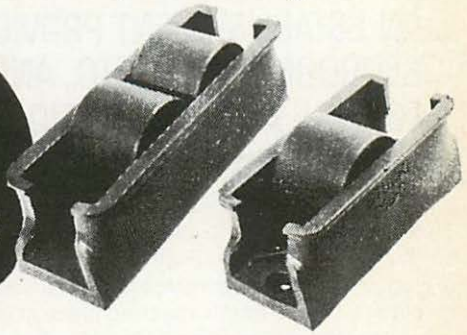
I would say that the new rules in Docket #243, will become effective October 15, in spite of many expressions of alarm that I have heard — and in many cases some of these expressions are quite startling.

We are trying to approach this change of rules in a very practical manner. We are not trying to impose any new, impossible or hard-to-live-with regulations on anyone. If any of you have any particular area in regard to the rules with which you are concerned, if you will call us or write to us or come to see us I can assure you that you and your problems will be given every consideration.

We are in a little bit different position now. In the Interstate Commerce

for PROVEN dependability...

STUCKI rolled steel side bearings



PRI MEMBER

A. STUCKI CO.
OLIVER BUILDING, PITTSBURGH 22, PA.

Electrical Equipment
Stays Cleaner...Longer

Generators Cleaned with New Antistatic* Turco-Solv Actually Repel Dirt!

*Yes, Turco-Solv...the standard safety solvent on America's Leading Roads...now contains an exclusive destaticizing agent that reduces static charge adhesion of dirt...actually **repels carbon dust!** Same perfect balance of evaporation rate, non-flammability and safety from toxicity. Same potent cleaning action. Only now, with new Turco-Solv, electrical equipment stays **cleaner...longer!**

CUT CLEANING FREQUENCY
AND COST WITH TURCO-SOLV

TURCO PRODUCTS, INC.
Railroad Division
Offices in all Principal Cities

PUREX

Commission we had one principal function, enforcement. Mr. Beischer, you will have to drop the word "Service". The Bureau of Railroad Safety is a part of the Federal Railroad Administration, which has a very definite interest in the welfare of the railroad industry as well as the promotion of safety, and I can assure you that the entire staff in our Bureau of Railroad Safety will do their utmost to not only fairly and equitably interpret the regulations, but also see if we can in some way offer some help to you with some of your problems.

If there are any specific questions, I will be happy to try to answer them. If not, just let me say that on October 15 the sword does not fall. We will be there doing what we can for the railroad industry.

Thank you, Mr. Beischer and gentlemen. I wish you a very successful meeting the rest of the week.

PRESIDENT BEISCHER: Mr. Longhurst just made an offer to answer any questions. If you wish to take advantage of his offer, please do so.

MR. HENRY C. JONES (Vice President, South Buffalo Railway, Bethlehem, Penn.): Mr. Longhurst, in regard to drilling the surface of air receivers, it says to drill them at 12 inch intervals over the entire surface. Does that include the heads of the receivers?

MR. LONGHURST: Yes, sir, it does. Let me say one thing. As the rule was originally proposed, it was proposed as a mandatory rule. I think you will note in the final report that came out that it is optional.

MR. V. L. SMITH: I have a ques-

SOUTHLAND

LUBRICATOR PADS...

the natural and correct way to lubricate journals

- contoured to fit easily into the journal box and against the journal.
- Highly oil resistant foam cores create constant supply of oil to looped lubricating wicks and onto journal surfaces.
- Extra heavily designed for long life and trouble-free service.

SOUTHLAND MFG. CO., INC.
711 Southampton Ave., Norfolk, Va. 23510
In Canada
Dominion Railway Car Supply Co. Ltd. Montreal, Quebec

AAR Conditionally Approved

WRITE NOW FOR DETAILS ON SOUTHLAND LUBRICATORS

Had your Punch-Lok® Clamp today?

FOR THAT "CLAMPING GOOD" FEELING . . . take Punch-Lok High Pressure Hose Clamps every time! Look for the letter "P" on the clamp . . . your assurance of no-leak, no-snag dependability!

©1964, Punch-Lok Co

See your distributor or write Punch-Lok.

PUNCH-LOK Company

"The Sign of a Good Hose Clamp"

Dept. D, 321 N. Justine Street, Chicago, Illinois 60607

tion in connection with the drilling of reservoirs. The Order which came from the Department of Transportation indicated that we would have to supply a certificate covering the construction of older reservoirs if we intend to drill them. I noticed in the AAR paper there was no mention made of the certificate. Is that still required?

MR. LONGHURST: The filing of those certificates will not be necessary with us.

MR. TURNBULL: I am Manager of Mechanical Engineering. There are many things you have in these changes — very small things such as you don't have to stencil the numbers on; now you can paint them on or use decals or whatever you want to. This makes sense to us. There are many things like that. We don't have to use glass but can use plastic, and so on.

Can we interpret this now as a precedent for more changes — more sensible changes like that?

MR. LONGHURST: I learned long ago not to stick my neck out too far, but I would say that we are going to try to take a very practical look at any future rule-making procedures that may come up. As far as we can, we will try to avoid any such technical details.

Thank you, gentlemen. As I said, and I repeat, if you do have individual problems don't hesitate to let us know about them. We will try to work out some sort of practical and worthwhile arrangement.

PRESIDENT BEISCHER: With words of reassurance to us that there will be a practical approach to any problems that these rules may impose upon us, and that we do have

MINER

CERTIFIED FRICTION AND
RUBBER DRAFT GEARS
HAND BRAKES
DOOR FASTENERS FOR REFRIGERATOR
CARS, TRAILERS, AND CONTAINERS

W. H. MINER, INC.
CHICAGO

SOMETHING USUALLY IS!

We're a *problem solver* organization. We're always on the track of new ways to do things better. We're specialists. RACON products are designed expressly for the railroad industry—and manufactured exclusively by EAGLE-PICHER. Our aim is not only to solve *today's* problems, but to meet tomorrow's needs as well.

SIGNAL PRODUCTS

Solid State Relays • Warning Devices, Audio and Visual • Grade Crossing Equipment • Complete Systems and Subsystems

MECHANICAL PRODUCTS

Locomotive Water Coolers • Locomotive Warning Beacons • Electronic Horns • Automatic Relay Resets • Railway Refrigerators

EAGLE EP PICHER **RACON RAILWAY PRODUCTS**

MANUFACTURED BY EAGLE·PICHER INDUSTRIES, Inc RACON

Racon Equipment, Incorporated • Box 1386, Joplin, Missouri 64801
Telephone (417) 623-8000

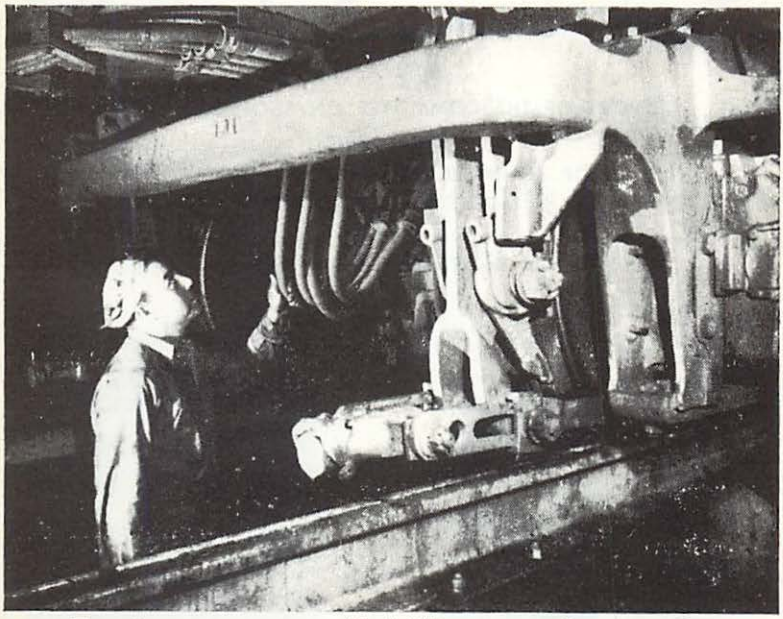
someone we can go to and talk over these problems, I am sure all of us (including myself) are breathing a lot easier. We certainly wish to thank you, Mr. Longhurst.

Gentlemen, this brings us to the conclusion of today's program.

On Wednesday the principal speaker at the luncheon will be Mr. A. Scheffer Lang, the Federal Railroad Administrator. I am sure considerable enlightenment on the role of the Federal Railroad Administration will be given to those of us fortunate enough to be there. I am told there are over 1,320 people scheduled to be at the luncheon, so there won't be room for very many more. This is a remarkable turnout.

At this time I would like to ask for a rising vote of thanks to Tom Harley and his Committee for a job well done.

KW
BATTERY COMPANY
Manufacturers of KW Premium Batteries for Diesel Locomotives, Car Lighting and Air Conditioning
3555 Howard St. Skokie, Illinois



For long-range reliability, use Anaconda Diesel-Electric Locomotive Cable (TYPE AD-90)

ANACONDA DIESEL-ELECTRIC LOCOMOTIVE CABLE, for exposed service or in conduit, meets and exceeds AAR Specifications 581. It is specifically designed for wiring diesel-electric locomotives, railway cars and other rolling stock. Type AD-90 is furnished with a tough 90°C covering that is resistant to oil, heat, and flame. It is approved by U/L as an RHW-RHH compound.

STRINGENT ANACONDA QUALITY CONTROL includes all important points such as maintaining extremely close tolerance on overall cable diameter. Each length of finished diesel-electric cable is subjected to standard voltage and insulation-resistance tests.

SINCE 1936, the year of the first diesel-electric locomotive, Anaconda has been supplying quality diesel-electric locomotive cable. The dependability and long life-expectancy built into today's cable reflects our long experience and association with the railroad industry.

65236

ASK THE MAN FROM
ANACONDA®
FOR RAILROAD CABLE

Tuesday Morning, October 10, 1967

9:00 A. M.

REPORT OF THE COMMITTEE ON SHOP EQUIPMENT

1967 TOPIC:

"SHOP EQUIPMENT TO MEET THE NEEDS OF MODERN LOCOMOTIVES"

Study the Full Text of this Report beginning on Page 117 of the Pre-Convention Report

E. L. ROHRER, President
Mile High Railway Club
Engineer
Union Pacific R.R.
Denver, Colorado

J. H. LONG, Chairman
Committee on
Shop Equipment
District Master Mechanic
C. & O. Ry. - B. & O. R.R.
Cincinnati, Ohio

PRESIDENT BEISCHER: We have a full and very interesting schedule today, and I am sure there will be as much and perhaps even more to be learned in the papers today than in those presented to us yesterday.

The morning session will be under the chairmanship of Mr. Thomas W. Bellhouse, General Mechanical Superintendent of the Southern Pacific - St. Louis - Southwestern Ry. at Houston, Texas.

The first paper this morning will be on Shop Equipment. There is no subject of more importance to us as mechanical officers than having the proper shop equipment for our men to work with. **In these times of comparative austerity, these times of raises in pay, it becomes increasingly important that we move the people from where the work is not to where the work is, from the outlying points to the main shops, and also give them equipment that they can work with most efficiently.** I feel much can be gained this morning if we will avail ourselves of the knowledge present in our Committee and in the assembly. The best way to do this is to make full use of the question and answer period. We will all gain if we do this.

PEERLESS TOOLS

Now a DIVISION Of CAM INDUSTRIES, INC.

HANOVER, PENNSYLVANIA

For many years PEERLESS Tools have served railroad repair shops throughout the United States and many foreign countries. Formerly produced by Electric Service Manufacturing Company, Philadelphia, they are now manufactured by CAM Industries, Inc., Hanover, Pennsylvania. Our engineers are equipped by training and experience to help you select the proper tools for every job. They also offer you expert assistance in shop planning and layout as well. Please feel free to call upon us for suggestions and recommendations without any obligation.

CHARLES A. McGOUGH, JR., President

Announcing — New Tools For The Motor Shop

SINGLE PURPOSE TOOLS

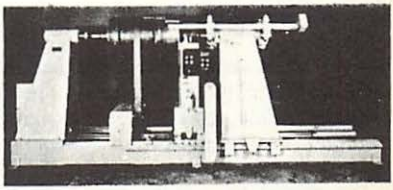
The PEERLESS Line includes fully automatic and semi-automatic Undercutters, Banding Machines with glass tape and wire tension devices, Seasoning and Grinding Machines, Coil End Brazing Machines, Armature Winding Stands, Traction Motor Up-Enders and Motor Frame Stands. Low cost, medium duty, hand operated Undercutter and other tools for general shop use also available.

MULTI-PURPOSE TOOLS

An amazingly versatile machine, the EHP will handle a variety of repair work for large and small armatures. Equipped for banding, undercutting, turning and grinding. New type tension device will handle glass tape as well as wire.

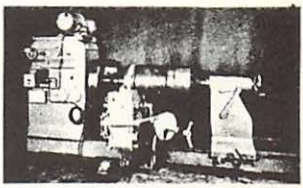
LATHE ATTACHMENTS

Abrasive Cut-Off Machines, Undercutters, Commutator Grinders, Glass and Wire Tension Banding Machines, Coil Winders and many other tools are included in the PEERLESS Line of equipment for small shops.



DS Undercutter

Fully automatic Peerless Type DS Heavy Duty Commutator Mica Undercutting machine will handle complete range of traction motor and generator armatures.



TS Banding Machine

New Type TS Peerless Banding Machine with Type TSC Peerless Combination Glass Tape-Wire Tension Device — rated 800 pounds tension also available attachments for re-rolling wire bands and power operation of carriage.

T. W. BELLHOUSE
First Vice President
Supt. Mech. Dept.
S. P. Co. - St. L. S. W. Ry.
Houston, Texas

The Chairman of the Committee on Shop Equipment this year is James H. Long.

Jim was born on November 28, 1923, at Covington, Kentucky. He attended public schools there and graduated from Holmes High School and attended the University of Cincinnati. He entered the armed forces in August 1941 and is a naval veteran of World War II and the Korean conflict.

Jim entered the service of the Baltimore & Ohio in 1945 at Cincinnati, at the Ivorydale Shops as a machinist apprentice. In due time he finished his apprenticeship and worked for a while as a machinist. He has been progressively promoted up through the ranks since that time. He served as a roundhouse foreman at Toledo, Ohio, in 1953, was promoted and transferred to Cincinnati as regional motive power inspector on the staff of the Superintendent of Motive Power. In 1956 he was made Regional Mechanical Inspector, and in 1961 Regional Maintenance Supervisor of the Western Region. He was again promoted in 1962 to Maintenance Supervisor - System.

On August 1, 1966, Mr. Long was promoted to the position he now holds, that of District Master Mechanic, C & O and B & O Railroads, Western Region. Gentlemen, your Committee Chairman, Jim Long.

(Chairman Long first showed the following slides which are reproduced here for your information and interest. A restudy of Mr. Long's report as shown in the 1967 Pre-Convention Report will add valuable understanding to **your** review of this slide presentation. For your convenience we have identified each slide with the 1967 Pre-Convention Report page number and item number and title.)

KIENE®

PORTABLE

INJECTOR TESTER

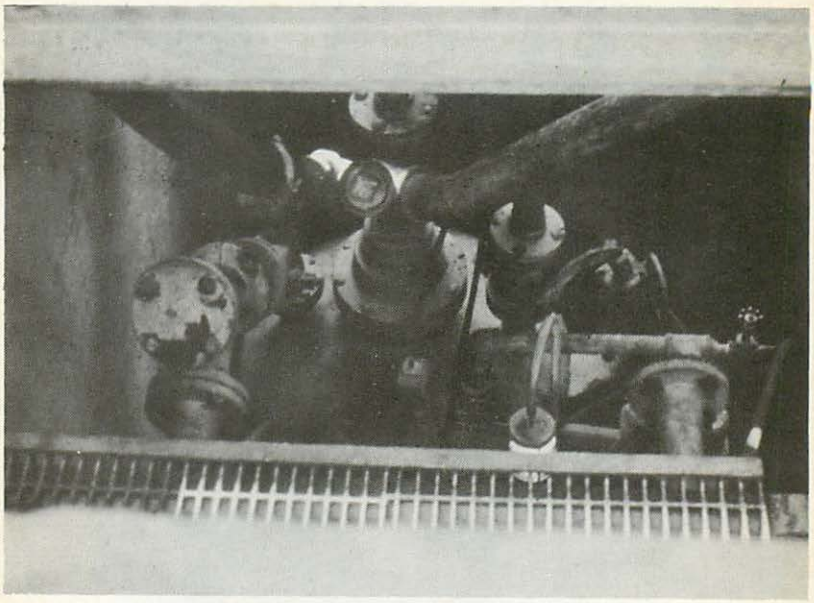
for 'On-Engine' Inspection!

The Model DT-1500 quickly isolates defective units right on the engine . . . without removal or bench tests. Save costly down-time . . . keeps your engines rolling at top efficiency. Kiene equipment is recognized throughout the Diesel industry for accuracy and adaptability. Designed for long service under severe field conditions. Complete kit of adaptors.

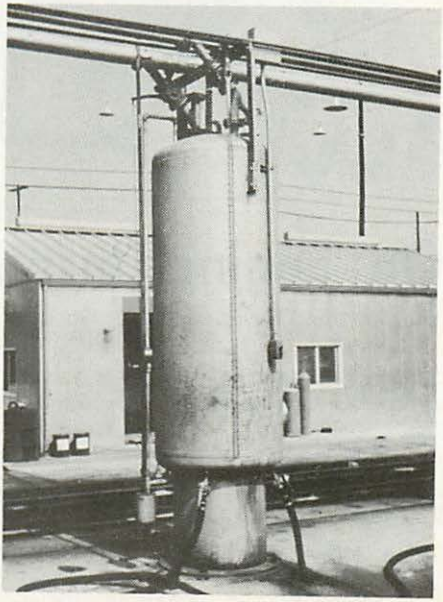
ILLINOIS AUTO ELECTRIC COMPANY

2001 - 37 INDIANA AVE. • CHICAGO 16, ILLINOIS

Exclusive Representative for Kiene to the Railroad Field



Page 118 — Item 3 — Auto Sanding — Concrete Pit — Fig. 1



Page 120 — Item 3 — Auto Sanding — Storage Tank — Fig. 2

ATLANTA
FT. WORTH
CLEVELAND
SAN FRANCISCO
CHICAGO
MINNEAPOLIS

Garlock offers the industry truly nationwide service

When you need diesel and rolling stock replacement parts, soft packing, sheet gasketing, TFE products, or a host of other precision-made replacement items, all you have to do is write or call the Garlock distributor nearest you.
He'll do the rest.

DIESEL ELECTRIC MAGNETO CO.
Atlanta, Georgia
PNEUTRONICS CORP./SUPER CO.
Fort Worth, Texas
DUROX EQUIPMENT CO.
Cleveland, Ohio
PNEUTRONICS CORP./SUPER CO.
San Francisco (Emeryville), Calif.
PNEUTRONICS CORP.
Chicago, Illinois
W. S. NOTT CO.
Minneapolis, Minnesota

GARLOCK

Page 120 — Item 3 — Auto Sanding — Hose & Nozzle — Fig. 3

Page 120 — Item 3 — Auto Sanding — Hose & Nozzle — Fig. 4

NOW

More and More Large Railroads Are *Completely Standardizing On Their Use Of*

MAHLE PISTONS

In Their ALCO and BALDWIN DIESELS

MAHLE Performance Records Confirm Their:

1. OUTSTANDING DEPENDABILITY.
2. REINSTALLABLE after the second and third cycle of service.
3. LOWEST NET COST because of their LONG LIFE.
4. CONFIRMED PERFORMANCE — made possible by 46 years of specialized experience in producing over 200,000,000 pistons to date, in sizes as large as 19" diameter.

Distributed by:

Component Engine Parts, Inc.

2200 North Lehigh Avenue
Glenview, Illinois 60025

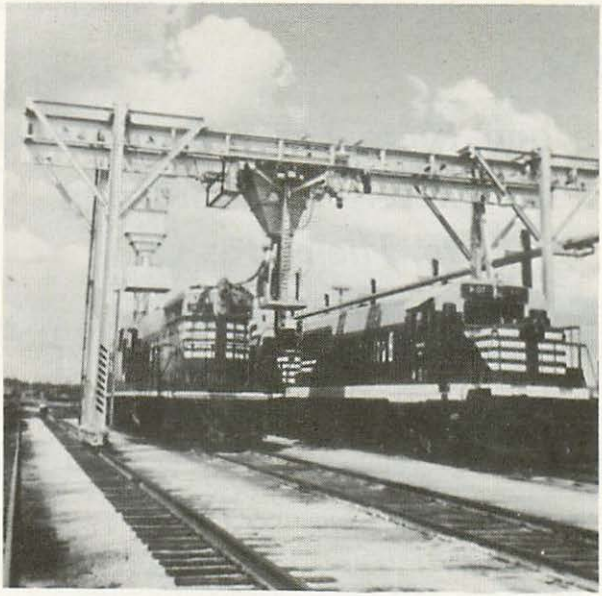
McDonald Railway Supplies, Ltd.

639 St. Remi Street
Montreal, Quebec, Canada

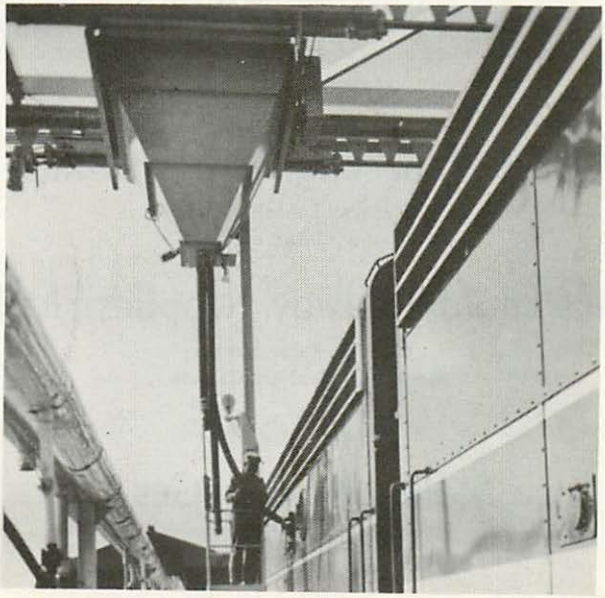
Manufactured by:

Mahle Komm. Ges.

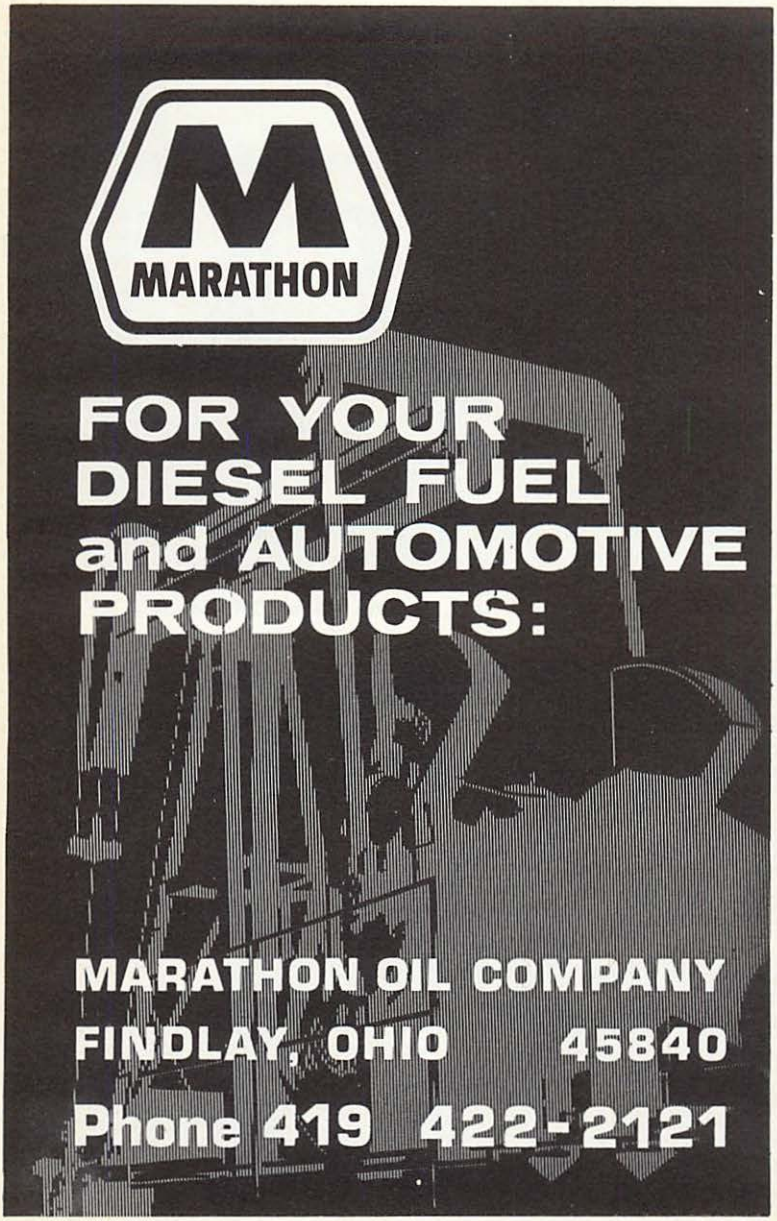
Stuttgart-Bad Cannstatt
West Germany

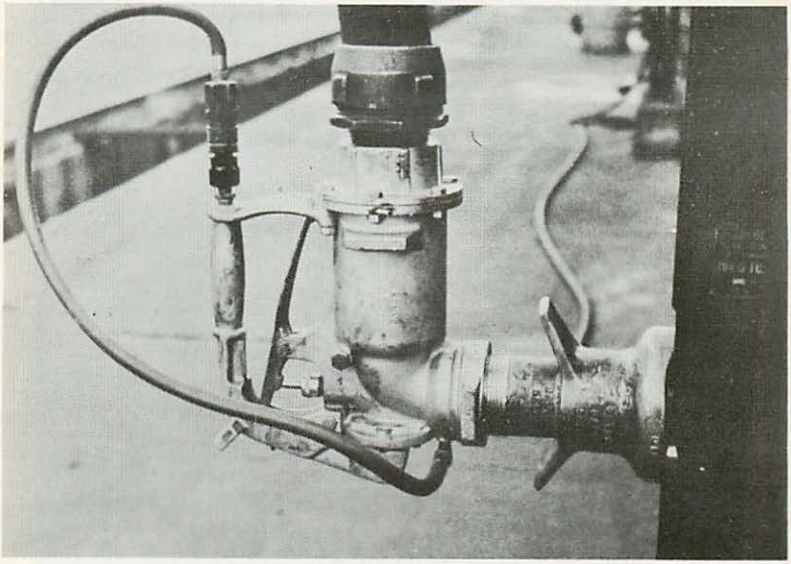


Page 120 — Item 4 — Gantry Sanding — Fig. 5 — Crane

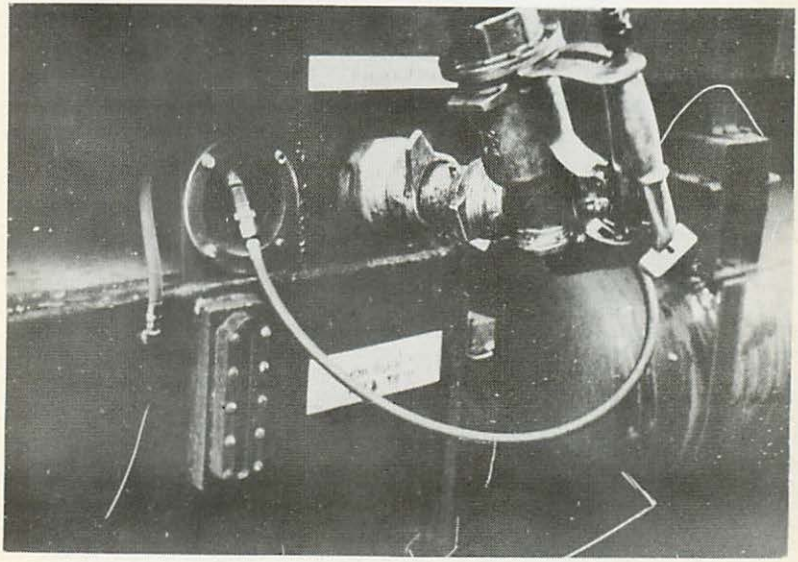


Page 122 — Item 4 — Gantry Sanding — Fig. 6 — Hopper


MARATHON
FOR YOUR
DIESEL FUEL
and AUTOMOTIVE
PRODUCTS:
MARATHON OIL COMPANY
FINDLAY, OHIO 45840
Phone 419 422-2121



Page 124 — Item 7 — Auto. Fueling — Shut Off Nozzle — Fig. 7



Page 124 — Item 8 — Auto. Fueling — Shut Off Nozzle — Fig. 8

BRAKE PARTS

HEADS, FULCRUMS, CAM BLOCKS, ETC.

Also, Fully Assembled Break Beams for AJAX, HERCULES, DAMASCUS, VULCAN & Others

*** From 1912 to 1956 ***

HUNDREDS OF PARTS IN INVENTORY
MOST ORDERS SHIPPED FROM STOCK
...AND WE HAVE THE TOOLING
FOR HUNDREDS MORE

SEND US YOUR INQUIRY

RICHMOND FOUNDRY COMPANY

10623 FOUNDRY DRIVE
RICHMOND, ILLINOIS 60071

PHONE: 815 · 678 – 2811

Page 128 — Item 10 — Static Testing Equipment — Fig. 9

Page 130 — Item 11 — Tools — Filter Clean Benches — Fig. 10

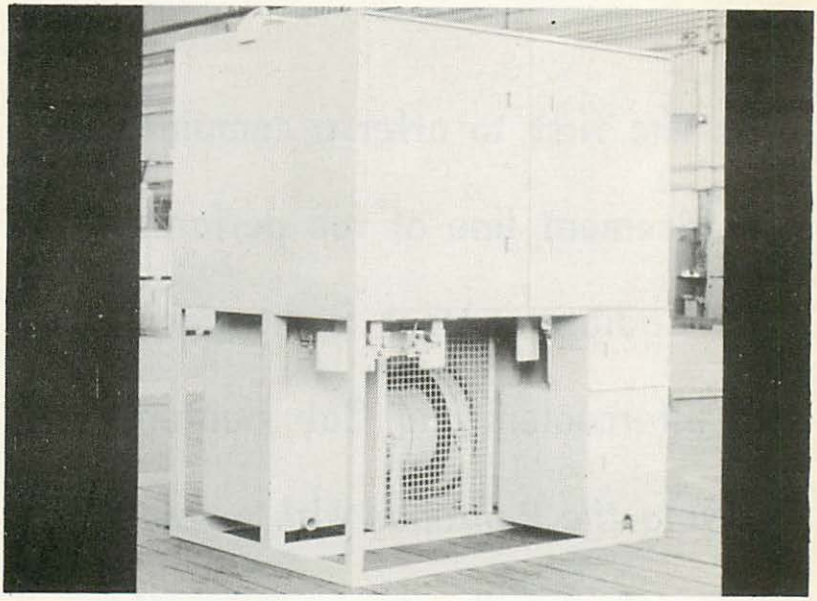
The first to offer a complete replacement line of top performance Radiators, Heat Exchangers, Intercoolers and Cab Heaters.

Serving the Railroads with a complete pickup and return service of remanufactured cores since 1946.

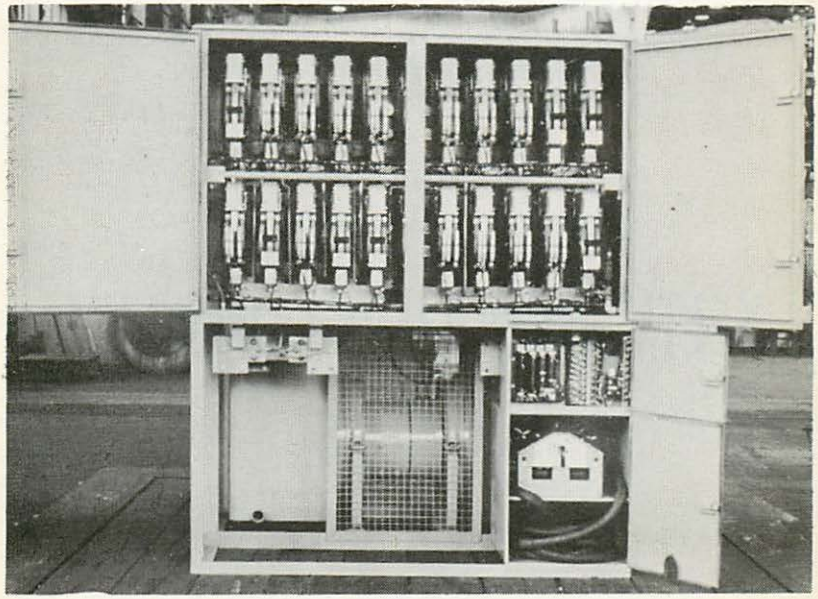
KELTY RADIATOR COMPANY

General Offices
312 ELEVENTH AVENUE S.E.
CEDAR RAPIDS, IOWA 52401

West Coast Warehouse
Sacramento, California

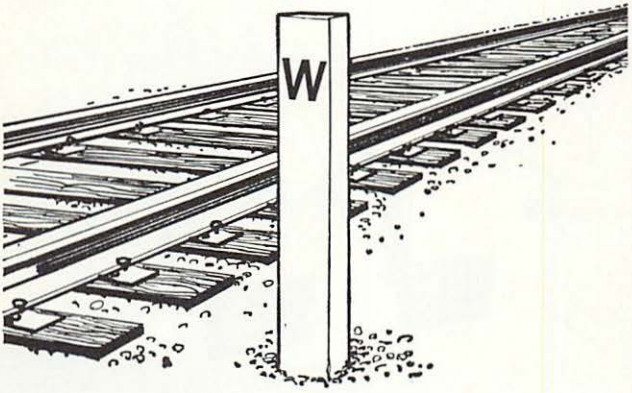


Page 136 — Item 16 — Load Testing Eqpt. — Fig. 11



Page 136 — Item 16 — Load Testing Eqpt. — Fig. 12

CREATIVE RESEARCH • QUALITY PRODUCTS • PROFESSIONAL SERVICE



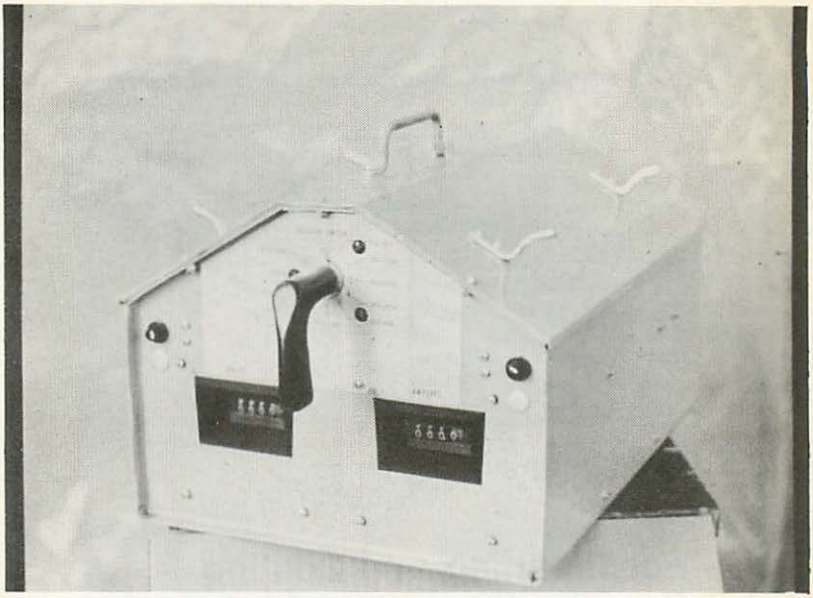
For Cleaning and Coating Supplies Signal for WYANDOTTE

For tough paint jobs get SUBOX® . . . the *only* American-made paint that has a unique corrosion-inhibitor, Suboxide of Lead. SUBOX will never crack, chip, peel, blister, or become brittle. You save on total paint cost, labor costs, and get better paint protection. With SUBOX you paint and forget repainting for 8 to 10 years.

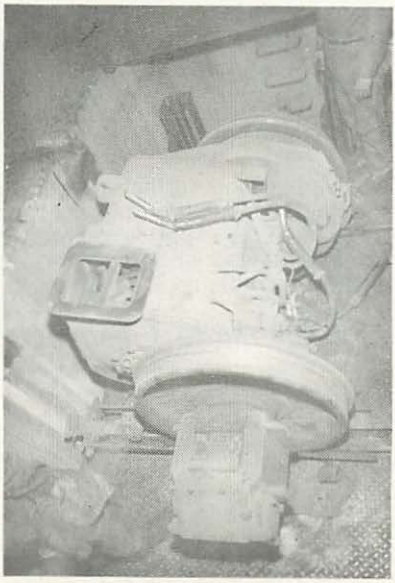
And for cleaning and surface preparation of rolling stock, equipment and structures, ask for Wyandotte products. We have the experience and the technically-trained representatives who know the exact product for your cleaning problems. Contact us.

Wyandotte Chemicals

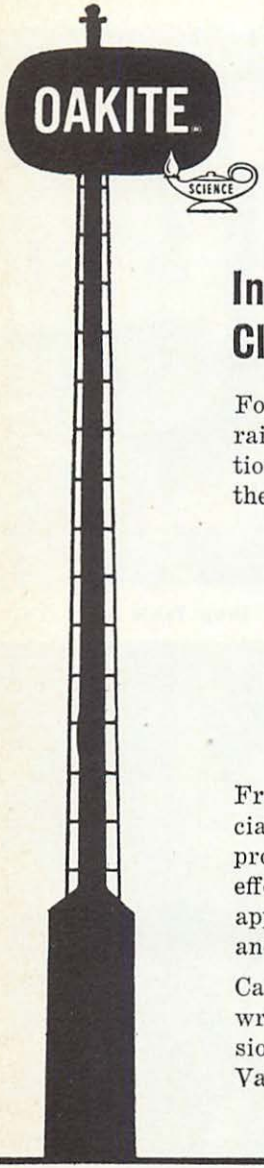
J. B. FORD DIVISION, WYANDOTTE, MICHIGAN



Page 136 — Item 16 — F — Selector Switch — Fig. 13



Page 136 — Item 17 — Single Wheel Drop Table — Fig. 14



Increasing Maintenance Cleaning Efficiency

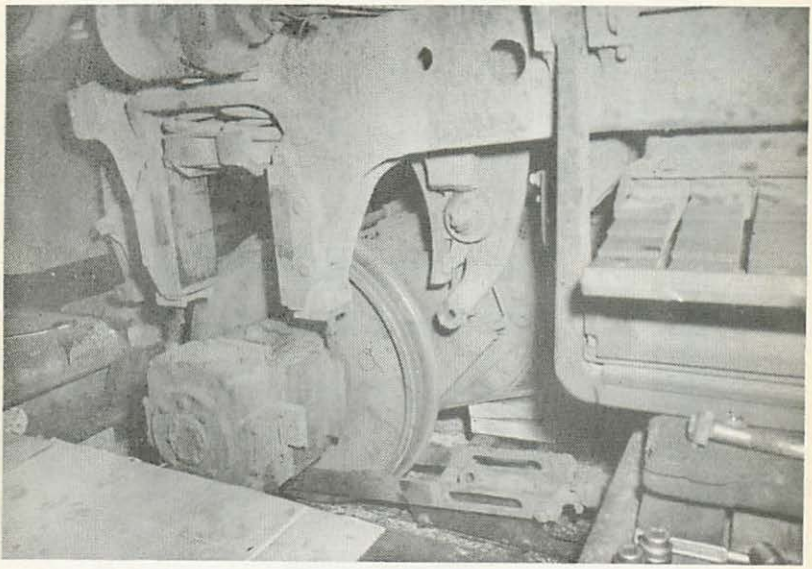
For as long as cleaning has been a basic railroad maintenance and overhaul function, Oakite materials and methods have set the standard for these jobs:

- diesel cleaning
- hot tank cleaning
- steam cleaning
- running gear washing and rinsing
- paint stripping
- rust removal

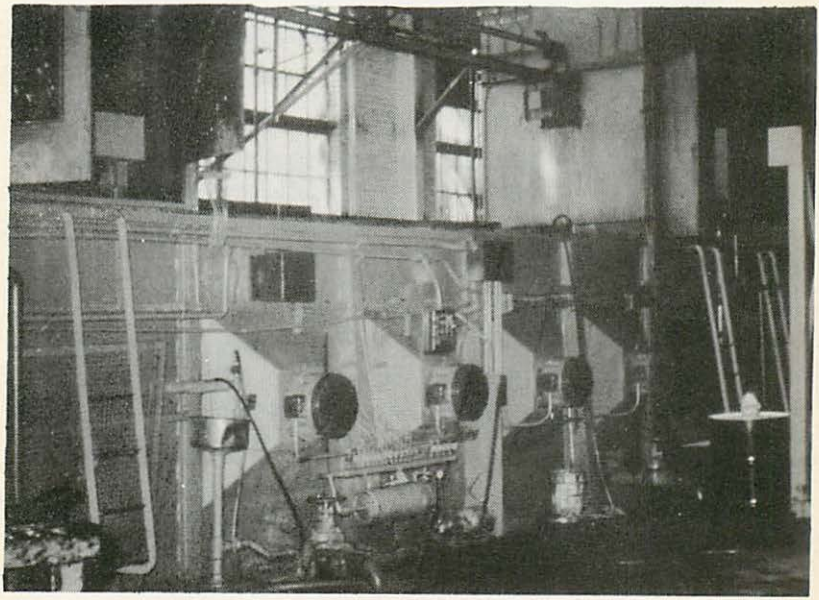
From our long experience as cleaning specialists and broad knowledge of railroad procedures, let us prove the economy and effectiveness of specialized compounds and application equipment for your cleaning and maintenance needs.

Call your local Oakite Representative or write L. M. Bowne, Transportation Division Manager, Oakite Products, Inc., 50 Valley Road, Berkeley Heights, N. J. 07922.

MEMBER RPI RAILWAY PROGRESS INSTITUTE



Page 138 — Item 17 — A5 — Single Wheel Drop Table — Fig. 15



Page 140 — Item 18 — Auto Cleaning — Power Assemblies — Fig. 16

the SALEM line

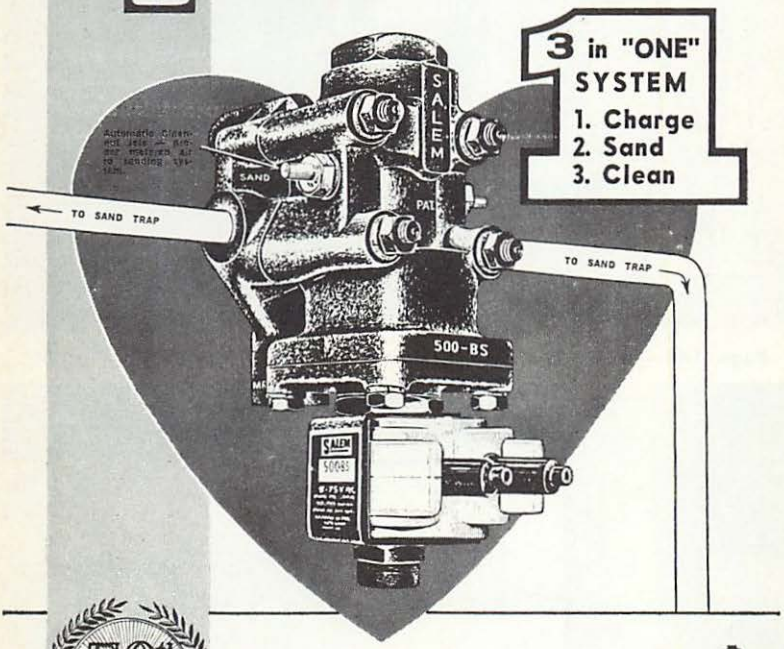
SALEM SANDERS

SALEM ELECTRIC SANDING

REPORT NO. 500-BS

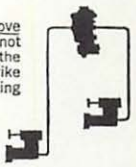
ISSUE OF JAN. 1, 1965

the Heart of the Salem System -



50th YEAR in Sanding

Salem #500-BS **3 in 1** Sander Control Valve is located above and away from the sand traps. Sand and sand dust will not enter the Control Valve and the Control Valve is out of the range of possible damage should maintenance forces strike the sand trap in an attempt to dislodge obstructions stopping the sand flow.

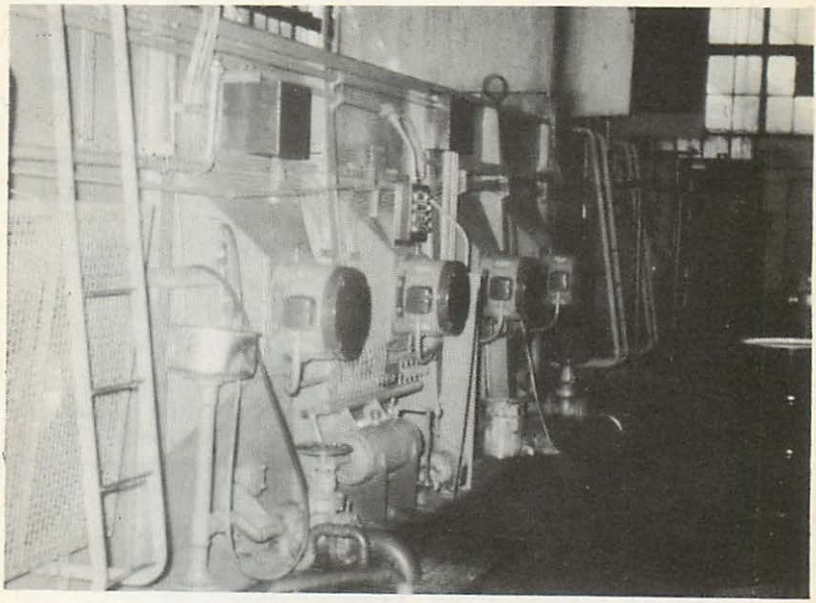


Only 4 Salem No. 500-BS 3 in 1 Sander Control Valves required per locomotive for the individual control of 8 sand traps.

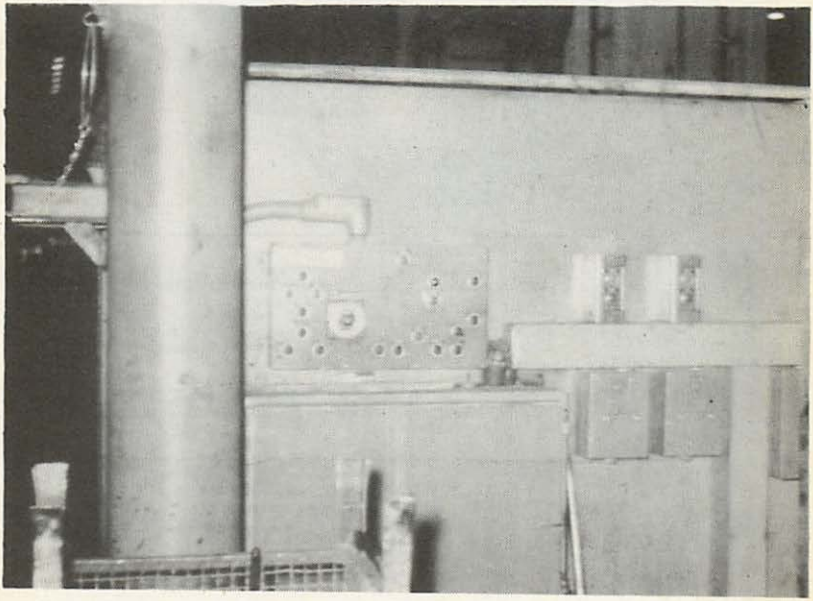
GRAHAM-WHITE SALES CORP.

SALEM, VIRGINIA

the SALEM line



Page 140 — Item 18 — Auto Cleaning — Power Assemblies — Fig. 17



Page 140 — Item 18 — Auto Cleaning — Power Assemblies — Fig. 18

SIMMONDS PRECISION TANK GAUGE

Model D6
Direct Reading

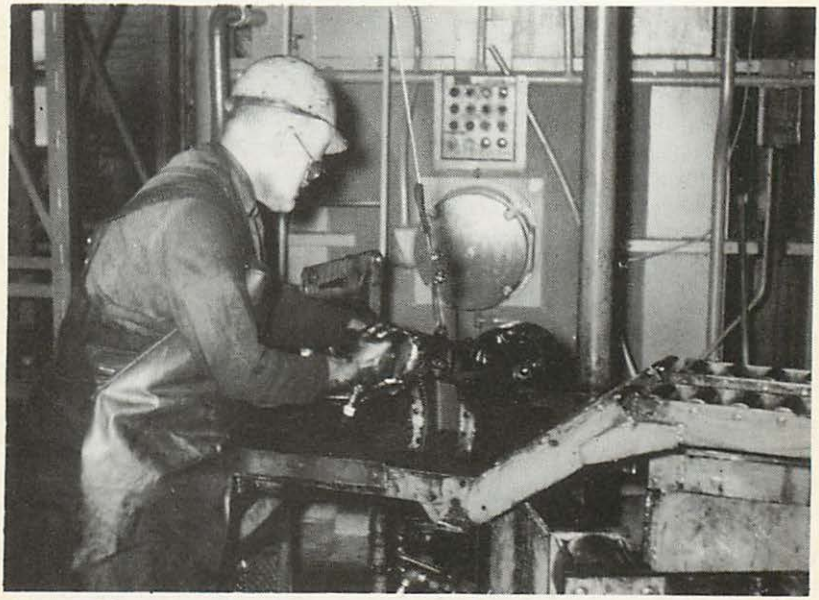
Over Fifty Thousand Units Now in Use . . .

The Simmonds Precision D6 dial type gauge insures accuracy, readability and a safe fuel seal. Our D6 gauge permits instant direct reading of tank contents. It is a rugged, easy to read gauge, designed for fuel or water gauging on diesel locomotives, passenger cars and mechanical refrigerator cars. Simmonds D6 dial type indication offers notable advantages over that of easily stained sight glasses. Fluorescent dials facilitate night readings, and a unique mechanical linkage and bellows-seal make it impossible for fuel or vapor to seep into the dial. Fuel loss and fire hazard are eliminated.

For complete details on all Simmonds Precision railroad level and temperature instrumentation, write us at the address below.

SIMMONDS PRECISION
Rockingham Road, Bellows Falls, Vermont 05101

Page 140 — Item 19B — Auto.Clg. — Pow. Assy. — Valve Press — Fig. 19



Page 140 — Item 19C — Auto Clg. — Pow. Assy. — Work Bench — Fig. 20

PRIME!

Electric and Pneumatic Sanding

Electronic Bells

Pneumatic Bell Ringers

Solenoid (Magnet) Valves

Automatic Drain Valves

Portable Gage Tester & Fittings

Welded Swivel Flange Fittings

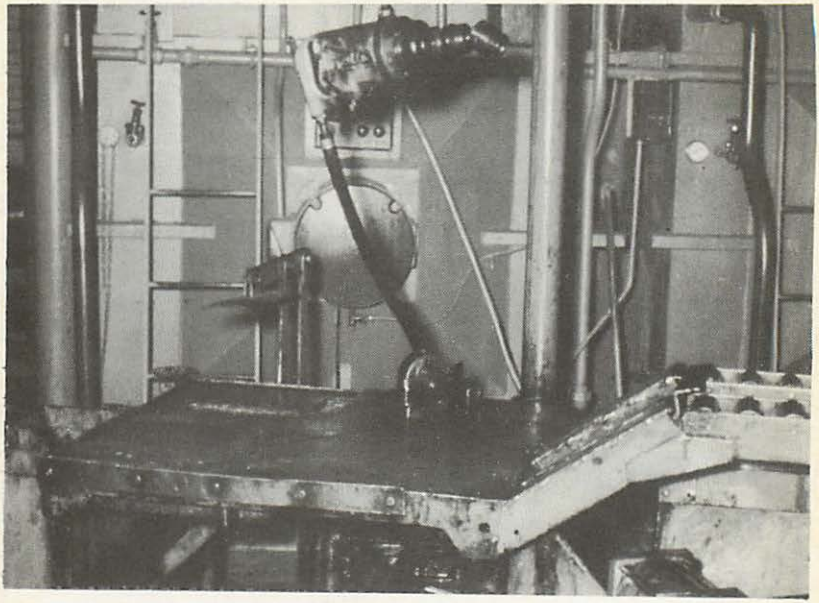
Metal Cab Awnings

Windshield Wings

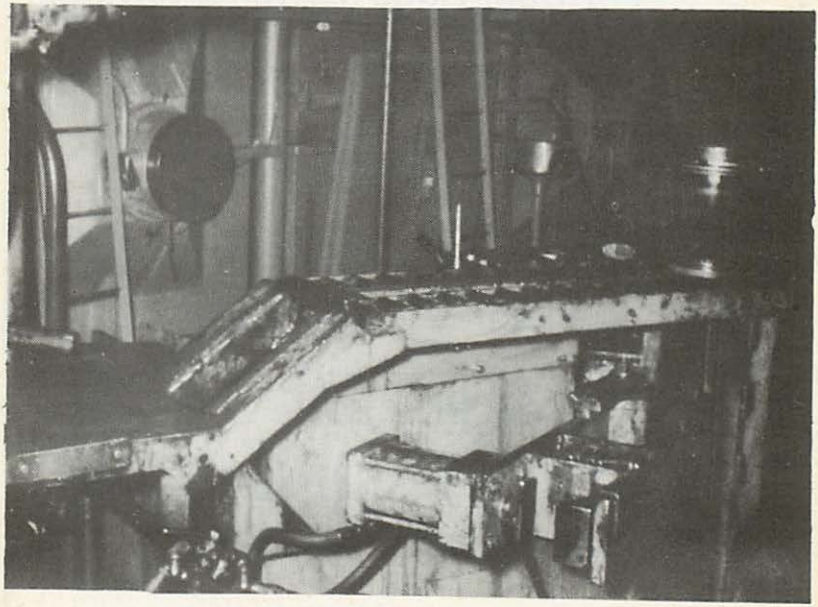
Rear View Mirrors

PRIME
MANUFACTURING CORP.

MILWAUKEE, WISCONSIN



Page 140 — Item 19C — Auto Clg. — Pow. Assy. — Work Bench — Fig. 21



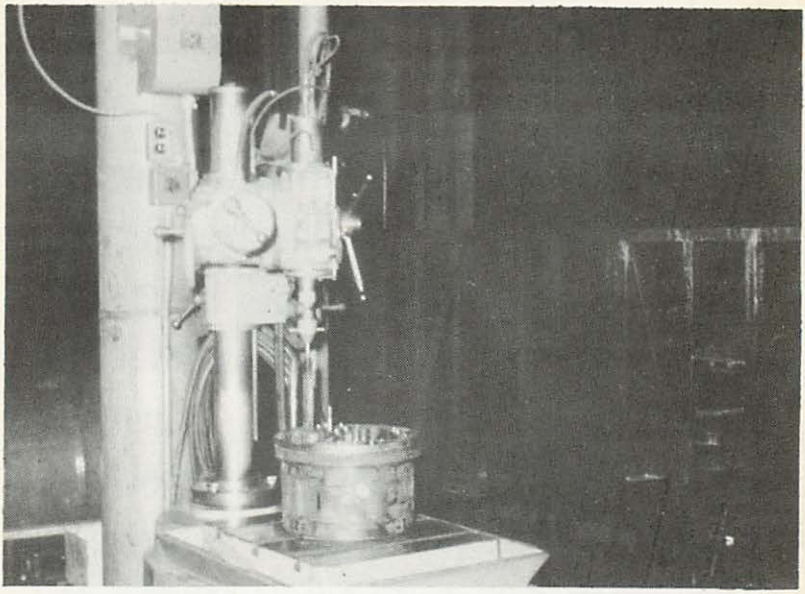
Page 140 — Item 19C — Auto Clg. — Pow. Assy. — Air Clamp — Fig. 22

Here is the first panel-mounted locomotive brake control system. It cuts costly "out of service" time through quick and easy maintenance procedures. Remove eight nuts, and the entire panel can be replaced with another panel.

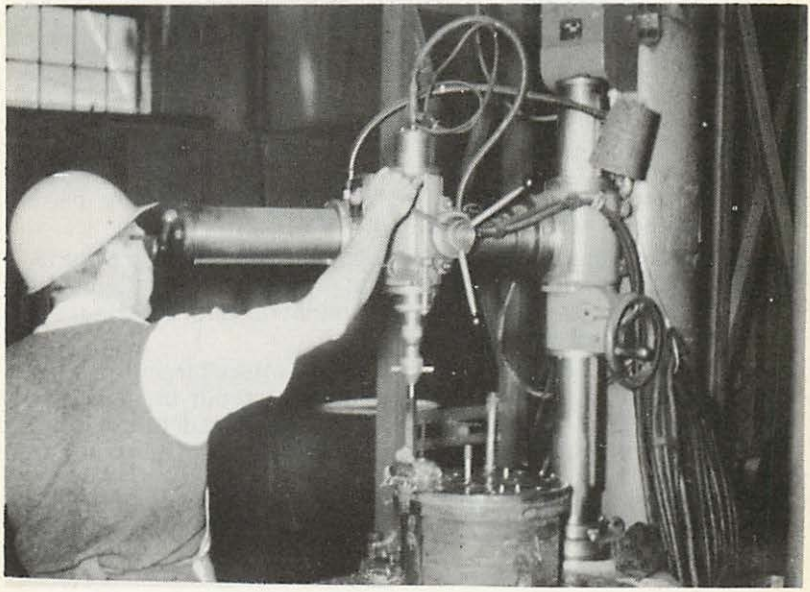
Standard 26-L control devices are panel-mounted to greatly reduce piping and minimize pipe fitting problems. Separate mounting brackets for each device are eliminated, and ordering and inventory are greatly simplified.

Any panel-mounted control device can be removed from the panel without disturbing the other devices and without breaking any pipe connections. Because all these devices feed through one common manifold, the possibility of leakage is greatly reduced.

WABCO WESTINGHOUSE AIR BRAKE DIVISION
WILMERDING, PA./Westinghouse Air Brake Company



Page 140 — Item 19D — Auto Clg. — Pow. Assy. — Disintegrater — Fig. 23



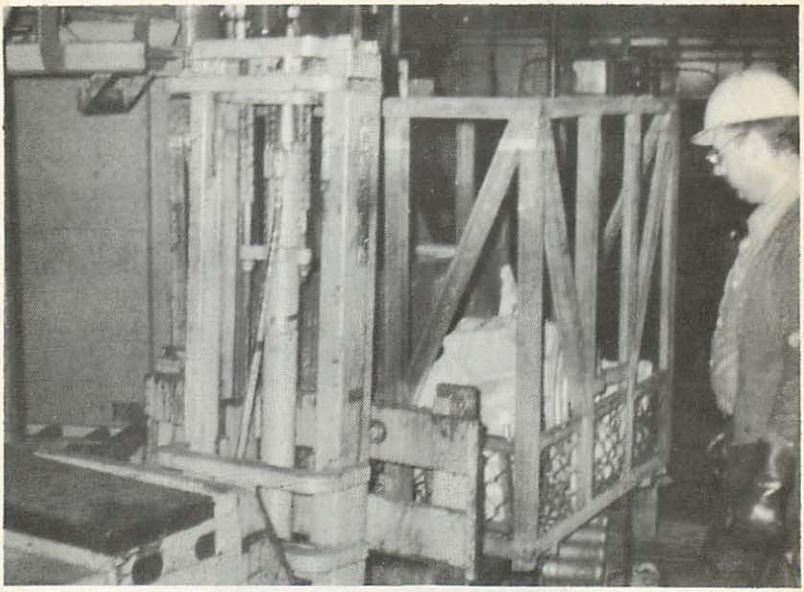
Page 140 — Item 19D — Auto Clg. — Pow. Assy. — Disintegrater — Fig. 24

ARE YOUR CARS ASKING FOR DAYS OFF?

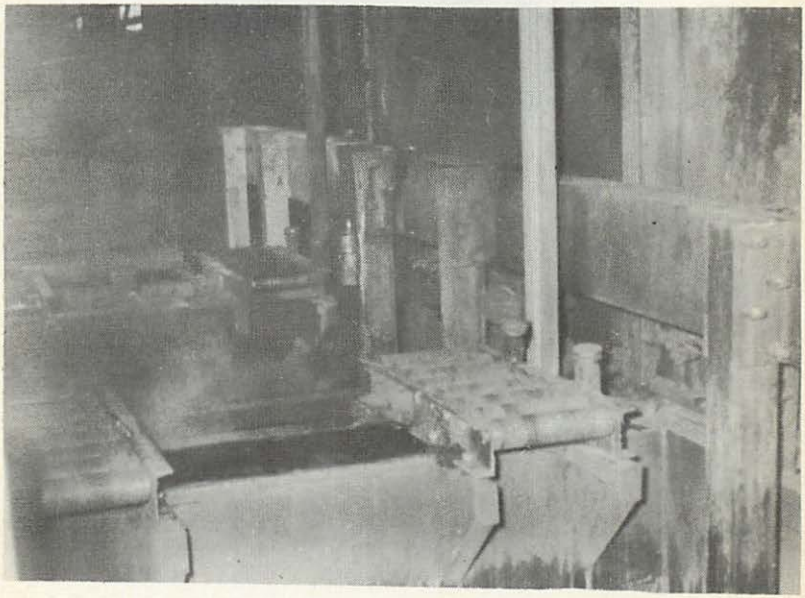
They'll work overtime and then some
with NDH Bearings

GM
MARK OF EXCELLENCE

NDH NEW DEPARTURE · HYATT BEARINGS
DIVISION OF GENERAL MOTORS CORPORATION SANDUSKY, OHIO



Page 140 — Item 19E — Auto Clg. — Pow. Assy. — Clg. Racks — Fig. 25



Page 144 — Item 21 — Auto Clg. — Pow. Assy. — Clg. Machine — Fig. 26

Specialized Chemicals and Service for Railroads

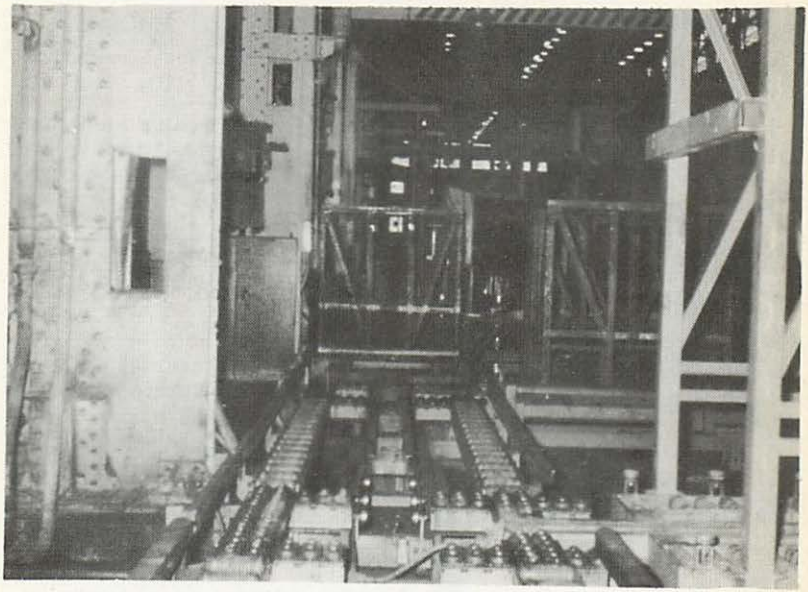
. . . serving the Railroads through Practical Applied Science

Nalco Moly Stick . . . an effective dry wheel flange lubricant	applied by Nalco's rugged low-cost lubricators . . . reduce wheel flange wear . . . extend wheel flange life from 30% to 300%.
Nalco Diesel Cooling Water Treatments	wide selection of formulations to keep diesel cooling systems scale and corrosion free.
Nalco Diesel Fuel Oil Treatments	Improve engine performance and minimize maintenance costs.
Nalco Complete Water Treating Service and Chemicals	to control scale, corrosion and foaming in train heating boilers, stationary boilers and auxiliary condensate systems.
Nalco Waste Water Disposal Treatments	Formulations and "know-how" to help you improve waste treatment plant efficiency . . . increase capacity . . . meet stream pollution requirements.
Nalco RC Rail Conditioner	Increase operating efficiency by improving locomotive wheel to rail adhesion.
Nalco Granular Herbicides	Complete selection for use in yards and around buildings, structures and storage areas.
Nalco Weed and Brush Control	Effective formulations custom tailored for your vegetation problems. If desired, Nalco also offers contract services with spraying equipment and trained personnel.

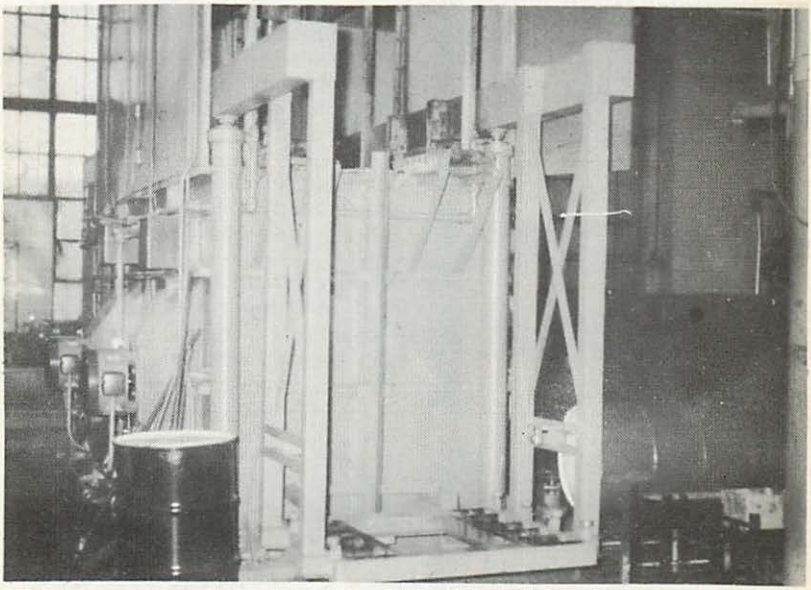
Nalco

NALCO CHEMICAL COMPANY

6216 WEST 66th PLACE ▫ CHICAGO, ILLINOIS 60638



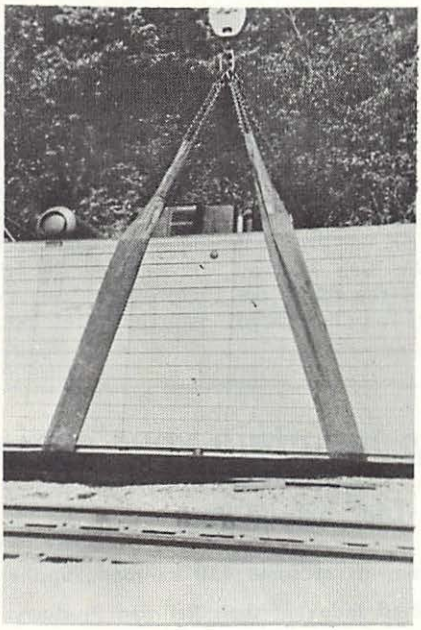
Page 144 — Item 21 — Auto Clg. — Pow. Assy. — Walking Beam — Fig. 27



Page 144 — Item 22 — Auto Clg. — Pow. Assy. —
Non-Ferrous Machine — Fig. 28

At A Derailment—

Miller Allied NYLON Slings



Provides non-damaging, wide bearing grip on overturned PIGGYBACK TRAILERS, TANK CARS, SPILLED CARGO. **Lightweight,** easy and fast to handle, **REPAIRABLE.**

MILLER ALLIED CORP.

1418 Park Ave. **Phone AC 415 521-1300**

ALAMEDA, CALIF. 94501

MR. LONG: At this time we would have called upon Mr. E. L. Rohrer, President of the Mile High Railway Club, but unfortunately he could not be with us. On behalf of our Committee and myself we would like to personally express our appreciation for the many fine courtesies shown and the fine discussion period at the Pre-Convention Presentation in Denver in April.

We will now call on Mr. John Schroeder, who will pinch-hit for Mr. Rohrer.

1. Automatic Fueling Equipment:

MR. J. D. SCHROEDER (Assistant Chief Mechanical Officer, Chicago, Burlington & Quincy Railroad System, Union Station, Denver, Colo.): I will try to pinch-hit for President Rohrer of the Mile High Railway Club, who sends his regrets at not being with us today. The Club hosted a very fine meeting. They had a wonderful turnout, and the discussion period involving the presentation of this Committee's paper was very gratifying; in fact, it was so well received that they are in a big hurry to help out our Association again next spring and have another committee or the same committee present its report in a Pre-Convention Session.

Among other things that were a part of the discussion period, there was a great interest in the automatic fueling that is mentioned in the report. I would like to start the discussion period this morning by asking the Committee if they have noted difficulties with the automatic fueling equipment where manufacturers have equipment that is not compatible and we are faced with the interchange of locomotives equipped

To help maintain your equipment

The Pocket List brings you:

Advertisements of some 450 Railroad Suppliers

A Classified Index of their Railroad Products

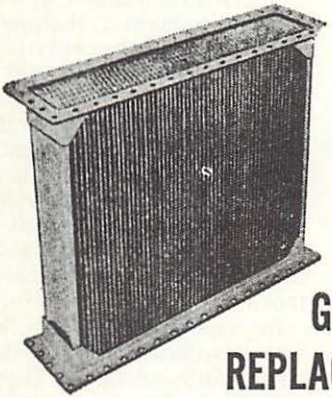
Listings of all their Railroad Sales Representatives

We thank you, both for making use of this information, and for telling our advertisers so.

The Pocket List of Railroad Officials®

PUBLISHED BY THE RAILWAY EQUIPMENT AND PUBLICATION CO.

424 West 33rd Street, New York, N. Y. 10001

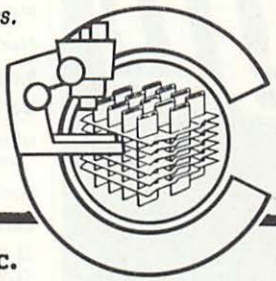


Original Quality

GENERAL RADIATOR REPLACEMENT CORES...

for diesel locomotives and work equipment, are designed by experienced engineers to equal or excell the cooling capacity and ruggedness of original equipment. For years, General Radiator has supplied the railroad industry with jacket water and oil cooler cores, cab heaters, intercoolers and fuel oil preheaters.

Write for Catalog and prices.



Solving heat transfer problems through custom engineering

General Radiator, Inc.
Mount Vernon, Illinois
Subsidiary of Chromalloy American Corp.
Phone: Area 618 242-5180

with various makes of automatic fueling devices? I wonder if the Committee can help us on that problem which now confronts us.

MR. LONG: One thing we must realize is that a few short years ago, when the various manufacturers of automatic fueling were pushing their products, the idea of railroads interchanging power like boxcars was something to be thought of. Today this is a reality, and this is one of the requirements of automatic fueling — that is, to insist that whatever goes into the side of the fuel tank is compatible with all the various brands.

On this Committee we have members who on their railroads have four various types of fueling devices. I would like to call upon Mr. Hoerath to comment on one type.

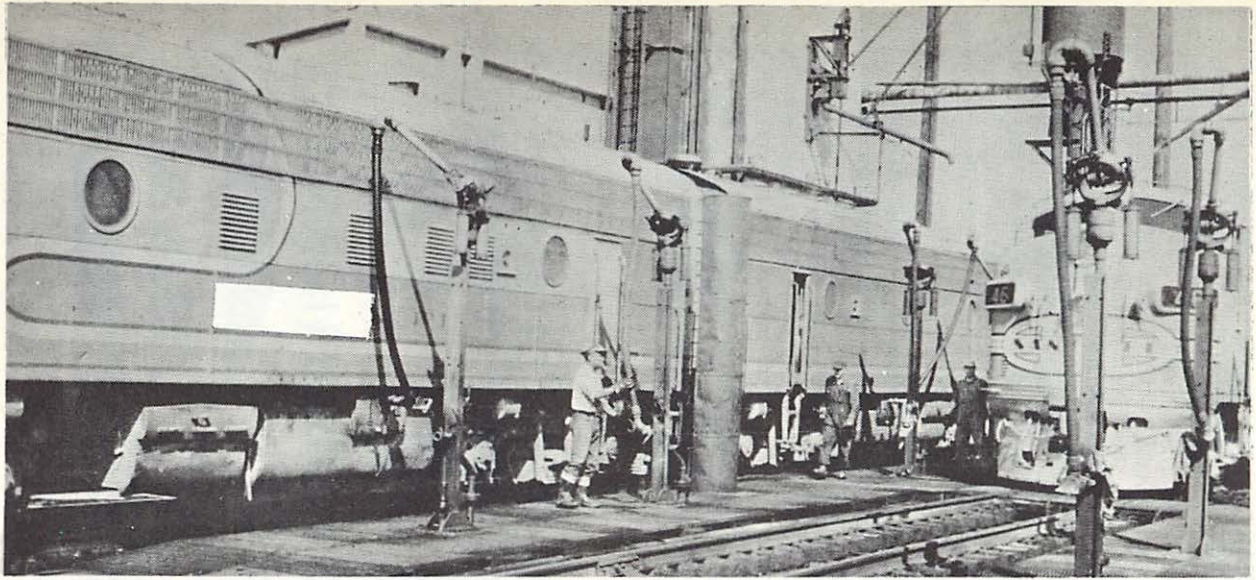
MR. P. F. HOERATH (Assistant Regional Mechanical Officer, Pennsylvania Railroad, Chicago, Ill.): On the Pennsylvania Railroad we use the Aeroquip system. It was installed a number of years ago. We cannot, without modifying all our units, go to a system compatible with all other types of equipment. However, we do use adapters on the power from other railroads which is presently running over our railroad. For instance, if we have an outside dealer fuel any of our units he can use an adapter rather than the automatic shutoff. What the adapter basically does is to void the automatic shutoff on our own units or on foreign power and thus allows fuel to go into the fuel tank.

We have over 2000 units equipped with this device on both sides. It is almost fully automatic. There is an override button on our later units.

GUSTIN gb BACON

Flextite® Air Brake Equipment Gaskets
Flexible Trainline Insulation
Locktite Cotters
Flextite® Brake Cylinder Packing Cups
Flextite® Split Ring Sealing Gasket
Snap*On® Pipe Insulation
G-B Brake Pipe Clamps
Ultralite® Passenger, Tank & Refrigerator Car Insulation
Lowery Air Hose Couplings
Carborundum Abrasive Products
G-244 Cast Iron Piston
G-251 Cast Iron Piston
G-B Brake Cylinder Release Valve

GUSTIN-BACON MFG. CO.
Div. of Certain-Teed Products
Kansas City, Mo.
New York • Chicago • Houston • Atlanta
Washington • Dallas • San Francisco
Los Angeles • Philadelphia



Snyder Spring Counterbalance Diesel Re-Fueling and Water Crane Assemblies.

For Further Information Write:

SNYDER COMPANY–655 W. Pratt St., Baltimore, Md. 21201

Serving Railroads Over 30 Years With Complete Fuel & Water Dispensing Systems

This was a change in design brought about to preclude failures or to allow you to fill the tank to the very top if for any reason you so desired. The automatic fuel cutoff usually cuts off the fuel before it is clear to the top. This device of course is subject to failure, as is any mechanical device.

MR. LONG: Mr. Mason, would you like to comment on the particular type you have on your railroad?

MR. R. S. MASON (Southern Railway, Atlanta, Ga.): We on the Southern have the Buckeye nozzles. At this time we are in the process of modifying them to the latest modifications that Buckeye has to offer. We hope that when this is completed we will have a much better nozzle.

MR. LONG: We on the C & O - B & O have been fortunate in that we have sat back and benefited from the experience of some of the other railroads. At this time we are engaged in installing Snyder automatic fueling.

MR. K. D. REED (Chief Chemist, Pennsylvania Railroad, Altoona, Penn.): About four years ago the AAR Locomotive Committee recognized that there was a problem here, and called on all the major manufacturers of these fueling devices to determine if a mutually compatible device couldn't be designed. As a result of this effort each of the manufacturers now have a system which is mutually compatible. They may not always give you complete shutoff, but at least you don't need adapters to make the fueling connection. I am sorry I don't remember the details, but you might check on it. I think it is worth looking into when the new units come out with fueling

Dependable Protection for Railroad Equipment

NA-RE-CO

RAILROAD LUBRICANTS

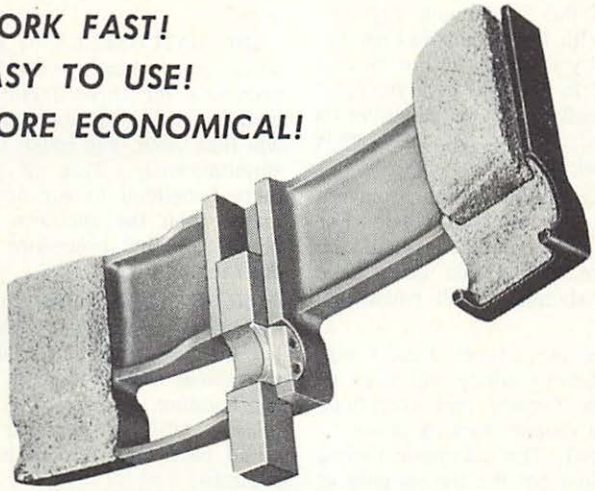
Ashland Oil & Refining Company

Railway Sales Division
1409 Winchester Avenue
Ashland, Kentucky
Phone 324-1111, Area Code 606

Ashland

FCC® FLANGE CUTTERS

WORK FAST!
EASY TO USE!
MORE ECONOMICAL!



FCC Flange Cutters cut high flanges fast, making drive wheels safer, and thus meet every safety standard. Now, with new, tough, "throw-away" carbide cutter inserts, they are more economical than ever.

WHEEL TRUING BRAKE SHOES

Remove flat spots, uneven ridges and other uneven drive wheel spots economically.

STOCK TO MEET YOUR NEEDS!

WHEEL TRUING
628 W. Baltimore Ave.
Detroit, Michigan 48202
Telephone 873-0500

BRAKE SHOE CO.
"Abrasive Brake Shoes since 1898"

systems that may have to be interchanged.

MR. TURVOLGYI (Canadian National): I would like to find out what your experience is with the reliability of this equipment. Can you dispense with the separation mechanism that you have in the fueling platforms? Is it 100 percent foolproof and you really don't put anything on the ground, or is it, let's say, 99.44 percent foolproof?

MR. MASON: Maintenance plays a great part in any type nozzle. For instance, with the Buckeye, if the O-rings are nicked you don't have automatic shutoff, which causes oil spillage.

Regarding other types, I can't say; but the Buckeye nozzle will work as long as the O-rings and everything else are in proper working order.

MR. LONG: The automatic fueling device is just not for the purpose of spillage. The primary fuction is to have fast operation, a minimum run of labor, and utilizing that labor to do other jobs. You can take the old fueling device that we presently have on the railroads, and with proper instruction and proper guidance a laborer can fuel an engine with minimum spillage.

Any equipment still has to be maintained. It is not going to be 100 percent troublefree, and it is not going to operate forever, but I think it is one step in the right direction for fast operations, and this is what we are all looking for today.

2. Inside Servicing Facilities:

MR. K. W. BATCHELLER (Assistant to Chief Mechanical Officer, Great Northern Railway Company, St. Paul, Minn.): I would be interested in the Committee's opinion of servicing; fueling, sanding and inspecting inside of a building.

MR. LONG: On the inside of a building?

MR. BATCHELLER: Yes, sir.

MR. LONG: Has anyone on the Committee had any experience along this line? Evidently not. You asked the question. Do you have the answer?

MR. BATCHELLER: I have been active on a committee that has made proposals for three facilities which include service buildings in which we will fuel, sand, and make inspections simultaneously. This of course is more beneficial in our northern climates than the southern. The economics of this procedure are very desirable.

MR. BUTLER: **The Boston and Maine has a facility like that at Boston for servicing RDCs, if you are interested. Everything is inside a big building.**

MR. LONG: I can see that this might be a requirement in northern climates.

T. W. BELLHOUSE: I would like to make a comment on a previous question before it gets away from us. A gentleman was asking about servicing facilities inside a building. I think that is a very important question. It is important not only from the point of view of the northern railroads but also from the point of view of southern railroads.

In the first place, we have more and more of the switch-engine, general-purpose type locomotives to service in our consist, and hopefully when we are servicing engines we can do some inspection and any necessary minor repairs at the same time. It certainly can't be done with this type of power unless you have at least a roof over it.

The rains in the southern climates cut down on the efficiency of workers terrifically, and they also make it impossible to do work.

It has been our experience (and I am sure yours too) that to get facil-

YOUR GUIDE TO RUST-OLEUM LONG LIFE PROTECTION IS READY!

Brand new Rust-Oleum "Maintenance Guide For The Railroad Industry." Includes application data, surface preparation, color standards, etc. for rolling stock, bridges, tanks, towers, signalling and communications equipment. A modern guide to help you achieve the lowest cost per square foot per year of protection! Write for your free copy or ask your Rust-Oleum Railroad Specialist!

RUST-OLEUM.
STOPS RUST!.

Rust-Oleum Corporation
2425 W. Oakton St.
Evanston, Illinois

2540

ities we have to do it on a bare-bone basis so that we keep the capital expenditure down. **I think any of these bare-bone expenditures we make should be made with a view in mind of later putting roofs and sides on our service facilities so that we can then do the work that should be done in the service facility and so that we can get the efficiency out of our men that we have to have.**

3. Station Sanding:

MR. C. H. DERNER (Master Mechanic - Locomotives, Pittsburgh & Lake Erie Railroad Company, Pittsburgh, Penn.): Referring to station sanding, your first slide showed one method. What is the cost factor involved in that versus the gantry crane installation?

MR. LONG: On gantry sanding, Whiting is the pioneer of this particular piece of equipment. As to cost, how big an installation do you want? How many units are involved? How much trackage?

For the other type of station sanding, which incidentally is on Mr. Mason's particular railroad, I am sure he can give us some very detailed information, as he himself has been deeply involved in the building, construction and layout.

MR. MASON: An automatic system with a concrete pit which houses the automatic elevating tank and controls, will cost about $7,000 to $8,000, depending on the ground layout and the geographical location.

As to sand storage tanks, that would depend entirely on the size of installation needed. I would say approximately $3,000 to $4,000 per storage tank, which would include all electrical work, piping, necessary exhaust system, et cetera.

MR. L. R. OSWALD (Sales Representative, Railhead Corporation, 10 South Riverside Plaza, Chicago, Ill.): I am sorry to have to bring you down from this lofty discussion to earth, so to speak, or sand, but one of the gentlemen asked about sanding facilities which were inside a building. I think the R. F. & P. at Richmond have quite an installation for fueling and sanding inside, as does the Union Pacific at Council Bluffs, Iowa.

If I may be so bold as to suggest it, perhaps your Committee might take into consideration at its next year's meetings the Impco Products sanding equipment. There are some sixteen or seventeen railroads using this product, and some of you gentlemen may have it on your own railroad.

MR. NIEMEYER: Have any of the railroads that have these automatic fueling systems set up a maintenance procedure for them? It is embarrassing to have the boss out there, and to have a nice looking fueling station, and have the men start to fuel the locomotive, and all at once a stream of fuel oil about 12 feet long shoot out the other side. With the valves open it is going to do that. What kind of maintenance procedure do you have set up to protect yourself against that?

MR. H. F. MACKEY (Manager Mechanical Department, Atchison, Topeka & Santa Fe Railway): Normally you have two things to maintain: You have the locomotive to keep up, and the nozzles have to be adjusted and maintained. If they aren't maintained properly they certainly aren't going to work. I think it is hard enough to make them work when they are maintained properly.

MR. HOERATH: The maintenance of the two parts that make up the automatic fueling system — the station end of it can be readily maintained and, if you will, can be seen if it isn't maintained. You may have either constant seepage at the nozzle when it is hanging free waiting for

WIX®

THE GOLD STANDARD IN FILTRATION OF DIESEL FUEL

The penalties of dirty fuel are too severe to gamble with anything less than the best in filtration. WIX Diesel Fuel Filters in both primary and secondary stages provide the extra measure of security that merits the designation—the GOLD Standard in Filtration.

Get all the facts—Write for Catalog today!

WIX CORPORATION • GASTONIA, N. C.

WAREHOUSES: Gastonia, N. C. • New York, N. Y.
St. Louis, Mo. • Des Moines, Ia. • Sacramento, Cal.
CANADA • ENGLAND • NEW ZEALAND

the next unit to be fueled or when it is fueling you may have leakage.

The locomotive is a much harder animal to catch because most locomotives — at least most road units — are running across your system; and although they may be assigned to maintenance points, such as ours are, the failure of the automatic device may show up at some other location.

The most frequent failure that we have had is the shutoff on the locomotive not working properly. With the system we use, a small sensing line is fastened near the fuel fitting on the locomotive. The sensing line is loosened or becomes loose and this cuts out the automatic shutoff. It is then tightened, and you check the locomotive to see whether it fuels properly, fills full, or overflows.

These automatic fuel nozzles, although a very good idea, are still subject to failure, and one of the most embarrassing failures is when the unit does not get fuel. In other words, this is the one which goes down the road a way and stops because the engine lacks fuel. I will say this does not happen too often. Most of the failures permit fuel to overflow.

MR. NIEMEYER: These gentlemen have my sympathy, because that is our problem. The question I asked was, what sort of maintenance has been set up on this to prevent it? Has a maintenance schedule been set up? What do they contemplate doing about it? I would like to have the benefit of their experience and the maintenance they have set up to save me some money.

MR. LONG: Mr. George Snyder, of Snyder Industries, is here. Maybe George can answer your question, Mr. Niemeyer.

MR. GEORGE H. SNYDER, JR. (President, Snyder Company, 655 West Pratt Street, Baltimore, Md.): I would like to make a few comments on automatic fueling.

For the last twenty years we have been working with railroads trying to come up with a sensible, practical, low maintenance automatic fueling installation. We have tried to keep all mechanical working parts off the locomotive and have one source of maintenance only at the fuel station, the nozzle.

We have adopted the standard tank fuel coupling that has been used over the years manually, and we have now come up with a practical solution from an operational and maintenance standpoint that if a failure does develop, the average mechanic fueling the locomotive can put his finger on the problem.

It should not take more than 15 to 20 minutes to correct locomotive sensing application or nozzle before locomotive leaves the fuel servicing facilities.

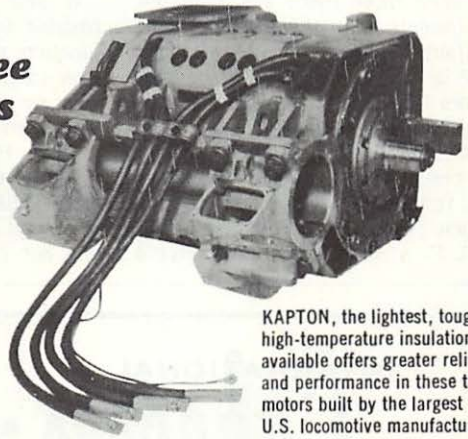
MR. LONG: Further in line with George Niemeyer's question, going over the four various types of equipment in writing this paper we tried to have an open mind and not push or try to put on a show for any one automatic fueling manufacturer. However, with some of this equipment, when you look at it, you go down and see charts and slides and write-ups on trouble-shooting equipment. I agree with you — you wonder what you are buying. Are you buying another costly piece of equipment that you will have to maintain, or is it something that will give us good, accurate service? I agree with you, George.

4. Load Test Equipment:

MR. WILLIAM O. BROWN (Superintendent Mechanical Department, Southern Pacific Company, Sacramento, Calif.): Is the load test equipment illustrated commercially available? If so, what is the approximate price of it?

Traction motors insulated with DU PONT KAPTON® increase horsepower

Now... three locomotives can haul the same tonnage that ordinarily required four



KAPTON, the lightest, toughest high-temperature insulation available offers greater reliability and performance in these traction motors built by the largest U.S. locomotive manufacturer.

Because KAPTON polyimide film has higher dielectric strength and thermal capability, it can be used in ultra-thin gauges that match or better the performance of thicker insulating materials. KAPTON allows the use of 18% more copper in the armature conductors, resulting in 21% more horsepower without increasing the size of the traction motor.

And increased heat dissipation results in a 20°C. drop in operating temperature, giving longer insulation life due to a cooler running motor.

Shouldn't you consider the use of KAPTON in your locomotive equipment for new operational savings? For more information, contact

THE DU PONT COMPANY
ROOM 5229
WILMINGTON, DELAWARE 19898

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*

MR. LONG: Yes, it is available. As to delivery date, we will ask Mr. Hansen to tell you about that. The approximate cost is $19,000. I am happy to say that our particular railroad has just acquired a piece of that equipment.

MR. E. A. HANSEN (Locomotive & Parts Department, General Electric Company, Erie, Penn.): Two loading resistors have been delivered to customers. I think three more are on order and three more are available. John Audett is in the audience, and I am sure he probably has an order blank in his pocket and will be glad to take an order from any of you gentlemen who may want one.

MR. BLAND: Mr. Hansen, are the load resistors as you have designed them readily adaptable for use with the new Search machine?

MR. E. A. HANSEN (Locomotive & Parts Department, General Electric Company, Erie, Penn.): Yes. When the loading resistor was designed we were aware of the Search equipment that is available, and so we endeavored to make the equipment compatible. When you get to a specific application it might depend on how you would want to use the loading resistor in conjunction with your Search equipment, so we should look at the specific application.

If you want to use the loading resistor separately as well as in conjunction with the Search equipment, that might be different than if you only want to use it with the Search equipment. So, we think it is compatible. However, we have to apply it as the railroad wants to use it.

MR. BLAND: We have units in line, one equipped with Search and one not equipped. Are there special

INTERNATIONAL Cabooses AND Campcars

MEMBER RPI RAILWAY PROGRESS INSTITUTE

Built by engineers with technical know-how in the caboose and mobile work car fields—International brings economy, quality and efficiency to railroad operation.

INTERNATIONAL CAR CORP.

835 ENGLEWOOD AVENUE • BUFFALO, N. Y. 14223

A Railroad Subsidiary of Nationwide Industries, Inc.

Other railroad subsidiaries of Nationwide Industries, Inc.:
RAMCO/Nationwide Railroad Leasing, Inc.

TRANSIENT VOLTAGES ?

TR-741-B TR-741-EC1

Semi-conductors failing in your circuits?

Could be the work of transient voltages! These voltages are now easier to detect than ever before with the Trott TR-741-B Transient Voltage Indicator. You no longer need to watch a 'scope hour after hour to "catch" a spike.

The Trott T.V.I. can be set to trip at any desired voltage. It reacts the moment a transient voltage occurs. A red light on the Indicator glows until the reset button is pushed. If the T.V.I. is connected to the Trott TR-741-EC1 Digital Readout Counter, the number of times the transients occurred in a given time will be recorded.

TR-741-B Transient Voltage Indicator. $195
TR-741-EC1 Digital Readout Counter. . $95

Write for bulletin T.V.I.-1 showing other uses and specifications.

TROTT ELECTRONICS INC.

30 RIDGELAND ROAD, ROCHESTER, N. Y. 14623

changes that have to be made? Would there be a time factor? Would this be a cost factor to us?

MR. HANSEN: If you have a locomotive equipped with the Search harness, and if you want to do some load checking to find a difficulty, then you would use the Search equipment to control the load unit. However, if you were going to run a four-hour road run for some reason, you probably would not want to tie up your Search equipment.

As far as connecting the load unit to the locomotive is concerned, you would use the ordinary power cable connections that you would use either way.

As far as the control of selecting a different point is concerned, we have a remote control, and you can either have that as part of your Search equipment and have it programmed in, or you can have it as the slide showed.

MR. J. W. DENT (Assistant Master Mechanic, Missouri Pacific Lines, North Little Rock, Ark.): On the new type load box where we are using this digital instrument for accuracy, is that another high-cost item that we would have to maintain?

MR. HANSEN: We think the digital readout equipment, which has been used in other industries for quite some time now, is reliable equipment and will not require a large amount of maintenance. We have to admit that we don't have very much experience with the particular load unit, with only two in service for a very short time, so I think only time will tell. However, we think it is reliable equipment, and it does give better accuracy and better speed in reading the equipment. We hope it will be satisfactory.

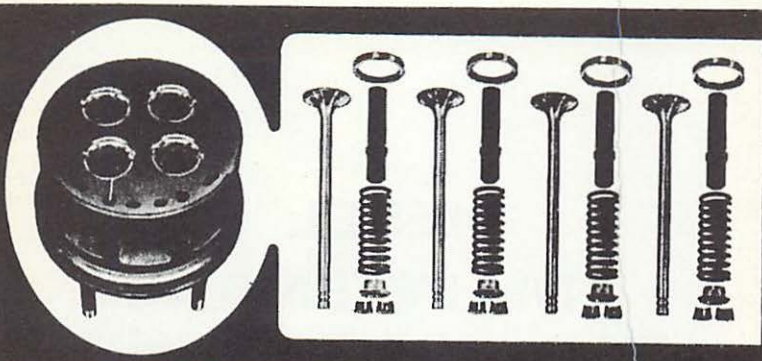
MR. LONG: In line with what Mr Hansen said, in the present-day load box equipment we have had, I have had the personal experience of standing and watching five different sets of figures come up for the same load. With a digital readout you ought to tell if your horsepower is consistent. It ought to eliminate figuring.

MR. E. F. HEATON (Supervisor Locomotive Equipment, Missouri Pacific Railroad, St. Louis Mo.): I might comment on the horsepower accuracy. You have to have the temperature and other conditions to really get an accurate range of horsepower. You have to know what the temperature is, so you will have a various range from the load testing at 100 degrees or load testing at 30 degrees above. You have to have a pretty wide range. You have to know where the governor it set, and the load regulator. There are other things to be considered in the horsepower range. You have to use the ambient temperature.

MR. DAVID L. STANLEY (Superintendent Locomotive Department, Bessemer & Lake Erie Railroad, Greenville, Penn.): I don't propose to mix up the subject matter any more than it has been mixed up, but I would like to relate back to yesterday's session on cybernetics and to today's session on the load test subject.

Every train we run is in fact a load test. We are simply not instrumenting the locomotive to read out. Yesterday we talked about GIGO — "Garbage In, Garbage Out". I propose that as we discuss the various components' life in these sessions, we are putting garbage in and taking garbage out, in the sense that if a locomotive is moving at 10 mph it will wear itself for 6 minutes going one mile, whereas if it is traveling at 60 mph it is going to wear at the rate of one minute for that mile.

With cybernetics we must have something more positive. We must



"SCRAP" CYLINDER HEADS
RECONDITIONED AND COMPLETELY OUTFITTED FOR LESS THAN THE COST OF A NEW STRIPPED HEAD!

Old cylinder heads with seat areas cracked or worn below tolerances can now be saved and **made like new with** Thompson's factory reconditioning service. Or you can buy the seats and other parts from Thompson, with installation instructions, and rebuild your heads in your own shops.

Thompson completely outfits your old EMD heads with valve seat inserts, plain or stellite-faced valves, hard honed guides, springs, spring retainers and keepers — all accurately installed, ready for service.

The cost: less than the price of a new stripped head! Moreover, Thompson prepays all shipping charges to and from our West Coast Plant.

Write Thompson — today — for complete details on this new service . . . the practical, economical way to get thousands of extra hours from cylinder heads already "seasoned" in your diesels.

Full details on Thompson-pioneered Inserts for EMD and ALCO heads are yours for the asking. Write Thompson today.

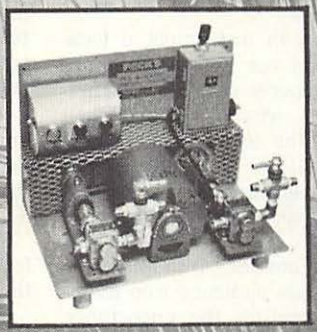
THOMPSON PRODUCTS INDUSTRIAL DIVISION
Thompson Ramo Wooldridge, Inc.
1017 W. Pico Blvd. • Los Angeles 15, Calif.

DIESEL
MAINTENANCE
CLEANERS...
Liquid Acid Kleen 055—
Acidic soak tank cleaner for aluminum pistons. Non etching solution—brightens as it cleans.
Rust Stryp 138—
Powdered alkaline rust remover. Removes rust, scale, pigments, etc. without hydrogen embrittlement. No neutralizer or acid proof tanks required.
Pepcophos 026—
Multi-purpose liquid acidic cleaner, deruster and phosphatizer. Removes rust oxides, oils and smut. Forms passivating film—prevents re-rusting.
Pepcosolv 086—
High solvency emulsion cleaner. Non phenolic. For removal of oily, greasy and tarry soils. Especially effective as a crater compound cleaner.

Liquid Pepco Kleen 174—Booster 154 System—For air agitated soak tank cleaning of roller bearings. Exceptional cleaning and rustproofing characteristics. Used at 1% to 2% by volume at approximately 180°F. Long solution with use of booster additive . . . much longer periods between dumpings.

PEX-O-MATIC CONTROL SYSTEM

Automate your washer with our Pex-O-Matic system. Automatically charges, and electronically tests concentration and adds material as needed. Assures constant solution strength and top results.



PECK'S PRODUCTS CO.

MAIN OFFICE • • • • • 610 E. CLARENCE • ST. LOUIS, MISSOURI 63147
LAKESEAL DIVISION • • 969 E. SHORE DRIVE • ITHACA, NEW YORK 14850

be able to measure much more accurately what we expect of these units. When we talk about a component living for 200,000 miles we are talking too inexactly. To you, 200,000 miles is something entirely different from 200,000 miles to me. I wonder why, when we come to these meetings in Chicago, we can't talk in the same terms. Cybernetics are going to force us to.

When we are able to talk about kilowatt hours produced, perhaps, or fuel consumed, then we can compare various methods and we will know in fact what we are talking about when we introduce innovations and we do in fact produce a part that will run longer.

When we discuss traction motor life we are not talking in the same terms. The trains on my railroad are running at an average speed of 14 mph. We are totally a bulk carrier. When I hear some of the astounding lengths between power assemblies change I have to adjust my thinking in that regard. I think we can be more exacting.

I think we can instrument a locamotive to read out information pure enough to properly employ cybernetics and when we do we will then have aboard the locomotive a readout which will in fact tell us Yes or No, this locomotive is in fact using its fuel and using it properly.

MR. LONG: On your particular question and answer, I think every one of us in this audience who maintains power realizes the importance of load equipment, not just for the fact that when we put an engine on the railroad we know it has 1600 horsepower or 2200 horsepower or whatever the horsepower requirement is.

An engine comes in in trouble. Many times the only place you are going to find the trouble — say a minor water leak — is on the load test. It would be nice to put every locomotive out on a railroad at its required horsepower, but any railroad represented in this audience can take a cross-sectional number of units out of its fleet, put them across the load test machine, and the figures will astound you. You will wonder how some of them are getting up and down the railroad.

So, as far as putting a perfect locomotive on the railroad, 100 percent, 1750 required horsepower, that is a dream.

Would anyone else on the Committee like to talk on this subject?

MR. HOERATH: We are set up on the Pennsylvania Railroad to run load tests on our units at our Altoona Works. Those units which have had engine overhaul are all load tested before they are turned out for service. At the maintenance enginehouses, we have taken dynamic brake grids out of some of our scrap units and converted them into load banks which we use for testing locomotives. **Basically, out of probably 100 locomotives on test, well over half of them are not producing horsepower they were designed to produce.** Occasionally maybe one out of 100 units you will find is over-producing, and you are getting more horsepower than the engine is designed to produce.

So, it becomes quite an important feature to run load tests at some time or another on your units.

MR. J. G. DOLAN (Service Engineer, Alco Products, Schenectady, N. Y.): I think what the gentleman is looking for is something I have seen done on an industrial railroad. They figured their consumption of fuel would dictate when they would work on the inners of the engine. **In other words, I think the statement is well put — that if you knew what**

SEARCH*

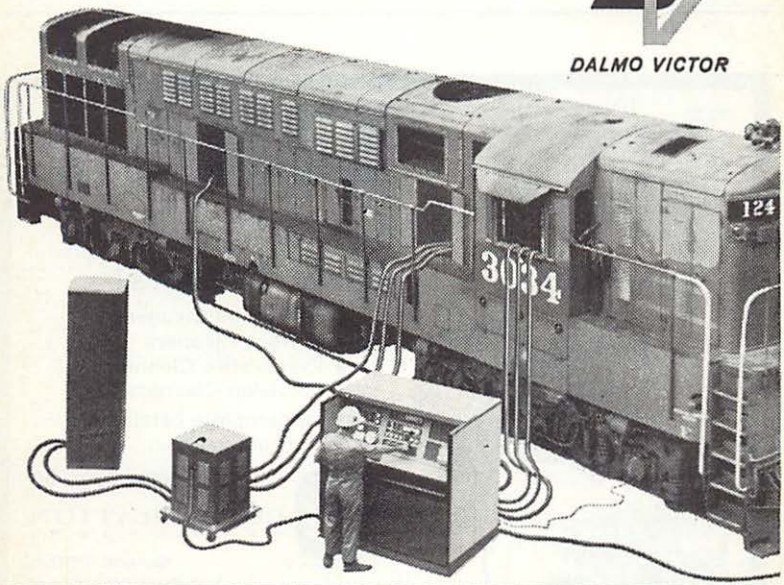
...THE ONLY FIELD-TESTED AUTOMATIC CHECKOUT SYSTEM FOR DIESEL-ELECTRIC LOCOMOTIVES

...NOW AVAILABLE IN PRODUCTION QUANTITIES

Contact Dalmo Victor today for an analysis showing how SEARCH will reduce your maintenance costs and increase locomotive availability.

*System Evaluation and Reliability Checker

DALMO VICTOR



DALMO VICTOR 1515 INDUSTRIAL WAY • BELMONT, CALIFORNIA 94002
TELEPHONE: 415/591-1414 TWX: 910/376-4400
A textron DIVISION

work the engine produced you could come to a more realistic figure of when to pull the engine down.

We as a manufacturer have given serious thought to this because we believe there is a discrepancy in many cases, where a piece of equipment is torn down and a figure of so many hundred thousand miles related to that equipment. But if you were to break it down into power produced, this figure somewhat pales into insignificance if you were to compare it with something that had a lower speed and high load factor versus a higher speed and low load factor.

I think the gentleman has a good point there. Of course I don't know what you are going to do with it. We have recording devices on other pieces of equipment. We have kilowatt-hour meters where we are running constant output, but when it varies up and down the ladder I don't know how you could use this type of meter. However, his thought is well taken.

MR. LONG: I would like to turn back to a few years ago when the first Sputnik was put into orbit. I walked into the office that morning, and my boss at that time said, "Sit down." He elaborated on this highly specialized piece of equipment that Russia had thrown into the sky and that was orbiting around the earth, and the complex systems and the testing that must have gone into it.

He said, "You know, the thing that really amazes me is that these people have put this thing in the sky. Here we are, running a big railroad, and we can't run a fleet and we can't run a set of units from Cincinnati to St. Louis without having a failure."

USED COMPONENTS FOR ALL MAKES OF DIESEL LOCOMOTIVES

SPARE ENGINES

MAIN & AUX. GENERATORS

TRACTION MOTORS

TURBOS

AIR COMPRESSORS

TRUCKS

WHEEL SETS

RESTORE LOCOMOTIVES TO SERVICE
SAVE DELAYS AND REDUCE MAINTENANCE COSTS

Good Serviceable Locomotives For Sale or Lease

Run The Miles Out And Still
Have Unit To Trade To
Locomotive Builder

"IF IT'S AVAILABLE, WE HAVE IT"

STRIEGEL SUPPLY & EQUIPMENT CORP.

6001 CHEMICAL ROAD BALTIMORE, MD. 21226

Tele. 355 - 7922 - 23 - 24

So, we have come a long way. Instead of running them 320 miles we are up to perhaps 1,000 miles. Sometimes we go months without having a failure on a particular locomotive. In those days we wrote books on failures.

I think the question is something for the future to answer. We will have like units before it is all over. The equipment presented last year and some of the equipment presented this year is a step in the right direction.

6. SEARCH Test Equipment:

MR. C. M. MACHIN, JR. (Chief Electrical Engineer, Baltimore & Ohio - Chesapeake & Ohio Railway, Huntington, W. Va.): In our attempts to develop and use modern technology in the evaluation of the locomotive, in the various systems we have used, we have demanded that a record be maintained automatically of the evaluation obtained by the machine. We know without any doubt, and we have computer people in, that we can take the output of the machine and record it, store it in the computer, and the next timt that diesel comes in it will compare itself against its condition formerly. Then we can attempt to evaluate on condition the necessity of replacing or doing something to the various components.

In addition, you can take this recorded evaluation and compare it to similar power in order to get empirical data as to life expectancy. So, this is our theory in trying to overcome this problem.

5. Production Line Cleaning:

MR. E. F. HEATON: My question is on the production-line cleaning, where you say it takes three hours for the cycle. How about these smaller pieces that you can clean in an hour and a half? Is there some way to program this line to shorten it up?

MR. LONG: Mr. Hoerath, what consideration has been given to the wrist pin, bearings, your silver parts or your lead parts, during the cleaning operation?

MR. HOERATH: Let me take them in order. The first question, if you will, concerned speeding up or shortening of the cleaning cycle. This basically cannot be done. In other words, a part runs the complete cycle, or a set of parts in a basket runs a complete cycle, which actually is not all cleaning, because you include the loading and unloading, precleaning, rinsing, and rust-preventive coating.

There are six steps: load, a preclean, a second pre-clean, the cleaning itself, rinse, and then unload. So, part of this is strictly a mechanical process, and part of it is actually cleaning and rinsing.

The second question concerned the non-ferrous items. These parts do not go through this section of the cleaning machine. There is a separate cleaning machine for non-ferrous items — aluminum pistons, babbited items, bearings, and so on. They are put through a non-ferrous cleaner, which again is automated but not to the extent nor the number of stages that the iron parts go through.

MR. ROGER H. SMITH (Assistant to General Superintendent Motive Power, Baltimore & Ohio - Chesapeake & Ohio Railway, Ellicott City, Md.): Is this automatic cleaning machine self-cleaning or does it require down time for cleaning and recharging? If so, how much down time is required for the cleaning and recharging of this machine?

MR. HOERATH: The down time runs to several hours. This machine is operated on a five-days-a-week, two-trick basis. The various stages are cleaned at different intervals. For instance, Stage 2 is cleaned once

USE "LUBRI-GAS".

FOR
INCREASED
THERMAL EFFICIENCY

LUBRI-GAS . . . added to DIESEL FUEL . . .
IMPROVES PERFORMANCES
KEEPS the PORT HOLES and
INJECTORS FREE from CARBON
and MINIMIZES SPARKING
KEEPS the RINGS and FAST MOVING
ENGINE PARTS . . . LUBRICATED . . .
and FREE from fuel deposits.

LUBRI-GAS COMPANY
RAILROAD DIVISION

Office
10176 LOOKAWAY DRIVE
ST LOUIS (37), MO.

Mailing Address
NORMANDY P. O. BOX 5732
ST. LOUIS (21), MO.

MEMBER OF . . . LOCOMOTIVE MAINTENANCE
OFFICERS ASSN.
THE CHICAGO RAILROAD DIESEL CLUB
THE ST. LOUIS RAILROAD DIESEL CLUB

Since 1917

per week and then Stage 3's cleaning fluid is put over into Stage 2 for the following week. Stage 3 is recharged completely. We are trying a different type of cleaner in Stage 4, which we figure will not have to be changed for six months. However, we do add concentrate to this stage weekly. Stage 5 is changed weekly.

This gives you an idea of the various time elements involved in the cleaning.

MR. LONG: What is the cost of these various cleaning operations, say, for one week?

MR. HOERATH: We figure the cost is somewhere in the neighborhood of $350 a week. This depends on how many tricks you use it, and how many days of the week, and the volume of parts going through it.

When the machine is going for two tricks, pretty well full-tilt, five days a week, you can figure around $350 to run the machine to do the cleaning. In other words, if you only change a stage once in six months, it contributes very slightly to the cost per week, but if you have to change another stage every week the cost is greater in proportion. The total figure is in the neighborhood of $350 a week.

7. Diesel Locomotive Toilets:

MR. DWYER: I was quite interested in the early part of your paper where it talked about the outside servicing facilities for the locomotive, sanding, fueling, watering, and so on. It started another chain of thought in my mind — something that we haven't discussed too much in the past, but a subject which I am afraid we may have to discuss more in the future.

This is the maintenance and servicing of toilets on locomotives. These new one-stop facilities are designed to reduce manhours involved in servicing. Of course you and I are familiar with the situation on our own railroad. What I am interested in is whether any other railroads represented on your Committee have incorporated into these new facilities any new or departure types of facilities for servicing toilets on locomotives, that is, incorporating sort of a cleaning station for toilets.

Has anything new been incorporated into these one-stop servicing facilities along this line? If this question happens to be more of a surprise today than you would like to accept, maybe you could think it over and bring back the answer tomorrow at the What's Your Problem session.

MR. MASON: Southern has gone to the dry hopper type of facilities, which can be rinsed out very easily.

MR. DWYER: That wasn't exactly what I had in mind.

With the new type of locomotive which discharges between the rails instead of outside the rails, we have a problem of getting buckets under the proper discharge spout. We were wondering if any of these new facilities have certain pits incorporated into them to take care of the toilets on locomotives.

MR. LONG: Mr. Whipple, I understand your railroad is designing one of the in-transportation yard facilities. Has any consideration been given to this?

MR. J. H. WHIPPLE (Manager Research & Production, Chicago, Rock Island & Pacific Railroad, Kansas City, Kans.): All of our locomotives on the Rock Island are equipped with dry hoppers. We have removed the flush-type toilets, and we haven't figured any toilet servicing facilities in these one-stop pit arrangements. The cleaning of our dry hoppers is incorporated into the locomotive washing facilities, where you have drains available.

MODERNIZATION

ONE *INCINOLET* *with CANDOR* SOLVES 2 PROBLEMS *...TODAY'S and TOMORROW'S*

New federal and state laws look seriously upon all water-flush or direct dumping methods aboard rail transport. Only Research Products incinerating toilet systems have **no** raw human waste effluents detrimental to surface and stream and **no** atmospheric effluents which pollute the air. Research Products' catalyst, Candor, oxidizes smoke and odor molecules prior to discharge through vent lines.

Purchase of electric INCINOLETS Model DLNL for locomotive and the new linerless INCINOLET CB-L for caboose, or the INCINOLET gas series for caboose—each designed specifically for the railroads—ensure equipment planning geared to long-range needs and requirements new to the railroad industry.

R P

RPMC

RESEARCH PRODUCTS MANUFACTURING COMPANY

P. O. BOX 35164 DALLAS, TEXAS 75235

RESEARCH PRODUCTS/BLANKENSHIP OF CANADA, LTD.
18 CANSO ROAD, REXDALE, (TORONTO) ONTARIO

RP 6801R

It is a real problem, and I can see no other place to do it other than at the time the locomotive is washed. I realize there are some impractical angles to that, because you don't wash locomotives every time you service them. We would like to. It doesn't always work out that way, but you are going to have to be over a sanitary drain in order to do it properly. It is quite a problem, and one that I doubt any railroad has solved to the satisfaction of all concerned.

MR. LONG: Our time has run out, so I would like to call on the Central Western Region Executive, J. D. Schroeder, who will summarize this discussion.

CENTRAL WESTERN REGIONAL EXECUTIVE

J. D. SCHROEDER
Asst. C. M. O.
C. B. & Q. R.R.
Denver, Colo.

MR. SCHROEDER: By way of summary I would like to begin by looking at the topic assigned this Committee, "Shop Equipment to Meet the Needs of Modern Locomotives".

Mr. Bellhouse started the report out by mentioning the importance of the economies we can expect to result from use of the ideas propounded in this report. We can look at higher wages that must be considered constantly. I go back again to the topic, "The Needs of Modern Locomotives". It is a more technical piece of equipment, in some ways more difficult to maintain, the troubles in it more dificult to analyze.

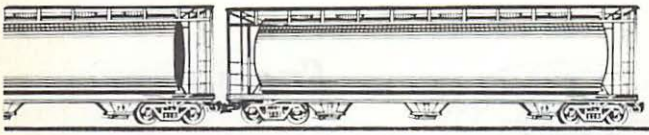
I think this Committee has done a good job in trying to cover a very comprehensive subject and trying to keep our locomotives turning faster, repairing them faster, trouble-shooting with less difficulty.

I have counted twelve areas in the report that are certainly worthy of thought. Incidentally, from the floor there have been at least two or more items injected, particularly the matter of toilets and how to handle them. Another gentleman talked about standardization of measurement of the work the locomotive does. I think both of these subjects are very important, although they are a long way apart.

To get the best out of this report, gentlemen, you must read it. Certainly none of the idease are contained in detail in the report, because that would be a physical impossibility. There are twenty very capable people on this Committee located around the country. If you want to take advantage of the ideas that have been offered, perhaps not right down to the last detail mentioned in the report but bearing in mind that there are twenty people on the Committee, one of whom must be near you, I would urge that you take advantage of every opportunity to review these ideas and take advantage of their thoughts.

If you need more details, I would certainly recommend that you not hesitate to call upon Jim or any one of the members of his Committee.

MISSING PROFITS IN NEW DESIGN HOPPERS?



New design hoppers create more cash flow, but they are expensive. Protect this investment with FARBO-COAT #99.

- This economy one-coat system gives a high film build with lower application costs.
- Absence of solvents reduces fire hazards and compartment toxicity.
- Its excellent anti-corrosive qualities are enhanced by Farboil #50 Epoxy Primer to give ultimate protection.
- FARBO-COAT #99 gives your hoppers a greater variety of cargo capabilities.

Use FARBO-COAT #99 with the secure knowledge that this coating has a proven record on major railroads and on the high seas.

THE FARBOIL COMPANY

8200 Fischer Road,
Baltimore, Md. 21222

They are listed in this report.

I believe the Committee is to be congratulated for putting together a lot of fine ideas. Admittedly there are some areas that have been overlooked. Space and time did not permit covering them all. Jim, I would like to congratulate you and your Committee on this fine report, and I will ask that we give a rising vote of thanks to the Committee for their efforts.

Specify

CARDWELL WESTINGHOUSE

Designers and manufacturers of the most efficient railway car components modern engineering can devise.

- **WESTINGHOUSE DRAFT GEARS** For Every Pocket and Purpose (Friction, Friction-Hydraulic, Friction-Rubber)
- **CARDWELL FRICTION BOLSTER SPRINGS** To Cushion Vertical and Lateral Shocks

CARDWELL WESTINGHOUSE COMPANY

832 S. Michigan Avenue, Chicago, Ill. 60604 Telephone 312-427-5051

Canadian Cardwell Company Limited Montreal 2, Quebec

RPI

CUT OUT:

Fire Hazard
Personal Injury Claims
Heat and Fumes
Expensive Machinery
Maintenance Costs

—with—

RIN X-100

COLD WATER VAT CLEANER

Time-Proven to be the Safest, Most Economical Way to Clean Diesel Locomotive Parts!

FREE

Demonstration Made In Your Shop
With Our Portable Vats
Write or Call TODAY:

CHEMICAL SUPPLY CO.

P. O. Box 7123 Houston 8, Texas

Tuesday Morning, October 10, 1967

10:30 A. M.

REPORT OF THE COMMITTEE ON DIESEL MECHANICAL MAINTENANCE

1967 TOPIC:

"A CRITICAL EXAMINATION OF DESIGN AND MAINTENANCE REQUIREMENTS FOR INCREASED LOCOMOTIVE AVAILABILITY"

Study the Full Text of this Report beginning on Page 149 of the Pre-Convention Report

A. M. TAYLOR, President
Mid-South Air Brake and
Railway Diesel Club
Division Electrical Foreman
Illinois Central Railroad
Memphis, Tenn.

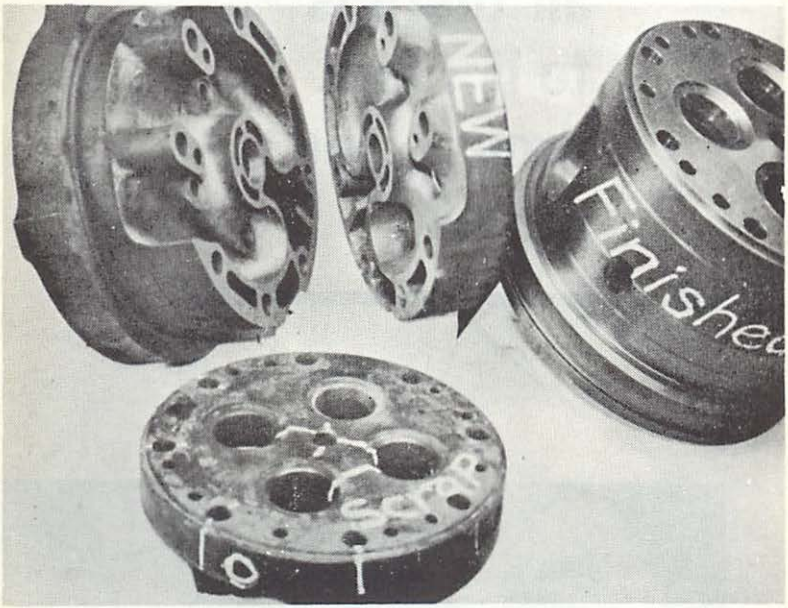
C. N. CAWLFIELD, Chairman
Committee on
Diesel Mechanical Maintenance
Engineer M. P.
St. L. - S. F. Railway
Springfield, Mo.

CHAIRMAN BELLHOUSE: Gentlemen, the next part of the session of the LMOA convention this morning is always one of the most interesting. This is the time when we discuss at some length the problems we have with locomotive maintenance, the things the builders have not done that they should have done, and what we think they should do. It is one of the best opportunities we have for a gripe session, and it usually turns into a good one and is usually quite productive.

The Chairman of the Committee on Diesel Mechanical Maintenance again this year is Mr. Chris Cawlfield. Mr. C. N. Cawlfield was born in Ash Grove, Missouri, on June 10, 1923. He attended grade and high school in Ash Grove. He served three years in the Air Force during World War II. He is a graduate of the Missouri School of Mines and Metallurgy with a B.S. degree in Mechanical Engineering. Chris is married and has one son. He lives in Springfield, Missouri.

Chris entered the railroad service in June 1950 as a special apprentice with the Frisco Railroad. Since completing his apprenticeship he has

Remanufactured Cylinder Heads



Our Jones Process produces diesel cylinder heads with improved design characteristics, even wall thicknesses, better water passages, core plugs eliminated, and exceptional metallurgy. Some users think these heads are at least as good as new originals, maybe better!

The price is right too.

We pick up and deliver without charge, on large orders.

Send for illustrated descriptive brochure.

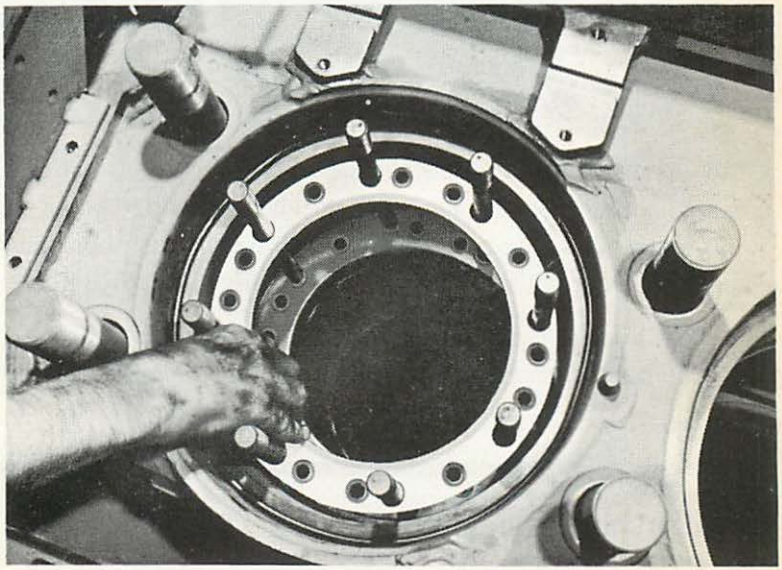
DISTRIBUTOR FOR U.S., CANADA, MEXICO:

RAILWAY SERVICE & SUPPLY CO. 510 South Harding, Indianapolis, Ind. 46221 Phone: 317-632-5596

MANUFACTURER:

J & J CASTINGS Hibbing, Minn. 55746 • Phone 218-263-6616

You mean that's all there is to it...just drop in one piece?



Sure, instead of 13 or 25 pieces... and these Parker diesel head gaskets stay tight over 300,000 miles!

Over 4,000 Parker diesel head gaskets are in service today, without a single reported leak! One user reached 300,000 miles, inspected, and put the same seals back into service. Installation normally takes a few seconds, because you just drop the seal—a single piece—into the cylinder and bolt on the head. No loose grommets or separate fire seal rings. No O-Rings. **And no leaks!**

A typical railroad can save over $40,000 per year with simplicity and performance like this. That is a strong statement—so why not make us prove it? Tests are being conducted throughout the industry to provide ample data for your decision. Ask for details.

Parker SEAL COMPANY

Culver City, California and Cleveland, Ohio • Distributors in Principal Cities

held positions as Diesel Foreman, Diesel Supervisor, Assistant Industrial Engineer, Supervisor of Planning and Scheduling, and as Engineer of Motive Power.

MR. C. N. CAWLFIELD (Diesel Mechanical Maintenance Engineer - Motive Power, St. Louis - San Francisco Railway, Springfield, Mo.): Yesterday afternoon in the meeting the questions that were asked about the last report were very good; in fact, the discussion went so far that I wondered if our Committee would even have to come in today.

After thinking about it a little more, I wondered if it was even safe to come in because of some of the discussion that went on. Hopefully we will have as good a discussion today. At this time I would like to start our discussion period by calling on Mr. A. M. Taylor, President of the Mid-South Air Brake and Railway Diesel Club.

1. Diesel Wheel Wear:

MR. A. M. TAYLOR (Division Electrical Foreman, Illinois Central Railroad, Memphis, Tenn.): Our Club is always happy and pleased to extend an invitation to the LMOA for a Pre-Conventation Presentation as we had this year, and we also extend an invitation to them to send one of their other fine technical committees to us next year.

Our meeting will be in May 1968 at the Hotel Claridge, Memphis, and a cordial invitation is also extended to all of you.

The Committee deals in this report on a most timely subject, and that is the last two words, "Increased Availability". I would like to open the discussion with this question:

Has anything been done as yet with the questionnaire mentioned on wheel wear? If so, what are the findings to date?

MR. W. E. BECKER (Manager Technical Section, Electro-Motive Division, General Motors Corp., La-Grange, Ill.): At our Memphis meeting we decided to alter the original wheel wear questionnaire which appeared in the booklet, and we did so. It was altered in two respects: It was altered to become more comprehensive, and it was also altered so that it would fit an IBM program. As a result of this, the questionnaire didn't get out to the Committee members until about the middle or the end of August. We have had a response, however, and I will give you a brief recap of what that response indicates at the present time:

So far, the railroads responding indicate wheel life anywhere from 249,000 miles up to 500,000 miles. Surprisingly enough, this encompasses all types of locomotive wheel and axle configurations. There are some 6-axle units at the 500,000-mile level and there are also some 6-axle locomotives at the lower level.

In general, the wheel turnings are spaced out in three equal mileage increments. The lowest one here shows the initial wheel turning at roughly 80,000 miles, followed by another 65,000 miles later and the last turning at 55,000 miles after that.

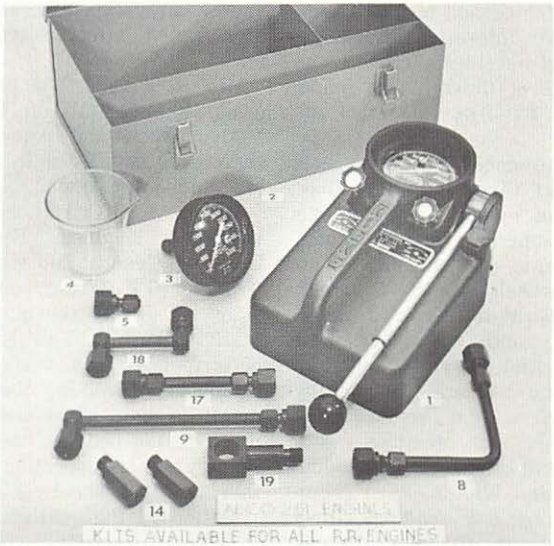
Concerning the people who enjoy the higher mileage, such as 400,000 to 500,000 miles, their first wheel turnings fall at about 125,000 miles and, strangely enough, they are about equally spaced throughout the life of the wheels until finally they are removed at 500,000 miles.

I would like to ask all of you, as Mr. Cawlfield did, to fill out the questionnaire and get it back to us so that we can get started with the IBM program or get the questions run through the IBM very rapidly so that at the time of the next Committee meeting we can publish some results.

KIENE®

PORTABLE

INJECTOR TESTER



for 'On-Engine' Inspection!

The Model DT-1500 quickly isolates defective units right on the engine . . . without removal or bench tests. Save costly down-time . . . keeps your engines rolling at top efficiency. Kiene equipment is recognized throughout the Diesel industry for accuracy and adaptability. Designed for long service under severe field conditions. Complete kit of adaptors.

ILLINOIS AUTO ELECTRIC COMPANY

2001 - 37 INDIANA AVE. • **CHICAGO 16, ILLINOIS**

Exclusive Representative for Kiene to the Railroad Field

MR. CAWLFIELD: In talking to Bill before our meeting this morning, he mentioned they have these printed questionnaires in the form they would like to receive them for their program. He indicated that he will be happy to send a questionnaire to anyone who requests it. This is a problem we should all take part in, and railroads not represented on the Committee are encouraged to participate.

MR. V. L. SMITH: We are primarily a switching and terminal railroad and are interested in flange wear. I would like to make one comment in spite of the remarks made in behalf of the iron and steel industry.

The steel produced to AAR specification M-124 Class B is not alike from different makers. I would like to recount some of our experience. We have some 43 locomotives on steel-tired wheels. Steel is steel, whether it is in a tire or a rolled steel wheel, and we experienced thermal cracking of tires manufactured by one maker. Though the specifications were very closely checked when the sections were taken from the broken tire, including the Brinell and all the other chemistry and physical readings, they could not determine why the trouble occurred.

We then changed suppliers, and the material is still made to the same AAR specification M-124, Class B, and has been in service for a long time, and we have never had one tire break and no problems have been experienced with this steel.

MR. CAWLFIELD: Is there a wheel manufacturer in the audience? Perhaps he might comment on that statement.

MR. RIEGEL: I am not a wheel manufacturer, but I do represent them. All I can say is that steelmaking is not an exact science. The specification provides a range of carbon and Brinell and other mechanical properties. It would be reasonable to expect some difference in performance between manufacturers, particularly if the product is heat-treated. They are all striving for the best performance, naturally.

MR. STACY: In your study on wheels and wheel performance, has any correlation been established involving the use of dynamic braking and/or any other operating procedures which affect wheel performance?

MR. BECKER: At this time I would like to call on the Electro-Motive truck and wheel designing engineers, and I would like to ask Mr. Koci to comment, please.

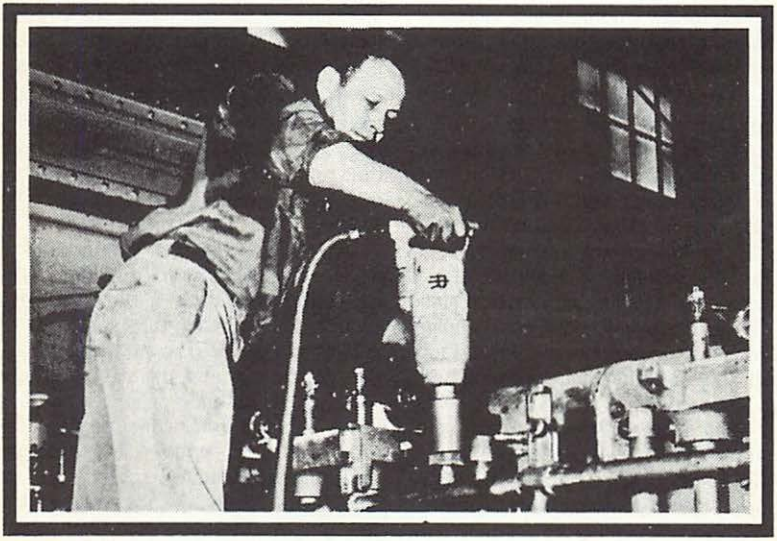
MR. L. F. KOCI (Locomotive Development Engineer, Electro-Motive Division, General Motors Corp., La-Grange, Ill.): Would you like to restate specifically the question?

MR. STACY: In evaluating wheel performance, has correlation been established involving the use of dynamic braking as against the use of non-dynamic braking operation, and/or any other operating procedures that do affect wheel performance?

Yesterday the gentleman from the P. & L. E. described experience with this problem, which involved the use of what is sometimes known as "bull-dogging". I don't know how many of you have heard that term, but on some railroads it applies to the practice of trying to stop the whole train with the independent brake on a locomotive.

MR. L. F. LOCI: No, we don't have a specific correlation regarding the use of dynamic brakes versus wheel performance. However, in the work we have been doing we have investigated relationships of various operating procedures affecting wheel wear.

Ingersoll-Rand portable tools cut maintenance time on big jobs or small ones



Cut maintenance time and get vital equipment back in service quicker with Ingersoll-Rand air tools! Impactools, screw drivers, drills, grinders —all built to Ingersoll-Rand's high quality standards have been proven on the toughest railroad maintenance jobs.

There's a complete line of Ingersoll-Rand air tools ready to go to work for you. Ready to show you savings in time and manpower you may not have realized possible. Contact your local Ingersoll-Rand branch office; an experienced AIRengineer will be glad to review your operations—help you tool up for efficient maintenance. Ingersoll-Rand, 11 Broadway, New York, N.Y. 10004. Or write for Tool and Hoist Catalog, Form 5319E.

Ingersoll-Rand

Ad No. 778A-380

Specifically, we have found that excessive gauge widening is a very definite factor on the rate of flange wear. We have found that the use of sand increases the rate of wheel wear, both tread wear and flange wear. We have found that heavy center plate reactions in curve negotiation, such as might occur from pusher service, or, for that matter, from heavy braking applications, definitely and directly affect the flange forces and result in flange wear.

In answer to the question regarding dynamic braking and air braking, I might say that some testing we have not yet completed has been very interesting, and I think I will mention it for that reason. A number of years ago we started investigating the effect of tractive effort on wheel wear. This primarily resulted from railroad data on higher horsepower locomotives which indicated that, in their particular operation, some roads were wearing wheels at a greater rate than the wear rate on lower horsepower locomotives.

After analyzing it and after laboratory investigations, this seemed like a definite possibility and one we had to put numbers on. So far we have run through a period greater than one wheel turning, in a test in cooperation with one of the railroads in which one axle was left unpowered on a GP-40, the latest highest horsepower 4-axle locomotive, and the other three axles remained powered to prove just how much of this wear was due to higher power.

Very much to our surprise, we found that the wheels on the unpowered axle wore almost as much as those on the powered axles — about 85 percent, to be exact. As a matter of fact, the wheels on the unpowered axle are wearing at a greater rate than railroad reports and records indicated for older locomotives.

So, this brings up a number of questions. We are duplicating this test on another railroad primarily because the road it was run on is a non-dynamic brake railroad, and it is entirely possible that under those conditions perhaps on-tread braking may be a major factor. We are hoping to expand the test to include an unbraked axle compared to braked axles, and I think this will give a little better answer to the question.

MR. O. M. DORSEY (Master Mechanic, B&O - C&O Railway, Cincinnati, Ohio): In your paper you state that one railroad manufactures its own gear cases. Is this economical?

2. Shop Made Gear Cases:

MR. CAWLFIELD: I would have to answer in the affirmative. **It is economical under their setup.** Maybe I should clarify that statement.

The way they are manufacturing this gear case, and the way they are working it in their shop, they are using it as fill-in work for a shop that does not require full time on routine maintenance.

VOICE: While we are on the subject of gear cases, I wonder if someone from EMD would care to comment further on the new gear case mentioned in the paper.

MR. H. H. KOCI: I think in your paper we probably got more credit than we deserved. We are not really designing a brand new case. **However, we are looking into the question of what we can do to eliminate the cracking problem on the gear case.** In that respect we are looking into two areas. One is different materials, and the other is stiffening and strengthening the side sheets by either increasing their thickness or adding stiffness, by applying embossments to the side sheets.

MR. CAWLFIELD: While we are on the gear pan subject as far as

pioneer in the science of corrosion control since 1887

DEARBORN CHEMICAL DIVISION
W. R. GRACE & CO.
Merchandise Mart, Chicago, Illinois 60654

MEMBER RPI RAILWAY PROGRESS INSTITUTE

questions are concerned, Cecil, would you care to comment on gear pans at this time?

MR. C. A. WILSON (General Supervisor Diesel Engines, Atchison, Topeka & Santa Fe Railway, Chicago, Ill.): I don't have any comments on EMD gear pans other than to say that **I feel what we have is next to nothing, and that there could be a lot of improvements made, particularly in the steel that is used in gear pans and in the seal arrangement and in the method of suspension.**

I know it is hard to go back and undo what has been done on a method of suspension, **but I still feel the manufacturer should get behind this and come up with a gear case that we can live with. The gutter arrangement in the gear case is something to be desired and I feel that a built-in gutter would be more practical. If gear cases were made out of better steel or possibly aluminum we would have better performance under EMD locomotives.**

MR. L. M. ALLISON (Master Mechanic, St. Louis-San Francisco Railway, Springfield, Mo.): We re-manufacture gear cases in our shop. This was brought about by failure of the gear cases on line of road. We made a jig primarily to repair EMD gear cases. We found that the condition of these gear cases coming in under our high horsepower units was not due to rough track, as EMD had told us. We operate all of these units on main line track. We found it was better to throw the case away many times and build a new one. We did not have to use EMD parts to do this. We are not manufacturing gear cases, just repairing them. **I don't think EMD has become interested enough in it as yet.**

3. Wheel Cracking:

MR. LONG: Concerning cracked wheels, has any study been made as to whether the wheels on the gear case side are cracking more due to the fact that you have a gear case there and air from the traction motors is not being directed against the wheel plate? I have been given to understand that the wheel on the gear case side is cracking more than the wheel on the opposite side.

MR. WONDERLY: I can't say that we know of any correlation. I think you have posed a rather interesting question. We certainly have enough data so we can check it out. As I sit here now, I don't know whether there is such a correlation.

MR. L. H. BOOTH (B&O-C&O Railway, General Master Mechanic, Huntington, W. Va.): We had a problem of wheel cracking some time ago, and it is a fact that the majority of wheels cracked on the pinion side, on the gear case side.

MR. CAWLFIELD: That is something to think about. It is something we haven't had come up in our Committee work this year, but it is something to think about.

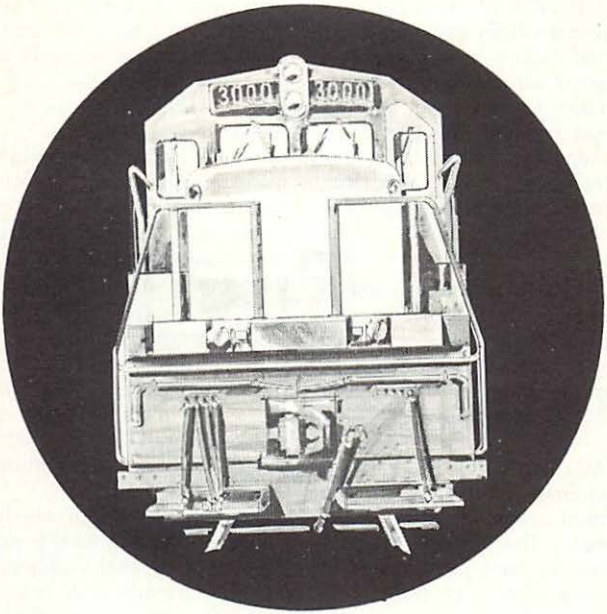
MR. LONG: Wouldn't this more or less indicate that the problem would be a braking problem and not a wheel manufacturer problem?

MR. CAWLFIELD: We are getting back to the discussion that came up yesterday and has already come up this morning, namely, operational practices and how they affect wheel wear and wheel life. Have you people at EMD run anything on that, Bill?

MR. BECKER: We have made some investigation. Mr. Koci, would you like to comment on this wheel cracking thing in particular?

MR. L. F. KOCI: I really can't say much. If there are wheels cracking in any significant number under our locomotives, the information isn't getting back to us.

MR. BECKER: I think this is a



General Electric Locomotives Advancing Railroad Progress

For over 70 years, General Electric has pioneered and developed many innovations that later have become standards for the industry. From Edison's first electric locomotive built in 1895 to the modern diesel-electrics of today, GE has pioneered efficient and reliable motive power. The U25, the first high horsepower locomotive to accumulate one million miles, introduced the modern concept of railroading . . . high-speed-and-tonnage capability with reduced running schedules.

The latest step in modern motive power is the U30. It incorporates the road proven features of the U25 and U28 locomotives with design improvements that further advance railroad operating efficiency and reliability.

117-47B

GENERAL ELECTRIC

general question.

MR. L. F. KOCI: How can you extrapolate data from something like one reported failure in two years? I can't comment on anything as far as our experience is concerned, because we have just not had wheel cracking problems reported. Certainly, in the past, historically, it has been run down to braking operation. That isn't much of a comment, but it is all I can say.

MR. CAWLFIELD: That is certainly something for us to work on perhaps for our paper next year, or come up with some answers to it in the interim. I am glad it came up, because it is something to think about.

MR. STACY: In our operations we are particularly interested in the wheel thermal cracking versus braking problem. The wheel thermal cracking that we have experienced — and there has been very little of it so far on our high performance passenger MU cars — has been on worn wheels — wheels worn near the limit on the rim.

With new Class CR wheels and composition brake shoes about which we talked yesterday, there has been no wheel cracking problem at all. However, on one particular car equipped with composition shoes and tread brakes, with worn wheels, there has been one case of a cracked wheel.

We won't know until the wheels get down to the worn stage whether or not we are going to get into trouble. In analyzing this situation we should remember that there may be more possibility of thermal cracking trouble with worn wheels than with new wheels.

MR. DON BARNETT (Alaska Railroad, Anchorage, Alaska): On this wheel cracking problem, in the past we have had quite a few cracked wheels particularly where we used composition shoes. We took the composition shoes off and immediately the trouble began disappearing. This was mainly with the Class C wheel. With the Class B wheel we didn't have quite that much of a problem. However, it didn't seem to make much difference whether we had a new wheel or a worn-down wheel, one that had been turned, or in various stages of wear. We found this trouble in all stages.

As far as from one wheel to the other, whether it was on the gear side or the opposite side, I can't recall there being any difference. We haven't made any particular study of this. This was just a visual observation as the wheels came through the shop.

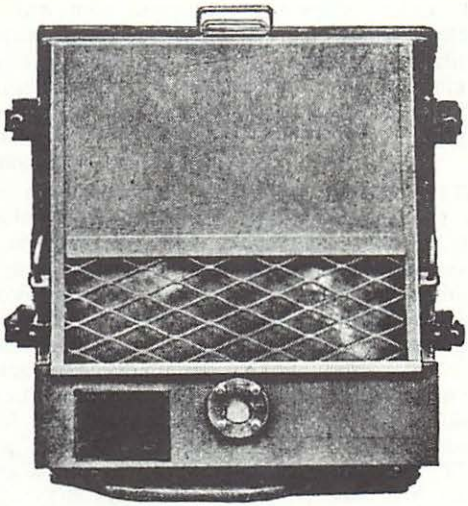
One other problem we have with wheels is shelling of the wheels contributed to by cold weather. We have had that trouble with new wheels. I have seen them where they wouldn't even make a second turning due to the shelling. You start to turn it out and it would be so deep that you couldn't even recover it. That also applies to new wheels and also worn wheels and turned wheels at various stages.

I believe a lot of shelling can be attributed to cold weather, where we are running at temperatures as low as —60° and even lower, and also extreme temperature changes. I feel that some of the shelling is started by small slid flat spots and also by stopping a hot wheel on a rail that has a temperature of as much as —60°. The majority of our shelled wheels occur during the cold weather. If it is worth anything to any of you people, I am glad to offer it.

MR. CAWLFIELD: What kind of service were these locomotives in?

MR. BARNETT: Road service.

MR. W. F. DADD (B&O - C&O Rail-



Keep it Clean with...

AIR-MAZE®

FOR LOCOMOTIVES

FOR PASSENGER CARS

Oil Bath engine air filters
Panelbath engine air filters
Inertia-Maze
Lube oil strainers
Compressor filters
Car body panel filters
Oil separators
Spark arrester kits

Permanent panel filters

For complete information, write or call
Rockwell-Standard Corporation,
Air-Maze Division, Cleveland, Ohio 44128

AIR-MAZE FILTERS ARE PRODUCED BY ROCKWELL-STANDARD CORPORATION

way, Assistant Chief Mechanical Officer Locomotives, Huntington, W. Va.): I would like to ask that gentleman what kind of composition shoes he was using. Was he using low friction or high friction composition shoes?

MR. BARNETT: We had at one time some low friction composition shoes, and I believe we also had some high friction composition shoes. However, we didn't have too many of them. We had two different types that we tried out, and we didn't use them too long.

MR. DADD: Was the majority of your wheel cracking with low friction composition shoes?

MR. BARNETT: Yes. We went so far as to put an iron shoe on one wheel and on the opposite side we put a composition shoe, and in a very short time we found the wheel with the composition shoe was cracked. We did that on only two occasions, I believe.

MR. RIEGEL: The reason a wheel fails in the plate or rim or anywhere else is because the internal stresses exceed the strength of the material. How do those stresses build up to the point that they cause a wheel failure? The stresses induced by brake shoe heating far exceed in magnitude anything you can put in a wheel from lateral or vertical mipact, but lateral and vertical impact added to stresses which might be locked up in the wheel from brake shoe heating may cause a sudden rupture, and apparently that is what happens.

Yesterday I was somewhat annoyed because the statement was made here that wheel technology is going backward. That is not so. The manufacturers of wrought steel wheels have spent in the neighborhood of $100,000 over the past two or three years to employ the General Electric Company computer and some of their brains to investigate stresses in wheels, and ultimately to design the optimum wheel. We are ready with a paper outlining the conclusions, which will be presented to the ASME next month.

We have been asking over the years for information from the railroads. We need to know what your maximum vertical and lateral impacts are. The Research Department of the AAR recognizes that we must have this information to design the optimum wheel, and they have it in their program; but they are very shorthanded and haven't been able to run the tests as yet. So, wheel technology is not going backward.

MR. ALLISON: This looks like a wheel meeting, so I would like to inject something, too.

I am going to agree with some of these fellows, that wheel cracking does come from operation. I am not going to buy the statement that it is all on the ring gear side. Over a year of fighting cracked wheels and we couldn't pin it down to any location except the hand brake. This is argumentative.

Concerning cracking of wheels, the gentlemen from the Department of Transportation can find them. They look for an overlapped shoe, or they look for a wheel that does not have the proper radius on the outside of the rim. All of us who are fortunate enough to have a wheel truing machine on our property probably take a wheel from the manufacturer that is 5½ + or — ⅛". The cutter on the wheel truing machine is built to take the maximum width. If you don't get a wheel that is a maximum width, you can't get your full ⅝" radius, and therefore you are set up to have a rolled rim condition develop.

If you have an over-shaping shoe you will have a cracked wheel. This

CENTURY 420

CENTURY 430

CENTURY 628

CENTURY 630

CENTURY 860

ALCO Century Locomotives

Reliable, economical motive power. From the 1500-hp Century 415 to the 3600-hp Century 636 and others.

All powered by ALCO's Model 251 diesel engine—proved by more than 750 million miles of mainline freight service.

When you're looking for better performance, greater dependability and lower operating and maintenance costs, look to ALCO Century locomotives.

Locomotive and Engine Products Division, ALCO Products, Inc., Schenectady, N.Y. 12305, a subsidiary of WORTHINGTON Corporation.

ALCO

can happen on a fresh-turned wheel. Anything under a new wheel, if it is under 5⅝" width, you won't have your full radius on the outside of the rim.

MR. F. W. GEHRER (Assistant Master Mechanic, Southern Pacific Company, Houston, Texas): I would like to know, if washing locomotives right off the road when they come in and have road heat on the wheels. whether the water has any effect on them. Would expansion and contraction over the years tend to create cracks in such wheels?

MR. CAWLFIELD: I am sure that would be a difficult question to answer. Would anyone on the Committee like to comment on that? On our road I would say that would be no problem, because on the Frisco we do not wash them that quickly after they come in off a run. I would suspect there are a lot of other roads in the same situation. We do clean them, but usually they are serviced first, and as a result they would have time to cool down and the heat would not have an effect on them.

MR. C. H. DERNER (Master Mechanic - Locomotives, Pittsburgh & Lake Erie Railroad, Pittsburgh, Penn.): A couple of months after we received our new GE units we started having cracked wheels. That was in April or May. We quit it in December. We did a lot of studying and ran a lot of tests in between times.

One of them was to try to find out, with the help of General Electric and Westinghouse Air Brake, what was going on. We tried to determine the heat input to the wheel from the first run, where we cracked about four wheels by feeding the computer the identical train information and operations.

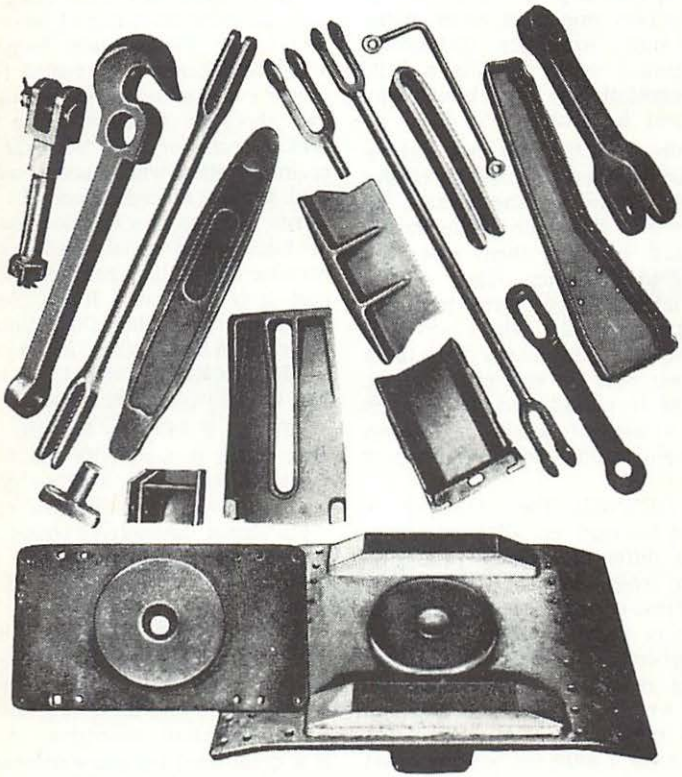
The computer estimated we had 1700 degrees in the wheel flange area. Later we got the steel industry in on it. They said you can induce a thermal check with a 600 + ° F. heat application to a wheel surface, and it won't necessarily start right now but will lie dormant, and with repeated applications of a certain amount of heat it can open up as a thermal check.

So, it is quite interesting to hear all these stories. When this first happened we thought we were the only railroad in the country that had cracked wheels at the rate we were having them. There is a lot of individual testing being done, and I think this will be a very good subject for next year.

MR. LONG: Going back to the question the gentleman asked about washing and not washing wheels, one of the nice things about this job of being on two properties, the C&O and B&O, is that on the B&O side we have an automatic washer rigged up, where all units are washed inbound. On the C&O side we do not. The wheels are cracking predominantly on the C&O side.

MR. V. C. BARTH (Chief Metallurgist and Engineer of Tests, Chicago & North Western Railway, Chicago, Ill.): Thermal cracking of wheels can occur more readily due to snow quenching than washing on the wash rack. Locomotives come to the wash rack after a little time to cool wheels, while traveling through a snowstorm, hot wheels are quenched that can lead to thermal cracking.

The other point I want to bring out is that on our road we have done three things. **We have found, using both the iron shoe and the composition shoe, that when the engine crews bulldog, this can result in an epidemic of thermal cracking on every locomotive so handled.** It will come in with cracked wheels, anywhere from one to eight or one to twelve, and naturally requires a



From Stuttgart to San Francisco . . .

Many of the major railroads are turning to Berwick for supplies of stock parts. The coupling hook (upper left) goes to Europe, welded center plates to a southern road, wedges to the west coast . . . international recognition of Berwick's supermarket approach to selling stock parts. Or perhaps, appreciation of the first-rate craftsmen who build them. Whatever their reason, buyers receive low bids and timely delivery.

How 'bout a crack at your next order?

Berwick Forge and Fabricating Corporation

Berwick, Pa.

Chicago office: 80 E. Jackson Blvd.

little missionary work.

Our second step, true brake alignment is very important. Overlapping brake shoes are very undesirable and bushing brake rigging a little more carefully for good brake head alignment important.

Thirdly, both the iron shoe and the composition shoe are now purchased with 3/8" relief on the outside. In other words, the width of the shoe is 3 3/8" and we have them cast with 3/8" off to 3", which allows a little more lateral to get away from the overlapping of the wheel which is very serious, particularly if it takes a contour over the side of the wheel. A wheel is almost certain to crack if any amount of braking application has been made with overlapping shoes.

MR. DERNER: The builders of the various locomotives, all build trucks with a different braking ratio percentage when they are sitting as is. With cross-country exchange of power, is there anything being accomplished in the stndardization concerning reducing or setting up reduced wearing of parts in one unit versus the other?

You have a different braking effort on each type of truck. You have different brake cylinder diameter, and you have different types of brake controls through the units, with a lag going back to the rear unit. Is there anything that can be done by the builders to standardize this: Exchanging power across the country, we can be blaming the wrong unit or railroad for the cause of bad wheels, or properly unusual wheel wear performance.

MR. CAWLFIELD: I think you have a very good point there; in fact, it was brought out in our paper. I would be interested in all three of the locomotive representatives on this Committee commenting on that.

MR. WONDERLY: As Mr. Derner says, the difference in braking ratio between different kinds of power can be a factor. We have also found that a bigger difference is created by the use of composition shoes versus cast iron shoes on units with the same braking ratio or even with different braking ratios when using independent brakes at high speed. In other words, the use of a composition shoe at high speed gives much greater braking effort than you get with the cast iron shoe, and this difference is much greater than the differences in brake cylinder sizes, and so forth.

MR. BECKER: I would like to ask Mr. Koci to comment on this.

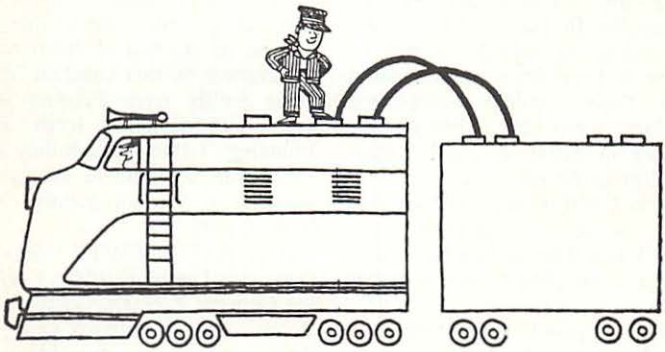
MR. L. F. KOCI: I really don't have much to add. With the 4-wheel truck, in our case, a large part of our locomotive manufacture now is replacement locomotives consisting of components that are reused, which more or less sets the ratio in those cases.

With our 6-axle locomotives, which are predominantly composition shoe, as you know, we offer independent relay valves, and these are based on railroad requests, among which there **is a great need for more standardizacan say is that we would be glad to standardize if the railroads agree to standardize on certain ratios.**

MR. E. C. ROBERTS (Performance & Dependability Chief Engineer, Alco Products, Inc., Schenectady, N. Y.): I have no comment on that question.

MR. CAWLFIELD: I think that tends to emphasize the standardization question brought up here. **There is a great need for more standardization in the areas where it is feasible.**

MR. C. M. MACHIN, JR. (Chief Electrical Engineer, B&O and C&O Railway, Huntington, W. Va.): In discussing wheel wear, there is one aspect that has not been brought



BEST WAY TO GET MORE STARTS FOR YOUR DIESELS?

(Hardly! The surest way is to install C&D's Type CXD batteries.)

It's a proven fact that diesels get more starts from Type CXD batteries. They combine higher starting capacity with lower internal resistance to give more power where it's needed . . . in the starter motor. Why? More grid in the positive plate is the basic reason . . . assures high capacity right to the end of long battery life. What about economy? Lower annual costs and long life add up to years of consistent savings. Get the facts about Type CXD's proven reliability and sustained cranking power. Ask your C&D man for details, or write to C&D Batteries, Conshohocken, Pa.

C&D BATTERIES
DIVISION OF ELTRA CORPORATION

out. We have found in our research, particularly with respect to wheel slip, that there is just as much wheel wear from the application of power as there is from the application of brakes, if it is performed at a similar rate.

In other words, we just made a trip up into Canada and on the Canadian Pacific they had a problem with spalling of wheels. I believe someone is here from the Canadian Pacific. Their problem disappeared when they were able, through the assistance of EMD, to control their wheel slip problems.

We also found on our railroad that quite a number of problems disappeared also with shelling of wheels when we were able to get it under control.

What most people don't realize is that under power the wheel is constantly sliding or slipping with respect to the rail. While I am not selling the Encyclopedia Brittanica, the best definition of rolling friction that I have ever read is in that particular book. It describes in detail the phenomenon both in braking and in application of power.

MR. CAWLFIELD: We have had a pretty lively discussion on wheels. Is there anyone who would like to change the subject slightly and get into another aspect of the paper?

4. Module Form Equipment:

MR. MACHIN: I would like to ask the locomotive manufacturers what progress they are making in making their equipment in module form to permit us to maintain their locomotives with less expense and less out-of-service time.

We have attempted in some of our brake equipment — and we had to pay rather heavily for it — to put certain components that are required by law (maintenance) in a module form. But we feel that there is a certain responsibility on the part of the manufacturer also to design his locomotives to let us maintain them with a minimum of expense and out-of-service time. It appears that the module form is the only way we have to go.

MR. WONDERLY: We have a number of General Electric people here today, and I would like to call on one or several of them to make a comment on this question. We have Dave Smith, from Product Service, and Earl Hansen, from Product Planning. I think Bill Bailey is here also, from Mechanical Design. Could we have a few comments from you first, Dave?

MR. DAVID SMITH (Supervisor, Domestic Diesel Electric Field Service General Electric Company, Erie, Penn.): We are already doing this in some areas. As you know, components are now mounted on "blue-front" cards that can be plugged in and removed quite easily. In the past we had a complete engine control panel on the old Fairbanks; it was a complete subassembly that could be unbolted and taken out. This did not prove feasible.

In subcomponents the entire wheel slip panel can be unbolted. The power cables prohibit any kind of plug-in device on the major power components at the moment. We have made quick disconnects on traction motors with some success, but in general the entire control cabinet is never going to be a removable part.

MR. BECKER: I would like to have our Assistant Chief Engineer, Mr. Max Ephraim, comment on that.

MR. MAX EPHRAIM (Assistant Chief Engineer, Electro-Motive Division, General Motors Corp., La-Grange, Ill.): I think Mr. Machin's point is a good one. We are looking very closely at what should be done with regard to servicing. There is no

Serving America's Railroad Systems

For Half A Century

SILENT HOIST FORK LIFTRUK

SILENT HOIST KRANE KAR

SPARE MEN • SPEED WORK
SLASH HANDLING COSTS

★

Authorized Sales and Service

JOHN J. CONNELL CO., INC.

3016 LOCUST ST. JEfferson 5-2488
ST. LOUIS 3, MISSOURI

question that when a locomotive comes in and is reported to be in trouble, in many cases it is difficult to ascertain the source of the trouble.

We are looking at modularizing. We are not sure what form it should take. We are thinking of several other items in connection with trouble-shooting. With our new "IDAC" wheel slip we have put a check circuit on it. A button is provided to check whether the circuit is operable or not. Thus far the results of this checking system have been encouraging.

We are also looking at putting some memory circuits aboard. We now have this on our ground relay, recognizing that in many cases we don't want to keep the locomotive out of service, but we would like to have some type of memory on the locomotive to indicate whether it has been in trouble.

We expect to extend these programs further in the near future. With regard to the basic question, EMD is very active in a program to simplify electrical circuit trouble-shooting and has already incorporated several improvements in our basic locomotive.

MR. E. C. ROBERTS (Performance & Dependability Chief Engineer, Alco Products, Inc., Schenectady, N. Y.): At the time we were designing our so-called Century line there was considerable preliminary design work on a rack to contain the major air brake components. Preliminary layouts were sent around to various railroads to get their comments on this arrangement. Surprisingly, it was not well received. Later on the air brake people did come up with a rack, and in some cases it has been used.

As far as the air filter components are concerned, the inertial filters, in our latest designs are arranged so that they are easily removable in a nest that can be handled manually without the use of a crane.

MR. THOMAS E. AIKEN (Purchasing Agent, New York Central Railroad, New York, N. Y.): In line with your topic on standardization, I would like to know if the locomotive manufacturers have any plans in mind for some type of cooperative program to standardize on vendor items such as filter cartridge sizes, or any other vendor item which would not affect a competitive locomotive design.

MR. ROBERTS: As far as lube oil filter elements are concerned, the builders are pretty well standardized. Fuel oil filter elements we are not standardized. Of course the builders were more or less standardized on air filter elements when we had the 20 x 20 panel, but now we have gone into inertial filters.

MR. CAWLFIELD: Mr. Roberts, when you say you are pretty well standardized, are you referring to filter sizes with respect to other locomotive manufacturers, or within your own company?

MR. ROBERTS: As far as the three builders are concerned, our lubricating oil filter elements, size-wise, are pretty much interchangeable.

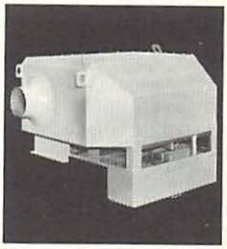
MR. BECKER: That is about the case at present. I have nothing more to add.

MR. WONDERLY: I don't think I have anything further to say. Earl, do you have any comments you would like to make? There certainly is one problem that I think you all recognize. You can hardly sit down with your competition and discuss the pros and cons of what they are and are not doing. I think you know what I mean.

MR. EARL A. HANSEN (General Electric Company, Erie, Penn.): Cus-

AAF ...The most complete line of engine and carbody intake air filters

AAF heavy-duty CYCOIL oil bath air cleaners

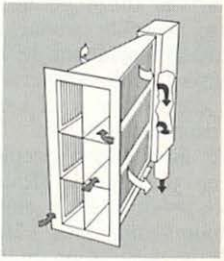


The HP01-V Cycoil is a self-cleaning oil-bath-type engine-intake air cleaner capable of operating efficiently in any weather condition.

This horizontal AAF Cycoil is designed to fit the limited space requirements of locomotives. High-cleaning efficiency offers less wear to engines.

Only maintenance requires simply changing the oil and removing sludge at regular intervals.

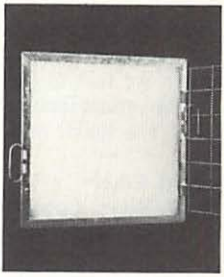
Compact AAF DUST LOUVRE air cleaners



The Dust Louvre operates on the principle of inertia-separation. It handles large volumes of air, requires a minimum of space and provides minimum pressure drop.

It is designed for the continuous removal of dirt and dust particles—ideal for applications where high concentrations of dry dust are prevalent. Ideal as a precleaner or as a primary filter.

Economical AAF AMER-kleen replaceable glass fiber filters



On-the-job operations clearly demonstrate these major benefits:

1. Lower initial cost — AMER-kleen filters cost up to 40% less than panel filters.
2. It's less expensive to replace AMER-kleen disposable filters.
3. AMER-kleen allows less dirt to get into your equipment.
4. Can be used as engine intake or carbody filter — wherever metal panel filters are suitable.

For more information write E. F. Hickey, American Air Filter Company, Inc., 111 Central Avenue, Louisville, Kentucky.

AAF American Air Filter

BETTER AIR IS OUR BUSINESS

tomers do specify many of the specialty items that we do put on, and I would assume they would specify the same thing on an EMD locomotive that they would on ours or on an Alco. I think customers do specify things that are standard on their railroad.

MR. WONDERLY: We are all quite aware, too, of the fact that individual railroads specify different items, and when you get into the interchange activity that is so predominant now it creates a lot of problems. **So, there truly is a problem in this area.**

MR. CAWLFIELD: I think that was a very good question. After all, we are at this meeting to exchange ideas, not only among ourselves as railroad people but with the manufacturers and vendors. Oftentimes they don't know what we want unless we express ourselves.

We as railroad people can do a lot on this standardization situation if we work a little closer with the various companies. Hopefully the AAR is doing something about this. I am sure they are in a lot of respects, but most certainly if we stir up interest by talking about it with our company representatives on the various committees of the LMOA, and when we talk to the vendors and locomotive manufacturers questions like that are good, and they stir up interest.

5. Inertial Filter:

MR. LONG: Concerning the inertial filter, some years ago some railroads started putting a manifold on with nozzles for cleaning of the inertial filters. I have a two-part question: First, is the manifold holding up that was made of plastic? Secondly, is it doing the job?

MR. CAWLFIELD: Does anyone on the Committee care to comment? Anyone in the audience? The Committee members have not had any experience with it. Jim, I am sorry, but I am afraid we are lacking an answer to that.

MR. LONG: I understood it was the Pennsylvania Railroad.

MR. CAWLFIELD: I am afraid we have drawn a blank.

6. Turbochargers:

MR. ALLISON: This question comes from my friend in Texas and I want to modify it a bit: What does the manufacturer offer as warranty on the re-manufacture of turbos? Are they rebuilt in kind, or are they upgraded to include all the modifications?

When it comes to EMD, personally I would like to know how we can tell what we are getting when we get it. I can't read the symbols.

MR. BECKER: In the case of our turbos, as they are re-manufactured they are brought up to the latest design standards.

As far as the symbols are concerned, I can't read them either.

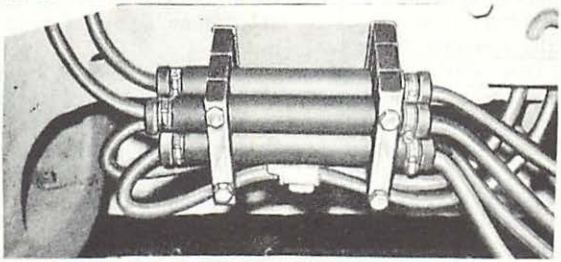
When you get a turbo today, it has the latest clutch design and all the latest components in it as required for the model locomotive you are placing it on. Our district people can tell you what the symbols stand for if you are that curious about it.

MR. ALLISON: Mr. Becker, you are mistaken. They can't. I would like to think that some time, even though you are making improvements and we are testing them for you, some day we would like to reach that 540,000 miles so we could send one in on unit exchange as a running turbo.

MR. BECKER: Fortunately, Mr. Allison, we have had a number of people who have reached that lofty goal, admittedly not 50 percent of them or even 60 percent, but a lot of them are getting close. I will make sure that our district representative

DO

CABLE SUPPORT BLOCKS and INSULATING SLEEVES



- All weather flexible Neoprene rubber
- Heat resistant
- Absolute seal against moisture
- Clamps tightly even on small cables
- High Dielectric strength
- Reusable
- Fast and simple to apply
- Molded of tough all weather rubber
- Permanently bonded steel backing plates
- Indestructible — will not crack, melt or swell
- Will not damage sleeves or cables when clamped
- Vibration resistance
- Reusable
- Lower priced than wood blocks

POST OFFICE BOX 679
LAFAYETTE, CALIFORNIA

appraises you of the proper symbols on them. We will supply them to him if he doesn't have them.

MR. CAWLFIELD: As I remember it, that question was aimed at all three of the locomotive manufacturers. Mr. Roberts?

MR. ROBERTS: When the turbo is sent in to us for rebuild, we build it up to our latest standards as far as material and design are concerned. The warranty situation I am not in a position to comment on.

Concerning the symbols, I am not familiar with that, but I am sure that what they mean is that the turbo is of the current production design at that time it is rebuilt.

MR. WONDERLY: When a supercharger is sent in, it is rebuilt to the current standard for the particular model involved. I was not under the impression that there was any particular confusion regarding designation for the model. Do you have anything to add to that, John Audett?

7. Base Line For Comparing Locomotive Maintenance Costs On Different Railroads:

MR. GARIN: I have a question, but I don't know if this is the right group to ask it of. It concerns the base line for comparing locomotive maintenance costs on different railroads.

Comparisons are odious, and personally I think this idea of comparing maintenance statistics from one railroad to another is very misleading; but some people insist on doing it.

I wonder whether any of the gentlemen on the Committee or in the audience have any good ideas on the baseline of comparison, such as cost of repairs per unit, cost of repairs per gallon of fuel, cost of repairs per 1,000 gross-ton miles, et cetera. Obviously these yardsticks all have their disadvantages, but we are trying to establish a reasonable baseline of comparison using the available statistics. **I think it would be a service to all the railroads if some agreement could be reached on what basic ratios should be established for comparative purposes.**

MR. CAWLFIELD: Would any of the members of the Committee care to comment on that? How about you, Nelson? I am sure they vary between roads, but we might get an idea here about how some of them do base theirs.

MR. N. A. BUSKEY (Assistant Superintendent Motive Power, C&O Railway Company, Huntington, W. Va.): We have costs on the C&O side. Actually, they are maintenance costs — maintenance dollars. It is not based on any fuel-ton or gross-ton miles. We would like to have that.

MR. K. F. MILLER (General Supervisor Locomotive Maintenance, New York Central Railroad, New York, N. Y.): We carry statistics on cost of maintenance based on direct labor costs per mile. To that we add an arbitrary percentage for material. The arbitrary percentage has been found over the years to be approximately 150 percent of the direct labor charge. That gives us some indication of what our operating costs are or what our maintenance costs are for the locomotive.

MR. W. B. HARRIS (Supervisor Diesel Equipment, Western Maryland Railway, Hagerstown, Md.): The use of direct labor cost per mile to obtain operating costs is a very controversial subject. Most railroads use unit mileage to secure maintenance costs, others use wattage hours, and a few roads use fuel consumption per unit to determine maintenance costs. The main trouble with those systems is the varying power factor, and railroad terrains existing on the American railroads. The Western Maryland

Chrome Crankshaft Co., Inc.

★ *Complete reclamation of Diesel Engine Crankshafts and related parts*

Grinding	Balancing
Hard Chrome Plating	Magnaflux

★ *Camshafts modified and repaired*

★ *All reclaimed parts warranted as new*

Chrome Crankshaft Co., Inc.

Tele.: LUdlow 6-3030
6010 South New England Ave.
Chicago 38, Illinois

Tele: 773-5936
6845 East Florence Place
Bell Gardens, California

L. A. BOOKER, *President*

Railway uses cost per thousand gross ton miles and cost per unit miles to secure maintenance costs. In order to improve unit availability, locomotive maintenance is performed on a time cycle. **For instance, the cylinder assemblies are replaced each six years. The new lube oils, improved lube oil systems and improvement in seals have enabled us to extend our engine cylinder assemblies to a six-year period.**

MR. BELLHOUSE: In the central part of the United States we have been swapping information on cost per car-mile and unit-mile, and so on, among about ten or twelve railroads. You have raised a horrible thought. Maybe we are no comparing apples with apples.

The unit used there is a cost per unit-mile. I am speaking now of the Cotton Belt. There, we keep track of our unit-miles. We have the total charges to Account 311. We divide the unit-miles into that total figure, and that is the cost per unit-mile.

MR. GARIN: That is exactly one of the traps you can get into, because the unit-mile is not always a unit-mile. A unit-mile going over the Sierra is a lot harder on the equipment than a unit-mile across the prairies. However, that is a very interesting topic.

I don't know if you gentlemen are faced with it, but I have an analysis of twenty-two railroads, and some can't be as bad as this shows, and some can't be as good. I think a lot of it is strictly due to the manner in which statistics are compared.

For example, one factor we are trying to grind in is the BTU content of the fuel, which in our case with low-gravity fuels gives us more BTUs per gallon. Another is the gallons of fuel per unit-mile. This ratio gives some idea of the severity of operating conditions on the locomotive. This type of weighting should be ground into the comparative figures.

The whole thing is confusing at best, but as we are constantly faced with comparisons between railroads, I think it behooves us to set up some standards of comparison that are more realistic.

MR. MACHIN: There is one statistic that is rather common among the railroads, and that is the number of times a unit fails within a week or ten days after it has been out shopped. This varies from ¾ to 1½, and in some areas the diesel will fail twice for each time it was put in through the shop to obtain scheduled repairs.

Normally, when we trace down the cause of failure we will find man failure, wherein either he hooked up a wire improperly or a pipe improperly.

What I am driving at is the we have been attempting to get the manufacturer to designate the wires and the terminals that the wires are connected to, and further to do the same thing with pipes and with air. I feel it would be helpful to all of us if we did not force the individual workman in the shop to make a decision as to where the pipe should go, and to let him guess at it.

I think all of the equipment should be properly designated, and then he can make a positive decision as to when and how to make the repairs.

MR. CAWLFIELD: Our time is up. I would like to call on Mr. Dent for a summary.

MR. E. E. DENT (Superintendent Motive Power, Missouri Pacific Railroad, St. Louis, Mo.): We are deeply appreciative of the time, effort, interest, and enthusiasm with which this Committee has made this fine report. Mr. Cawlfield and his Committee represent one of the most knowledgeable teams ever assembled

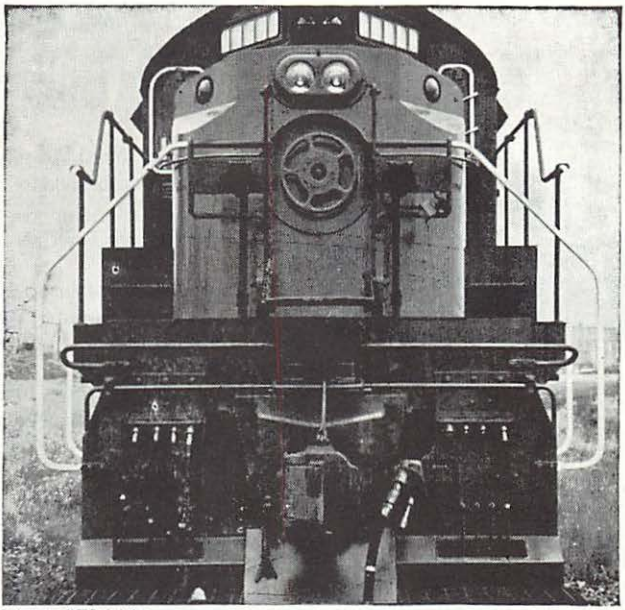


Photo courtesy ALCO Products, Inc.

Specify the red nylon locking collar for vibration-proof bolted connections

ALCO specifies Elastic Stop® nuts to insure reliable bolted connections through continuous twisting and pounding. Elastic Stop nuts fully meet AAR locknut requirements; they hold fast despite severe vibration, shock and impact.

ESNA's exclusive red nylon locking collar holds the bolt with an unshakeable grip but never galls bolt threads. It can be used again and again.

Elastic Stop nuts reduce inspection, retightening requirements, downtime, and maintenance costs.

For more information about Elastic Stop nuts write Dept. S2-733.

ESNA **ELASTIC STOP NUT CORPORATION OF AMERICA**
2330 Vauxhall Road, Union, New Jersey

SOUTHWESTERN REGIONAL EXECUTIVE

E. E. DENT
Supt. Motive Power
Missouri Pacific R.R.
St. Louis, Mo.

to explore and prepare such a reservoir of information, and in depth.

The following are but a few of the important subjects discussed, and will merit your attention concerning future efficiencies generated through maintenance economies and greater utilization of your locomotive.

It is interesting, although the report is early, as Mr. Becker has said, that some railroads are claiming from 249,000 to 500,000 miles in wheel service. The gauge widening of the rail influencing the flange wear I thought was interesting. The economics of a railroad manufacturing or rebuilding their own gear cases as needed was interesting. Then, of course, the brief discussion of the new gear cases EMD is currently producing and has been strengthening in critical areas.

We may sometimes have had a tendency on our railroad to consider putting much pressure on the wheel manufacturer as the means of eliminating this problem. Our research in this area, however, indicates wheels can and do thermal crack for varying reasons other than those which can be improved upon in the manufacturing process. Further, our research, covering the following questions generated here, has not thus far disclosed a trend or relationship of this condition or location to thermal cracks:

1. Wheel location, pinion end or commutator end of motor
2. Traction motor cooling air exhaust vent whether (a) Lowered (b) Open

The question of braking ratios was discussed which has a direct relationship to thermal cracking, particularly so when these different ratios appear in multiple unit consists. Obviously, the unit with the greater braking ratio will be doing the heavier braking, thereby becoming most susceptible to this thermal cracking condition. **This is a very important subject since a standard braking ratio acceptable to all concerned would lend itself to a more compatible operation where units of different builders are utilized by various railroads in pooling service.**

Standardization of vendor items such as sanding valves, drain valves, windshield wings, awnings, horns, fire extinguishers, location of cab controls, control equipment, etc., would further help in the interchange of locomotives.

I trust that each of you will benefit in some manner from the subject matter which has been presented this morning by this Committee.

PRESIDENT BEISCHER: Thank you, Mr. Dent, for those very appropriate comments.

It is very apparent to me, in hearing what has transpired here this morning, that our function is not being completely fulfilled. I am most impressed with the discussion that

DEPENDABLE

® EVERLASTIC COILS

—for—

GENERATORS and TRACTION

MOTORS

—also—

UNIT EXCHANGE

—or—

REPAIR and RETURN SERVICE

EVERSON ELECTRIC CO.

1126 UNION BLVD. ALLENTOWN, PA.

Phone — Area Code 215 434-5211

took place concerning wheels, and the various opinions and various problems, and the lack of complete knowledge that we as an industry should have of what is actually going on. I think we can be of far greater service than we have been to all of you.

I am very much encouraged by the attendance we have today. It is substantial. This represents a considerable cost to our industry to have you here. In turn, to justify this cost we must be able to accomplish something positive.

Mr. Riegel, of the American Steel and Iron Institute, you stated that your Institute is making considerable investment into the investigation of the wheel situation as far as what can be done to improve the performance, the adherence to specification, and so on, in wheels. Yet the remarks made by Tommy Temple of the Frisco, and the gentleman from the Philadelphia Transit Company, and many others here today, indicate that we are just not getting through to everyone as to exactly what is going on.

We have heard our members comment that the high horsepower locomotive is taking more life out of the wheel. We heard another man say he looked into this and made an exhaustive study and found this wasn't so. Just what is going on? Just what is the answer?

I don't feel we are getting to the root of what is a common problem with all of us, and getting down to what direction we must be taking. I wonder, Mr. Riegel, if your Association could be instrumental and greatly helpful in working with our committees so that we as an industry represented here today will be far more knowledgeable in what is going on and what must be done, and how we can accomplish it.

I throw this out to you as a suggestion. **I think perhaps we may be in an area where we can accomplish something beneficial.**

Certainly we heard enough varying opinions, enough varying conditions under which things are happening to our wheels, that we seem to be going in many directions, and we can't resolve all of this into a common answer.

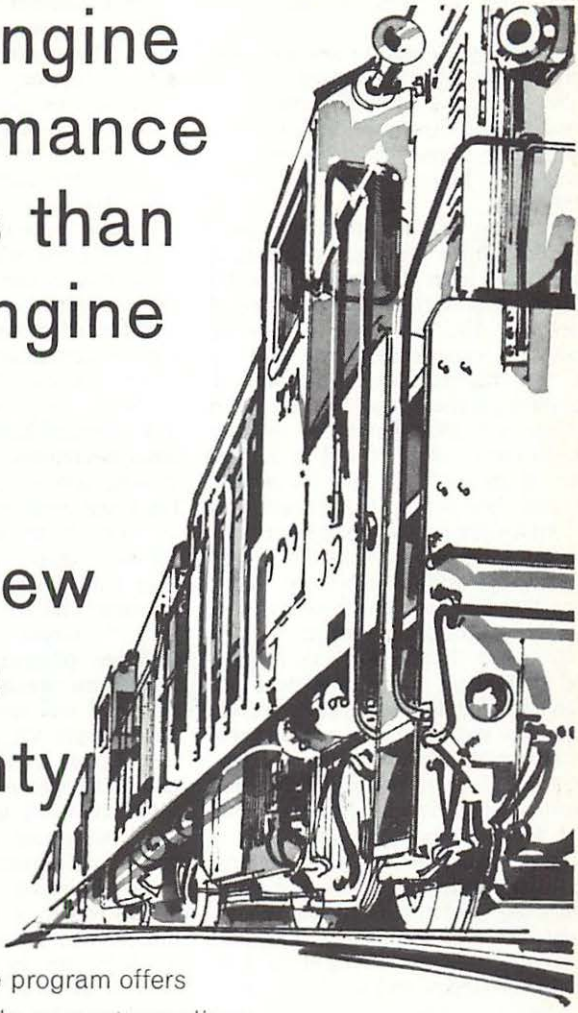
I think we as an organization are not functioning as well as we should. So, we would like to invite you to work much more closely with us, and perhaps what you and your Institute are doing, and the sizeable investment you have in this area, can help us in solving the problems with us today. Perhaps this can be made far better known to the industry through our people here.

I won't ask for any comments from you at this time because I don't believe it is necessary. These are things we have to work out on an individual basis and involve our committees in, **but I am disturbed that we just don't know what is being done, and we don't know what extensive work and what highly exhaustive means are being taken to solve some of the problems we do have.** We are just going in too many different directions and are not getting to the answers, and are not helping our industry. So, I think we have a big job ahead of us.

Mr. Riegel, I think perhaps you are one of the main keys to how this whole thing can be tied together to serve the industry, having your Institute become of more benefit to the industry. Certainly in the paper you are giving before the ASME a lot of information will be forthcoming. I am not too sure it will get back to all the people who should have it. I think we have a great opportunity

New engine performance at less than new engine price!

With new engine warranty



Our unit exchange program offers many advantages to anyone operating a Fairbanks Morse O-P Diesel: it includes a *complete* engine rebuild; fast service; expert workmanship; adding up to trouble-free operation with low maintenance. For further information write to us at Beloit.

Colt Industries
Fairbanks Morse
Power Systems Division
BELOIT, WISCONSIN 53511

here, and we can do something better.

I am very pleased to see Mr. Barnett, of the Alaska Railroad, here. I believe he has probably come the greatest distance to be with us. Mr. Barnett, I hope the investment to bring you here will be well warranted.

Mr. Long, there were many questions asked on the floor which indicated that your Committee can be of greater service to all of us. I refer back to Mr. Niemeyer's question about the experience of the industry in the maintenance of automatic fueling equipment, and what has been set up as guides that all of us may use to direct what we will be getting into to insure that this investment in the improvement capability to automatically-fueled equipment can be protected and kept in the proper operating condition necessary to assure that we gain the benefits from this very sizable investment.

Mr. Long, I think your Committee had better get busy. This does not mean to wait for next year's report. You have the capability in your Committee which represents a good cross-section of our industry. I think you should determine what has been done and what can be done, and what is a proper standard of maintenance, and a suggested program of maintenance for automatic fueling equipment. This can be made available to any of the representatives of the railroads here today who would so desire to have it by direct contact with you.

We are not just here once a year to stand up before you and go over several problem areas, and not come to any conclusions, and then forget about them. We are here to be of service to you, and unless we are then we aren't fulfilling our function.

Let's go to work. We are not going to wait until next year. I would like to know the answers to these problems, too.

I think it is of interest to everybody to know what next year's program has in store for us. Next year the associated mechanical group or coordinated group will hold its meetings on September 30, October 1 and 2, here at the Sherman House. The Railway Supply Association will hold a Mechanical Exhibit, which will run from September 28 through October 2, with indoor exhibits here in the hotel and with outdoor track exhibits at South Water Street Yards of the Illinois Central Railroad. So, next year should certainly be a very interesting one for all of us.

Don't forget our What's Your Problem program tomorrow. I am sure there are a lot of questions to be asked and answered. Get them to Jack Dwyer for presentation tomorrow. I hope we will have more questions than we can handle, so we can select those of the greatest importance. Make use of Jack Dwyer. He will be on tomorrow morning.

Our afternoon session will consist of the report of the Electrical Committee, and I am sure it will have much to offer to all of us.

Gentlemen, let's give a rising vote of thanks to both committees who reported this morning, and with that we will recess.

Award - Winning

HYDRA-CUSHION UNDERFRAMES

America's Leading Cushioning Device

Award-winning Hydra-Cushion Underframes give railroad cars the kind of cushioning carriers and shippers must have. Because they provide maximum protection against shock for both cars **and** lading, year after year, Hydra-Cushion Underframes protect the interests of both railroads and shippers.

HYDRA-CUSHION, INCORPORATED

332 SO. MICH. AVE.
CHICAGO, ILL.

13101 ECKLES RD.
PLYMOUTH, MICH.

Tuesday Afternoon, October 10, 1967

2:00 P. M.

H. N. CHASTAIN
Past President
Gen. Asst. Mechanical Dept.
Atchison, Topeka & Santa Fe Ry.
Topeka, Kans.

W. L. HUEBNER
Fifth Vice President
(Co-ordination Chairman)
Asst. to Gen. Mgr. - Mech.
A. T. & S. F. Ry.
Chicago 4, Ill.

PRESIDENT BEISCHER: At this time I will call on a man who needs very little introduction to you, who has been with this organization for a good many years and who is a Past President. Every one of you knows Mr. Henry Chastain, of the Santa Fe Railroad.

HENRY CHASTAIN (General Assistant Mechanical Dept., Atchison, Topeka & Santa Fe Railway, Topeka, Kans.): Mr. Huebner couldn't be with us today, so I am pinch-hitting for him.

The first order of business this afternoon will be to call upon one of our Past Presidents, Carl Love, Chief Mechanical Officer of the L & N.

MR. CARL A. LOVE (Chief Mechanical Officer, Louisville & Nashville Railroad Company, Louisville, Ky.): I appreciate very much the opportunity of handling this assignment. This is the report of the Committee on Resolutions:

C. A. LOVE
(Past President)
Chief Mechanical Officer
Louisville & Nashville R.R. Co.
Louisville, Ky.

"RESOLVED: That the Locomotive Maintenance Officers Association express its appreciation to L. S. Mc-

National main and interpole field coils manufactured and reinsulated to close tolerances to insure trouble-free service

Installing field coils, using National method to dampen vibration and shock by axial and radial high temperature rubber mountings.

All dimensions of National field coils are carefully maintained and the thickness of each coil gauged and marked thereon. Inside dimensions of the coil are maintained for a pressed fit on the pole piece to prevent relative motion. Main field coil connection leads are strengthened and accurately positioned to give perfect "fit up" so no bending is necessary during installation.

For your convenience, National maintains stocks of coils, unit exchange traction motors, generators, and armatures at Columbus, Ohio and Bluefield, West Virginia.

National Electric Coil
COLUMBUS, OHIO 43216

DIVISION OF McGRAW EDISON

GREGOR and A. SCHEFFER LANG for their special participation in our program and for the encouragement and inspiration of their several messages; to the various committee chairmen and members who through their efforts during the past years have made possible the great meeting enjoyed this year; to the Sherman House for the excellent service and hospitality extended us; to the Railway Supply Association for the invaluable assistance, evidenced in many ways, that has contributed so much to the success of this Annual Meeting; and to our Advertisers who exhibited both at the meeting, in the Advertisers' Honor Roll, and in the pages of our 1967 Pre-Convention Report, providing very helpful assistance to the work we are doing."

CHAIRMAN CHASTAIN: We will now have the report of the Auditing Committee for the year ending December 31, 1966. The report is as follows:

"We, the Auditing Committee, have examined the Annual Report of the Secretary-Treasurer for the year ending December 31, 1966. We have also reviewed the report of the auditor who made the annual audit of the books of the Secretary-Treasurer for this period.

"We find that all funds received are deposited in the bank to the credit of the Association and that all disbursements are made by check, signed by the Secretary-Treasurer and countersigned by the President, and all vouchers for such disbursement checks are approved by the President and the First Vice President in due form.

"We are pleased to recommend acceptance of the Secretary-Treasurer's report when it is presented.

"s/ G. M. Beischer
J. J. Ekin, Jr.
O. L. Hope"

It is now my distinct pleasure to introduce to you the Secretary-Treasurer, who I am sure needs no introduction. Charley Lipscomb has been the mainstay of this organization for many more years than I have been associated with it, and I can assure you that the way this meeting has been functioning during the past two years, as compared to the way it functioned three days last year in Charley's absence, is an example of Charley's value to the Association.

I should like now to call on Mr. C. M. Lipscomb, our Secretary-Treasurer, for his report.

SECRETARY CHARLEY M. LIPSCOMB (Special Assistant - Mechanical, Missouri Pacific Railroad, 1721 Parker Street, North Little Rock, Ark. 72114): Report of the Secretary-Treasurer of the LMOA for the year ending December 31, 1966:

C. M. LIPSCOMB
Secretary-Treasurer
Spec. Assistant - Mechanical
Missouri Pacific R.R.
1721 Parker Street
North Little Rock, Ark.
Phone 501 FR 4-7730

SECRETARY LIPSCOMB (continuing): 1967 has been another record-breaking year. We know you are

REPORT OF THE SECRETARY-TREASURER OF THE LOCOMOTIVE MAINTENANCE OFFICERS ASSOCIATION FOR THE YEAR ENDING DECEMBER 31, 1966

BALANCE ON HAND 1/1/66		$ 960.69
RECEIPTS:		
Active Membership Dues & Registration Fees	$11,972.50	
Assoc. Membership Dues & Registration Fees	2,611.00	14,583.50
Advertising		21,741.97
TOTAL RECEIPTS FOR YEAR ENDING 12/31/66		$36,325.47
TOTAL RECEIPTS FOR YEAR ENDING 12/31/66 AND BALANCE ON HAND 1/1/66		$37,286.16
DISBURSEMENTS:		
OFFICE EXPENSES (Secretary-Treasurer thru 12/31/66, Office Assistance, Printing, Postage, Stationery and Supplies, and Miscellaneous Expenses, and Operating Reserve		$23,126.72
PRE-CONVENTION REPORTS, ANNUAL PROCEEDINGS AND CONVENTION EXPENSES		12,997.91
TOTAL DISBURSEMENTS FOR YEAR ENDING 12/31/66		$36,124.63
BALANCE ON HAND 12/31/66		$ 1,161.53
TOTAL DISBURSEMENTS AND BALANCE ON HAND 12/31/66		$37,286.16

APPROVED: President George M. Beischer — 1st Vice President George Bachman. Approved this 3rd day of April 1967, Chicago, Illinois. Auditing Committee: O. L. Hope, G. R. Weaver, Tom W. Bellhouse.

going to make this a very successful meeting. Your efforts have the membership way up the line, but it is still lagging about 200 behind the total at this time last year. But when you enroll every supplyman you meet here, and if you accidentally enroll him twice, we will have set a new record before we go home Wednesday. You have already broken the all-time high advertising enrollment set last year. We have 175, if you want to count them, and I could find room for ten or fifteen more if you fellows will sign them up here at the meeting.

The Technical Committee reports are indeed without equal. You are going to make the floor discussions the best we have ever had. The annual meeting attendance is good. All these make 1967 a very successful Association year.

This success is due to nation-wide cooperation that is simply hard to believe. The united efforts of many important people have made it possible for us to be in this meeting room here today. We are deeply indebted to them for helping us do the many things that we just cannot do ourselves. We want to express our appreciation sincerely to all who have helped, and especially to:

RAILROAD MANAGEMENT for the real help and encouragement that they gave us every time we needed it.

TO THE RAILROAD CLUBS for the valuable trial runs of the reports at the Pre-Convention presentations.

TO THE RAILROAD PUBLICATIONS for some splendid publicity. To Charley Combes, Norm Gillespie and Al Oehler, of **Railway Locomotives and Cars** and **Railway Age;**

Frank Richter, Tom Shedd and Ed Myers of **Modern Railroads**, for their personal participation in our committee meetings and Annual Meeting.

TO OUR ADVERTISERS, indexed on pages 1, 2 and 3 of the 1967 Pre-Convention Report, pictured in the pages of this publication, and shown here in the Greatest Advertisers' Honor Roll just above us, we certainly want to say Thank You. These advertisements liven up our publications, and their checks certainly do put some money in the bank where we can use it in support of the Association work. **We appreciate these advertisers.** We will make room for more and will welcome the additional advertisers that you enroll at this meeting.

TO THE RAILWAY SUPPLY ASSOCIATION for being such gracious hosts at all times.

TO OUR MANY "SILENT PARTNERS" who support our membership. They support our advertising and our committee work. They help every time they are asked to help, and many times they pitch in without being asked, doing things that they know need to be done, and yet they always decline very modestly and very expertly to take any credit at all. They simply like to help us, and we are very glad they do.

TO OUR LOYAL PAST PRESIDENTS, who have earned and received all the honors we can give them. They have earned a rest too, but they are not going to get it. They take personal delight in helping their successors surpass their own great accomplishments.

TO OUR UNTIRING OFFICERS, who lay out a very heavy work load indeed and then join right in and help get the work done.

TO OUR REGIONAL EXECUTIVE COMMITTEE MEMBERS, who get in the membership from every railroad and who promote all phases of the work.

TO OUR TECHNICAL COMMITTEE MEMBERS, who invest much personal time and effort to compile the valuable Technical Committee Reports that make it worthwhile for railroad management to send us to these meetings.

TO OUR GREAT MEMBERSHIP of 2,995 (and we certainly want to get everybody else we can before we leave here to reach the 3,000 mark) who pay their own dues and then tell others of this fine Association and get them to join, too.

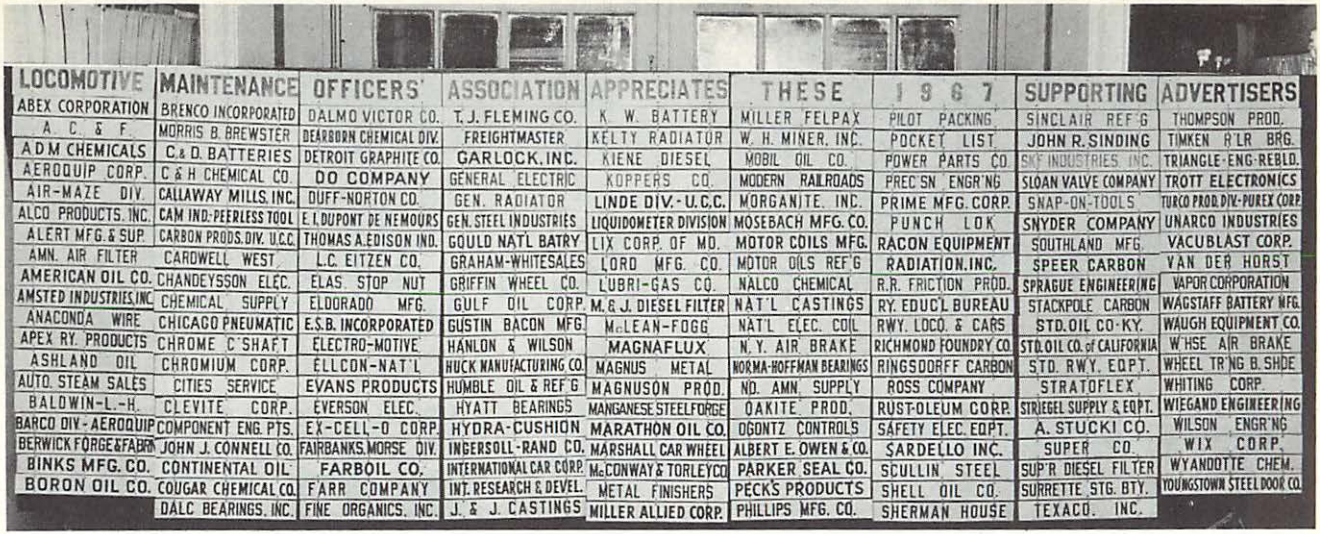
TO THE 300 LADIES and the approximately 600 MEN who are here at this meeting and who help make it what it is.

To all of these, and also to many other people, we want to express our great appreciation for their very great and real help. We are most grateful for it, and more than any others, we know we just couldn't get along without it.

1968 is almost at hand. We are going to need your assistance in making it our best year yet by doing these important things very soon:

Write your boss a detailed report when you get home. Tell him what you have learned here. Do this as soon as you get home. **Don't put it off.** A good report will encourage him to send more people back here next year. Who knows? If your report is good enough he might send you back. Most important is that you use the things you learn here in *your own* work at home. Point out to your boss what you have learned. The ideas that are paying off for the other fellow will be of no value to you unless you use them.

Now, get every member you can. We want his money, of course; but most of all we want everyone to get



ADVERTISERS HONOR ROLL

ATTENTION ALL MEMBERS:

WE **DO NOT ENDORSE** ANYONE'S PRODUCT; BUT WE **DO APPRECIATE** OUR ADVERTISERS!

Listed above are the names of the ADVERTISERS whose ads appeared in our PRE-CONVENTION REPORT.

We appreciate the fine financial support that these advertisers provided. **These cards were displayed immediately above and behind the speaker's table during the entire Convention.** They were referred to with appreciation daily, and their attractive appearance drew much favorable comment.

A picture of these cards was displayed in the Annual Proceedings.

We hope to see **these** and **many more** advertisers' names displayed in this fashion at all of **our** future **Annual Meetings** and **General Executive Committee Meetings.**

Be sure to read their ads in the Pre-Convention Report and Annual Proceedings.

a member who can bring in new ideas and new experiences to the work we are doing, and who in turn can use to good advantage the valuable information that the other members contribute.

We are all proud of the way that the railroad industry is stepping right out in front where it belongs in the transportation field and in the national economy. We are grateful for the part we have been permitted to play in the bearing of our common problems and in the solution to them, and in this way being a part of the great progress which is being made.

Plan now to come back on September 30, October 1 and 2, 1968. Be sure to note these dates — September 30, October 1 and 2, 1968, when we will have our Annual Meeting with a great Mechanical Exhibit right here in the Sherman Hotel and at the exhibit track. For those fellows who are able to get away a day or two early, the Exhibit will be open on September 28 and 29, the Saturday and Sunday preceding our Annual Meeting. That will give you an excellent opportunity to see everything in the Exhibit.

Railroad Management has endorsed the work of our fine Technical Committees by sending such a nice group here this year. Now you in turn will have to merit this expression of approval by digging in and developing the finest and most helpful floor discussions we have ever had. We know that you will do just that. It is your hard-to-believe cooperation that has made this another great Association year. We thank you for it and for your even greater assistance that we just cannot do without in our efforts to make 1968 even better than 1967.

We hope to see all of you at the fine sessions we know are going to follow this one, and we hope to see all of you here and many more next year on September 30.

As I edited the remarks of last year's meeting for the benefit of our Annual Proceedings, I noticed that President Frank Upton said, "We have been here one day and already we need six people prepared to take Lipscomb's place." Well, Lipscomb couldn't find six people to do that, and of course I am always willing to have the other fellow do the work — if I get the credit for it.

It was my good fortune this Spring, while in Memphis at the Pre-Convention presentation on May 18, to talk to Mr. Kenneth Howard Wyatt, Secretary of the Mid-South Air Brake and Diesel Club and Chief Clerk of the Illinois Central at Memphis. I told him I was looking for someone to come along and do all my work and give me all the credit for it. He said, "I am just the man you are looking for."

I am happy indeed to introduce him to you at this time, and I am happy to tell him that this will be his task from now on. Mr. Wyatt, your new Assistant Secretary-Treasurer.

MR. KENNETH H. WYATT (Chief Clerk, Illinois Central Railroad, Memphis, Tenn.): Thank you very much, Charley. I certainly appreciate those kind remarks.

Mr. President, it certainly is a pleasure for me to stand before this fine group this afternoon and tell you that I have been, as Charley said, Secretary-Treasurer of the Mid-South Air Brake and Railway Diesel Club in Memphis for fifteen years. I have certainly been dealing with the LMOA on a small scale. I have always been interested in the LMOA, and now with Charley's help and the help of all you fine gentlemen I think we will have a very wonderful year ahead of us.

CHAIRMAN CHASTAIN: I am sure

Convectair
Cab
Heaters

Diesel Engine
Water
Temperature
Regulators

Diesel
Cooling Fan
Controls

Fail Safe
Shutter
Controls

OGONTZ
CONTROLS CO.
PHILADELPHIA,
PENNA. 19117

you will all agree that without Charley Lipscomb and his well-selected assistant this organization would be sadly lacking. I am sure

K. H. WYATT
Assistant Secretary-Treasurer
Chief Clerk to Master Mechanic
Illinois Central Railroad
Memphis, Tenn.

with Charley's experience and the help of the new Assistant Secretary-Treasurer, this organization will not suffer at all.

It is now my pleasure to recognize those at the head table who have spent many years in assisting this Association materially. I should like now to recognize the Past Presidents who are seated at this front table, beginning on my extreme right.

Mr. C. A. Love, Chief Mechanical Officer, L & N. Cal so graciously read the report of the Committee on Resolutions.

Mr. G. E. Bennett, Retired Vice President, General Purchasing Agent, Chicago & Eastern Illinois Railway.

Next, it is a special privilege to introduce my boss, Mr. T. T. Blickle, General Manager - Mechanical, Santa Fe.

Mr. J. J. Ekin, Superintendent Special Equipment, B & O Railroad.

Mr. F. A. Upton, Chief Mechanical Officer, Milwaukee.

Now I should like to call on Mr. Upton for the report of the Nominating Committee.

F. A. UPTON
(Past President)
Chief Mechanical Officer
C. M. St. P. & P. R.R.
Milwaukee, Wisc.

MR. F. A. UPTON (Chief Mechanical Officer, Chicago, Milwaukee, St. Paul & Pacific Railroad, Milwaukee, Wis.): Charley, I still won't back down from the fact that I needed six more men last year. I am glad to see that you have one now. That's a good start.

Seriously, it is very good to see Charley back in the saddle. An organization like this, of course, needs a good General Manager, and we certainly have one.

At this time I would like to give the report of the Nominating Committee, covering nominations for the year 1968.

Officers: President: G. F. Bachman, Chief Mechanical Officer, E. J. & E. Railway, Joliet, Illinois.

First Vice President: T. W. Bellhouse, Superintendent Mechanical Department, Southern Pacific Company - St. Louis Southwestern Railway, Houston, Texas.

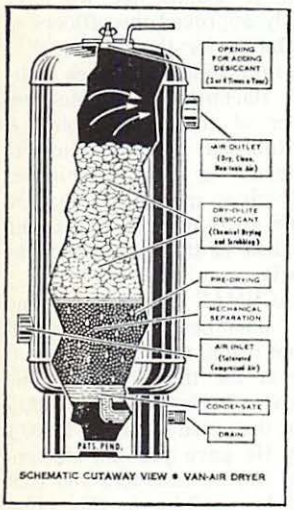
Second Vice President: G. R. Weaver, Manager Mechanical Engi-

Specialists Since 1894 in Railroad PACKINGS AND GASKETS

For
Diesel Locomotives
Shop Equipment

Steam Conduit
Gaskets-Springs
Ferrules

VAN-AIR COMPRESSED AIR DRYERS



SCHEMATIC CUTAWAY VIEW • VAN-AIR DRYER

DRY COMPRESSED AIR SOLVES TRAIN, YARD, SHOP PROBLEMS

More and more yards are drying the air used for charging trains—also drying air for yard and shop equipment—all with one single-vessel, large capacity, low-cost dryer.

Diagram at left shows how wet air is processed through Van-Air Dryer without heat or power. The Van-Air takes moisture out of air—prevents freezing of train brakes—prevents corroding of shop tools, air cylinders, valves, etc.—makes sand blast and other air equipment work better, last longer. 16-page book explains process, lists sizes, shows various applications. Send for free copy.

PILOT PACKING CO., INC.

Executive Offices and Factory
235 Glen Cove Ave., Sea Cliff, N. Y. 11579

Barrington, Ill.
Richmond, Va.
San Francisco, Cal.
St. Louis, Mo.

In Canada
The Holden Co., Limited

neering and Tests, Pennsylvania Railroad, Philadelphia, Pennsylvania.

Third Vice President: G. W. Niemeyer, Mechanical Superintendent, Texas & Pacific Railway, Fort Worth, Texas.

Fourth Vice President: W. L. Huebner, Assistant to General Manager - Mechanical, Atchison, Topeka & Santa Fe Railway, Chicago, Illinois.

Fifth Vice President: Ky Pruchnicki, Supervisor of Locomotive Maintenance, Southern Pacific Company, San Francisco, California.

Secretary-Treasurer: C. M. Lipscomb, Special Assistant - Mechanical, Missouri Pacific Railway, North Little Rock, Arkansas.

Executive Committee:

W. F. Dadd, Assistant Chief Mechanical Officer, Locomotive Department, C. & O. and B. & O., Huntington, West Virginia.

C. P. Stendahl, Assistant Superintendent Motive Power, Great Northern Railway, St. Paul, Minnesota.

M. J. Chandler, Manager, DeWitt Diesel Terminal, New York Central Railroad, East Syracuse, New York.

J. D. Schroeder, Assistant Chief Mechanical Officer, Chicago, Burlington & Quincy Railroad, Denver, Colorado.

E. E. Dent, Superintendent Motive Power, Missouri Pacific Railroad, St. Louis, Missouri.

W. L. Ellison, Superintendent of Motive Power, Louisville & Nashville Railroad, Louisville, Kentucky.

F. G. Fisher, General Manager Operations, Reading Company, Reading, Pennsylvania.

L. H. Booth, Superintendent of Motive Power, Chesapeake & Ohio and Baltimore & Ohio Railroads, Huntington, West Virginia.

We also have two additional members on the Advisory Board: H. J. Bowyer, Chief Mechanical Officer, Chicago, Rock Island & Pacific Railroad, Kansas City, Kansas. E. A. Manetta, Engineer Motive Power & Equipment, Norfolk & Western Railway, Roanoke, Virginia.

Mr. Chairman, I would now like to move that these nominees be elected unanimously.

PRESIDENT BEISCHER: Gentlemen, you have heard the recommendations of the Nominating Committee. I would like to second the motion that the slate of individuals for these positions be approved. May I have an expression from all of you. All in favor, say "aye"; any opposed, "no". Gentlemen, it sounds like we have unanimously approved the officers of this Association for the year 1968.

This immediately places Mr. George F. Bachman, Chief Mechanical Officer of the Elgin, Joliet & Eastern Railroad, in the office of President-elect of our Association. George, it gives me great pleasure to hand the gavel over to you as the new President of this Association as of Wednesday.

MR. BACHMAN: Looking ahead into 1968, I have been asked to spend a little time trying to determine what the score is for the LMOA in the coming year. Charley told you pretty much what the score is for the LMOA next year. He gave you the convention dates, and he also told you that there will be exhibits in this hotel and on the Illinois Central tracks next year.

There are a lot more things in the coming year than just the meeting and the exhibits. The LMOA requires a full year of advance planning to prepare its programs and papers. For the year 1968 the committees and the officers of this Association will immediately, after this convention is over, begin planning their schedules and the topics of their papers.

Left to right: Past Presidents T. T. Blickle, General Manager, Mechanical, A. T. & S. F. System; C. A. Love, C. M. O., Louisville & Nashville R.R.; President-Elect G. F. Bachman, C. M. O., E. J. & E. Ry.; Past President G. E. Bennett, Vice President - Gen. Purch. Agent (Retired), C. & E. I. Ry. Co.; President G. M. Beischer, C. M. O. - Locomotive, C. & O. Ry. - B. & O. R.R.; Past Presidents J. J. Ekin, Supt. Marine & Pier Maint., B. & O. R.R.; H. N. Chastain, General Asst. Mech. Dept., A. T. & S. F. Ry. System; F. A. Upton, C. M. O., C. M. St. P. & P. R.R.

Besides planning for the exhibits next year, a new committee is being formed in the LMOA to report on the progress of Commuter Equipment. This committee, at least in the beginning, will concentrate on electrically-propelled rail equipment. It is a paradox that, despite the trend to less passenger trains, **it now is apparent to many experts that the passenger train is the cheapest and most satisfactory way of moving people into and out of our cities.**

The field of commuter rail transportation gives evidence of tremendous growth. This committee will consist of a group of maintenance experts from the railroads, transit authorities and manufacturers, and their job will be to gather, discuss, and report the facts concerning the maintenance techniques in connection with this equipment.

Each of the other committees will immediately begin to plan its activities. These committees work hard to bring together all the information available concerning problems and developments that will be of interest to the membership. These committees merit your help, and I hope you will give them your wholehearted support.

The progress to be made in 1968 by the LMOA and the railroad industry will depend on its people. This organization and the railroad industry will only progress at the rate dictated by the amount of energy, enthusiasm, intelligence, know-how and hard work displayed by its members.

The progress in locomotives and their maintenance has been influenced greatly by these meetings and the work of the membership. The papers presented by the committees have made all of us aware of relative merits of the designs, materials, and techniques available for locomotive operation and maintenance.

Very considerable progress has been made in past years as suppliers and maintenance people have learned of locomotive requirements. Locomotive design and maintenance practices have been developed as the result of this experience. Fuel and lubricating oils have been tailored to fit the needs of the locomotives. Bearings, pistons, valves and rings have all been tremendously improved. **The LMOA, its members, its committees, and its meetings have played a big part in this progress.** They have pointed out the needs, reported progress and, in many cases, pointed out the solution of the problems. **The committees have often insisted that solutions to specific problems were not only desirable but imperative to improved locomotive operation.**

Progress has been made. However, I am reminded of a speech made several years ago by a railroad president. He was telling of the satisfaction he felt in riding a train over his newly-reconditioned track. However, his satisfaction was considerably dampened when he looked out the window and saw alongside the track a newly-completed expressway. It embodied the most modern in engineering and construction practices. There were no speed restrictions because of curves and no signals to stop vehicle movements. Heavy trucks were speeding along, moving cargos that once had traveled by rail. **It is true the railroads have made progress — but have we made enough?**

To make progress it will be necessary for each of us to do the best job we can. It will be necessary that we hire the best available people and see that they are properly trained. It will be necessary to use the most modern of shop equipment and facili-

Left to right: Past Presidents C. A. Love, C. M. O., Louisville & Nashville R.R.; J. J. Ekin, Supt. Marine & Pier Maint., B. & O. R.R.; G. E. Bennett, Vice President - Gen. Purch. Agent (Retired), C. & E. I. Ry.; President G. M. Beischer, C. M. O. - Locomotive, C. & O. Ry. - B. & O. R.R.; F. A. Upton, C. M. O., C. M. St. P. & P. R.R.; H. N. Chastain, Gen. Asst. Mech. Dept., A. T. & S. F. Ry. System; T. T. Blickle, General Manager, Mechanical, A. T. & S. F. Ry. System.

ties that we can economically justify.

Locomotives are by no means developed to the ultimate. Unreliable operation of the electrical equipment still causes many road failures. Wheels have high rates of wear and are cracking in service. Brake rigging wear is excessive. I personally feel that some effort should be made to replace the pins and bushings with rubber-mounted shackle bolts, such as used on automobiles and trucks. More research is needed on the power plant design.

Your committees will be thoroughly probing these and other areas during the coming year. I am sure they will have much to report. I hope all of you can be here to hear their reports and that you will share with them the results of your experience.

At this time I would like to call on Past President J. J. Ekin.

MR. J. J. EKIN: This is one of the easy jobs; in fact, I don't think I have enjoyed anything more in the LMOA than being able last year to nominate Mr. Beischer as our President, and this year, after he did a lot better than I did as far as membership and advertising are concerned, to present him with this Past-President's plaque in recognition of his 18 years of service in the LMOA. George, you have earned this.

CHAIRMAN CHASTAIN: While we are all here I should like to call on Mr. Blickle.

MR. T. T. BLICKLE: George, it gives me a great deal of pleasure to present this Past President's Pin to you. As Charley said earlier, you work hard to become a Past-President, and you are never done when you reach that goal because Charley will have a lot of chores left for you to do.

PRESIDENT BEISCHER: Gentlemen, this certainly gives me a great deal of pleasure. I am pleased that in the years past we have been able to bring our Association along and make it useful to each and every one of us.

CHAIRMAN CHASTAIN: This concludes the business session of the meeting. I would like to suggest that we give the Past Presidents a rising vote of appreciation for their services this afternoon.

While the next committee is assembling on the platform, I would like to express my sincere congratulations to Mr. Beischer. I should also like to express my condolences to Mr. Bachman. He will find out now just how much work he has to do.

Left to right: Past Presidents J. J. Ekin, Supt. Marine & Pier Maint., B. & O. R.R.; C. A. Love, C. M. O., Louisville & Nashville R.R.; T. T. Blickle, General Manager, Mechanical, A. T. & S. F. Ry. System; G. E. Bennett, Vice President - Gen. Purch. Agent (Retired), C. & E. I. Ry.; President G. M. Beischer, C. M. O. - Locomotive, C. & O. Ry. - B. & O. R.R.; Past Presidents F. A. Upton, C. M. O., C. M. St. P. & P. R.R.; H. N. Chastain, General Asst. Mech. Dept., A. T. & S. F. Ry. System.

Tuesday Afternoon, October 10, 1967

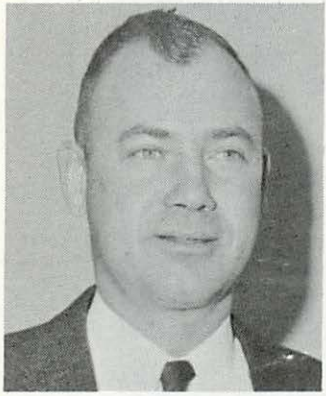
3:00 P. M.

REPORT OF THE COMMITTEE ON DIESEL ELECTRICAL MAINTENANCE

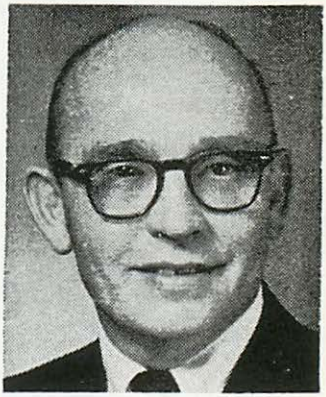
1967 TOPIC:

"THE EFFECT OF AC-DC ELECTRICAL SYSTEMS ON DIESEL LOCOMOTIVE PERFORMANCE AND AVAILABILITY"

Study the Full Text of this Report beginning on Page 181 of the Pre-Convention Report



J. A. W. SMITH, President
Southern & Southwestern Railway Club, Inc.
Master Mechanic
Richmond, Fredericksburg and Potomac Railroad Co.
Richmond 20, Va.

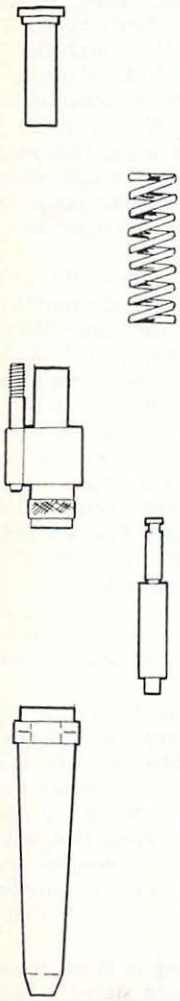


M. J. CHANDLER, Chairman
Committee on Diesel Electrical Maintenance
Manager, DeWitt Diesel Term.
New York Central R.R.
East Syracuse, N. Y.

CHAIRMAN CHASTAIN: We are now ready for the presentation of the report of the Diesel Electrical Committee. The Chairman of this Committee is Mr. M. J. Chandler, General Diesel Shop Foreman, New York Central Railroad, Cleveland, Ohio.

Mr. Chandler was born June 21, 1922, at Hillsdale, Michigan. He saw military service with the U. S. Marine Corps from August 1942 through November 1945. He was educated at Fenn College of Engineering, Cleveland. He is married and has three children, two sons ages 15 and 8 respectively and a daughter 12 years of age.

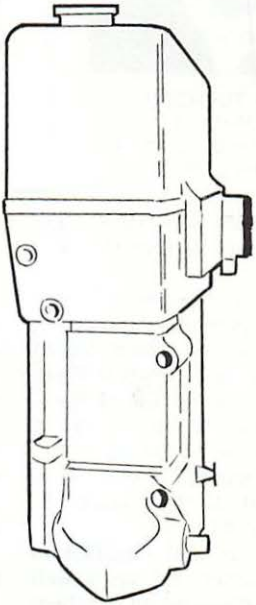
Mr. Chandler began his career with the New York Central as a machinist apprentice in June 1942. He was then in military service until 1945, at which time he returned to railroad service and completed his apprenticeship in June 1947. He was employed as a machinist until October 1949, when he was assigned to the position of Special Inspector. Since then he has been progressively promoted to Foreman, Assistant Enginehouse Foreman, Apprentice Instructor, As-



DIESEL INJECTION &

GOVERNOR SPECIALIST

RAILROAD & INDUSTRIAL



SARDELLO INC.

2 Complete Shops

PITTSBURGH, PA.
916 4TH AVE.
CORAOPOLIS, PA.
PHONE 412-264-0829

CLEVELAND, OHIO
2329 ABBEY RD.
WEST SIDE
ABBEY RD AT LORAIN
PHONE 216-621-8190

R. P. TURNBULL
Mgr. - Mech. Engr.
Long Island Railroad
Jamaica, N. Y.

sistant Production Supervisor, and has served in the Industrial Engineering Group.

In July 1955 Mr. Chandler was appointed to the position of Assistant General Foreman, and then in March 1960 to the position of General Foreman at the Collinwood Diesel Locomotive Shop. He was promoted to his present position of Manager, DeWitt Diesel Terminal, New York Central Railroad, East Syracuse, N. Y., on June 1 of this year.

Mr. Chandler is well qualified to head this committee. He has a well qualified Committee and an excellent report.

1. Commuter Equipment:

MR. M. J. CHANDLER (General Diesel Shop Foreman, New York Central Railroad, Cleveland, Ohio): Gentlemen, this Committee in the past two years has, through a subcommittee, dealt briefly with the self-propelled electric cars in high speed transportation. At this time I would like to call on that subcommittee to make its presentation for this year.

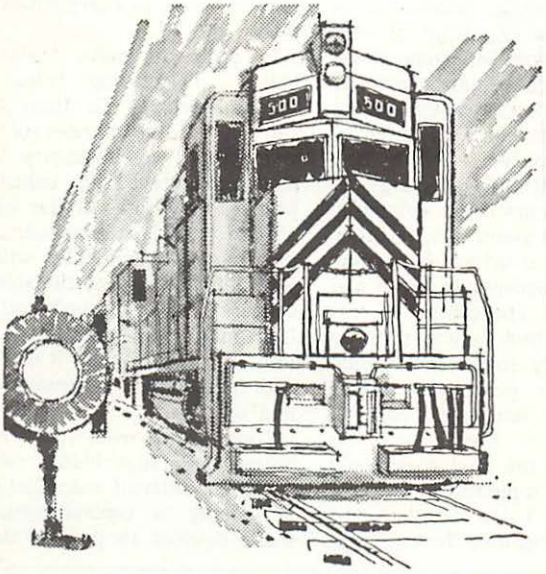
As our new President has stated, in the coming year this will be a separate committee. We are hopeful at this time that we may see a brief preview of what we can expect in this area. I would now like to call on Mr. R. P. Turnbull, Manager - Mechanical Engineering, Long Island Railroad, Jamaica, New York, to make that report. Mr. Turnbull.

MR. R. P. TURNBULL (Manager - Mechanical Engineering, Long Island Railroad, Jamaica, N. Y.): It is a pleasure to be here again this year and see all of you and to talk about the new revolution taking place in railroading today in passenger service.

Last year I was here for the first time and we had our subcommittee report. This year, the same thing. I will talk a little about that. I would like to mention the new committee for the coming year. We will start as soon as this meeting is over on work for the coming year. I will be its chairman. We sent out letters to all railroads that had any electrification and all of the builders that are connected with electric railroading. The response has been remarkable; it is beyond our greatest expectations, thus indicating the tremendous need for and interest in this new committee.

Part of our Committee report for this year was given in Roanoke, Virginia. I would like to cover that for a moment and then I would like to show you a few slides of the new high-speed corridor trains that have been built by the Budd Company and that will operate from Washington, D. C., to New York over the Pennsylvania lines.

Electric railroading is in an era of revival. Mr. Bachman stated it very appropriately when he said it is rather a paradox that we have more building up of railroading in passenger service today while everything

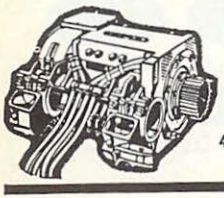


Reduce delays . . .
Increase utilization . . .

Do it with

CHANDEYSSON
TRACTION MOTORS AND GENERATORS

Get years of reliable trouble-free service



CHANDEYSSON ELECTRIC COMPANY

4084 Bingham Avenue • Saint Louis, Missouri 63116

GEARED TO PROGRESS

Y64-5

else seems to be going down.

The diesel electric locomotive is now reaching the top limit of controllable power from D.C. generators. The A.C. static conversion system is here; so is electric car design, reaching a limit in the old D.C. progressive interlock system, and a new static power control is evolving.

D.C. electric cars were originally designed over 60 years ago, in order to move people in urban and suburban areas with acceptable speed and relative comfort. The control of current to traction motors was done by using a relatively simple unit switch group with the progressive interlocking principle, and with a nominal 650 volt third-rail feeder with resistor banks on the cars they could be accelerated somewhat smoothly. The accelerating rates were low, and the most objectionable feature was the ability to feel the distinct notching. However, this jerk rate was relatively low.

In order to move trains faster, higher accelerating rates become more desirable. To limit the jerk rate, a greater number of progressive notches was necessary. The electrical manufacturing industry then produced a cam controller which was able to provide a smoother acceleration more economically without the jerk rate being objectionable to passengers. This proved satisfactory from most viewpoints, but it also was limited in the current it could handle with reasonable parameters of size and weight.

Today, with even more speed required and much higher currents to control, electrical manufacturers are developing a control system with static devices to provide an almost

EMCO
Valve Processing
LONG WEAR - LOW COST - GUARANTEED QUALITY
Hard Facing, Metallizing, Chrome Plating, Ceramic Coating of valves and other engine parts, Plasma Flame Process.
Diesel engine valves before and after EMCO processing.

EMCO
Serving the Nation's Leading Railroads
ELDORADO MANUFACTURING CORP.
P.O. BOX 29 • U.S. HIGHWAY 45 • ELDORADO, ILLINOIS
Represented by
SUPER CO., P. O. Box 566, Fort Worth, Texas

SUPER SPARK ARRESTERS

• *REDUCE CLAIMS* • *SELF CLEANING* • *LONG SERVICE LIFE* • *SIMPLE & FAST TO INSTALL* • *DOES NOT CREATE EXHAUST BACK PRESSURE*

DOUBLE SEAL *Piston Rings for Main Engines & Air Compressors*

ELDORADO *Railroad Engine Valves*

SUPER *Spark Arresters*

SUPER *Air Compressor Parts:*
• *Pistons* • *Valve Plates* • *Wrist Pins*
• *Crankshafts*

SUPER CO.

P. O. BOX 566 • FORT WORTH, TEXAS 76101

SUPERIOR PRODUCTS AND EQUIPMENT FOR RAILROADS

completely smooth notching current all the way along the motor performance curve. The state of the art of static devices is considered to be at the point where this new static control will match the cam controller systems in reliability. As of now, only a few electric trains are so equipped.

This new concept of chopper control regulates the D.C. traction motor power by pulsing the 650 volt input power off and on. The duration of time between pulses is in the millisecond range and determines the amount of power delivered to the traction motor. A smoothing reactor and a directional diode are employed to smooth the pulses to a predetermined level of average traction motor power.

Some key people will have to be schooled in basic electronics, and they in turn will have to train more technicians in preventive maintenance and troubleshooting. We will have to have much more sophisticated shot tools and testing equipment.

2. Shop Testing Device:

The electrical manufacturers and some instrument manufacturers are presently engaged in working out the necessary details as to the best way to provide on-car wiring and hardware so a shop testing device can be plugged into the car and simulate complete control functions. Power circuits may require a load box or a dynamometer type of apparatus to simulate load conditions. **In any event, we are trying to avoid the present practice of road testing to insure a properly working car.**

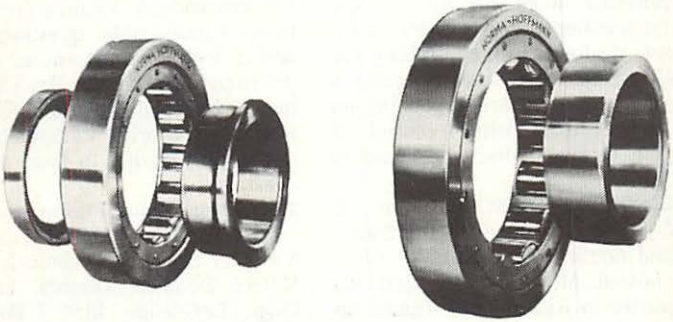
Several existing railroads and transit authorities, as well as several

• Armature Cleaning Guns
• Custom Spray Booths
• Mastic Applicating Guns
• Hydraulic Car Washing Nozzles
Air – Airless – Electrostatic
Pumps • Respirators • Accessories
Binks Manufacturing Company
3114 W. CARROLL • CHICAGO, ILL. 60612

Two ways to get

MORE MILES

from your traction motor bearings



1. Let us inspect and rebuild your used NORMA bearings...

Our skilled traction bearing specialists will clean and inspect the bearings, replacing (1) rollers or (2) rollers and inner ring with new production parts as required.

2. Or replace them with new super-duty NORMA bearings...

Where inner and outer rings of your old bearings are no longer useable, we replace them with completely new bearings of the conventional or drop-roller type, whichever you request. The new NORMA bearings have the design, construction and metallurgy that assure maximum mileage in rugged railroad service. Send for Bulletin TM1167.

NH

NORMA-HOFFMANN

BEARINGS COMPANY · STAMFORD, CONNECTICUT

A DIVISION OF UNIVERSAL AMERICAN CORPORATION

completely new mass transit rail systems, either new or being planned, are mutually involved with the supply industry in getting equipment that uses the most up-to-date state of the art. **Our goal? To provide safe, reliable, comfortable and clean transportation within economic guidelines.**

MR. MACHIN: Mr. Turnbull, in his remarks about the MU cars — and he mentioned pulse width modulation — we have been controlling our diesel engines this way for quite a few years, and we are expanding on this to get a smoother control of applying torque to the wheel and to the rail.

PRESIDENT BEISCHER: Mr. J. A. W. Smith, President of the Southern and Southwestern Railway Club, who hosted Mr. Chandler and his Committee in Richmond, Virginia, on April 20, at which time the Committee made their presentation, cannot be with us today, so I want to take this opportunity to express my appreciation to them for the courtesy shown our Committee, and report to you that they had an excellent turnout and a very fine discussion period.

I am sure there are some things involving the electrical aspects of our present-day locomotive that you have considerable questions about, and I look forward to an excellent discussion period on Mr. Chandler's paper. I am told that Mr. Chapin, of EMD, has a brief statement, and he is probably trying to head off a few questions.

3. Traction Motor Flashovers:

MR. D. D. CHAPIN (Assistant Manager Service - Technical, Electro-Motive Division, General Motors Corp., LaGrange, Ill.): I do have a

The RIGHT Combination

Most Helpful to YOU in 2 ways:

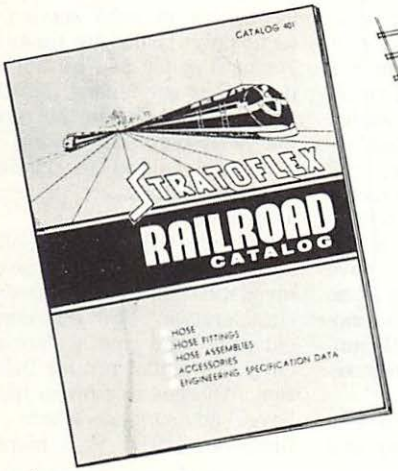
1. Keeps you "up" on advanced mechanical developments.

2. Keeps you in tune with what's going on in the entire railroad industry.

Here is the **one** magazine that gives you both types of useful, helpful information — and at the same time is a pleasure to read. Top circulation. Top usefulness. Top readability.

MODERN RAILROADS

5 S. WABASH AVE. CHICAGO, ILL. 60603



NEW CATALOG!
COMPLETE DATA
TO HELP YOU SPECIFY GENUINE STRATOFLEX HOSE AND FITTINGS!

▪ Contains helpful information on Stratoflex low, medium and high pressure hose, air brake and diesel engine hose, hose fittings and hose assemblies for fluid lines. ▪ Complete accessory products including Stratoflex "Self-Sealing" and "Quick Disconnect" couplings, "Gladhand" fittings, "Adapters," "Hose Support Guard" and "Internal Supported Coil." ▪ Engineering data including hose assembly instructions, proper hose installation data, flow chart and general hose information. SF9–6

To order this catalog write
Power Parts Company
1860 North Wilmot Avenue
Chicago, Illinois 60647, or

STRATOFLEX

Stratoflex, Inc. / P. O. Box 10398 / Fort Worth, Texas 76114

brief statement on some further developments that have occurred since the Committee report was written.

The Committee's report has been studied very closely and we would like to offer the following comments:

With regard to motor flashovers, it is our opinion that this problem has been greatly alleviated as a result of recent modifications recommended by EMD. Many of these changes, including commutator clean-up, are outlined in the report. One recent modification, known as the NGR or neutral ground relay system, is not covered in the report, and we have urged that this be incorporated at an early date on "40" series locomotives. This NGR system greatly improves flashover detection, thus reducing flashover damage.

For your reference, our most concerted efforts have been extended toward a better understanding and solution to the problems mentioned in the report. A total of over 400 flashover tests have been conducted on the test floor and a GP 40 test locomotive in road service was intentionally flashed 180 times to better evaluate motor and control modifications. It is our feeling that the modifications included in the report, plus the NGR detection system mentioned above, will make significant improvements in motor performance.

4. Brush Holders:

With regard to the EMD brush holder, the Committee's past recommendations have been given careful consideration. Two thousand of the old style sand cast holders are presently being pilot run for field evaluation. Whereas this brush holder does have advantages where frequent flashovers occur, it is more suscep-

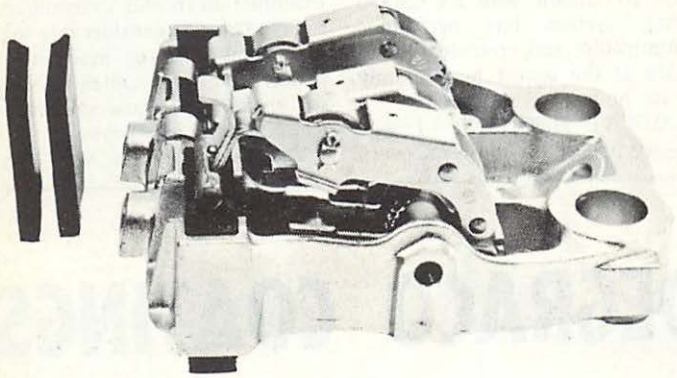
New freight cars equipped with

TIMKEN®

TAPERED ROLLER BEARINGS

have a head start in setting new performance records

TRACTION MOTOR SHUNTLESS HOLDERS



- Shuntless Brushes
- Damping of Brush Vibration
- One Hand Brush Changing
- Constant Pressure
- Increased Brush Life
- Improved Commutation
- Reduced Brush Cost

RINGSDORFF CARBON CORPORATION

P. O. BOX 22 • EAST McKEESPORT, PA. 15035
(PITTSBURGH DISTRICT)

tible to cracking. It is our feeling that the present design's vulnerability to flashover damage will be minimized when the motor and control changes mentioned above are made. In the meantime, several other brush holder designs are being evaluated preparatory to future field testing.

5. Armature Grounds:

We would like to call attention to one notable feature of the D77 traction motor. Armature grounds have been mentioned by the Committee in past years as a leading cause of motor failures. We are happy to report the D77 motor with its Kapton insulating system has performed very admirably, and grounded armatures are at the lowest level of any motor we have ever produced.

PRESIDENT BEISCHER: I was right — we had some of the answers before we had the questions. Thank you very much, Mr. Chapin. I appreciate very much that you have done this. I think the additional comment with regard to the D77 traction motor, and some of the work you have done on your traction motor, is of the utmost importance to all of us.

I am not going to initiate the discussion period by asking a question, but I do wish to very briefly comment with regard to this paper. I am certain that the area of electrical equipment, in particular the propulsion part of the locomotive, is an area which does merit very close examination by this assembled group today. **There is considerable improvement that must be made if we are to have the most reliable locomotive we should have and one for which we certainly are paying.**

You have seen in Mr. Turnbull's

DEGRACO COATINGS
FOR
CARS & LOCOMOTIVES
PRIMERS – FINISHES
AND
DIRECT-TO-METAL
WHITE STEEL/MASTER
THE DETROIT GRAPHITE COMPANY*
7701 West 47th Street • Lyons, Illinois 60534
*A Division Of The Valspar Corporation

MAGNA KOLD

Water Cooler - Refrigerators

for

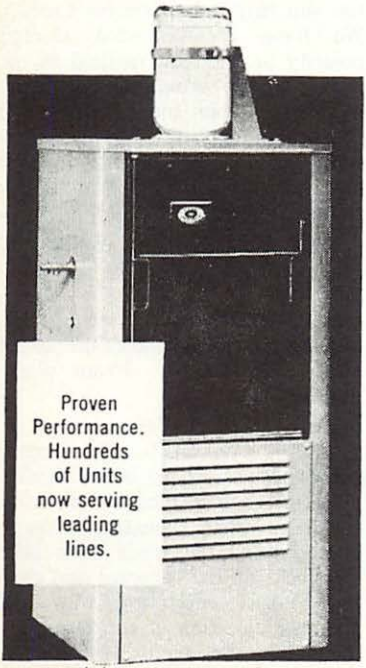
Cabooses and Locomotives

Highest cooling efficiency under torrid heat, extreme shock and excessive vibration. Provides cool drinking water instantly and cool food storage space, even on the most rugged runs, for a more efficient, satisfied crew. Hundreds of units now in service on leading lines.

BATTERY POWERED • HERMATICALLY SEALED

LOW BATTERY DRAIN

MAGNETICALLY DRIVEN • RUGGED • EFFICIENT



Model 9018 WRR shown

Only DC refrigeration compressor with hermetically sealed system offering "magnetic coupling" – which completely eliminates shafts, seals, belts, etc., resulting in low battery drain and minimum service needs. Automatic safety control device protects against unusual operating conditions on any run.

Four Models

9018 WRR – 9018 WDR
For Bottle Service

9018 WRF – 9018 WDF
For Remote Water Supply

Write for Bulletin

MAGNA KOLD

Manufactured by

SPRAGUE ENGINEERING
A Division of TELEDYNE, INC.
19300 SO. VERMONT AVENUE
GARDENA, CALIFORNIA 90247

presentation some of the adaption of the modular concept of components in control circuitry. **This we must have. There are any number of areas of improvement and progress to be made, insofar as our diesel electric locomotive as we have it today is concerned. We need them today and should have they right now.** I believe the questions from this audience should point very clearly the direction that these improvements must take in coming about.

I know some of you here are working in the areas of standardization of electrical equipment, looking into aspects of it that are perhaps not generally known to all of us who have day-to-day problems confronting us. I am looking forward to a very spirited and well-directed and useful discussion. I would appreciate it if you gentlemen will begin it right now.

6. Alternator Slip Rings:

MR. C. P. STENDAHL (Assistant Superintendent Motive Power, Great Northern Railway, St. Paul, Minn.): You report the alternators as being a maintenance-free item — that is, a large alternator in a new locomotive.

There is a condition that exists on the slip rings. I wonder what the recommendation of your Committee is regarding transposition of the excitation leads on the slip rings of the alternator to get the best service and the best performance of the slip rings in the alternator.

MR. CHANDLER: I think we spoke of this performance as "relatively maintenance free". We do have the slip ring and brushes that must be maintained.

Some performance has looked very good with the use of the spiral grooving in the slip ring, and periodic changing of polarity on the connections to the slip rings to try to relieve any of the plating and pitting action we have seen in the past.

I will call on Mr. Smith of G.E. He may want to comment on what their thought would be in this connection.

MR. D. I. SMITH (Supervisor Transportation Systems Division, General Electric Company, Erie, Penn.): We have quite a few locomotives out now with varying kinds of troubles. We find some are solved by changing slip ring polarity and others are not. Some do not reverse polarity, some change it quarterly, and some monthly. I don't know the answer on slip ring polarity. It apparently has something to do with the condition of the rings, but it is more than just the polarity itself. It may be a brush condition or an environmental condition. **We don't have the answer, yet.**

MR. CHAPIN: The problem with the slip ring has of course faced us. We have recommended changing polarity as the best method of combating it. We are in the process of evaluating other means of changing brush size or brush area or brush type. We are still trying to develop means of approaching it other than changing polarity.

MR. STENDAHL: Would you recommend a quarterly change on polarity?

MR. CHAPIN: Yes, I would recommend a quarterly change on polarity.

MR. STENDAHL: From plus to minus?

MR. CHAPIN: Yes.

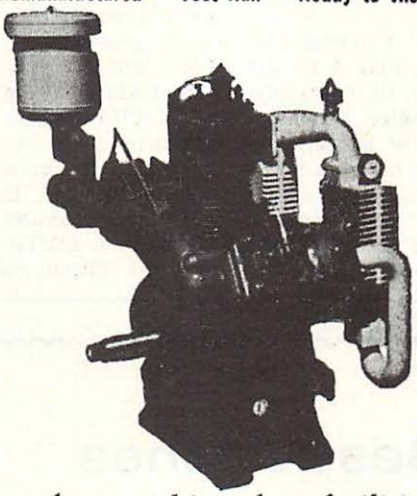
MR. CHANDLER: This subject came up yesterday, and I heard a very interesting thought on it that might be worth repeating. This concerned tying the leads to a set of interlocks on the reverser and changing polarity each time the consist changes direction. I think it was a thought by Mr. Smith yesterday.

We might have some expression

Triangle ENGINE REBUILDERS, Inc.

4416 W. Roosevelt Rd. • Chicago, Ill. 60624 • 638-3212

Locomotive Air Compressors
Remanufactured • Test Run • Ready to Install



Complete machine shop facilities specializing in remanufacturing of compressor components such as:

- **Cylinders**
- **Crankshafts**
- **Valves**
- **Connecting Rods**
- **Oil pumps**

Air Conditioning • Generator and Reefer Units

about this from people in the group, as to whether it would be worthwhile to have this extra set of interlocks on the reverser to actually handle each time the consist changed direction, or whether we would rather depend on quarterly or semiannually or annually having a workman make the re-connection. I thought it was a very interesting comment.

MR. D. I. SMITH: These are 300 amp contacts. These are not really interlocks.

MR. R. A. HOEFT (Foreman, Chicago, Milwaukee, St. Paul & Pacific Railroad, Bensenville, Ill.): Has anyone on your Committee derived a method of cleaning or possibly jig-stoning the collector rings on a GE locomotive?

MR. CHANDLER: Yes. I just recently got into that area. I really haven't completed the development on it; but having ten units that were not spiral grooved, we ran into some that required jig stoning. Not having a device readily available for that machine, I found that the one I had been using to stone EMD traction motors with the brush change adapts with very little difficulty to the alternator on the GE for stoning of it, and it doesn't do too bad a job.

MR. HOEFT: That is what I was thinking about. We are all seeing spiral grooving. We have to go to spiral grooving on the AR10s and D14s. Why was this equipment furnished without being spiral grooved?

MR. CHANDLER: There again we will revert back to our friends from the manufacturers and ask them for their advice on that. Mr. Smith, would you comment on it?

MR. D. I. SMITH: I would rather have Mr. Chapin comment first.

"Best Wishes for a Great Convention"

The Youngstown Steel Door Company

CAMEL SALES COMPANY · CAMEL COMPANY LIMITED
CLEVELAND · CHICAGO · YOUNGSTOWN · HAMMOND

If it rolls on rails . . .

WAUGH

. . . it should be cushioned by Waugh

WAUGH TYPE 420 DRAFT GEAR

WAUGH TYPE 700 FRICTION-RUBBER DRAFT GEAR

WAUGH CUSHION UNDERFRAMES

HYDRA-CUSHION UNDERFRAMES

SYMINGTON WAYNE TRANSPORTATION EQUIPMENT

WAUGH EQUIPMENT COMPANY

332 SOUTH MICHIGAN AVENUE

CHICAGO, ILLINOIS 60604

NEW YORK • ST. LOUIS

SAN FRANCISCO • MONTREAL

MR. CHAPIN: We are not so sure that spiral grooving is the answer to the slip ring problem, and that is one of the reasons that the machines weren't provided that way. I am sure we are investigating other avenues.

I would like to call on our Mr. Koci, Electrical Machine Rotating Engineer, for some comments on this subject.

MR. H. H. KOCI: The spiral grooving is there mainly to get rid of extraneous dirt accumulations by directing it from on the top of the slip ring to outside of the slip ring. I think the first few new model locomotives we delivered didn't have the spiral grooving, but I am quite confident that we have delivered a large pilot run of 100 new locomotives which have the spiral grooving on the slip rings.

Spiral grooving will not cure all the ills of slip rings. I might remind you gentlemen that the slip ring problem has been with us and with many, many other manufacturers for many, many years. It seems to come and go. We are actively investigating the problem at present very thoroughly, looking at different types of slip ring materials, different types of brush materials, brush spring pressures, different angles of approach on the brush, and hopefully we will find relief in one or several of these areas.

MR. D. I. SMITH: **We came out originally without the slip rings spiral-grooved because we didn't think we needed it. After we got in trouble we tried several types of grooves and determined that the spiral groove works best.**

MR. CHANDLER: **Over the years,**

PERMAG
CLEANING
COMPOUNDS
—are moving in carload lots to shops and terminals for cleaning engines, cars and equipment.
Your request will bring information on a compound that meets or exceeds railroad specifications.
MAGNUSON
PRODUCTS CORPORATION
Mfrs. Specialized Cleaning Compounds for Industry
50 COURT ST., BROOKLYN 1, N. Y.
In Canada: Canadian PERMAG Products, Ltd., Montreal

TRACTION MOTOR ARMATURE BEARINGS

Through constant research and continuous field tests, in cooperation with traction motor builders and railroads, SKF has developed the finest in traction motor bearings. SKF traction motor bearings are approved by all builders of diesel locomotives.

TRACTION MOTOR BEARING INSPECTION AND SERVICE PROGRAM

5-point inspection determines necessary action

1. **Disassembly of bearing.**
2. **Cleaning and polishing of inner ring.**
3. **Cleaning and polishing of outer ring.**
4. **Cleaning of cage.**
5. **Inspection of cage and both rings for evidence of damage.**

CONDITION 1

If cage and both rings pass inspection, bearing will be reassembled with new rollers.

CONDITION 2

If the cage and outer ring pass inspection, but the inner ring is no longer usable, the bearing will be reassembled with a new inner ring and new rollers.

CONDITION 3

If outer ring is no longer usable, entire bearing will be scrapped. In this case no charge is made for inspection and the customer will receive a report concerning condition of the bearing (dirt, improper lubrication, electric pitting, etc.).

ROLLING BEARINGS — MOTION ENGINEERING

SKF INDUSTRIES, INC.

as we talked about our D12s and D14s with the alternator, this was only an aid, not an over-all cure to all our problems with slip rings.

MR. MACHIN: On the older D14 usage in the DC generator, we have used the new brush holder and we have doubled and tripled the life on the slip rings, but we haven't solved the slip ring problem with the higher amperage on the AR10 alternator.

MR. BUTLER: We have some AC generators applied to Alcos of GE, and last March we had a machine in for flat spots. We noticed the flat spots are starting to return again. Will spiral grooving correct that, or will reversing the polarity correct it?

MR. D. I. SMITH: I don't know, but I sure would try it. I just don't think we know what it means when these flat spots develop. It is simply too early in the game to know.

7. Higher Voltage Diode:

MR. STENDAHL: May I ask another question, regarding diodes. You made a statement that there is a new higher voltage diode available, 2400 against the present 2000 volt. Is this a recommendation, that diodes should be changed to a higher voltage value diode?

MR. CHAPIN: Apparently it was the Committee's feeling that this should be so, but of course it is a matter of economics. The higher voltage diode naturally costs more money, and for the lower voltage requirement, which is the SD 40 and the GP 40 locomotive, it is doubtful whether the increased cost would be justified at this time.

I think the Committee's recommendation was that on the basis of uniformity of stock you have to balance

DIESEL WATER COOLER BOTTLE

(Plastic Throwaway)

5 Quart Capacity — Model 1005 DWCB

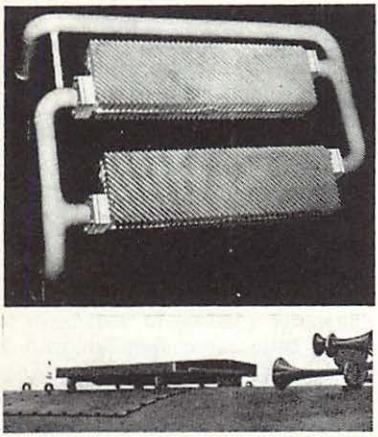
Translucent
Carrying Handle
Screw Cap
Unbreakable
Economical
Sanitary

John R. Sinding Co.

P. O. Box 323 Wynnewood, Pennsylvania 19096

WILSON *HELPS YOU*

REDUCE MAINTENANCE AND REPAIR COSTS

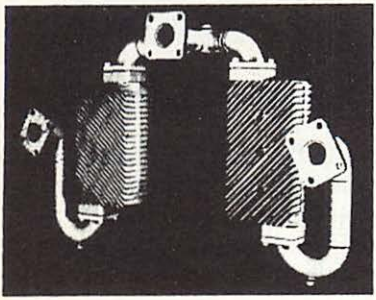


Wilson aftercooling elements may be mounted as shown or in other arrangements as required.

WILSON AFTERCOOLERS

Water and oil vapors entrained in compressed air cause increased maintenance and repair, as well as possible freezing and other failures of air operated equipment. If aftercooling is adequate between the compressor and No. 1 main reservoir, these vapors are precipitated in the reservoir where they may be easily removed. The standard Wilson aftercooler is mounted on the roof of the locomotive unit—compact, out of the way and performing with high thermal efficiency. Two sizes—equivalent to 180 feet of 1½" standard pipe, or equivalent to 90 feet of 1½" standard pipe.

- "LIFETIME ELEMENT"
- HIGH THERMAL EFFICIENCY
- EXTREMELY RUGGED
- COMPACT DESIGN



WILSON INTERCOOLERS

Wilson intercoolers are in service on more than 5,000 units of 47 railroads —providing consistently reliable interstage cooling of compressed air for multistage compressors. Due to their ability to withstand constant vibration, Wilson intercoolers are maintenance free, requiring only periodic cleaning.

ASK FOR BULLETIN 41

WILSON ENGINEERING CORPORATION

6 North Michigan Avenue, Chicago, Illinois 60602

that against the difference in cost, which was recently not quite nearly 50 percent difference in cost. So, you really have to balance it on the basis of economics.

The lower voltage diode does an adequate job for the applications into which it is placed. It would be a matter of customer or railroad economics.

MR. R. G. CLEVENGER (Assistant to General Supervisor - Diesel Engines, Atchison, Topeka & Santa Fe Railroad, Chicago, Ill.): I am in agreement with Don and believe it is strictly cost-wise, so that is what you should go by. I don't believe you should just go ahead and put in the higher voltage diode. If you should happen to have a large group of engines in the SD 45 class and a smaller group of SD 40s, then I think it would be beneficial to go ahead and use the higher voltage diode, since you have a much bigger inventory of them.

8. Plug In Module:

MR. LELAND O. TOWNLEY (Mechanical Engineer, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.): I think the plug-in module is certainly something that we are going to have to have, particularly on our more complicated locomotives. My question I might word in two ways:

Have you been successful in switching high current through these plug-in disconnects? Or, asking it in another way, how many amperes have you successfully switched or disconnected with these plug-in modules?

MR. TURNBULL: I am going to pass the question to somebody who is a little more familiar with the trains that we saw on the slides. Most of the circuits you saw that

LOOK TO GSI

for cast steel railroad products

General Steel Industries is one of the world's foremost designers and manufacturers of cast steel products for the railroad industry. Included are components for freight and passenger cars and locomotives, as well as complete flat cars, bulkhead cars and pulpwood cars.

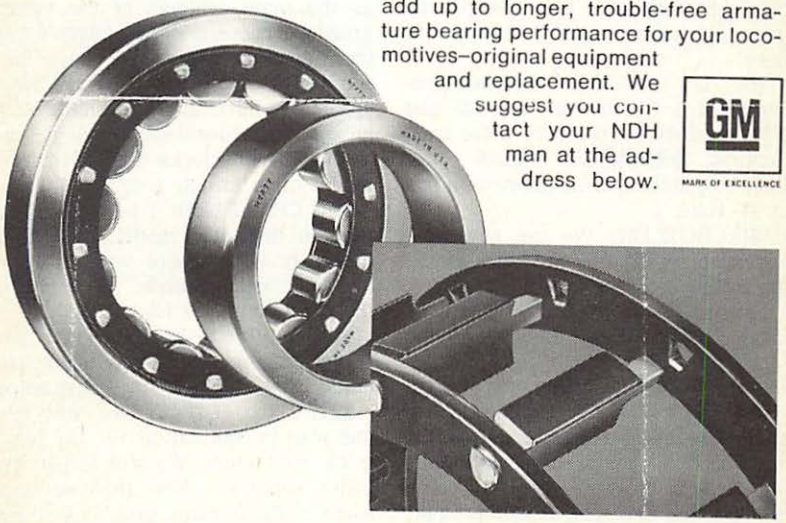
GSI
CASTINGS DIVISION

GENERAL STEEL INDUSTRIES INC.
GRANITE CITY, ILL. · PHILADELPHIA, PA. · SAN FRANCISCO, CALIF.

Dependable
NDH Pinion-End Armature Bearing

We pioneered its self-locking cage bar construction back in '53 and, with subsequent improvements, it continues to be the most rugged and dependable pinion-end armature bearing ever built. Why? For many reasons. Extra-large rollers for greater load capacity, for one thing. Removable cage-and-roller units, for another. Plus contact free cage-and-race flanges, and unrestricted flow of lubricant to all parts. These are just a few of the NDH design advantages that add up to longer, trouble-free armature bearing performance for your locomotives–original equipment and replacement. We suggest you contact your NDH man at the address below.

GM
MARK OF EXCELLENCE



NDH NEW DEPARTURE · HYATT BEARINGS
DIVISION OF GENERAL MOTORS CORPORATION · SANDUSKY, OHIO

were plug-in modules are on the 64 volt control side. You don't very often find the high power as a plug-in module. They are mostly controls. There may be some of it. Perhaps Mr. Kelley can answer the question.

MR. W. E. KELLEY (Assistant Electrical Engineer, Pennsylvania Railroad, Philadelphia, Penn.): I think what you saw on the slide answers the question. The plug-in modules were on the control side of the circuitry, on the 64 volt side for the most part — as a matter of fact, in all cases.

I think what Bob pointed out in the slides is that you do see a lot of big contactors still in evidence on these new cars. This is something we are looking for in the future — silicone controlled rectifiers which will do these switching operations and which can be more easily maintained and more easily replaced; but as yet the technology isn't there to give us the material we want at the present time.

MR. D. I. SMITH: On the blue-front cards we use on our U25 and U30 locomotives, we have these free-floating gold-plated contact tips. They are seldom used above 20 amps at 75 volts.

MR. BUTLER: We are now having trouble with the fan blades cracking in the back on these locomotives. That has given us quite a lot of trouble. I heard Bill Kelley had the same problem.

9. Fan Blade Cracking:

MR. D. I. SMITH: On the earlier models we had some fan blade cracking trouble. It has been solved in current design, but there are still some running that are subject to this fault.

10. Magnetic Switch Gear:

MR. HAROLD STRINGER (Canadian Pacific): I would like to register some surprise and possibly a little exception at the Committee's findings on magnetic switch gear. It has been our experience with the locomotives on the Canadian Pacific, particularly the new high horsepower locomotives, that the power contactors, heavy duty electromagnetic switches and their associated interlocks and motor circuits in particular, have been responsible for one of our chief sources of electrical trouble.

I wonder if there are some American roads that haven't yet achieved the enviable state reported in Item 10 of the Committee's report, or are we alone in this North of the Border?

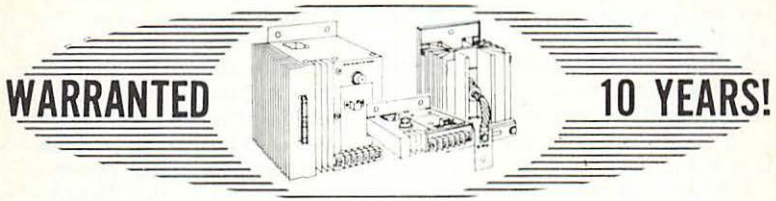
MR. CHANDLER: I think we can get some comment on it. I know there are other areas where this problem has existed. Mr. Norton, do you have any comment on that?

MR. W. C. NORTON (Electrical Engineer - Equipment, Illinois Central Railroad, Chicago, Ill.): As far as the main contacts of the switch gear are concerned, we haven't had too much difficulty. We have had some isolated cases, but for the interlocks we have had problems that have caused considerable delays, and so on. The interlocks themselves, not in the main switch gear.

MR. CHANDLER: I personally feel that on the later model units from the early GP9, where we saw some excellent performance, in some of the older units we have found areas of difficulty both with interlocks, and so on, that have led to failure in our units. That has been my experience.

MR. D. I. SMITH: We still use, and plan to continue to use, the pneumatic contactors. We still feel it is a faster contactor. Now that we have some of the packing problems solved on it, it is a better contactor than we can find magnetically.

MR. CHAPIN: We are aware of a few problems that exist with the new



This is your assurance of long term economy when you install

General Systems

Model 101 Voltage Regulators, Current Limit Controls and Reverse Current Rectifiers

This warranty applies to all units listed below and is subject only to the fixed maximum repair charges indicated:

All Model 101 Voltage Regulators	**$35.00**
All Model CL 101 Current Limit Controls	**20.00**
Reverse Current Rectifiers	
Model RCR 100	**25.00**
Model RCR 200	**30.00**
Model RCR 300	**40.00**

When you standardize on General Systems solid state equipment — as so many railroads have already done — the **most** it can cost you for any repair is the fee noted above. You can readily check the importance of this warranty feature to your own operations by adding up some of your recent repair bills for voltage regulating devices. **Aside from repair bills, any** breakdown of auxiliary generator voltage control can result in train delays and often requires the emergency substitution of equipment. This means **more** unexpected expense.

Reducing these breakdowns to an absolute minimum is another very real advantage that GSI equipment offers you.

In effect, what we're promising is operating dependability such as you've never experienced before with any similar equipment. **And again, your assurance** is the unique GSI warranty. Because — as you can well understand — this long-term warranty wouldn't be practical — or even feasible — if it were not for the remarkable reliability record which literally hundreds of GSI installations **have already made** in the field.

Standard GSI systems are available for 37, 75 and 125-volt operations. Special models can be designed to whatever requirements you specify.

We will welcome your inquiries.

PRODUCTS OF *General Systems, Inc.* ARE DISTRIBUTED BY

THOMAS A. EDISON INDUSTRIES
PRIMARY BATTERY DIVISION, BLOOMFIELD, N. J. 07003

MEMBER

McGRAW EDISON

magnetic devices. However, the entire performance of the device in the whole picture seems to be very gratifying. The interlock system really has been in use for a number of years and is pretty much the same as it was previously. The configuration of the device has changed.

I might call for a few comments from our Ken Bower on the subject of our switching devices.

MR. KENDALL BOWER (Electro-Motive Division, General Motors Corp., LaGrange, Ill.): **I think we have had some problems on the interlocks.** In general, however, it is my understanding they have been quite satisfactory. We have had some breakage on the transfer devices, which has been corrected with the design change rather recently.

MR. STRINGER: One of our chief problems with the electromagnetic switches seems to be bending of the interlock actuating arm, and this often prevents the A interlock from opening to allow the economizing resistor to function. We have had a large number of coil burnouts because of this. This is just one area. The other one on the power contactors seems to be that the fiber contact carrier binds, and either breaks or prevents the interlock from acting, and this can cause all sorts of difficulties such as intermittent transition or no loading.

I wonder if in particular, the problem dealing with interlock arm bending has been encountered on the American roads.

MR. CHAPIN: The bending of the interlock carrier arm has not been a widespread occurrence. **However, the location of the interlock operating arm is such that it is vulnerable to**

SERVICE and QUALITY

our trademark since 1876

MANUFACTURER OF

Cast Iron Brake Shoes

and Gray Iron Castings

MARSHALL CAR WHEEL and FOUNDRY COMPANY, Inc.

MARSHALL, TEXAS

Specializing In

QUALITY

Cleaning Compounds

for

Railroad Maintenance

at

Reasonable Prices

COUGAR CHEMICAL CO.

1041 No. Hollywood

Memphis, Tennessee

damage from other sources or bending from other sources.

There has been some attention given to that area, and of course if the interlock operating arm does bend then the coil fails to economize, and it could lead to failure of the coil.

We are aware of the Canadian difficulties through our Division in London, Ontario, and we have given them some comments on the possibilities that exist. We think perhaps damage from external causes may precipitate much of the difficulty.

MR. CHANDLER: Do you have any comment on the binding that was described?

MR. CHAPIN: I would like to call on our Mr. Bower again for that portion of the discussion. There have been design alterations and changes in that area of the device.

MR. BOWER: In regard to the operator for the interlock, and the bending, yes, we found that trouble, and we have made a design change to stiffen up both the support for the interlock switch and also for the operating arm, and putting a reinforcing rib in there to strengthen it. That change has been made.

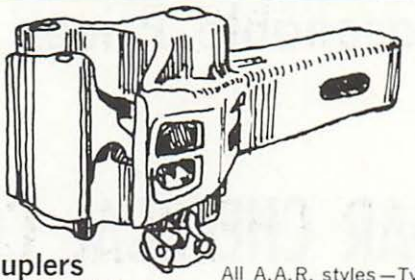
Regarding binding, I am not sure I understand the problem. Which device is it that you are talking about?

MR. STRINGER: This particular binding occurs with the square bakelite armature or contact carrier binding in the bakelite guide.

MR. BOWER: Of the interlock housing, or of the interlock assembly?

MR. STRINGER: The interlock assembly.

MR. BOWER: We have made a design change on that recently. There

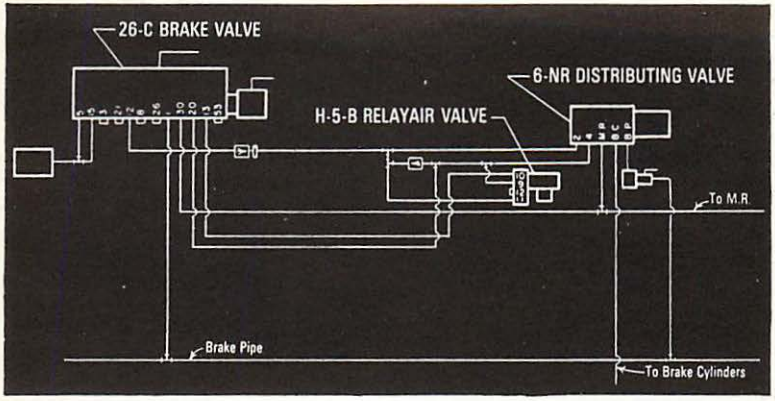


Couplers
Coupler Yokes
Coupler Parts for
Freight Cars
Passenger Cars
Locomotives

All A.A.R. styles—Type "E" Modified, Type "F" Interlocking, Type "H" Tightlock. In McConaloy® NI-CR-MO High Tensile Steel, grade "C" and grade "E". Specialty Steel Castings: 100—20,000 pounds.

McConway & Torley Corporation

Pittsburgh, Pa. 15201/Since 1869/Chicago • PITTSBURGH • San Francisco • Boston • Omaha • New Orleans



26-NL New Concept Gives Switch Locomotives... MODERN BRAKE CONTROL

by The New York Air Brake Company

The new 26-NL Control Group is a streamlined combination of three modern Valves which are standard in the industry...the 26-C Brake Valve, the 6-NR Distributing Valve and the H-5-B Relayair Valve. Arranged as shown in the piping diagram this Control Group provides:

1. An efficient brake for Switch Locomotives at lowest initial cost.
2. Reduced maintenance costs..."O" ring packed Spool Valves and Diaphragms replace hand-fitted rings.
3. Ample capacity for any length train.
4. Flexibility permitting addition of optional functions, such as: MU Control, Penalty Type Brake Applications and Break-In-Two Protection.
5. Freedom from stuck brakes when shipped dead anywhere in train.

Take advantage of this new 26-NL Control Group to modernize your existing switchers at a reasonable cost.

MEMBER RPI

NEW YORK AIR BRAKE COMPANY
A UNIT OF GENERAL SIGNAL CORPORATION
230 PARK AVENUE · NEW YORK, N.Y. 10017

was some binding, and actually we have found a number of breakages. That has been changed. I hope we have corrected it.

MR. P. D. STARR (Chief Mechanical Officer, Denver & Rio Grande Western Railroad, Denver, Colo.): Certainly the Canadian railroads aren't the only ones having trouble with their contactors. We have had a number of contactors in which the main power contactors, reversers, and so on, have completely burned up in the main contacts. Whether this is a case of dirt or a case of improper shunting around the flexible, movable portion of the contactor, we don't know.

Binding of the small plastic element has occurred most often in the small wheel slip relay, particularly on the SD 45 locomotive. Apparently this plastic seems to grow a little bit, to the extent that it will bind the little interlock, and the interlock cannot properly move up and down.

Our correction is to tear the contactor apart, take a file and file off part of the plastic, and put it back together. This is a lot of work for a small device which can create a big delay. **I think a lot of work certainly needs to be done in this particular area by the manufacturer himself.**

MR. CHANDLER: Would Mr. Bower have any suggestion about that?

MR. BOWER (EMD): We have been doing considerable investigating of this problem of the burn-up of the power contactors. Were you talking about the power contactors themselves, or was it the transfer device or the shunting, in regard to the alterations? I didn't quite follow your problem specifically.

As far as the power contactors are concerned, one of the problems that has exhibited itself is relative to interrupting capabilities under certain abnormal conditions or not normal transition conditions. We are making some intensive studies on that score, and hope to have that under control soon.

Regarding other devices, I think this is somewhat (according to our information) associated with the flashover problem, and we are also investigating further what can be done to correct some of these problems.

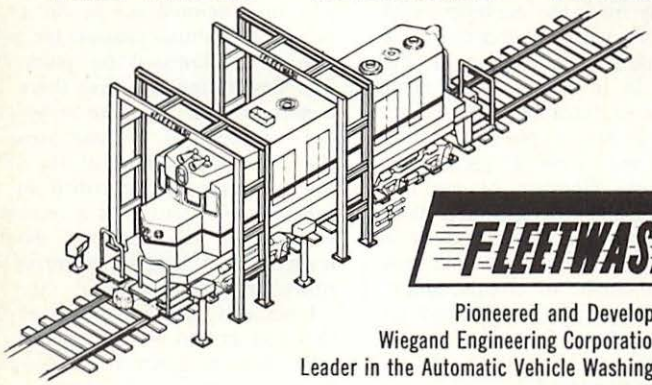
MR. CHANDLER: Are there any other questions? I think we have covered the contactor subject quite well. How about the motor or propulsion system? Can we answer any questions about this for you today, gentlemen?

11. Train Line Wire Standardization:

MR. ROY S. DAVID (Electrical Engineer Equipment, B&O - C&O Railway, Huntington, W. Va.): In Item 14 you imply that we need a new standardization for train line wires. As of 1960 AAR Standard 4.202 has been established, assigning all wires except 1, 11 and 14. They were assigned as spares. You have conflicted with that standard on four occasions here, and after getting together with five railroads and establishing a standard according to the AAR, now to abide to your standard I will have to go back and change a considerable number of wires on a large number of locomotives. I don't know how many other railroads are in the same position.

There is also another aspect. Many of these functions that we are doing with a train line wire, should be done as a unit function. Quite a few years ago we had manual transition, and now it is done as a unit function, so that will create 18 and 19 wires as spares very shortly.

THIS LOCOMOTIVE IS ON THE RIGHT "CLEANING" TRACK



Pioneered and Developed By
Wiegand Engineering Corporation . . .
Leader in the Automatic Vehicle Washing Field

Through constant research and progressive thinking, Weco has perfected an automatic wash system that can thoroughly clean an engine in just 3 minutes for less than $2.00! Here's why it pays to have FLEETWASH on the job:

FLEETWASH CLEANS THOROUGHLY: Powerful heavy duty acid and alkaline detergents, applied by 20 h.p. to 100 h.p. pumps, wash all exterior parts of the engine sparkling clean.

FLEETWASH PAYS FOR ITSELF: By eliminating the need for labor and providing a wash for under $2.00, a system pays for itself in just a short time.

FLEETWASH CLEANS QUICKLY: At the rapid rate of 3 minutes, all your locomotives can be "well-groomed" every day.

Other FLEETWASH Benefits:

- Recognized By Leading National Companies
- Field Tested
- Installation Supervision
- Operational Instruction
- No Hand Labor Required
- Guaranteed Equipment
- Wide Variety of Optional Equipment

FOR DETAILED BROCHURE, CALL OR WRITE

WECO

WIEGAND ENGINEERING CORPORATION

P. O. BOX 2362, FORT WORTH, TEXAS 76101/(817) MA 5-1141

In addition, we have emergency sand. We have a brake pipe that tells us when there is an emergency situation. Emergency sand should be sensed from this, not electrically.

Another item is our ground relay reset. Why have the engineer reset this? Do it as a local function with an automatic reset device on the unit that is in trouble, and don't expect the engineer to do it.

Changing No. 5 pin (excitation control relay) to No. 27 pin doesn't make sense. Number 27 pin has been established a long time as boiler shut down. I think you have caused confusion, and I can't ask our management to change something the AAR has established as standard and we have had heartaches in the past few years changing to this standard.

In summary I believe the AAR standard should stand as written. I might add, all the voting railroad members have just this year voted to accept this as the standard for the industry.

MR. CHANDLER: **The example you have pointed out in our report is not a recommendation for adoption as a standard for train line. The Committee felt that there was a necessity for us as an industry to have a standard. We are aware of the recommendations of the AAR. The example as described in our report under Item 14 is a composite of what is the apparent existing train lines, I believe, of seventeen railroads that reported.**

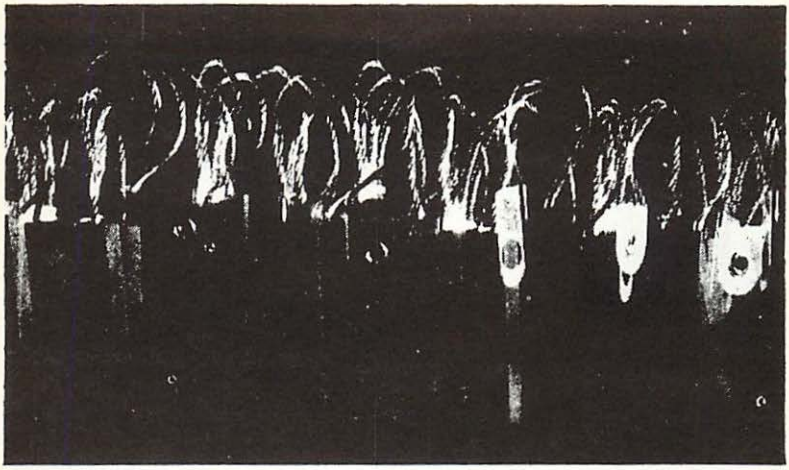
I actually am in the same position you are in as far as my own train line is concerned. However, in surveying the industry — and I believe we had seventeen railroads

POWER BY
Wagstaff

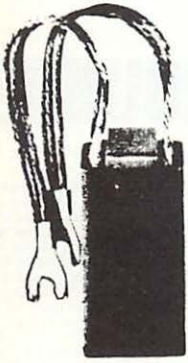
TYPE 4RD-25

IN MOULDED RUBBER
CONTAINERS
FOR
DIESEL LOCOMOTIVE
CRANKING CONTROL
AND OTHER APPLICATIONS
4 CELLS - 8 VOLT

Wagstaff BATTERY MANUFACTURING COMPANY
2124 N. WILLIAMS AVENUE ★ PORTLAND, OREGON 97227



When this is a problem...



this is the answer

It's that little neoprene pad (red) that takes the shakes. Sort of a buffer that reduces vibration, eliminates uneven wear and lengthens brush life. You get improved commutation, more uniform wear, lower operating costs; no broken hammer plates, no shunt fraying, less flashovers, less commutator threading. You get Speer Red Top Multiflex Brushes, one branch of a large and efficient family of high quality brushes for electrical rotating machinery. To get to know the family better, write for complete details.

SPEER Carbon Co

Dept. 190, St. Marys, Pennsylvania 15857
Speer Carbon Co. is a Division of Air Reduction Company, Inc

Photo courtesy of *J-Milepost*

34-inch snowfall with 10-foot drifts... 78 locomotives driven by EPOXI-MICA® insulated motors

STILL NO GROUNDS

'Not one instance of grounding' EJ&E reports to our Frank Bosart

Throughout the disastrous snow storms which began on January 26, halting nearly all surface transportation in the Chicago area, the Elgin, Joliet & Eastern Railway kept its equipment in operation. Behind this astonishing feat lies a story of dedication, organization and railroading sense which will live in the annals of the "J" for all time. We at MOTOR COILS are proud that our product was a part of this story.

During the past six years the Elgin, Joliet & Eastern Railway has been converting its traction motors to the *Epoxi-Mica* system of insulation. The value of this

ON THE "J"

program was dramatized, last January, by the Chicago area's three-foot blizzard: *under the most severe environmental conditions there were no motor grounds.* EJ&E mechanical department officials told Frank Bosart, MOTOR COILS' Sales Manager:

"We experienced no difficulty resulting from insulation breakdown. There was not a single instance of grounding on Epoxi-Mica insulated motors."

This welcome report on the experience of the EJ&E comes as no surprise to our insulation engineers. In the short period of a dozen years the *Epoxi-Mica* insulation system has repeatedly demonstrated its ability to satisfy accelerated demands on traction equipment. Its once-theoretical basis has become a railroading fact.

Of equal importance are the economics of *Epoxi-Mica* insulation. "Longer life at lower cost" — MOTOR COILS' slogan — has proved out for many of the nation's leading railroads, who estimate their savings through the system in the millions of dollars.

The year-in, year-out dependability of Epoxi-Mica insulation has been established on railroads throughout the continent. For information write or telephone:

FRANK BOSART

MC M

MOTOR COILS
manufacturing company
32nd Street, Pittsburgh, Pa. 15201 (412) 471-0677

reporting — this is about the picture we found being reported.

The necessity of adopting some standard is what the Committee is recommending, not the adoption of the example as reported to us by the many railroads. Does that answer your question?

MR. BLAND: I agree with Mr. Davis. I wonder why we need to adopt a standard when we already have the AAR standard.

MR. CHANDLER: **We found so many who have not adopted that, and that is the reason this question was brought up this year.**

MR. BLAND: It might be in order to put that in the form of a motion, that we adopt this.

MR. CHANDLER: I think that would be an acceptable solution if it is truthfully followed out. Would anyone else on the Committee care to make a comment on that area? Evidently not.

Are there any questions in the area of traction motors that the Committee might be able to help you with?

12. Traction Motors:

MR. HUBERT F. McNAIR (General Foreman, Missouri Pacific Railroad, Houston, Texas): Have you found it necessary to re-scrape the riser on D77 traction motors?

MR. NORTON: Yes, we have had to re-scrape some of them. We went through our complete fleet, with the help of EMD, by sending a great number of them back to the plant after flashover. We have had a few isolated cases of flash damage and repeats. However, we have been able to locate some of the difficulty with these motors that have flashed over the second time, such as "IDAC" wheel slip malfunction, loose connections in the brush holders, and so on. We have had repeats with it. It has gone way down. We have just a few isolated cases now.

MR. CHANDLER: On our railroad we have experienced a few instances where we have found it necessary to re-work a motor, not actually fully re-scrape it but re-brush the risers in an effort to clean it on up. I wonder if EMD has any comment on that.

MR. CHAPIN: In any operation, like scraping varnish or removing varnish from a riser, there are a number of possibilities. There are as many possibilities as we have mica slots to make some errors or omissions. I am sure not everyone has done a perfect job, and certainly the ones we have attempted to do have not all been perfect, but the general situation has been very encouraging.

There have been a few instances where flashing did occur, and there has been good reasons found in other portions of the locomotive or in the fact that the clean-up operation was not properly done. **Of course, in any flashover clean-up you have to at least wire-brush the riser to clean it up.** That is one of the operations in properly performing the clean-up.

MR. HOEFT: I was glad to see in the report the remark about brush holders. Mr. Chapin said they are doing some work on it. That is a costly maintenance item, and I think possibly you gentlemen might find it is the reason you have to do your motors over.

I tumbled on this recently because we have to give brush life to keep our motors from flashing. They recommended a certain brush tolerance — how far down the brush can go in the holder. **The brush cannot run in that holder under that high horsepower engine. We are pulling the brushes to keep from flashing. In other words, the constant pressure holder loses its constant pressure as the brush goes down.**

MR. CHAPIN: I would like to ask Mr. Koci to return to Mr. Hoeft's question about the brush holder on the D77, and having to change brushes that are not down to the short limit. I would like to ask Mr. Koci to comment on that.

MR. H. H. KOCI: The constant pressure spring does not lose its pressure nearing the end of its travel. I wonder whether the fact that you see short brushes is an indication that after additional miles they get so short that they lose contact with the spring completely. Right now, the way the holder is designed, you have pressure all the time up until the brush gets so short that the spring finger rests against the holder itself. That is about all I can add.

MR. H. F. MACKEY (Manager Mechanical Department, Atchison, Topeka & Santa Fe Railway, Los Angeles, Calif.): I would like to confine my remarks to EMD D67 and D77 traction motors on the higher horsepower locomotives. I would like to ask the Committee or anybody here whether or not they are experiencing any difficulty in the banding on the pinion end of those motors.

In my opinion, in the higher horsepower locomotives we have experienced an increase in difficulties on this end of the motor, which in our opinion is the result of the type of banding utilized by the manufacturer, and I wonder if the manufacturer or any other roads are experiencing a difficulty of this kind.

MR. CHAPIN: The question had to do with the banding at the pinion end. Some of the early D77 motors showed some difficulty at the pinion end clip, but this was a rather scattered situation and no great numbers were involved. I am not aware of any similar situation on the D67. Perhaps Mr. Koci can comment on this situation.

MR. H. H. KOCI: What you have said is essentially true. In some of our early motors, before we had gained any experience with "Kapton" insulation, when we brazed the pinion end clips on the rear end of the armature coils, we did burn some of the "Kapton" insulation. It was more sensitive to the heat of brazing than the old mica. In a short time after field operation, shorts developed in this area and caused the solder in the band to melt and eventually the wire band was destroyed. I think that was corrected very early in the life of the D77 motor.

MR. KELLEY: We have had some recent trouble with pinion end bearing failures, and it seems to perhaps be tied in with the grease problem. I don't know for sure as yet. I don't know if EMD may have some comments on that.

MR. CHAPIN: I think this is a problem apart from the banding of the pinion end. We have experienced a few pinion and bearing failures, and we are in the process of trying to make an intensive investigation of the problem. We see that there are two areas involved here, with grease migration from the traction gears as one of the factors. Another factor on some particular bearings — an outer race fatigue problem exists at the edge of the outer race. Perhaps Mr. Koci could comment on the situation a little concerning the bearings and the bearing problem on the traction motor pinion end.

MR. MACKEY: If you lose a pinion gear or bearing you would be in trouble with the back end of that motor. I didn't mean to indicate that that was the problem, but progressively we are of the opinion that we are in trouble on this end, and I wondered if any others have experienced the same difficulty. That was the purpose of the question.

MR. CHANDLER: What was your finding in that area to make you draw that conclusion? Perhaps that will give us some lead.

MR. MACKEY: Generally speaking, the motor will come to pieces on the back end, and in many cases we are finding loose bands after mileages that we do not feel we should be experiencing this trouble. We were of the opinion that perhaps we were working in temperature areas in excess of the capacity of the banding.

MR. CHAPIN: I am sure we aren't in excess of the capacity of the banding. From your further clarification, it sounds like we are talking about the area of the pinion end clip and insulation problems on a few of the early motors that Mr. Koci described.

MR. CHANDLER: Perhaps you might comment on any plans for improvements within the motor other than the brush holder variants that we talked about today. That might answer the gentleman's question.

MR. CHAPIN: I will call on Mr. Koci again for his comments.

MR. H. H. KOCI: I am not sure this is a fair question to ask in front of all these people. All I can say is that, generally speaking, yes, we do recognize that there are some shortcomings in the present design, and there is always room for improvement by investigating new design features and we are constantly doing this. We have a very active development program on the brush holder itself. We have been under considerable criticism in this area and I hope shortly we will have some of the new proposed designs under field test.

We are continually doing more work in the area of the commutator, trying to build more stability and reliability into the commutator. We are also constantly investigating improvements in the electrical and magnetic aspects of the motor and studying improvements for the transmission system in general. Other than those general remarks, I don't think I can say much more.

MR. MACHIN: **This is a little unfair, but every change General Motors has made in their motors has resulted in a detriment and a problem to us, particularly with respect to their brush holder.** The new brush holder is more fragile than the older brush holder. They still have a constant pressure brush spring that has two arms, but they negated the need for that by putting a rubber top on. They have made the brush smaller and increased the tolerance between the brush and the brush holder, and this has resulted in the brush itself wobbling in the brush box, resulting in instability of commutation.

While Mr. Koci feels that he does not necessarily feel at this time a comment is necessary (and I know he is working on it), I want him to be certain to know that we are having a problem with his motor; and I am not sure whether anyone else is, but we are.

MR. CHANDLER: Mr. Koci, would you like to add anything further to your statement?

MR. H. H. KOCI: No. We are anxious to go out and test some of these early brush holders.

13. Dynamic Braking:

MR. STACY: This question keeps coming up — and this applies to both MU cars and locomotives: When is it a net gain to install dynamic braking? You first must wrestle with the question of economics. In a recent instance, there arose the question of extra maintenance on traction motors, with the use of the dynamic brake. We tried to make a survey on just what that figure might be, and we received answers all the way

from plus 50 percent in cost maintenance to an actual minus 20 percent, the latter figure deriving from the use of the dynamic brake keeping traction motors warmer which would otherwise suffer from moisture grounds.

I don't know if anybody can give an answer right here and now, but I would be very curious to hear what opinions might be. Perhaps you could develop this in the future. Basically, does dynamic braking cause X number of dollars of extra maintenance on traction motors? If so, how much?

MR. TURNBULL: We have operated complete trains with dynamic brakes — MU trains, that is — and we have had some experience with dynamic brakes over the years. I have also watched several transit authorities use dynamic brakes.

First of all, you are dealing with something that is quite intangible. You can't put your finger on it, and you can't evaluate it in dollars and cents. I don't think it can be done. On the other hand, you don't get something for nothing, and don't ever think you can. It's not free. **You pay for it in motor maintenance.** You have extra grids on the car for dissipating the energy usually in dynamic brakes, and they are not free, and they do burn up and they must be replaced. They are used for that purpose only, whereas the motor is used for both power and braking. **Nothing is free.**

It also reflects itself, in some cases, in wheel troubles. We have cars with dynamic brakes; many authorities do. It is possible dynamic brakes are part of it because of the spalling that is taking place. Nothing is very conclusive but I am convinced that it is a factor in wheel wear. Here again, how are you going to evaluate it? It is very difficult to do it, but you do pay for it. The question is whether it is more economical than a straight friction type of brake. I do not know.

MR. CHANDLER: I wonder if Mr. J. J. Schmidt, of the B&O and C&O, is in the audience. He has done some work on dynamic brakes in this area, and perhaps we can have an expression of his views on this subject.

MR. J. J. SCHMIDT (Assistant Director Research, B&O and C&O Railday, Baltimore, Md.): As a matter of fact, I am not at all sure I can shed any light on this subject. I am going to raise another question that Mr. Stacy reminded me of.

We are talking about standardization because of locomotive operating in interchange. This also implies, I believe, that we will probably be mixing locomotives of various manufacturers together in one consist.

My question is: What consideration has the Committee given to defining the operating characteristics of the dynamic brakes so that it is uniform from one manufacturer to the other? Among the three manufacturers the characteristics happen to be quite different today. Therefore, if you have a consist that is all of one type, and the locomotive engineer is acquainted with this characteristic, and if he switches suddenly to a consist of another type, he can be in for quite a surprise when he applies dynamic braking.

MR. CHANDLER: In regard to your question about what consideration the Committee has given to this, as an item we haven't given it much consideration, at least not in the past two years. Perhaps we can get some expression from some members of the Committee. Bill Kelley, can you comment on that?

MR. W. E. KELLEY (Assistant Electrical Engineer, Pennsylvania Railroad, Philadelphia, Penn.): We do have dynamic braking on all of

our later units from three suppliers, and we do run them in mixed consists. We haven't really had a great deal of trouble with units not mixing in dynamic braking.

You can have troubles with dynamic braking in extended range, under difficult track conditions of putting too much braking force on the head end of a train with certain types of cars at the front end of the train, and also applying the dynamic brake too suddenly at high speeds. I don't think our experience has shown any great difficulty with mixed units.

MR. CHANDLER: Going back to the original question, in my experience I have seen very little that would indicate too many detrimental effects of traction motor life by the use of dynamic brakes, as was first suggested in the early portion of this question.

MR. MACHIN: We made rather exhaustive studies of dynamic braking because it was felt it may have contributed to the shelling of the wheels. We put plastic covers on the motor and holes in the decks of the diesels, and we found from a commutator standpoint that we had a black band.

Dynamic braking is not a commutation problem on our railroad. I can't speak for all. Insofar as whatever markings or shelling or spalling we had on the wheels is concerned, in our tests in trying to duplicate similar circumstances we could not attribute it to dynamic braking.

14. Grounds On New High Horsepower Locomotives:

MR. BLAND: I haven't heard anyone talk about this question, and I would very much like to hear it discussed.

What about grounds on new high horsepower locomotives? **We have a constant siege of locomotives being tied up for grounds that are will-o'-the-wisps. They are hard to find.** In one instance, with an SD40 our people tried everything in the book to locate a will-o'-wisp ground that was there; then it wasn't, and they put it on the road and it was there again. A complete cleansing with compressed air of the diode sector around the AR10 eradicated the problem.

I would like to hear some discussion of grounds, and, beyond that, I would like to see the Committee get really interested in directing the builder as to what the railroad man's experience is in rewiring cables and running them in a different manner to avoid some of these grounds. IT IS FINE TO HAVE AUTOMATIC GROUND RESET RELAYS, BUT IT WOULD BE MORE WONDERFUL IF WE DIDN'T HAVE THE GROUNDS!

MR. CHAPIN: In reply to Mr. Bland, I would like to say that the neutral ground relay system which we now apply and recommend for all of our "40" models of locomotives offers much higher tolerance — something like a difference of 17 milliamps versus 400 milliamps. So, there is a great deal of difference in sensitivity. The neutral ground relay should reduce the sensitivity to these nuisance grounds. I think perhaps this would offer the greatest benefits for Mr. Bland.

MR. STRINGER: If Mr. Bland would allow me to add a little bit to his question, which I thought was very interesting and to the point, **I would like to ask the Committee what they think about the growing list of items that have to be shorted out or jumpered in order to perform megger or high potential insulation tests on the new high horsepower locomotives. It seems to be getting to be quite a chore, to go about preparing one of these units for locating wiring grounds.**

TRANSIENT VOLTAGES?

TR-741-B TR-741-EC1

Semi-conductors failing in your circuits?

Could be the work of transient voltages! These voltages are now easier to detect than ever before with the Trott TR-741-B Transient Voltage Indicator. You no longer need to watch a 'scope hour after hour to "catch" a spike.

The Trott T.V.I. can be set to trip at any desired voltage. It reacts the moment a transient voltage occurs. A red light on the Indicator glows until the reset button is pushed. If the T.V.I. is connected to the Trott TR-741-EC1 Digital Readout Counter, the number of times the transients occurred in a given time will be recorded.

TR-741-B Transient Voltage Indicator. $195
TR-741-EC1 Digital Readout Counter. . $95

Write for bulletin T.V.I.-1 showing other uses and specifications.

TROTT ELECTRONICS INC.

30 RIDGELAND ROAD, ROCHESTER, N. Y. 14623

I would like to appeal to the manufacturer and to the Committee to try to apply some of the available present-day technology and have suitable protective networks permanently installed around these critical electrical components or, failing this, to perhaps bring these connections out to a common point where we could close a switch or put in a set of plugs or something, in order that these tests could be made far more rapidly than we can do them now.

MR. D. I. SMITH: Many railroads are currently meggering our GE locomotives without doing any shorting of diodes in the power circuit at all. There are internal resistors across the diode that offer this protection. If you have a high-powered meggering system and a fault, you may cause secondary damage if the fault is behind some diode that has no protection.

We do suggest for hipotting purposes that you do short the rectifier panel out, but for meggering you need do nothing but open the ground relay cutout switch on GE locomotives.

MR. CHANDLER: I would like to go back to Mr. Bland's subject, which was a good one. He mentioned improving cabling and wiring. I think we brought this up in our report this year.

If the manufacturers can give us any advice as to what their plans are for the future as far as new types of cable or insulation to try to avoid some of the pitfalls we have had in the past, where relatively late model locomotives are tied up for rewiring or re-cabling, when the cabling didn't last the life of the components within the unit, we would like to hear about it. Mr. Chapin, would you like to comment on that?

MR. CHAPIN: **I think there have been many cases where we have located the wiring in areas where the temperature environment was such that it caused it some damage.** We are, of course, looking at different types of insulating materials and different types of wire continually, to be aware of the best possible material to use.

I would like to call on Mr. Bower again, to give us a reading on the situation as far as the new materials that might be coming on the scene are concerned.

MR. BOWER (EMD): We have a continual program going of checking out new insulations for our cable and wiring, and we are exaluating it all the time. At the moment we don't have anything new on the scene that we are going to be applying in the near future.

We do know there are problems that exist in some of the applications, and certainly in some of the operating conditions where particularly high temperatures are involved, but we do have a continual program going of looking at new materials that are available, and checking them out in our laboratory.

15. Stakon Connections:

MR. STARR: Talking about wiring has brought to my mind a problem we have, and I would like to ask if the Committee has had the same problem. This has to do with the relatively new Stakon type of connection on terminal boards, contactors, and so on. Is the Committee happy with the performance of this Stakon?

We have had numerous cases of wiring coming off of the Stakon. Whether it comes off because of a vibration situation or because someone accidentally hooks the wire while making repairs, I don't know, but it has caused some very serious trouble, and I wonder if other mem-

bers of the Committee have had this same problem.

MR. CHANDLER: I personally have had that difficulty on some model locomotives. Mr. Norton, would you care to comment on what your experience has been?

MR. NORTON: We have had considerable trouble with Stakon. As a matter of fact, we think possibly we have had some control wiring fires due to that. One fire in particular we think started at a Stakon terminal board, where a Stakon had either dropped off or had not been applied properly, and dropped down to another terminal and caused a short. That is our interpretation of it.

Of course we didn't rewire the locomotive, so we don't know exactly what was found. We have had several cases of malfunction of certain parts of the locomotive, and when you check it out you find that you may have a terminal that came off. Whether it was not correctly applied, or whether vibration caused it, is a problem.

MR. C. J. FREY (General Electrical Foreman, Chicago, Rock Island & Pacific Railroad, Silvis, Ill.): We have had trouble on the Rock Island from the same problem. We figure that the Stakon has probably been pulled off in making a test, and either put on the wrong terminal or left off altogether. We know of several failures that we have had on the Rock Island that were hard to find due to the fact that the Stakon was applied to the wrong terminal.

We talked about correcting this in our Committee meeting, and it was suggested that all the vacant terminals be covered so that you could not get the Stakon on the wrong terminal after making a test. It was a good suggestion but it didn't get very far. It is still a good idea.

MR. MACHIN: **We have had this problem, too, and we found a very simple solution to it. If you press the Stakon in one direction you lose all friction, and it will fall off with the slightest bit of vibration. If you press it in the opposite direction it maximizes the friction and it will not fall off. So, you must be very careful when you reapply the Stakon, or when you are in the electrical cabinet searching for problems, that you do not press the Stakons in the wrong direction.**

16. Teflon Wiring:

MR. CHANDLER: I do know there is some effort being put forth in the industry to improve the unit.

In connection with the General Electric Company on some of our newer models, we are trying some Teflon wiring. Possibly Mr. Smith would like to comment on it at this time.

MR. D. I. SMITH: It is very expensive. It offers the possibility of being a better insulation. It requires better clamping of the wire because there is cold flow with Teflon. If it or one of its successors turns out to be very attractive (and probably more expensive), no one builder can offer a more expensive wiring unless all builders are forced to supply the same specification. **So, we can't give away a better wire.**

If you want a better wire you can specify it from all builders in open competition, and we will be glad to supply it.

MR. KELLEY: What Mr. Smith says about Teflon is very true. It hasn't proven too successful except in using it in electric lockers and cabinets, where it can be put in bunches and not into a conduit. However, there is an AAR specification on wire. **I think if we insisted on getting this kind of wire we would be better off.**

17. Hypalon Wire:

There is also a new AAR spec on Hypalon wire which may in the long run prove to be even better than the heavy rubber Neoprene. **I think if the railroad industry wants better wiring they can have it.**

MR. CHANDLER: **I think that indicates part of the job you and I as maintenance officers have. It indicates that there are materials available that can relieve us of the situation in this area, but as Maintenance Officers we must sell and justify this need to our superiors if we are to try to improve the quality of this area of the locomotive.**

MR. CHANDLER: Gentlemen, we have run out of time. Again we would like to thank you for your attention and your attendance, and also for the fine way you have added to the program.

I will now call on Eastern and New England Regional Executive L. H. Booth.

EASTERN & NEW ENGLAND REGIONAL EXECUTIVE
L. H. BOOTH
Supt. Motive Power
C. & O. Ry. - B. & O. R R.
Huntington, W. Va.

MR. BOOTH: I hate to break up this discussion, because from the interest developed from the floor I think you will agree that it has been most informative.

In summarizing Mr. Chandler's paper I think we can say that standardization of motor power, enabling units to be interchanged between roads, is something we have heard from almost every committee, and AAR or other study groups should develop common standards so this can be more readily realized.

However, high out of service time with today's locomotives, which are expensive high horsepower units, is something that top management will not tolerate. The sales executives of the builders must give us factual information concerning these locomotives in order that we can operate them.

Considerable trouble with traction motor flashes and ring fire continues in epidemic proportions. I am sure the technical ability and know-how of the builders can overcome this problem that seems to be prevalent with so many.

Progress is being made, as Mr. Chandler has pointed out, but there remains much to be done. Control and traction circuitry, short brush life of brush holders, wavy commutator services, are some areas where improvements can be made. **Mr. Chandler's paper should serve to show the builders that their job on new locomotive development is not finished and should be regarded by them as official recommendations where improvement can be expected.**

I think Mr. Chandler and his Committee have done an excellent job on this report.

PRESIDENT BEISCHER: Thank you, Mr. Chandler and Mr. Booth.

There is an honor that this Association wishes to confer upon one who has been with us for many years. I would like to ask Mr. Carl

C. L. HALL (Retired)
Gen. Supvr. Loco. Maint.
New York Central R.R.
38 Ferris Place
Ossining, N. Y.

G. N. BEISCHER, President
C. M. O. - Loco.
C. & O. Ry. - B. & O. R.R.
Huntington, W. Va.

Hall to come forward and meet me at the podium.

Many of you have been at our meetings over the years and are well acquainted with Carl Hall. Carl has been quite an active, loyal supporter, and one who has contributed much to the growth and success of our Association. A few years ago Carl reached the position of Canadian and Great Lakes Regional Executive in our Association, but his duties with the New York Central Railroad Company required that he not be as active as he had been previously. We unfortunately were the losers.

Carl gave a spark to our meetings, and gave us direction and sound advice that we could carry back and very usefully put to work for ourselves. We do want to honor this man who has done so much for us and who has worked so hard for us. Perhaps you don't know how much Carl Hall has done for our industry.

Carl Hall started on the Boston and Albany Railroad a good number of years ago in the position of electrical apprentice, and progressed through many positions to those of a responsible supervisory capacity at the West Springfield Shops of the Boston and Albany Railroad. During that period of time his knowledge of electrical equipment qualified him to become involved in the embryonic aspects and periods of development of the diesel electric locomotive.

Carl was quite instrumental in the testing and trial application of the first of the road diesel locomotives to be used on any railroad in this country, and much of the work he did at that time is the reason why

today we have reached the state of the art with the diesel locomotive that we are now concerned with.

His work over the years in bringing to a much higher degree of efficiency and competency the development of the diesel electric locomotive has been manifold. It has been far greater than I believe anyone here can ever appreciate. Many of the developments that we have, not only electrically but mechanically as well, can be traced to the intensive and intelligent investigation and hard hours of work of testing, trying, and living with the diesel electric locomotive in its early years on the American railroads, so that much of what we have today is directly due to him.

We and the railroad industry owe much to Carl Hall. We owe him much more than we can ever repay. We as the LMOA can at least recognize and honor him, and be sure he is always a member and always one of us; always one who has made us far richer because we have been associated with him.

At this time it is my pleasure to award an Honorary Life Membership to Mr. Carlton L. Hall, who reecntly retired from a position of high responsibility in the Mechanical Department of the New York Central Railroad Company. Carl, this is indeed a pleasure. (The audience arose and applauded.)

C. L. HALL (Retired)
Gen. Supvr. Loco. Maint.
New York Central System
38 Ferris Place
Ossining, N. Y.

MR. C. L. HALL (General Supervisor Locomotive Maintenance — Retired, New York Central Railroad, 466 Lexington Avenue, New York, N. Y.): Mr. Beischer, Officers and Members of the LMOA:

It is an extreme pleasure to receive this honor from you. Words are beyond me. I wish I had done all the things George has given me credit for having done. Thank you.

PRESIDENT BEISCHER: Gentlemen, this concludes our session for Tuesday. I would remind you that we will begin again tomorrow promptly at 9 a. m.

I would like to request that we give a rising vote of thanks to our Electrical Committee.

Wednesday Morning, October 11, 1967

9:00 A. M.

REPORT OF THE COMMITTEE ON DIESEL MATERIAL INVENTORY AND CONTROL

1967 TOPIC:

"IMPROVED MATERIAL CONTROL AND AVAILABILITY THROUGH COORDINATION OF MECHANICAL PURCHASES AND STORES DEPARTMENTS AND SUPPLIERS"

Study the Full Text of this Report beginning on Page 201 of the Pre-Convention Report

L. J. MEEKER, President
St. Louis Railroad
Diesel Club
General Foreman
B. & O. Railroad
East St. Louis, Ill.

J. J. FOSTER, Chairman
Committee on Diesel Material
Inventory and Control
Ass. Chief Engr., Signals, Electrical
and Communications Center
Reading Company
Reading, Penn.

PRESIDENT BEISCHER: Gentlemen, the Wednesday morning and final session of the 29th Annual Meeting of the Locomotive Maintenance Officers Association is about to begin.

Our program this morning should be very valuable and interesting to all concerned, and I am sure much can be gained through the participation of each one of you.

In the What's Your Problem session this morning, with Mr. Jack Dwyer, all technical committee chairmen will be seated at the head table following Mr. Foster's presentation. Again let me remind you that it is your participation in both Mr. Foster's presentation as well as the What's Your Problem part of our program this morning that makes these meetings the real success and value that they can be to us.

In the What's Your Problem part of the program Mr. Dwyer has some inquiries that have been sent to him. However, I would much appreciate that the problems on your mind, that you do wish to have discussed, be

G. F. BACHMAN
President-Elect
Chief Mechanical Officer
E. J. & E. Ry.
Joliet, Ill.

brought out first, and that you come forward and use the microphone closest to you, and state the question or problem that is bothering you.

At this time I will call on President-elect George F. Bachman, who will be Chairman of the morning session.

CHAIRMAN BACHMAN: The What's Your Problem session is scheduled for 10:15 a. m., and 12:30 is the time of the Coordinated Association Luncheon, to be held in this room. This afternoon you are all invited to tour the AAR Research Center.

It is my pleasure now to introduce the Chairman of the Committee on Diesel Material Inventory and Control. Mr. J. J. Foster is presently Assistant Chief Engineer of Signals, Electrical and Communications Center, Reading Company.

Mr. Foster was born in Philadelphia, Pennsylvania in 1927. He served in the United States Navy in World War II as electrical technician. He graduated from Villanova University in 1949 with a Bachelor of Science degree in Electrical Engineering. He went to work for the Pennsylvania Railroad in 1949 as junior engineering trainee in the Mechanical Department. He worked in various enginehouses on the Pennsylvania through 1956, and then joined the Jones and Laughlin Steel Company, where he was the Power and Control Engineer. He then went on to receive a Master's degree in Business Administration at the University of Pittsburgh in 1960.

Mr. Foster joined the Reading Railroad in 1960 as a Technical Assistant Engineer. In 1961 he was made General Foreman of the Locomotive Shop. In 1962 he was made General Foreman of the Erie Avenue Enginehouse. In 1963 he was made the Cost and Budget Engineer and later was made Superintendent of Planning and Control. In 1965 he was made General Mechanical Superintendent, and in July 1965 was apopinted to his present position.

MR. J. J. FOSTER (Reading Company, Reading, Penn.): We had our Pre-Convention Presentation in St. Louis. They are wonderfully hospitable out there. I would like to introduce Mr. Lloyd Meeker, President of the St. Louis Railroad Diesel Club.

1. Surplus Material:

MR. L. J. MEEKER (General Foreman, Baltimore & Ohio Railroad, East St. Louis, Ill.): Gentlemen, on May 1, 1967 Mr. Foster, assisted by his Committee, presented their Pre-Convention Report to the St. Louis Diesel Club. I would like to thank Mr. Foster and his Committee for their fine presentation. The philosophy of the LMOA is how much can be attained with a good Pre-Convention Report. It is an asset to both the LMOA and the individual railroad diesel clubs.

At this time I would like to start

the floor discussion with the following question: The surplus plan for diesel material sounded very good. Would you please describe it in greater detail?

MR. H. S. HINCE (Marketing Manager, Electro-Motive Division, General Motors Corporation, LaGrange, Ill.): I would like to correct an impression. While we started this plan some 14 years ago, all of the other builders have today a similar plan. I can describe our plan in detail, and maybe Mr. Audett would like to add something for the General Electric side of it.

The plan in essence is familiar to your material people. In the past 14 years it has taken back more than $2¼ million in surplus parts. It provides an interchange, through the builder, on some of the less frequently used parts and what we call "order as needed" — parts that in these days, when material is difficult to get, would normally take us 90 days or more to supply to you starting from scratch.

When those parts are available on another railroad we refer to our files and then interchange the parts between the railroads. In the last year we have put new emphasis on this program.

At the time of our annual inventory in July we dispose of all past records, as they have become obsolete. We ask for a new list to be submitted by the railroads. We check these lists against our current procurement schedules and then place an order directly with the railroads who have the material, and bring into our stock at Electro-Motive these surplus parts. (In the last year it was 1,600 items.) Beyond that, when we have back orders through the year we check against the surplus plan listing, send telegrams to those railroads that initially had the stock, and if the item is still in stock we will then issue a shipping document to transfer the material to the railroad that is in need of the material at the time.

Of course we specify that the parts be new, that they be in good condition, preferably in the original packages. They can't be rusty, because we have to protect the receiving railroad. We ask that the parts be of Electro-Motive original manufacture.

For this service and inspection of the parts and guaranteeing that the parts will be good, we make a 20 percent handling charge. The railroad that ships the material gets 80 percent of the current price.

Mr. Audett, do you have something to add from General Electric's point of view?

MR. J. R. AUDETT (Manager, Product Planning and Marketing Research, General Electric Company, Erie, Penn.): General Electric has basically the same program. It operates through the regional parts centers and parts sales engineer. I don't think you can stress enough the desire to get this material back in first class, resalable type condition. **All too often we open up cases of material and find it rusted and very unusable and very unsalable.** Our only alternative at this point is to scrap the material. At this point the railroad's expense of transportation is lost. It's too bad as it all adds up to waste.

MR. FOSTER: The surplus parts plan actually takes care of not only surplus but even some obsolete stock. Occasionally obsolescent stock can be sold under a surplus plan, and I think we should all utilize it. I believe most of us already have utilized it.

2. Data Phone Ordering:

MR. DWYER: I was interested in

that part of your paper that mentioned the Data Phone process of procuring material. Would you tell us how many railroads are using this system?

MR. HINCE: It varies with the builder. All builders have this, too. We have fourteen railroads that are actively using this service.

In addition to the builders there are eleven major national suppliers that offer the service; and in local areas — Pittsburgh and Chicago, for instance — there are many mill supply houses and smaller specialized companies, not necessarily in railroad supply, that use it.

Data Phone is growing and expanding. We are working now with four more railroads that will be online with Data Phone very shortly.

MR. DWYER: I appreciate the fact that you can only summarize your paper this morning, but in the original text you mentioned several possible disadvantages of the Data Phone. I was curious to hear whether they over-ride the advantages. Apparently they do not.

MR. BUTLER: Getting back to Mr. Dwyer's question, isn't there a certain amount of misuse of the Data Phone by purchasing departments, in that they will deal with a supplier just because he has Data Phone and thus cut their cost and their handling?

MR. FOSTER: I agree with you, Jim. The Committee has found that a disadvantage. Data Phone can be abused because of the fact that the stores department, or whoever is procuring the material, has a tendency to take the card out of the rack and put it through the Phone. We get our material, but there is no consideration of price.

We think it is abused. We also mentioned other abuses in our paper. Actually, Data Phone is exceptionally good on captive items where there is only one supplier. This is a main benefit of Data Phone. On competitive items normal procurement procedures should prevail, we think. Data Phone is essentially an emergency procurement service for captive items. It is also an asset in simplifying "bread and butter items" procurement.

3. Special Exchange Pool:

MR. W. C. FLETCHER (Director, Industrial Development Department, Chesapeake & Ohio Railroad, Huntington, W. Va.): Regarding General Electric's special exchange pool, why is there a specific time limit for the special exchange of material, since the material is already under warranty?

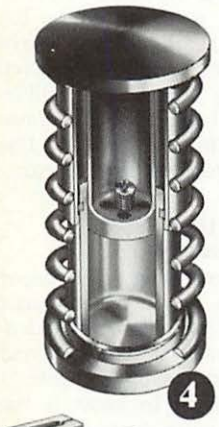
MR. AUDETT: The special exchange pool is exactly what the name implies. This is a pool of material that was put together to satisfy a particular programmed locomotive complaint. When undertaking such a program to correct some problem, usually there is a very good meeting of minds between the roads involved and the General Electric Company, and tht time limit shown on the special exchange is merely, in writing, what this understanding is.

4. Zero Defects Program:

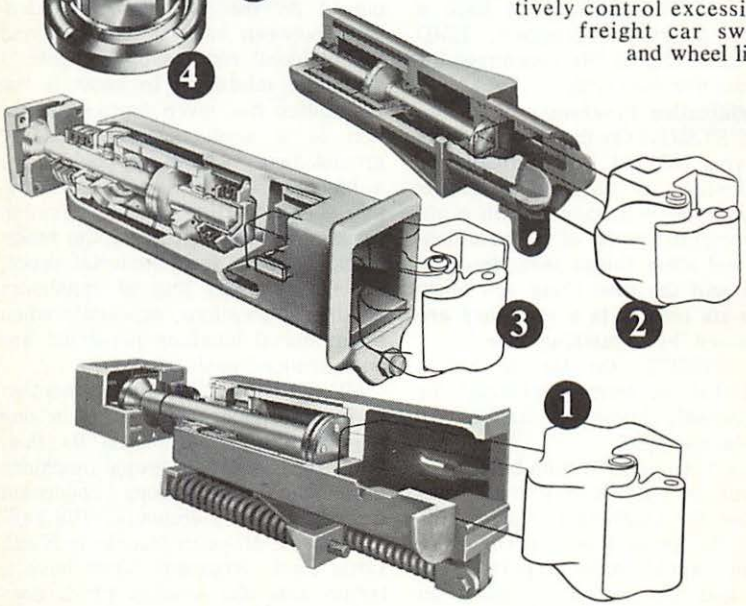
MR. P. D. STARR (Chief Mechanical Officer, Denver & Rio Grande Western Railroad, Denver, Colo.): You mentioned the problem on new equipment when the supplier does not keep an adequate amount of back-up material. **I think there is also a problem connected with the fact that quite often the material we get from the supplier and put on the locomotive is defective.**

What efforts are being made to have something similar to the Zero Defects program by the manufacturers?

NEW CONCEPTS OF INCREASED PROTECTION FOR CARS AND CARGO...THROUGH RESEARCH



1. **Type HD FreightMaster** Superior cushioning capacity unit provides 15" hydraulic stroke in each end of car.
2. **Type SP-E FreightMaster** Proven end-of-car cushioning concept with 7" of travel. Installs easily in standard 24⅝" draft gear pocket.
3. **Type E and F FreightMaster Units** Started modern end-of-car hydraulic cushioning . . . 25,000 car sets now in use.
4. **FreightMaster SWAY ARRESTOR** Economical, easily installed solution helps effectively control excessive freight car sway and wheel lift.



FreightMaster®
A DIVISION OF HALLIBURTON SERVICES

NEW CONCEPTS OF INCREASED PROTECTION FOR CARS AND CARGO THROUGH RESEARCH

424 W. Vickery Boulevard • Fort Worth, Texas 76101 • Canada: Hawker Siddeley Canada Ltd., Montreal • Mexico: Materiales y Servicios Ferroviarios, S. A., Marconi Numero 2-37, Mexico 1, D. F.

MR. HINCE: We are in the second year of our version of the Zero Defects program, which we call Excel. We feel it has been productive for us and therefore productive for you.

Earlier you saw a man using a Hovair machine moving an axle into our axle and wheel press. This man mounted 1,527 wheels and axles without rework. **This was sensationally above previous performance on that job.**

We find this throughout our whole plant. It has been given top-level visibility by Mr. Brownell, and all of our top management people. Excel is not just a temporary thing at EMD, but a way of life.

MR. FOSTER: I think most manufacturers today do tend to have a quality awareness program. EMD calls theirs Excel. We recommend a program for everyone.

5. Modification Programs:

MR. STARR: On the new products that you put out on railroads, or modifications of different programs like that, do you have an elaborate test program? **Some of the modifications and other things seem to come to us, and the first thing you know within six months to a year they are supplanted by something else.**

MR. HINCE: On the 40 Series model that we recently released, as you probably know, we had 9 test units in the field.

Those nine units accumulated over one million miles before they were released for production. During this period the parts that our engineers thought would have failures, the parts that we carried as spares on board the locomotives, didn't fail; but after the units became production models and went into the field, other items where we had not anticipated failures did give us trouble, and we have had to have programs to replace them.

As an example, in all of our branches we had in excess of 600 parts waiting to be used as replacements on the new models. The problem was that the parts that failed were not generally in that 600 category. If we could forecast which of the new design parts would be the parts that would fail, we would have them in storage ready to go. Even with this testing of over one million miles we weren't able to isolate those parts ahead of time. I think that this is a universal engineering problem.

6. Telewriter:
Shop Ground High Speed Communications System:

VOICE: In reviewing your paper I noticed quite a bit of emphasis placed on the instant communications between various railroads and the builders' main supply depots. I would be interested to know if the Committee has given any consideration to a similar system on the ground floor, where we could have a higher speed communication system between the actual shopman working on the floor or at the ready track, with the local material depot, to cut down on loss of manhours waiting at locations, especially when the material handling personnel are on a reduced basis.

MR. FOSTER: We didn't mention it in the paper, but there is one major railroad that does do this. They have Tel Autograph machines throughout their shops connected directly to the storehouse. The railroad is the Missouri Pacific in North Little Rock, Arkansas. They have a tremendous stores setup which does just this. How many other major railroads do this, I can't tell you. Does any member of the Committee know of another such elaborate setup?

MR. NIEMEYER: Talking about the Telewriters, that isn't only at

Little Rock; that is quite universal on the Missouri Pacific. We have it at Fort Worth.

PRESIDENT BEISCHER: I am very much interested in the remarks by Mr. Niemeyer. I notice you have Mr. Dent of the Missouri Pacific on the Committee. I personally would be interested in hearing a little more about the Missouri Pacific's system, and I would like to hear from Mr. Dent.

MR. J. W. DENT (Assistant Master Mechanic, Missouri Pacific Railroad, Little Rock, Ark.): This has definitely improved our situation at our North Little Rock terminal because of the fact that the workman himself, who spends probably 30 to 45 seconds writing up the material, goes back to the job and stays on the job, either removing the piece of material that is bad and which is to be renewed, or doing something else, and while he is doing this the new piece is being moved from the stores to the location where he is at.

In case the stores department does not have it, the supervisor himself is passing the machine, and if the stores department does not have the material they write back on the same machine and let him know at that station that the material is not on hand. Then we get on the telephone and try to get it from one of the other points on our railroad. It is a great benefit to us.

MR. DWYER: May I ask Mr. Dent a question in this connection. When the stores department tells you that they don't have the material, is it your responsibility to get on the telephone and try to locate it, or is it the stores department's responsibility to try to get it for you?

MR. DENT: At the time the stores department finds out they don't have the material, they try to get it; but at the same time, when the man writes it back to the department, then the supervisor gets hold of me; and by joint working on the material to get it in, we can do it that much faster. At least both of us, on both ends of the line, know we are out of the material.

MR. F. T. HALL (Material Supervisor, B&O - C&O Railroad, Huntington, W. Va.): On the C&O - B&O we have a system that is basically a telephone call which is initiated from the using point. They call the general office and talk to our materials supervisor. This is mainly for the small outlying points that would not normally stock the part. The general office will arrange to expedite the movement of whatever material is needed to that point. Many times this will involve a baggage shipment on a passenger train.

MR. FOSTER: You could also get information right from the Missouri Pacific.

7. Intercom System In Store Room:

VOICE: I might point out that in our shop at Cumberland we have initiated a system where we have an intercom system located on the first floor or at the materials window, and this has speakers connected with all three floors. On our second and third shifts, when we are operating with our Stores Department on a reduced manhour basis, the mechanic walks to the window, presses a button, and pages the material handler in the storeroom. **The man may be on the third floor and the piece of material he wants may be on the third floor.** The material handler picks it up and hands it to him at the window. It saves a trip back to a remote part of the storeroom. We find this method quite practical.

MR. FOSTER: Does the original loudspeaker system result in bringing the material to the man, or to

a man in the stores counter?

VOICE: Actually there is a man in the storeroom. In the past, the man came to the first floor window and sounded an alarm bell, and this meant that the material man, who was on the third floor, would get on the elevator and ride down. Then he man would say, "I need a 1/2" bolt" which maybe the material man had passed by on the third floor on his way down. Now, when a mechanic goes to the window, he presses the button on the intercom, and he can page the material handling man on any floor. The system is connected simultaneously with all floors.

He says, "Bill, I need a 1/2" bolt 2" long." The material man might be standing right by the bin. He picks up the bolt and comes down with it in the elevator.

Also, with our ready track we have radio communication between the ready track foreman and the shop foreman. If we have a running repair engine coming in on the ready track, the shop foreman walks a few feet to the storeroom window, and by use of the intercom can be told whether he does or does not have the material on hand.

We can get the locomotive back in service without even shopping the locomotive.

We have different positions in the shop, and each one is numbered. As the mechanic or the supervisor makes a requisition it is immediately written out at the storeroom. We have store delivery to these positions. That does away with the necessity of the man on the job leaving his department to get the material he needs.

Also, it makes it possible that when he needs material it is delivered to him. He does not have to write a backlog order and have material all over the floor so that he can't work around the area where his work is. It is quite an advantage to the shopman both in speed and because of the fact that he does not have to get a tremendous surplus around where he is working.

8. Talk Back Stations:

MR. H. T. RAINEY, JR. (Chief Mechanical Officer, Richmond, Fredericksburgh & Potomac Railroad, Richmond, Va.): I would like to supplement what Mr. Niemeyer just touched on. We have found it is economically undesirable and we prohibit mechanics from going to the stores department.

We have a system in our shop of 26 talk-back stations. We try to encourage our people to anticipate their needs. They call the storehouse and order material. A requisition IBM card is placed in a container and the material is delivered to the workman at the work location. At the same time the motorized delivery vehicle picks up scrap material and reclaimable material.

9. Shop Radio System:

We are currently installing a radio system, and all of our stores people and supervisory people are being tied in together with portable transceivers. We think this is going to increase the efficiency of our stores operations very much.

10. Unit Out Of Service Protection Material Pool:

MR. L. H. BOOTH (Superintendent Motive Power, Chesapeake & Ohio Railway, Huntington, W. Va.): Under the subtopic of "Better Control of New Products", in paragraph B you speak of a supply of 288 items that are set aside to protect stock materials, and you say, "No part can be drawn from this area unless it is for a locomotive out of service."

Who determines when the locomotive is out of service?

MR. HINCE: Let me describe to

you our normal handling when you find a locomotive is out of service and you place the order with our Parts Department in the normal way.

Our man, who handles your account, will then process the order as though there is a locomotive-out-of-service. He will honor your definition of the locomotive being out of service. This will unlock the locked area.

We have set up for new model locomotives a special line of communications that will give you faster service than that. This handled not by the Parts Department but by the Service Department, which is in another building, and it is the people who have control of our district engineers.

If you check with the district engineer in the morning (actually he is supposed to check with you), and if you have a locomotive out of service, he then phones this information in to one man who is known as the Locomotive Out - Of - Service Coordinator. He has the authority not only to open the locked area for you, but he has the authority to go out on our production line and, against the normal protests of our production people, take from that production line the assembly or the next largest assembly sometimes, and have it shipped out so you can get the locomotive back in service.

This is new with us, with the advent of the 40 Series locomotives. This fellow has no other responsibility than to handle these orders and get the locomotive back in service.

So, I recommend to you that on the latest model locomotives you work through the Locomotive Out-of-Service Coordinator in the Service Department. **He can get things done that the man at the desk in the Parts Department cannot get done.**

11. Make Or Buy Chart:

MR. BELLHOUSE: I was interested in your Make or Buy chart. I am inclined to agree with your figure of 200 percent for labor, but that is a difficult think to prove to folks like the personnel department. What is the basis for that? Do you have anything you can tie the 200 percent to?

MR. FOSTER: Some railroads add 71 percent to direct labor costs and some add as much as 166 percent of direct labor costs to arrive at total labor costs. The Committee said that they feel that 100 percent of direct labor coss is the minimum that you should consider. The reason that we took this figure is to make sure that the person making a decision should think in terms of approximately $6.00 per hour in total labor costs. We also realized that this will vary with the individual railroads.

We want to make everyone aware that they just can't think of out-of-pocket costs or direct wages. That is the reason that we used a multiplier of at least 2.0. We also recognized that it will vary with the plant and shop environment and with the individual railroad.

12. On The Job Free Material Stocking:

MR. M. M. EARLY (Mechanical Supervisor, Norfolk & Western Railway, Roanoke, Va.): Getting back to the question about the availability of material to the man and the need of his having to go to the storehouse or somewhere else to get material, **we found it of advantage at one of our major repair shops to have material so available that it is a matter of self-service. There is no need for the man to spend any time going back and forth to the storehouse.**

We have found from past checks that there is a tremendous waste of manhours when a man waits for material to come to him, or when he

has to go to get it. Our material is placed at strategic points so that a man can help himself to it, and the charges are taken care of. **The man therefore is working rather than carrying material back and forth.**

We believe it is quite an advantage to have the self-service system for him. He sees the work sheet items on a unit coming through the line for work station repairs. He has the material on hand by the time the locomotive gets there. **We have cut down loss of productivity immensely in the last several months by putting the material where the man works.**

MR. FOSTER: We think free material is a major consideration for big installations where the material should be next to the man. I believe we will elaborate on that next year. That is a very important area.

13. Polystrene Molds:

MR. F. W. GEHRER (Assistant Master Mechanic, Southern Pacific Company, Houston, Texas): Can polystrene molds similar to that in Illustration No. 2 be cast to your own design in a railroad shop easily? If so, what is the process, and is there a practical size limitation?

MR. FOSTER: The pack can be cast to any design. With regard to the ease of casting and the process, that is in the domain of Mr. Hince.

MR. HINCE: There are a couple of ways it can be done. Where you have a high volume usage, as we do on the injector, the polystyrene material is molded into a bathtub effect. It has been preformed for the injector. In some instances we have used another technique, placing the part in a plastic bag and then putting foam inside the box with an activating material that stirs up the foam. This then fills the rest of the box. This can be done without limitation as to size.

We don't use it for this purpose, but it could be done with a part as large as an EMD cylinder head. We use this fairly infrequently. It is a little messy to do, but it can be done, and there are suppliers in the country that will come to you and work with you, as they have with us.

MR. FOSTER: Is there a cubic-foot cost?

MR. HINCE: It is fairly expensive. I don't have the cost figures at hand. We use it rather infrequently.

14. Material Availability:

MR. JOHN D. SCHROEDER (Assistant Chief Mechanical Officer, Chicago, Burlington & Quincy Railroad, Chicago, Ill.): I noticed you talked about availability. I wonder what you mean by availability. Available in the United States, in the storehouse, or on the supplier's shelf?

In our mechanical departments something is not available until we have it at the place where it is actually needed, particularly if we want to avoid units being out of service. This becomes a very costly thing, actually more costly than manpower when a man has to walk to get material.

Last night in the Purchases and Materials Management Division a man said they should be known as the "Purchases and Fresh Out Division". Apparently it applied not only to the Burlington but to a lot of other railroads.

Thinking back to last year's report, you talked about some elaborate accounting systems. This year in your report you talk about some fine methods of getting material from one place to another. But do we raise the flag soon enough to suit our needs? In other words, before we get to this "fresh out" point, what is being done to insure that the material is somewhere near at hand so that when the locomotive

says "I need this or that" — and I am talking principally about the small, expendable items that we use constantly — will really be available.

We can't expect to have the big, rarely used items readily available. What can we do to get some really firm action **before** we are fresh out of material?

MR. FOSTER: We are thinking in terms of our needs as a mechanical department. When we say "availability", we mean available for the fellow on the floor so that he can keep a locomotive running.

With regard to bread-and-butter items, the recommendation was that at least Data Phone can help us. We know Data Phone can bring us 2- or 3-day delivery to remote points.

With regard to last year's paper, we recommended an economic ordering quantity. This is primarily a stores problem. If they can't keep bread-and-butter items available, then we as mechanical people should endeavor to get help from our mutual managerial level. We feel Data Phone will enable us to more quickly obtain material for mechanical needs.

With regard to major items, we feel that the builders are endeavoring to aid us to keep locomotives running. **Concerning coordination between Mechanical and Stores Departments, if we can forecast the usage we can insist on the material being there. Basically it is that simple. If we can't forecast usage, then no one can. This is a basic problem.**

15. Packaging Of Material:

In Transit Damage:

MR. J. J. GREGORY (Manager Shop Engineering Services, New York Central System, New York, N. Y.): I would like to elaborate for just a moment on the packaging, containers and material handling engineers or analysts.

I think one of the gentlemen brought up item No. 2, where EMD has what they call the boat and matchbox type for shipping injectors.

Last week in Cleveland, one of the local plastics suppliers gave a demonstration of plastics available. They have different types of plastics for containers and for wraparounds. In fact, they have **inexpensive small boxes** that are lined with plastic and you can ship mostly anything in them — from injectors to relays, contactors, electrical equipment.

These come with a self-contained box, and the plastic is self-forming, **selling for approximately 35 cents.** When the man brought over the equipment, we thought "This is something that will cost $1 or $2 a package."

We made a survey on containers and damage to material in shipment and determined that the damage which occurred to material during shipment exceeded, in many cases, the cost of containers by 250 per cent. This is in-transit damage to the material.

I had hoped to have some literature here but believe by next year, when the convention meets again, we will not only have literature from many suppliers, but hope to have an ad of several pages advertising their products.

There is another item, as far as re-worked material is concerned. In a grocery store the meat is wrapped in Saran material. There are available machines that can wrap any piece of equipment. It might be called a Commercial Baggie. Consider a $75 relay or contactors or electrical equipment. You overhaul it, send it to the Stores Department and they put it on the shelf and then send it to the terminal that requests it. **Dirt, grease or other contaminants may get into the equipment and foul**

it up while it is on the Stores shelf.

15. Material Handling Engineers:

Material Handling is something that we should recognize as a necessity and should be viewed objectively. Too often a railroad will say, "We have an industrial engineer, per se, for same," or they take someone out of the shop or off the staff to do the work — a crash program.

Material handling analysts, I would be willing to say, will pay back their wages ten-fold through savings to the railroad. We have found this to be true. The analyst must devote all of his time to material handling. In other words, he should look at the long-range programs and the short-range programs.

If you approach material handling on the basis that you have a problem today, you send someone out to solve it, or think it will solve itself, or will be forgotten, you are wrong. **You must have your material handling people assigned on a full-time basis. Any large shop or any large terminal will find it worth their while to have a person on an assigned, permanent basis as a Material Handling Analyst or Engineer.**

16. Coordination For Availability:

MR. FOSTER: Mr. Schroeder, the entire area of internal relationships was explored. We recommended some concepts that might be utilized to gain this coordination for availability. I hope that helps you.

MR. BELLHOUSE. **I am glad you went have to John Schroeder's department, because that "Fresh Out Department" costs us a lot of money.**

I wonder if the Missouri Pacific has any system of review in the higher echelons with the Purchasing and Stores Department, every one or two weeks or so, on items that have been "out". I wonder if there is any review of that sort set up, or whether we just scramble around and do the best we can, and then do the same thing next week.

MR. FOSTER: From my recollection of the Missouri Pacific system, they definitely review outages and they definitely review counts, and they do this by computer. I believe 90 percent of their inventory is computerized and is reviewed constantly. Is that about right, Mr. Niemeyer?

MR. NIEMEYER: I don't have any figures on the actual amount of our material that is computerized, but I do know that the computer handles the majority of it.

Also, at the time the mechanic makes out the requisition, if it is not in stock, a stock-out form is written. This stock-out form is immediately transmitted to St. Louis, where an add-on order is made on the computer. Also, a time record is kept, from the time the stock-out order was made until the material is actually in hand. Then the supervisor has the stock-out form returned. The Stores Department holds that to a bare minimum.

If material is out of stock, they make an added effort to get it back in stock. **Of course that doesn't help you when the mechanic is waiting with an engine down.** It is better than it used to be, however. There is somebody looking at it. Somebody knows we are out, and somebody is working on it to get it to us. The computer aids a great deal in getting material to us, because when the stock is reduced the computer orders it.

However, there are many times when a crash program comes up and you need some extra items. We buy it out from the computer before it can reorder. This stock-out form does put a little pressure on them, and we get it back.

While I am up here I would like

to ask the gentleman from the Norfolk & Western a question. We talk about bread-and-butter items being put out in the shop. Every piece of material we buy costs money. Where do we make the break for the material we put in the shop? Is it usage or is it cost?

You put a lot of material in the shop. A man need five bolts and he gets ten. That doubles the price of the bolt. I realize we need material available for the man. We furnish filters and such things for the man to use, and they are readily available to be picked up. At the same time we find filters that are dirty, and it is necessary that they be thrown away. Where do you make the break in deciding what you are going to stock or use? Is it money, or the amount of material you use, or is it both? I would like to know.

MR. H. J. ALTIZER (Mechanical Inspector, Norfolk & Western Railroad, Roanoke, Va.): To return to Mr. Niemeyer's question on the basic problem of availability, we are now thinking that the problem can be solved on the so-called bread-and-butter items such as traction motor brushes, filters, air brake material, and so on, by establishing a rate of flow from the supplier based on normal usage. The system is not perfected yet. We actually have not got off the ground, but we are working on it.

We have worked in some areas, such as filters, with one major locomotive builder. Air brake items have been identified as to usage and quantity. We believe that by establishing the rate of flow on the big percentage of such items we will solve perhaps 30 to 50 percent of our problem.

True, you will find a unit that will use an uncommon amount of fuel filters, and so on, and that disturbs your usage; you must establish an override of a certain percentage to take care of this excess.

The idea of putting the items close to the work, say, in the roundhouse, is somewhat new to us. We are also putting items out in bulk depending on usage. Some items, such as pipefitting items, are being studied to determine how to make our accounting. We are feeling our way on this, and I am sure in time we will find an answer to the problem. We also believe it is the only way to go.

MR. EARLY: Going back to Mr. Niemeyer's question, everything in the maintenance point is out in the shop, whether it is a bolt and nut, cotter keys or turbocharger, regardless of the item.

As to the possibility of filters becoming dirty before they are used, they have to be moved to the station where we change out filters; but they are carefully protected there from any contamination. This requires policing. We know there are some ills that can develop. A man can rob a part off the contactor. The next time he wants a contactor the piece is missing. We have been quite diligent trying to police this situation.

Every supervisor is responsible for seeing that the material in his territory or jurisdiction is kept as it should be. **It is the responsibility of the stores people to see that the material is in the designated location and is in adequate supply. It is the mechanical department's responsibility to see that the material is not abused.**

Let's consider one of the ills of going to the storehouse for material. Many times a man will go to the storehouse and get more than he needs to keep from making a return trip, should he need additional. If it is within walking distance — a few

feet away and available — he will go there to get the exact quantity.

Maybe a man will take a piece that is not quite what he wants, and he will put it back in the wrong bin. This gets our people in trouble once in a while. **We find this system is so beneficial in getting production out of the men that the few shortcomings are far overridden by the advantages.**

MR. FOSTER: Gentlemen, we have run out of time. If there are more questions, Mr. Dwyer's What's Your Problem session will be glad to help answer them.

I would like to call on Northwestern Regional Executive Carl Stendahl to summarize this report.

NORTHWESTERN REGIONAL EXECUTIVE

C. P. STENDAHL
Asst. Supt. Motive Power
Great Northern Ry.
St. Paul 1, Minn.

MR. STENDAHL: I wish to thank Mr. Foster and his very fine Committee for the excellent report they have written and the fine manner they have handled the discussion today.

This Committee on Diesel Material Inventory and Control, and availability of material and better communication between the mechanical, purchases and stores departments and suppliers, is a relatively new Committee in comparison with such other committees of the LMOA that report on other subject matter, such as engines, fuel and lube oil, electrical equipment, shop equipment, and so on. This Committee is really rolling along and developing a lot of good information.

I believe the Committee was started as the result of a question asked in the open discussions at the LMOA meetings. It shows that these questions can result in action.

The question asked regarding better communication between the mechanical department and the stores department for better availability of material and better handling and less damage to the material, especially needed repair items that have to be sent to a central point for repair or re-manufacture, is most important.

I certainly feel Mr. Foster and his Committee have done an outstanding job in bringing out many of these points in their report.

You will recall that Mr. Foster covered in his report and discussion the matter of communication and good coordination. He talked about the Data Phone service, the computer inventory systems, the material availability for new locomotives, damage-free handling of material, schedule, and material control through forecasting material requirements. Some interesting discussion also was brought forth regarding whether to repair or not to repair needed items.

During the discussion it was also noted that considerable interest has been shown in a good, workable type of communication system that is needed between the workman and the stores directly.

In closing, may I say that a great many dollars are involved, and could be saved by proper handling of needing repair items, and I believe it behooves us all to visit regularly with our stores departments. Maybe they should be called the "material management division" instead of "stores department", from what we have been hearing lately. An effort must be extended to improve the handling and availability of material, especially handling free-issue material on a larger scale, reducing any inventory that has not moved for several years, and handling such inventory with the builders on a surplus plan as much as possible.

Again I would like to thank Mr. Foster and his Committee. I would ask that we all rise and give Mr. Foster and his Committee a rising vote of thanks.

AMERICAN STEEL FOUNDRIES

The World's Leader in Development and Production of Freight Car Trucks

ONE OF THE Amsted INDUSTRIES

SIDE FRAMES AND BOLSTERS
ASF RIDE CONTROL® TRUCKS
ASF RIDEMASTER® TRUCKS
ASF 6-WHEEL TRUCKS
COUPLERS AND YOKES
DRAFT SILL END CASTINGS
CAST STEEL BRAKE BEAMS
ASF RIDE CONTROL® PACKAGES
SIMPLEX® UNIT SNUBBERS
EXTENDED LIFE® COIL SPRINGS
ASF UNIT® BRAKES
ROTOR BRAKES
SIMPLEX® UNIT CYLINDER CLASP BRAKES
HARDENED PINS AND BUSHINGS
SPRING TESTING DEVICES
FORGED AND MACHINED PRODUCTS

Wednesday Morning, October 11, 1967

10:15 A. M.

ANNUAL MEETING PANEL ON:

WHAT'S YOUR PROBLEM?

W. L. HUEBNER
Vice Chairman
What's Your Problem Panel
Asst. to Gen. Mgr. - Mech.
A., T. & S. F. Ry.
Chicago 4, Ill.

J. J. DWYER, *Chairman*
What's Your Problem Panel
Chemical Engineer
C. & O. Ry. - B. & O. R.R.
P. O. Box 907
Huntington 12, W. Va.

C. L. COMBES, Co-Chmn.
What's Your Problem Panel
Editor, Railway
Locomotives & Cars
30 Church Street
New York 7, N. Y.

WHAT'S YOUR PROBLEM PANEL MEMBERS

M. J. Chandler, Gen. Foreman, Diesel Shop, N. Y. C. R.R., Cleveland, Ohio
J. H. Long, Dist. M. M., B. & O. R.R., Cincinnati, Ohio
T. A. Tennyson, Asst. Mgr. Maint., Southern Pacific Co., San Francisco, Calif.
E. T. Harley, Asst. C. M. O. - M. P., Pennsylvania R.R., Philadelphia, Pa.
C. N. Cawlfield, Engineer - M. P., St. Louis - San Francisco Ry., Springfield, Mo.
J. J. Foster, Gen. Mech. Supt., Reading Company, Reading, Pa.

CHAIRMAN BACHMAN: I now have the pleasure of introducing to you the Chairman of the What's Your Problem Committee, Mr. Jack Dwyer. Before I introduce him I would like to say that the purpose of this Committee is to give each of you an opportunity to bring to the floor any questions that have not been fully answered to your satisfaction in the last few days. I am sure Mr. Dwyer will elaborate on this further. I would like to emphasize that this is your session, and we actively solicit your participation.

Mr. Dwyer was born in Ashland, Kentucky, and attended school there and at Huntington, West Virginia. After he graduated from school he served an apprenticeship with the Marine and Mechanical Engineering Division of the Oceanic and Oriental

Navigation Company and the American-Hawaiian Steamship Company.

After this duty he returned to Huntington and Marshall University, where he received his Bachelor's degree Magna Cum Laude in Chemistry and Physics in 1936. After graduation he worked briefly as a graduate assistant on the university faculty. A year later he went to work with the C&O Railroad, where he was promoted to Assistant Chemist, and was loaned to the Nickel Plate Railroad, Lima, Ohio. While on the Nickel Plate he met and married Anna Marie Palmer in 1938. In 1939 he returned to Huntington and the C&O as Assistant Chemist. He was promoted in 1943 to Chief Chemist, in in 1955 to Chief Chemist — System. In 1963 he became Chemical Engineer for the C&O - B&O Railroad.

He has several hobbies which have given away to one: He built a home almost brick by brick. During the rest of his off-duty time he serves on the LMOA, the AREA, is Corrosion Committee Chairman, and with the West Virginia Society of Professional Engineers as Chapter President.

He is a registered Professional Engineer and a member of the National Society of Professional Engineers and of other scientific and technical organizations. In recent years he has been putting in his spare time trying to set up a new committee for the AAR to study water and air pollution. This committee is in the Engineering Division of the AAR and the AREA and is named Committee 13, Environmental Engineering. It will encompass, in addition to water and air pollution, industrial hygiene including locomotive and shop sanitation, corrosion control, and so on.

MR. DWYER: We now are officially open for the question and answer session.

1. Lubricating Oil:

MR. GARIN: Mr. Dwyer, I think it would be unfortunate if we went through this meeting without having some discussion on lubricating oil. I have been waiting to hear it, and I guess this is the best time to bring it up.

As we all know, the advent of higher output diesel engines has aggravated lubricating oil demands. Coupled with this has been the trend to adopt a common additive for purposes of mixing and interchanging power.

On our own fleet we have run into certain problems on 20-cylinder engines with alkaline depletion in our lubricating oil — prematurely, we feel. I wonder whether this has been the experience on other railroads. If so, what corrective action has been taken to maintain alkalinity in lubricating oil with this type of power, or what work is being done to provide the railroads with a new type of additive combination that might permit you to extend drain periods for this reason on these engines?

MR. TENNYSON: Mr. Dwyer, we have a number of railroad members on our Committee here. The problem of alkalinity depletion, which seems characteristic of the SD 45 locomotives on our railroad, does not seem to be very prominent on other railroads. This may be due to the use of lower sulfur content fuel.

I would like to have some expressions from some of the members of the Committee on this, because it is a very startling thing. I would like to call on Mr. Newman of the Southern Railway. Do you have any experience with loss of alkalinity on the higher horsepower locomotives? He says no.

What about you, Mr. Hansen of

the Northern Pacific?

MR. HANSEN: On the Northern Pacific we have not been checking the alkalinity or the total base number, and so on. We haven't had any trouble with additive depletion to date on the SD 45s using Oranite additive.

MR. TENNYSON: This is strictly a depletion of the alkalinity component and it does not affect the dispersion of the oil in any way. We have measured pH values down as low as 2.5, with no loss of dispersency. The particle size in the lube oil is still so small that it cannot be filtered out. Loss of pH seems to be aggravated if the sulfur content of the fuel is above 0.5 percent. I don't see Mr. Hayden from EMD. I would like to know what they have done about this problem.

MR. R. K. LANNING (Mechanical Assistant, Atchison, Topeka & Santa Fe Railroad, Chicago, Ill.): I would like to ask you and Mr. Garin a question. Other than having a number in a test, if the alkalinity is down what does the engine say about this low alkalinity?

MR. TENNYSON: We haven't given the engine a chance to say much yet because we are afraid of excessive wear or increased wear if we go to these lower alkalinity values and stay there too long. So far the iron has not normally gone above 50 ppm.

MR. LANNING: I might say that we started a test of an ashless oil with very little initial alkalinty on some of our SD 45s, and we did have to terminate the test temporarily because of some ring wear.

MR. DWYER: Mr. Tennyson, I have a question that was sent to the Mail Bag by Mr. Beischer. In connection with Item 22 on page 64 of your discussion in the bulletin, he asks: "Is there not a real improvement in lube oil life and performance justifying a specification of large crankcases?"

MR. TENNYSON: A large crankcase certainly has some very definite advantages, in that, for one thing, it acts as an increased volume heat sink. You can conceivably get better control of maximum lube oil temperatures. The larger crankcase also gives you a chance to pass intermediate points without having to stop for lube oil because the increased volume is enough to permit running between terminals.

Otherwise, the large crankcase is still subject to fuel dilution; it is still subject to water contamination, and the amount of difference or the extended time you can expect before the oil deteriorates to the point of being condemned is just a little more if any.

I think the biggest advantage of the increased capacity sump is the ability to carry enough oil on board to go from one terminal point to the other without having to make intermediate additions.

As far as fuel dilution is concerned, you only buy a little more time until the oil is condemned anyway.

MR. BUTLER: To tie Mr. Garin's problem together, how will a larger tank affect his problem with alkalinity?

MR. TENNYSON: So far, the only locomotives we have had this problem with have been the SD 45 units with the large sump. There is that much more volume of oil to neutralize. The reaction is volumetric so the time for alkalinity loss is extended. If you had a smaller sump you would reach the condemning limit sooner.

I would like to hear some comments from some of my Committee members on this. Does anyone want to volunteer?

MR. K. D. REED (Chief Chemist, Pennsylvania Railroad, Altoona, Penn.): I think you have covered it. The idea of buying more time seems to me the important consideration, and probably the only disadvantage is that with drastic fuel or water leaks you are also throwing more oil down the drain every time you change. **However, this would not overcome the advantages.**

MR. TENNYSON: This depends on what you are measuring. Lube oil deteriorates, of course, from contamination. It also deteriorates from oxidation. The oxidation depends, among other things, on the temperature. Since you can control the temperature a little better with a larger volume of oil, you might expect a little less oxidation. However, this is just a small amount of time, and there is nothing phenomenal about it. You can almost say that deterioration will take place almost as fast in the large sump as it will in the small.

MR. CHASTAIN: Have we fixed the air compressor? If we have, I would like to go back to Mr. Garin's question, which I don't believe has been answered.

Mr. Garin expressed some concern about the loss of lube oil alkalinity in the crankcases on the high horsepower engines. There has been considerable discussion about larger capacity crank pans. I do not believe that the capacity of the crank pan has a thing to do with what the engine will or will not live with. We have large capacity crank pans on these engines for very simple reasons. First, we have a bigger engine and it requires a larger crank pan to cover the crankshaft. Secondly, we have greater lube oil capacity for the same reason we have larger fuel oil capacity, simply to eliminate unnecessary stops for refueling and replenishing the lube oil.

If the new engines are telling us and the oil manufacturers that they cannot deliver higher horsepower and extended life with the lube oils now being used, we have not answered Mr. Garin's question. The matter should be discussed further.

MR. TENNYSON: I will say, Jack, that there is a lot of work and study going on at the present time to try to find out why this is taking place. So far, no logical or concrete conclusions have been reached. Maybe King Simpson can give us some elaboration on this.

MR. SIMPSON: It is a very involved situation, and whenever we get into this question there are always at least half a dozen contributing variables.

One of the contributing variables to additive depletion, of course, is high sulfur fuel. For instance, in Mexico they are using 1.75 sulfur fuel. They deplete the very best additive oils before one month's time. They are operating way below a 4 pH with no total base number whatsoever. Let me be the first to say that they are not operating well. So, this is a very simple way to ruin the alkalinity of an oil.

In contrast, of course, the oil company would claim that any oil that completely neutralized the acidic materials in the combustion chamber is doing the job for which it was designed. We would agree with that. However, it is very evident that one type of additive is having more trouble than other types of additives. Therefore, in the old American competitive spirit one might say this supplier must improve.

If you have any condition where you minimize the air supply to the engine by plugging paper air filters, you get this condition instantly. A recent survey of all the railroads in

the United States with SD 45s showed that only three railroads have even a semblance of this problem. These railroads in many cases are using the same oil.

So, it is very obviously not a function alone of the locomotive; it is not a function alone of the railroad, but it does seem to be a question of whether you take the locomotive into the mountains or whether you keep it at sea level. **Again, gentlemen, this entire investigation is really getting rolling now.**

MR. ELMER M. DOBBELS (Assistant Master Mechanic, Chicago, Rock Island & Pacific Railroad, Sylvis, Ill.): I have a question on the high capacity oil sump. Has the ratio of consumption of lube oil versus fuel oil remained constant, or has lube oil consumption greatly increased in proportion to the amount of fuel oil burned, thereby necessitating a large capacity oil reservoir?

MR. TENNYSON: Unfortunately, records of lube oil versus fuel oil are not as readily available today as they used to be. However, some people who have studied the problem very carefully have come up with very little change in the amount of lube oil consumed versus fuel burned.

MR. GARIN: To answer the question mentioned by Mr. Chastain, the main reason for considering the large sump is the same as for installing the large fuel tank; namely, to get these locomotives from terminal to terminal without intermediate additions of lue and fuel oil. The large sump is not required because of any increase in the lube oil consumption per gallon of fuel.

MR. SIMPSON: Again from the standpoint of the engine builder, we very carefully check oil consumption, and I agree with Tom that railroads have foregone the accurate records of fuels and lubricants that they used to maintain in an operating comparison.

Actually, the engine is really designed to use the same amount of oil in relation to the amount of fuel, and the ratios still hold, depending on how you want to express it. If you are running long drain periods, the ratio will be 100 gallons of fuel to 1 gallon of oil, and on shorter ones it could go to 80 to 1. This is the old ratio we used during the war to obtain fuel allocation.

MR. HOFFMAN: Relative to the oil consumption change with increased rating on engines, our higher horsepower engines, in the U 33 or U 30 for example, the specific lube oil consumption, whether measured on pounds per horsepower hour or measured more realistically as gallons of fuel burned, has been reduced very greatly compared to lower horsepower locomotives rather than increased.

MR. STRINGER: I noticed that you touched on the subject of auxiliary lube oil tanks in your preliminary report. I would be interested in getting the experience of some of the large roads that actually have these on their units.

Does this augment the large crankcase on the high horsepower locomotives? Has it worked effectively, or are there far more problems associated with this tank than the value you get from it?

MR. GARIN: Again I can speak from our own experience. We used the auxiliary tanks as an expedient for extending the distance of operating the locomotive without lube oil make-up when we were separating lube oil by brands. We used to carry brand name oils in drums at many of our terminals. With the make-up tanks we could carry a specific brand of oil on board.

However, with the adoption of a common additive package in our

lubricating oil we have eliminated this need for make-up tanks, and we now favor the large sump. If you are separating lube oils by brands and additive types, however, the make-up tank is certainly worth considering.

2. Elimination Of 567 Power Assemblies:

MR. IVAN L. FRYE (Supervisor of Production and Quality Control. B&O - C&O Railroad, Cumberland, Md.): We are all cognizant of the equity we accrue in used power assemblies. My question is: Has any railroad embarked on an active program of eliminating, by attrition, the reuse of used 567 power assemblies by the application of 645 power assemblies in engine sets? If so, what problems have arisen with the adoption of this program?

MR. CAWLFIELD: That did not come up in any of our Committee meetings or any of our discussions. I do not know if there are any railroads doing that. Are any members of the Mechanical Committee here today who might have something to offer on that question?

I might add that there is a very economical way of reclaiming 567D assemblies through chroming. Half-chroming has proven very successful as far as we are concerned. We are not changing out any of the 567 assemblies in favor of the large ones, but we do re-chrome — half-chrome the top half of the liner, which is the main wear surface during the life of the liner, and we have had these in service long enough to know we are receiving a life span equal to the new liner itself.

MR. NIEMEYER: You asked if anyone has converted 567 engines to the 645's. I know there is a railroad doing it, because EMD has come out with instructions about what to buy to do it. **We have done it.**

It is necessary to change the blower speeds, and the bearings in the blower, and the water manifold. EMD gives you all the equipment you need to buy to make this change. **We have changed several engines and they are operating quite satisfactorily.** I know other railroads are doing the same thing, because EMD would not have put out these specific instructions just for the Missouri Pacific.

I think it is a step in the right direction, and I believe it is going to increase the service life of power components. The units we have converted have load-tested quite satisfactorily. Some of them have been in service 6 to 8 months and are doing a good job. Because this information is available, I think we ought to give it to everybody who asks for it.

MR. DWYER: Would EMD like to tell us how many railroads are doing this?

MR. W. A. GARDNER (Assistant General Service Manager, Electro-Motive Division, General Motors Corp., LaGrange, Ill.): The Missouri Pacific is the only one I know of that has a definite program of not buying any more 567 liners. There may be others, but if there are I am not aware of them.

MR. DWYER: This discussion and the answers to these problems are not necessarily restricted to the members of the panel or to each panel member's committee members. Anyone in the audience who would like to elaborate further on any of these subjects is invited to step up to the microphone and speak out.

3. High Dispersant Crankcase Oils In Air Compressor:

MR. V. L. SMITH: I have one more question on oil that I would like to get an answer to. Are there

any railroads using the high dispersant crankcase oils in their air compressors?

MR. TENNYSON: I am sorry to say that our Committee this year didn't go into air compressor lubrication. However, all of the current maintenance instructions issued by the engine builders seem to discourage the use of high dispersant oil in the air compressors.

I would like to call on some of the oil company members of my Committee to see what the general opinion would be. I will start with Mr. Donaldson, of Gulf Oil.

MR. H. H. DONALDSON, JR. (Staff Engineer, Gulf Oil Corporation, Box 2038, Pittsburgh Penn.): I don't know, Tommy, of any railroad that is specifically using high dispersant oil in the crankcase of air compressors. **However, there is one railroad I know of that is lubricating the air compressors from the engine crankcase.**

Where high dispersant oils are used for this purpose, there has been some indication that tighter emulsions are formed in the air tanks from a combination of the condensate and oil that gets blown over into those tanks.

However, I don't think this is a very serious problem, in that you blow this emulsion out the same way as you blow water out or a mixture of water and oil. It does have a rather shocking appearance, and a lot of people are concerned when they see this gray emulsion coming out of the blowdown valves.

MR. C. A. PHALEN (Engineer, Shell Oil Company, San Francisco, Calif.): I can't make any further comment on what Paul had to say. We are using regular compressor oils for this, and I have had no experience with crankcase oils in the compressor.

MR. J. G. HOFFMAN (Diesel Engine Engineer, General Electric Company, Erie, Penn.): Tommy, I can't really speak officially for the company relative to air compressors, since my responsibility ends with the engine. I do know our official policy, however, which calls for oils other than crankcase oils to be used in compressors. To my knowledge this decision was made prior to the advent of the modern high dispersing oil, so I do know that the decision had nothing to do with the modern polymeric dispersion oils.

Don Wonderly is at another microphone, and if he has any information beyond that he migh comment.

MR. EARL A. HANSEN (Locomotive and Parts Department, General Electric Company, Erie, Penn.): I am sitting with Don. What Jack said is essentially correct. About two years ago we changed from our recommendation of using crankcase oil in the air compressors to using air compressor oil in the air compressors. We felt many customers were doing this, and that we should do it. We felt we would get better operation from the air compressor by doing this.

MR. KING SIMPSON (EMD): For about six years air compressor design changes have been directed at minimizing oil pumping cinditions. If any oil is ever pumped up into the valve area of the high pressure cylinder, the operation of the air compressor will not be proper or good. Therefore, we are studying air compressor oils today which contain mainly rust and oxidation and antifoam additives. We have to study each additive individually to make sure they are non-polar materials, because if they are polar materials they will promote oil consumption.

Therefore, the use of a heavy duty oil in an air compressor today is

absolutely not a good thing to do. This has been true for almost six years.

4. Traction Motor Brush Holders:

MR. DWYER: Gentlemen, we will move to another subject at least temporarily in order to give each of our panel members a chance to answer your questions. If we have time we will come back to this very important subject. I am sure we could discuss it all day.

We have an electrical question which was sort of left over from yesterday. We had quite a lively discussion on brush holders. Mr. Kelley, I wonder if you would like to comment. The Mail Bag question asks:

"Could we have further discussion on the traction motor brush holder?" Somebody must still be interested and didn't have his question answered yesterday.

MR. KELLEY: If they are talking about the EMD brush holder (and I am assuming they are), the fact was brought out yesterday that we did come out with a new constant pressure brush holder, and then we negated the whole idea of constant pressure, separate pressure on each wafer, by tying the wafers together.

It appears we could get rid of some of this extra springing and fingers and simplify the maintenance on it. I think in checking our shop, the maintaining of tension on these constant pressure fingers is very difficult, and the pressure varies quite drastically, from very low to very high.

The EMD brush holder body itself is rather flimsy; and if the brush holder body itself were beefed up or were brought back to somewhere in the vicinity of the rigidity that we had in the old brush holder, I think we would have better performance of brushes. I think there is a lot of binding and warping in the brush holder body that causes brush trouble.

I don't see anybody from our Committee here just now who might answer this question, but I do see Al Dunne, from the Illinois Central. He might have a few comments on this brush holder problem.

MR. AL DUNNE (Illinois Central Railroad): We have had about the same problems that you spoke of. We are currently running a test on constant pressure brushes in the heavy brush holder. To date we have no information on what we will find.

5. Traction Motors:

MR. MACHIN: For five years I have come up to this microphone and have said that the greatest single item of maintenance cost on a diesel locomotive on the majority of railroads is the traction motor. Further, the largest single item of service delay on the diesel engine, particularly in the wintertime and most particularly in the northern area of our country, is still the traction motor.

One of the most difficult parts of the traction motor is the brush. **Each year we plead with the brush manufacturers to do something for us in advance, to give us a brush that will successfully handle the high horsepower locomotive before we receive that locomotive, and not force the railroads to become the field-testing device in order to find a brush that will do the job after we get the locomotive.**

The only thing I can see that has been done in the last five years has been some improved maintenance in restoring the traction motor to its original condition, which was very weak in the first place.

No. 2, they have improved the insulation in the motor; but our problems are not related to the insulation: they are related primarily to

the ability of the traction motor to take the vibration and the mechanical damage under the environment in which it is operating.

One big step was the rubber nose support. This did reduce our failures. **I would be interested in knowing what the manufacturers are doing now to improve the traction motor.** They are spending a lot of money to improve the truck to give us better adhesion, and they are conscious of the need for a better wheel slip control system, and this is going to further aggravate our traction motor problems.

MR. R. J. STRUM (Electric Foreman, Great Northern Railway, St. Paul, Minn.): I would like to concur with what Mr. Machin said. **I think the poorest part of our whole system is the brush holder.** It certainly has caused many, many failures on motors, total failures, and probably the expense involved is almost uncountable.

We were talking about brush holders a while ago, and I made the statement that it was neither mechanically nor electrically correct. Who ever thought of a brush holder that would have a spring tension finger on one side of the brush? In the first place this causes uneven tensioning of the brushes against the commutator. There is nothing more resistance-conscious to pressure than carbon, so we made some tests, using the standard type of scale, and we discovered that the tension under the tension finger is about twice as great under that part of the brush as it is on the opposite side. This causes uneven wear and an uneven distribution of current in that brush.

So, if you look at the brushes and pull them out of the holders, you will see that every one of them is worn cocked. Instead of having a 90° angle with the side, it is greater on one wafer, and on another wafer it is greater on the opposite side, increasing brush friction in the holder.

It seems to me that when we had the old clock-spring type of brush, we had something that made carbon bear evenly over the entire surface of the commutator and at least distribute the current properly.

Talking about constant pressure, I would like to say this before I forget it: In making these tension tests we discovered that there is about 1/2 lb. of static friction developed in each finger. The spring is so wound that if you lift the finger slowly, instead of 4 lb. it will take 4.5 lb. to lift it. After it moved it will move under the 4 lb. tension. The same thing occurs when you release the tension. It takes about 1/2 lb. of friction, so the tension spring goes down to about 3½ lb. before it actually follows the slow motion that you are making with your scale in order to discover this fault.

A non-concentric commutator surface makes for loss of brush to commutator contact as static friction of the brush holder mechanism has the effect of lowering brush finger tension at least 1/2 lb. This causes sparking which leads to flash-overs.

So, we were wondering if some kind of brush with the old clock-spring type of spring device on it, that would keep the spring from moving laterally, could be made available, with a rubber pad under so as to be able to take away the inertia that is developed by the spring trying to follow the circumference or differences on the commutator, and allow only the brush to move. We might then have something that would really contribute to our motor mileage.

I am sure we have lost many miles on our motors due to these brush

holders and all these faults that have been brought to the attention of the manufacturer.

Therefore, corrective action must come from the manufacturer.

MR. BLAND: I would like to add a comment to what Mr. Machin and Mr. Sturm had to say.

With the many modifications of the constant pressure brush holder, we who have to maintain the locomotive feel that we have had change without improvement. It has aggravated our problem. I totally agree that this is an area that needs maximum attention for improvement.

MR. E. F. HEATON (Supervisor Locomotive Equipment, Missouri Pacific Railroad, St. Louis, Mo.): I am looking for some brush manufacturers to get up and say something about their padded brushes with various innovations that can guide or hold the brush spring fingers in the proper place. We use the padded brush extensively. As far as brush holder warpage, we have had only one or two holders with this problem. Maybe some brush manufacturers would like to tell us what they have been doing to improve service life.

MR. KELLEY: Bob Mitchell of Union Carbide is sitting back there. He has been working on various configurations. He may wish to say a few words.

MR. DWYER: Mr. Mitchell is a former Chairman of our Electrical Committee.

MR. J. R. MITCHELL (Parma Technical Center, Union Carbide Corp., P. O. Box 6116, Cleveland, Ohio): I think the brush industry in general has been doing a lot more than is generally recognized at this particular time. I will tell you about some of the things we are doing to attempt to minimize some of these problems.

One of the largest problems in the field today is 3-wafer brush shunt fray-offs on the traction motors. This is symptomatic of the particular condition of the commutator, irrespective of the cause of it. In the past, symptoms have occurred on the commutator where you had bar burning and smut, the life goes down, and various things occur with the brush and the commutator that give you visual evidence that something must be done to the commutator to restore life and commutation.

Now, with the advent of the 3-wafer brush, several of you have heard me make this comment, and I believe it is true: We hardly know how, and I personally hardly know how, to grade a commutator any more, because the 3-wafer configuration has followed these irregularities, and you might say it sort of walks around like a caterpillar. It has alleviated the smut and the bar burning that we see. It has widened out some of the irregularities that have occurred. This is particularly significant in the high speed field.

Various carbon manufacturers have different grades available to try to compensate for this, and some of them readily do.

There is another field that is being investigated quite heavily in the area of hardware construction and pads, and one of the things is to keep stability in the brush holder under these various high speeds and at the same time give good commutation in the low speed areas.

One thing we are just coming out with, in recognition of this, is a pad with a little T in it so that as the spring finger wants to push down against the brush, the rubber T wants to flare against the two outer wafers. We hope this will cause a stabilization downward; and at the same time when the impact is over

with and the spring finger wants to rise again, it has a tendency to come back in and allows the wafers to squeeze back together again.

Another thing (and this is generally true in the industry) is that all of us are playing around with various things such as resiliency and other configurations that will make the brush ride the commutator much more satisfactorily. For instance, some of the innovations in process that are not readily seen by just a casual glance are changes in resilient capping applied around shunts in little wells milled into the top of each wafer, at considerable expense, to minimize shunt fray-off, as well as silastic materials coated around shunts on top of wafers.

The condition of the commutator is not readily visualized when the shunt fray-offs occur. I know it is quite difficult, under the wage impact that is hitting the railroads today and there has been a reluctance in the past, to jack up the locomotive and jigstone the commutator when you readily see visual evidence of commutator distress. There is even more reluctance today to do this when you don't see these visual evidences.

We used to say that the fuse in the motor was the sweating of the solder at the risers, now, it seems to me that the fuse of early symptoms in the motor is when the brush shunts are in distress.

These are some of the things I wanted to point our in generalities. These tests are in progress, and new products are on stream. It is quite a revelation to see what all the carbon manufacturers are doing to minimize these problems. It is like engines and other things: You want to make this great leap forward, but it seems you almost have to do it in evolutionary increments.

MR. HANSEN: I would just like to comment briefly about what we are doing on the GE 752 traction motor, and some changes we are making shortly. We will be using the rubber top Duplex brush. We are changing the brush holder to have a toggle-up action so it will improve the maintenance and you will be able to change the brushes much more easily.

We also think, from our experience so far with locomotives equipped with alternators, that the full field operation has measurably improved the commutator performance on the 752 traction motor.

6. SEARCH Test Equipment:

MR. DWYER: Gentlemen, we have an electronic question sent in to the Mail Bag, and it is directed to Mr. Long. I am going to ask him to comment on it, or perhaps ask for comments from some members of his Committee. Jim, the question reads:

"In your paper reference was made to SEARCH test equipment. What is the success of SEARCH equipment in testing and correcting (a) new units and (b) old units? How serious were the defects found and corrected, if any?"

MR. LONG: This year I have not followed the SEARCH equipment because our prototype has been forwarded back to Dalmo-Victor. I believe Mr. Machin would be better qualified to answer this question than anyone else in the audience.

MR. MACHIN: I took a trip to Canade the week before last to look at the new system they have on the Canadian National. We took a trip to the West Coast to look at the system they have on the Southern Pacific, and in general the system has proved out to be very valuable.

On new locomotives there is no locomotive that comes out of the manufacturer's plant that has not

been found to have some defect that could not be corrected by the SEARCH system.

Secondly, in reviewing older locomotives we have never found an older locomotive that had a harness put on it that was functioning in the manner called for in the specifications. The enthusiasm of the Southern Pacific appears to be growing as they are developing their empirical experience, and the Canadian National also is finding that the system is going to be a valuable tool.

MR. DWYER: Gentlemen, our time has run out. We have many questions left over which we were unable to answer today, but we will try to give the solution to them through the magazine, **Railway Locomotives and Cars.**

At this time I would like to mention that the co-Chairman of this Committee, whom we couldn't do without, is Mr. C. L. Combes. Charlie, will you stand and take a bow, please?

Now it gives me great pleasure to call on our Alaskan, Canadian and Great Lakes Regional Executive, who will summarize. Mr. Dadd.

MR. W. F. DADD, Assistant Chief Mechanical Officer - Locomotives, B &O - C&O Railway, Huntington, W. Va.): Gentlemen, we have a little time remaining. **It is quite obvious to everyone here, I am sure, that we still have many problems. As Mr. Beischer pointed out several times during this convention, we haven't come up with too many answers.**

Some of our problems seem to be due to a lack of coordinated information being fed to these problem-eaters who handle these committees. One thing in particular that was brought out, which I think is important enough to discuss again, is the fact that EMD as one builder (and I am sure the other builders

ALASKAN, CANADIAN & GREAT LAKES REGIONAL EXECUTIVE

W. F. DADD
Asst. C. M. O. - Loco.
C. & O. Ry. - B. & O. R.R.
Huntington, W. Va.

will likewise be interested) would like much more accurate wheel truing, wheel life, and wheel defect information. **I am sure we can all benefit from furnishing this information. It must be one of our greatest problems.**

We have really only talked about two things during most of this convention — commutation, flashovers and wheels. There must be many more problems. In order for your committees to get themselves organized for next year, let's put all these problems on paper and give them to your Chief Mechanical Officer or to your representative, who can feed them into the Association so that we can have even better papers next year.

PRESIDENT BEISCHER: Gentlemen, I believe our meeting this year has been most informative and beneficial. I am quite pleased that so many of you have taken the time and trouble to be here and to participate so actively in the program. This is the only way you can carry back anything of lasting and real value.

Our 29th Annual Meeting has been one that I think we will look back upon with considerable pride, and know that the job has been well done. I personally want to compliment all who participated, and thank them personally for making this meetings such a success.

G. M. BEISCHER, President
Chief Mechanical Officer
C. & O. Ry. - B. & O. R.R.
Huntington, W. Va.

POWER BY
Wagstaff

TYPE 4RD-25

IN MOULDED RUBBER
CONTAINERS
FOR
DIESEL LOCOMOTIVE
CRANKING CONTROL
AND OTHER APPLICATIONS
4 CELLS - 8 VOLT

Wagstaff BATTERY MANUFACTURING COMPANY
2124 N. WILLIAMS AVENUE * PORTLAND, OREGON 97227

Wednesday Afternoon, October 11, 1967

12:30 P. M.

Coordinated Railroad Mechanical Associations'

LUNCHEON

HONORING ALL RAILROAD PRESIDENTS

Principal Speaker

A. SCHEFFER LANG
Federal Railroad Administrator
Department of Transportation
Washington, D. C.

Chairman

T. T. BLICKLE
Past President
General Mgr. — Mechanical
Atchison, Topeka & Santa Fe Sys.
Chicago 4, Ill.

Address of
MR. A. SCHEFFER LANG
Administrator
Federal Railroad Administration
before the Annual Meeting of
Coordinated Railroad
Mechanical Associations
Sherman House, Chicago, Illinois
Wednesday, October 11, 1967
12:30 p. m.

When Mr. T. T. Blickle first asked if I would speak at the luncheon here today, I was both honored and pleased to have been offered an opportunity to participate in the Annual Meeting of the Coordinated Railroad Mechanical Associations. Since that original invitation, I have discovered that the audience today includes many others from the railroad industry and the railroad supply industry who are also here in Chicago for the meetings this week, so that I am now doubly honored and pleased to be here.

Because the Department of Transportation and the Federal Railroad Administration are still new to most of you, I want to say a little bit about those organizations and what they do. But I want to go on to speak more specifically about locomotives and the special interest which we in government have in locomotives, an interest which we share with so many of you here today.

Let me first, however, preface my remarks with what might be billed as a "denial." It seems there are a few in the railroad industry who think that in recent months I have systematically set about "denouncing" the railroad industry at every opportunity. It shall be for you to judge whether anything I have to say today constitutes a denouncement of any kind; I can only assure you that I have no interest in denouncing anyone, least of all an industry I have grown up in and one in whose future I plan to participate. What I have been trying to do in these past few months is to explain to as many in the railroad industry as will listen how the future of railroad transportation and the problems the industry faces in realizing that future look to those who are in government. My intentions, and those of the Department of Transportation, are not to criticize the industry but rather to find ways in which government can help ensure that railroad transportation will achieve its full potential in the years ahead.

Most of you realize, of course, that the Department of Transportation, and hence the Federal Railroad Administration, officially went into business only six months ago. The establishment of the Department — a goal of legislators and transportation interests for over 90 years — has finally brought most of our wide range of government transportation programs together in one place. In addition to the programs in the Federal Railroad Administration, the Department administers the Federal-aid highway program and the national highway and traffic safety programs. It administers the aviation safety program and operates the Nation's complex air traffic control system. It includes the United States Coast Guard with its responsibilities for navigation and safety at sea.

Additionally, and perhaps most importantly, the Department has an overall mandate to facilitate the development and improvement of coordinated transportation service; to encourage cooperation between government, carriers, labor and other interested parties toward achieving national transportation objectives; to stimulate technological advances in

transportation; to provide general leadership in the identification and solution of transportation problems; and finally, to develop and recommend policies and programs to accomplish these objectives. In short, the Department has a responsibility to provide general leadership in the identification and solution of national transportation problems.

As one of five operating agencies within the new Department, the Federal Railroad Administration has responsibility for three rail-related programs: 1) the railroad safety functions that were formerly handled by the Interstate Commerce Commission, 2) operation of the Federally-owned Alaska Railroad, formerly in the Department of Interior; and 3) the so-called High Speed Ground Transportation Program, which includes the Northeast Corridor Transportation Systems Planning Study, the High Speed Ground Transportation Research and Development Program, and our High Speed Ground Transportation Demonstrations Program. The latter presently has three projects under its wing — the high speed Washington-to-New York service on the Pennsy, the Boston-to-New York operation of the United Aircraft turbine train equipment, and the Washington - to - Florida auto - train demonstration.

But the Federal Railroad Administration — like the other operating agencies in the Department of Transportation — has a double role. While it has the responsibility for administering the aforementioned programs, it also has the equally important responsibility of providing the principal reservoir of expertise in the Executive Branch on railroad matters. In this second role, our job is to generate "input" to the more general problem-solving activity carried on by the various Department of Transportation staff groups headed by Assistant Secretaries for Policy Development, International Affairs, Public Affairs, Research and Technology, and the General Counsel. This input works in reverse too, and the resulting two-way dialogue between the operating administrations, such as the Federal Railroad Administration, and the Department of Transportation staff groups is an essential ingredient in the Federal transportation policy-making process.

The importance of the formation of the Federal Railroad Administration to the railroads is quite plain. There is now, for the first time in recent history, an agency within the Executive Branch of Government whose focus is specifically on the problems of railroad transportation and its future role in the economic and social life of the country. It is difficult for anyone who has not worked in the railroad industry to appreciate the importance of this event.

This brings up a number of questions for the industry, however, not the least of which is: Where do we go from here? Nowadays, the production of high-quality railroad transportation poses problems of the highest order of complexity. Competition, spiraling operating costs, inflation — you name it. Until someone proves differently, however, I am firmly convinced — as is Secretary Boyd — that the industry — if government provides it with the right environment — can meet all comers. I am also convinced about another thing: The people that make up this audience — you who literally move America's railroads — can be an important force in helping to create that environment.

Our problems in locomotive safety offer one example of why this is so. When the Interstate Commerce Commission's safety responsibility was

transferred to the Federal Railroad Administration, our basic mandate regarding locomotive inspection did not change. The law still says that the first duty of our inspectors is to see that the carriers make all their inspections and tests in accordance with prescribed regulations. Our field staff inspects the equipment, and when they cannot get corrective action through administrative handling, they have no recourse but to initiate the legal steps provided for in the law.

Now a lot of you maintenance men don't appreciate this. And we don't like it either. We are, in fact, disturbed at the large volume of prosecutions for minor matters. Our fines seem, unfortunately, to be more of a nuisance than an incentive for change.

The fact of the matter is, however, that we are finding a large number of defects and continuing to order a large number of units out of service.

Although the Annual Report of the Bureau of Railroad Safety for Fiscal Year 1967 has not yet been completed, we are disappointed to realize already that 1967 was not a good year for locomotives. The report will indicate that during the year there was an increase in the number of defective units, a substantial increase in the number of units ordered out of service, and, most discouraging, an increase in the number of accidents. With few exceptions, this situation has been worsening over the past five years.

Now, in an effort to bring about improvement, the Bureau has, in the last two years, vigorously increased its inspection efforts, particularly at the larger maintenance points, increased the number of prosecutions for non-compliance, and has had representatives of the Washington office accompany top mechanical department officials in making on-the-ground observations of maintenance and inspection practices on some railroads.

While we would like to believe that in certain instances our efforts have brought about some improvement, it is quite clear that in the aggregate, neither singly nor in combination, do they possess the proper curative powers. In a word, the step-up hasn't worked.

As you are aware, the vast majority of locomotives inspected by our people have supposedly already been inspected by carrier personnel. I would like to insert here that there isn't a major railroad in the United States that does not have locomotive maintenance instructions which are far tighter than any requirement which we impose.

With the results being what they are, however, we are inevitably led to raise several basic questions: Do your inspectors have a copy of our inspection regulations? Do they know what the regulations require and what constitutes a defect? Is your first-line supervision conversant with the locomotive inspection requirements?

These in turn lead to other questions: Is there an open communication pipeline between the mechanical department officials and the people on the line? How effective is your railroad's training program?

Since many of our people in the Federal Railroad Administration have worked in the ranks of railroad mechanical departments, we know that you are as interested as we in better compliance with the regulations and in the promotion of safety. This leads me to where you gentlemen come into the picture — and possibly where we fade out. If the industry really took a good hard look at this inspection situation you could

probably put us out of the inspection business within three years. I can visualize the myriad problems that railroad shops are having around the country — l o n g hours, employee shortages, the usual budgetary ups and downs, and rising costs. My people tell me that, all things considered, the inspection job being done is good. But apparently, some of the things occurring just don't make sense.

Can you imagine buying a $500 colored television set and then when it breaks down running out on the street to grab the first man you come to and asking him to fix the set?

Railroads are not spending $500 but a quarter of a million dollars for a modern locomotive, yet it appears that sometimes they may be doing basically the same thing in attempting to keep them running. This is where proper training comes into play. For if a railroad's own instructions were complied with, it would not only boost locomotive utilization, it would also keep our people out of your hair. It seems clear that the needs here are for proper training and improved control.

These needs are ones which we are sure that most of you here in this room recognize yourselves. We can only reinforce this recognition by pointing out that these are the very needs which we also perceive in looking at these problems from our vantage point.

I would be remiss, however, if I were to leave you with the impression that railway mechanical departments are the only ones who seem to be faced with these problems. The fact is that we are conscious of similar problems in our own Bureau of Railroad Safety. Accordingly, we have developed a reorganization plan for the Bureau, one which is designed to achieve two particularly important objectives, among others.

The first of these objectives is to upgrade the technical quality of our staff work and, in the process, to create a more analytically-oriented approach to all railroad safety problems. The second objective, and this ties in directly with my comments of a moment ago, is to provide — within the framework of the Bureau's organization — a much more intensive, continuing program of training for our field inspection personnel. Just as we see a need for better training of railroad maintenance personnel, we see a need for better training of our own personnel who work with yours.

We also have decided that the time has come for us to take the first steps towards a thorough and systematic review of railroad safety problems. The goal: A restructuring of our safety regulatory activities so that they more appropriately reflect the real safety problems which the railroads face today. As most of you know, our Bureau of Railroad Safety is charged with administering regulations and laws which have their roots in the safety problems of a bygone era. While this does not mean that all of these laws and regulations are inappropriate, it does suggest that, in detail, they must be less than fully consistent with the technical and operating problems of today.

Accordingly, we hope — within the next few weeks — to establish the first of several special study groups whose mission will be to look at each major area of railroad safety from "the ground up" and to pinpoint where the important problems are and where a governmental regulatory program can contribute meaningfully to the solution of those problems. These study efforts will neces-

sarily involve technically qualified personnel from the railroad industry itself, a need which many of you will hear further about in the immediate future.

We do not expect these study efforts, or our plans to reorganize and upgrade our existing regulatory activities, to work wonders overnight. We are convinced, however, that, even as we call upon you people in the railroad industry to improve your safety performance, we ourselves must be doing everything that we can to improve our performance in this common area of concern.

In all of this, our objectives are not to create regulations, or to enforce regulations, or to prosecute violations. Our objectives are to play a constructive role in improving the industry's safety performance. It is safety results that count, not the number of dollars in fines we collect for the Federal treasury!

This attitude, I assure you, is that which the Department of Transportation as a whole takes toward its mission. The job of DOT is not to produce transportation or to direct others to produce it in ways that we as bureaucrats may think appropriate. Our mission, rather, is to help you people who **do** produce transportation to produce better transportation — transportation that is better for the public, better for the transportation industry and its employees, and better for the country.

"NATIONAL" and "EVEREADY" Products for Railroads

"National" Carbon Brushes	"Eveready" Box-Type Batteries For Signaling
"Eveready" Copper Oxide and "Air Cell" Renewals	"National" Spectroscopic Electrodes and Powders

"National," "Eveready" and "Air Cell" are trade-marks of

UNION CARBIDE CORPORATION

CARBON PRODUCTS DIVISION

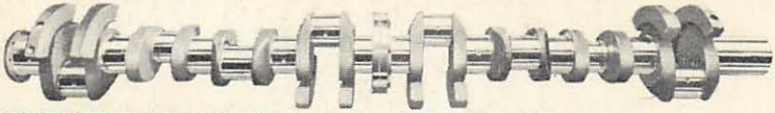
UNION CARBIDE

270 Park Avenue, New York, N.Y. 10017

Sales Offices: CHICAGO • NEW YORK
PITTSBURGH • SAN FRANCISCO
EXPORT: International Department, New York
IN CANADA: Union Carbide Canada Limited, Toronto

Serving the railroad industry for over 30 years as major suppliers of . . .

NEW AND RECONDITIONED CRANKSHAFTS • HARD CHROME PLATING GRINDING AND HONING • USED DIESEL LOCOMOTIVES AND PARTS

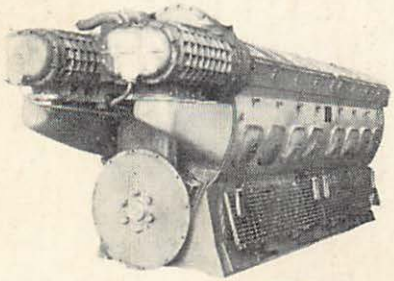


RECONDITIONED CRANKSHAFTS

Precision Engineering Company is the world's largest reconditioner of crankshafts. Rebuilt to original manufacturer's specifications by a process pioneered and perfected by Precision to achieve maximum accuracy. Each crankshaft undergoes rigid quality control checks . . . each carries a new guarantee!

NEW CRANKSHAFTS

Crankshaft forgings are produced for Precision by the Erie Forge & Steel Corporation. All Precision crankshafts are made to the original equipment manufacturers' specifications and often exceed their standards. Precision maintains a complete stock of new crankshafts. Orders shipped promptly, often the same day.



HARD CHROME PLATING

Hard chrome plating; an industry standard today, was pioneered by Precision. Crankshafts are hard chrome plated then finish ground to original specifications at savings up to 75 per cent. Finish grinding and honing within .0002 tolerance.

USED EQUIPMENT

Precision Engineering Company has the nation's largest inventory of diesel parts . . . everything from a horn to a complete locomotive . . . ready to ship! And Precision's stock of used equipment includes many parts that are no longer manufactured or available anywhere.

SERVICE

There are four Precision plants ready to serve you. For prompt, efficient service just call the one nearest you.

MAIN PLANT:
Mt. Vernon, Ill. 62864
P. O. Box 789
618-244-0405

PRECISION ENGINEERING COMPANY

(5653)

Los Angeles, Calif. 90058
1717 E. Slauson Ave.
213-587-4131

Clarks Summit, Pa. 18411
P. O. Box 358
717-587-1191

Waco, Texas 76710
P. O. Box 7157
817-754-1491

SIANOS