1957 ANNUAL PROCEEDINGS

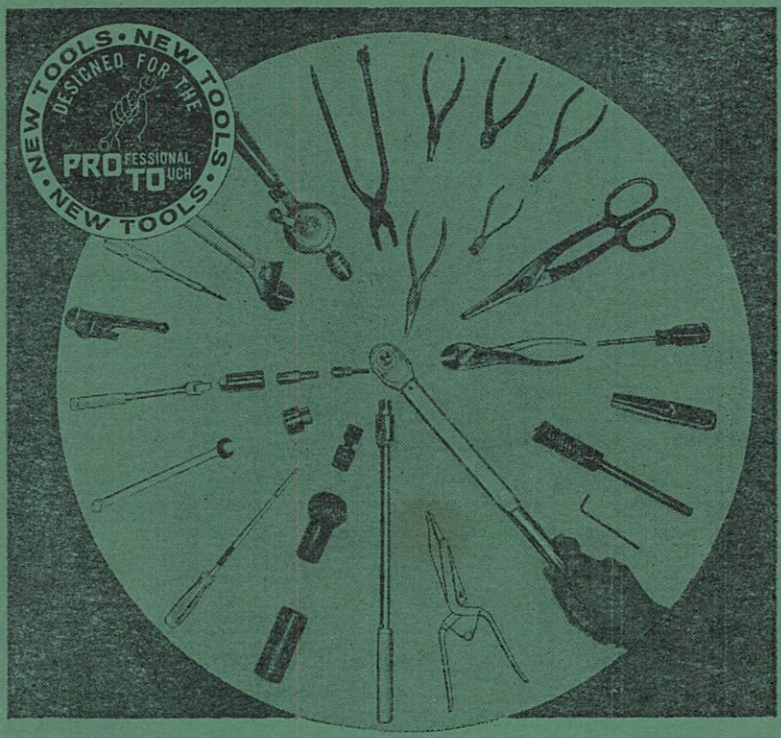
★

19th Annual Meeting

—of—

Locomotive Maintenance Officers' Association

Sept. 16, 17, 18, 1957—HOTEL SHERMAN, Chicago, Ill.



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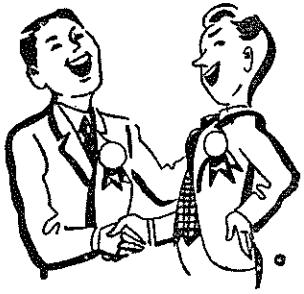


If YOU haven't gotten your New Member for this year, PLEASE GET HIM TODAY. If YOU have gotten your New Members for this year already, thanks and thanks again, for the part you have played in getting our grand enrollment. HELP US GET ONE MORE TODAY.

Take this book to a friend; tell him two similar books will reach him as a 1958 member:

1. The 1958 Pre-Convention Report, containing the full text of all the Technical Committee Reports, on 8/15/58.

2. The 1958 Annual Proceedings, containing the verbatim record of the discussion of these reports at the Annual Meeting in Chicago this fall.

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

GET HIS APPLICATION NOW!

1958 Dues are payable NOW. Please give us a big lift by paying YOUR own 1958 dues today. (If not already paid, of course. No way to separate in this mailing.)

1957 ADVERTISERS INDEX

This space dedicated to the firms listed below for their cooperation and assistance in making possible the publication of our Nineteenth Annual Proceedings in the year 1957.

INDEX

MONDAY, SEPTEMBER 16, 1957

TUESDAY, SEPTEMBER 17, 1957

WEDNESDAY, SEPTEMBER 18, 1957

YES SIR, WE ARE ASKING FOR 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.

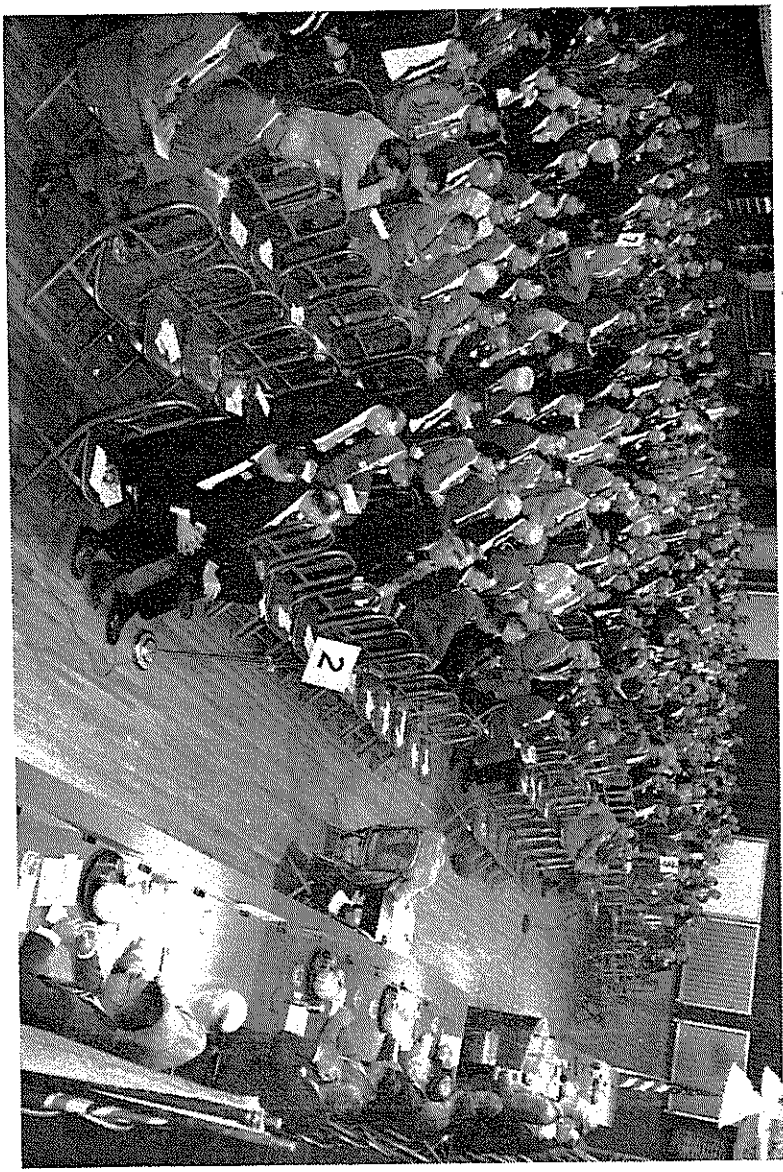
Pack your GRIPES and GRIEFS and unload them at YOUR Pre-Convention Presentation!

Your 1958 Pre-Convention Presentation Schedule

1. MARCH 6, 7:30 P. M., CHICAGO Railroad Diesel Club
   Topic # 1: "Extension of Diesel Locomotive Maintenance Intervals."
   Topic # 2: "Economies Can Be Obtained By Proper Storage Battery Maintenance."
2. APRIL 8, 9:00 A. M., JACKSONVILLE, Southeastern Railway Club
   Topic: "Economy Fuel — Its Effect On Diesel Locomotive Maintenance."
3. APRIL 9, 8:00 P. M., LOUISVILLE Railroad Diesel Club
   Topic: "A Practical Evaluation Of Economic Justification For Reclaiming Diesel Locomotive Parts."
4. APRIL 15, 2:00 P. M., HOUSTON, Southwestern Railway Diesel Club
   Topic # 1: "Lube Oil Coolers."
   Topic # 2: "Fairbanks-Morse Engine."
   Topic # 3: "EMD 567-C Rings."
5. MAY 2, 8:00 P. M., MONTREAL, CANADA, Canadian National Railways Staff Service Club.
   Topic # 1: "Extension of Diesel Locomotive Maintenance Intervals."
   Topic # 2: "Economies Can Be Obtained By Proper Storage Battery Maintenance."
6. MAY 13, 7:00 P. M., ST. LOUIS Railroad Diesel Club.
   Topic # 1: "Equipment Necessary For Economical Battery Shop Operation."
   Topic # 2: "Cleaning Equipment and Procedures For Economical Diesel Parts Cleaning."
7. MAY 22, CLEVELAND, Great Lakes Railway Diesel Club
   Topic # 1: "Diesel Locomotive Water Treatment."
   Topic # 2: "Diesel Locomotive Standby Protection."
8. MAY 26, 8:00 P. M., DENVER, Rocky Mountain Diesel Club.
   Topic # 1: "Traction Motor Armature Bearings."
   Topic # 2: "Maintenance For Prevention Of Grounds, Shorts & Opens."
9. MAY 27, 8:00 P. M., ST. PAUL, Northwest Locomotive Association.
   Topic # 1: "Diesel Truck Maintenance Procedures For Shops Where Wheel Truing Machines Are In Service."
   Topic # 2: "Procedure For Storage Of Diesel Locomotives."

SPECIAL ATTENTION: In line with current economy measures, we are NOT encouraging long "off territory" travel to these meetings. This means we will need and will depend upon everyone of you "HOME FOLKS" to make a special effort to attend the meeting closest to you. WE WILL ALL APPRECIATE YOUR HELP IN THIS WAY.

INFORMATION BOOTH — 1957 ANNUAL MEETING



MONDAY MORNING SESSION

September 16, 1957

JOHN T. DALEY
President
Supt. Motive Power
Alton and Southern Railroad
East St. Louis, Ill.

The opening session of the 19th annual meeting of the Locomotive Maintenance Officers' Association, held at the Sherman Hotel, Chicago, Illinois on September 16-17-18, 1957, convened at 10 a. m., Mr. John T. Daley, President of the Association, presiding.

PRESIDENT DALEY: Gentlemen, the 19th annual meeting of the Locomotive Maintenance Officers' Association is hereby called to order.

I would like to call on Father William O. Goedert, Assistant Pastor of the Cathedral of the Holy Name, Chicago, to give the invocation. Will you all please rise.

REVEREND WILLIAM O. GOEDERT: O Almighty and Everlasting God, Who has established every element for Thy glory and man's utility, grant, we pray, a blessing on these men and their deliberations. Help them in their work of providing for the fitness of that equipment that is used in carrying us and our things, and let all who use it advance in Thy law and Thy commandments, that they may arrive finally at their heavenly destination.

Graciously hear our entreaties, O Lord God, and with Thy Holy Hand approve our work. Appoint Thy holy angels ever to guard and keep safe from all dangers those who use it, and show salvation to Thy servants so that, strengthened by Thy grace, they may attain after the vicissitudes of their life the eternal happiness of heaven through Christ our Lord, Who taught us to pray:

Our Father, Who art in heaven, hallowed be Thy Name. Thy kingdom come, Thy will be done on earth as it is in heaven. Give us this day our daily bread, and forgive us our trespasses as we forgive those who trespass against us. And lead us not into temptation but deliver us from evil. Amen.

PRESIDENT DALEY: Gentlemen, I am very happy to see such a large turnout so early in the morning on opening day. It is certainly very gratifying.

As you know, we have a large membership, the result being that, generally speaking, only a small percentage of it is able to attend our annual meetings. Consequently, those who are unable to attend must rely upon our printed proceedings in order

to gain knowledge of the work that is done by this organization.

In order that all members will have full information as to the work of this organization, a pre-convention report is printed and circulated prior to the convention which contains the various committee reports. After the convention a final report is printed and released to all members.

Your officers and committeemen, as usual, have done a very outstanding job this year in preparing these reports, and have worked very hard throughout the entire year in getting them ready. Most of you no doubt know them. However, in order that all will have an opportunity to see them, I am going to ask them to stand by groups for recognition and to remain standing until all have been introduced, after which I feel we should give them a round of applause in appreciation of the fine work they have done.

Vice Presidents. Special representatives. The General Membership Chairman. Past Presidents. The Secretary and Treasurer. The Publicity Chairman. The members of the Executive Committee. The members of the Advisory Board. All committee chairmen, and all committee members.

Thank you, gentlemen. I would like you to give all these fellows a round of applause for the fine work they have done for this Association. (Applause)

We have with us today a number of our foreign freinds from all over the world, and I would like to recognize them. We have some here from Australia, Pakistan and Thailand, in addition to Canada. Will the foreign visitors please rise and be recognized? (Applause)

Since our last meeting here, some of our members have passed on. Consequently, we cannot express our thanks for the good work they have done and the loyal support they have given us in the past. I would like to give recognition to these men at this time. I will appreciate it if you will please stand while we pay tribute to them.

IN MEMORIAM

George Egan, Service Engineer, Manning Maxwell and Moore, Incorporporated.

O. A. Garber, Retired C.M.O., Missouri Pacific Railroad, St. Louis, Missouri.

W. B. Graham, Retired Ch. Mech. Inspector, International Great Northern Railroad, Houston, Texas.

L. B. McCall, General Diesel Foreman, G. C. & Santa Fe Railway, Cleburne, Texas.

P. J. Neff, Chairman of the Board and formerly Chief Executive Officer and President, Missouri Pacific Railroad, St. Louis, Missouri.

H. E. Niksch, Superintendent of Motive Power, Elgin, Joliet & Eastern Railway, Joliet, Illinois.

J. L. Perkins, Superintendent of Shops, Texas and Pacific Railway, Marshall, Texas.

Charles Roth, Special Inspector, New York Central System, Buffalo, New York.

John Schmidt, Diesel Foreman, Belt Railway of Chicago, Chicago, Illinois.

C. H. Spence, Superintendent of Shops, Baltimore & Ohio Railroad, Baltimore, Maryland.

L. J. Verbarg, Retired Assistant to Chief Mechanical Officer, Missouri Pacific Railroad, St. Louis, Missouri.

J. M. Whalen, Retired Master Mechanic, Missouri Pacific Railroad, St. Louis, Missouri.

Thank you, gentlemen. I am sure the work of these departed members will be long remembered by this organization.

Your officers and committees have had a very busy year preparing and presenting the preconvention committee reports at eight regional railroad clubs throughout the country, namely, Chicago, Houston, St. Louis, Louisville, Cleveland, St. Paul, Jacksonville and Denver.

While I did not have the opportunity to attend all these preconvention reports, I understand they were very well received and of considerable assistance in formulating the final reports for our present meeting. Some of the presidents of these regional clubs are here, and you will have an opportunity to see and meet them later. However, in any case I wish to express my thanks to them for their fine support of our work.

It is customary at this time for the President of LMOA to make a few remarks. I have sat out in the audience with you fellows every year since 1945 to hear the remarks of other presidents.

Now it is my opportunity to address you. I am very grateful for that, but also realize that right now is a chance for me that comes but once in a lifetime to any of us.

What would you say if you were asked to express in ten minutes or so what is the most important thing about the work that your own life's work is wrapped up into?

I could talk about how far the art of locomotive maintenance has advanced, how locomotives themselves have been improved, or many related matters that we worry about day in and day out.

But I would not be doing justice to myself, nor—I feel—to you.

The most important thing about the work we do is deeper

than that. It gets down to how you and I work together. How we chose this field as our life's work, and what we are doing to make it better for ourselves and our railroads.

With that thought in mind, haven't we overlooked a potential we have on our own property in people who have indicated a desire to work in the railroad industry?

I realize that the lack of interest shown by college graduates in the railroad industry is perhaps understandable because of several factors that may be involved. There are the long hours. We are called upon to work different shifts, seven days a week. There is strong likelihood of living in different communities, compelling us to change family location and friends.

Any man who meets these tests has a lot to be said for his loyalty to his company and his job.

For instance, the man who applies for employment first makes out an application form. He puts in writing his own qualifications and indicates to us his desire to be a part of the railroad industry. Then if accepted—and while he is gaining experience—we have the opportunity to watch his growth; his attitudes not only toward management but also to people he is associated with; how he reacts to criticism; his ability to create new ideas; and finally his ability to be his own critic.

What better place, then, is there to get our future leadership than among people who have indicated a strong desire to make railroading a life work?

Isn't it possible that we have overlooked a number of such people who have great potential? Why not give *them* the opportunity to obtain higher education? The way surely can be found to accomplish this. All we as an industry need is the determination to do this.

Isn't it true that we have a far better chance of keeping this employee after he has advanced himself in this way than we do with certain college graduates? Many of you have had the experience of hiring such men and then having them leave after they have acquired certain experiences and been called upon to take an assignment they may not particularly like, knowing they can readily gain employment in some outside industry?

This problem hangs over our heads at all times with college graduates. Isn't it true that when outside industry goes after the college graduate and familiarizes him with their particular equipment they not only encourage the men to accept other positions. Often they furnish experienced people to other industries upon request. By doing so these individuals cannot help but recommend the parent company.

But once a railroad has lost an engineer to outside industry he is of no further value to the railroads as a salesman.

I think this is one of the most important problems that confronts railroad management today. And I think we have the answer. Let's just take a few minutes to look around and recognize it rather than taking the lines of least resistance by applying solely to schools and colleges for future leaders, hoping that they have the ability and knowledge needed to carry out the work.

By starting out with our own people as a nucleous to work with in carrying out my previous recommendations, I am sure it will have a great effect upon the morale of all employees. By doing that, it will not be too long before other employees will react to the desire for educational opportunities. We will also

automatically set up more and better education for other employees doing work that doesn't require advanced education but does require that we bring our standards above what they are today.

This is a small price to pay in relation to the value of equipment and machinery today. I think we have failed to recognize the value of such an insurance policy to aid and protect the railroad industry in the future.

Remember, the equipment will not get any less complicated as railroad technology advances.

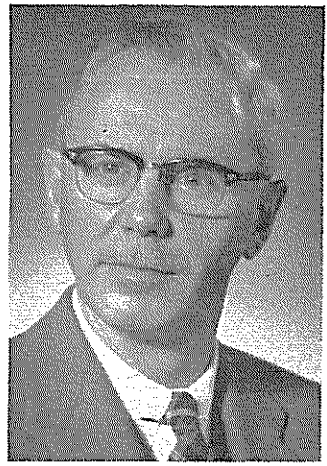
I think there is no greater challenge to the railroad mechanical man today. In order that he meet the ever increasing costs of this equipment and labor he must create an educational program that fits today's needs—instead of trying to fit today's needs into outmoded educational patterns.

The foregoing attitudes of our top mechanical people may be some of the reasons why more recognition has not been given to top mechanical people in higher managerial positions. If this is so, (and I am inclined to believe it is) it is time that we made a bid for these jobs through a stronger educational program in mechanical departments.

The railroad industry does not realize how much a test of leadership lies in every day problems of mechanical departments — keeping hundreds of powerful locomotives in top shape, servicing them quickly, doing the same for freight and passenger cars, making complete overhauls of intricate mechanisms.

All these are every day responsibilities which mechanical people assume with—I believe—far too much modesty.

PRESIDENT DALEY (continuing): Gentlemen, we have a very fine relationship with out northern brothers, and I would like to introduce to you now Mr. R. M. MacDonald, who is Director of Operations, Board of Transport Commissioners for Canada, Ottawa.



R. M. MacDONALD
Director of Operations
Board of Transport
Commissioners for Canada
Ottawa, Ontario, Canada

I want to express, at this time, my genuine appreciation of your kind invitation to address you at the opening session of the 19th Annual Meeting of your Association. Because of the close liaison which we have maintained with your Association and the Master Boiler Makers' Association I do feel quite at home in a gathering of this kind and I can assure you that I am looking forward with keen anticipation to the discussions on current motive power problems.

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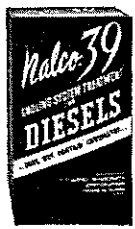

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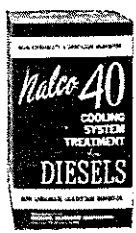

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well advised to foregather periodically for the purpose of comparing your methods, pooling your knowledge and tempering your development plans with a good background of the other fellow's experience.

Highly organized and well-planned conventions such as this have become traditional North American institutions, and I know of no better medium of getting to the core of a complex problem than to subject it to the sort of bombardment which it is bound to get in a forum of this kind.

As a matter of fact, it may be of interest to you to know that in recent years we in the Operating Department of the Board of Transport Commissioners have adopted the policy of holding informal conferences in an effort to resolve some of the more contentious problems with which we are required to deal. In giving you this brief description of the Board's work, I would be remiss in my duty if I failed to emphasize the good results which have come out of these conferences.

Undoubtedly, there are many here who have little to do with the Board of Transport Commissioners for Canada and I do not intend to burden you with a detailed description of the functions of that body. As a prelude to what I have to say, however, I think it is appropriate to give you a sketch of the Board and its regulatory duties.

As most of you know the Board of Transport Commissioners in Canada is the counterpart of the Interstate Commerce Commission in the United States. There are, however, some fundamental differences in the statutory requirements of railway regulations in Canada as well as in the Board's activities in the regulatory field.

Under the terms of Section 92 of the British North America Act, the framers of our Canadian Constitution explicitly excluded from provincial jurisdiction all railways subject to the legislative authority of the Parliament of Canada. On the strength of this constitutional obligation the Canadian Railway Act was introduced by the Federal Parliament early in this century, and the Board of Transport Commissioners is the body which administers the requirements of this Act.

The Board is now in the second half century of its existence. It has an extensive and interesting jurisdiction under the Railway Act, Transport Act and Pipe Lines Act over transportation by railway and by inland waterways, communication by telephone and telegraph and transmission of oil and natural gas by pipe lines, all vital to the economic life of Canada.

The Board is, at present, headed by Mr. C. D. Shepard, Q. C. as Chief Commissioner and also consists of an Assistant Chief Commissioner, Deputy Chief Commissioner and three other Commissioners.

The authors of the Railway Act seem to have envisioned the Commission as an itinerant body and travel arrangements for the Board and its officers, as outlined in the Railway Act, are designed to facilitate movement across the wide expanses of our country. In this connection, it is possibly of interest to say that in the past year the total number of formal hearings held by the Board were just about equally divided between those held in its Court Room in Ottawa and those held at various other points across Canada.

The powers given to the Board under the terms of the Railway Act are broad indeed. The Canadian Parliament empowered the Board to deal generally and somewhat extensively with vir-

tually every phase of Railway operation. Briefly defined the Board's powers in the field of railway regulations relate to matters of engineering, location of lines, crossings and crossing protection, safety of train operation, operating rules, investigation of accidents, handling of dangerous commodities by rail and fire prevention on or adjacent to the Railway right-of-way; accommodation for traffic and facilities for service, abandonment of operation, freight and passenger tariffs and rates and uniformity of railway accounting.

While the Board's powers are administrative and regulatory, as well as judicial, it is constituted as a court of record and given the necessary authority to settle its own procedure to summon and examine witnesses and to enforce its decisions.

It is significant to note, however, that notwithstanding these somewhat broad judicial provisions, a great deal of the Board's activity is of an administrative character which is carried out on a somewhat more informal basis. It is in the light of the administrative activities of the Board upon which I wish to dwell for a few moments today, particularly as it relates to the Board's interest in safety.

From the early days of railroading in our two neighboring countries the famous motto "Safety First" has become a widely accepted and generally respected phrase to men in the railway field. This is, indeed, as it should be. The very nature of this great and essential industry leaves no room for careless practices and many a good railroad man has found that he can get into more trouble by ignoring the lessons of "Safety First" than in almost any other way.

You will agree, I think, that there are some obvious benefits in viewing a question of this kind from my particular point of vantage. We, in the Board, can see passing over our desks day after day, reports of accidents which are occurring on not one railway, but on all the railways in Canada which come under the Board's jurisdiction. For instance, during the course of the past year, our inspectors investigated and reported on 3,289 accidents. You will appreciate that an analysis of these reports does provide an excellent opportunity of detecting significant trends in the incidence of railway accidents.

Broadly speaking, accidents are generally divided into two main groups—one being attributed to human failure and the other being the multiplicity of physical failures which occur in the day-to-day operation of a railway.

In dealing with the human aspect of the situation, one must readily concede that railways as a group (with a little gentle persuasion from those infernal regulators) have taken effective steps to bring home to the individual railway employee, the inherent advantages of working safely at all times.

We in the Board have been impressed with the realistic manner in which our Canadian railways have approached this important development in safety education, particularly in more recent years. Considerable time and money has been expended in broadening the scope of railway safety organizations and providing these missionaries of safe working habits with the necessary equipment to interest and impress all concerned, with the beneficial rewards of working safely. There can be no question, however, but that the time, the effort and the cost have been fully justified by the results.

To say that the inauguration by Railway Management of safety meetings with employee groups was at first attended by an evident lack of enthusiasm is to put the case mildly. Happily, however, these get-togethers are now the order of the day on all railways in Canada and they are providing an effective medium of safety education mainly because of this direct and first-hand approach to the working habits of the individual employee.

It seems timely, indeed, that such a practice took root during the period when accepted and long-established railway patterns began to take on a new concept. It is significant that the inauguration of the informal conferences by our Branch of the Board in Canada also took place around the same period.

Let us look at how these conferences developed and what they have accomplished. One of the obligations of the Board's Operating Branch is to investigate accidents involving collisions between trains and motor vehicles at public crossings with a view to providing greater safety. In this connection the Railway Act deals specifically with the question of warning devices and their use by train crews approaching public crossings. Because of the relatively large number of unprotected crossings in Canada this is recognized to be one of the important factors in the Board's investigation of such accidents.

Following the introduction of the diesel electric unit in Canadian main line service, attention was soon focussed on the incidence of a series of crossing accidents in which the driver of the highway vehicle failed to associate the sound of the warning signal with that of an approaching train. The Board's investigation clearly established that this was a contributory factor in causing the accident. It was evident that the situation demanded prompt remedial action.

With the object of reviewing all aspects of the situation, a conference was called by the Board's Operating Department. This conference was attended by representatives of the Railways, the Railway Supply Industry, representatives of the National Legislative Committee of the Railway Transportation Brotherhoods, together with skilled technicians in the field of sound from the National Research Council.

The conference culminated in substantial agreement being reached to the effect that an effort should be made to produce an air whistle which would more faithfully simulate the sound of the conventional steam whistle with which the public had become so familiar over the years. Following a recommendation made to the Board, in this connection, General Order No. 753 issued directing the railways, within a stipulated period, to equip diesel electric motive power units operating regularly in road service, with horns having tonal characteristics simulating the sound of the conventional steam locomotive whistles.

In due course experiments were conducted with substantially the same representation in attendance. Individual types of horns were finally approved on the basis of actual field listening tests and it is to the credit of the Railways and the Railway Supply Industry that suitable horns were manufactured and installed within the prescribed period. The real significance of this development, however, lies in the fact that the ratio of public crossing accidents associated with a misunderstanding of the warning signal diminished very perceptibly following this modification of the warning device.

All this was accomplished in a

relatively short period of time and undoubtedly the conference approach to the problem providing as it did an opportunity of frank and candid discussion on all aspects of the situation was directly responsible for the production of what we consider to be a sensible and realistic regulation.

This Order has not been cited because it represents an outstanding example of the results of round-table discussions on matters involving the railways and the Board. This is but one of several of the benefits which have issued from these informal discussions between management, labour, and representatives of the regulatory body.

As an illustration of some of the other major accomplishments which have developed from these conferences, I might mention the following:

Because of a wide disparity in the individual operating rules in effect on various railways in Canada, the Board's Operating Department sponsored the adoption of a Uniform Code of Operating Rules on Canadian Railways. Following a number of informal conferences, a Uniform Code of Operating Rules was prepared and presented to the Board for approval. This Uniform Code is now in effect.

Uniformity of operation is recognized to be closely akin to safety since it tends to standardize operating procedure, reduce the risks of confusion, and guard against operating misunderstandings which frequently contribute to the incidence of serious railway accidents, particularly on joint sections over which two or more Railways operate. This was the keynote of the Board's proposal to sponsor a uniform code of operating rules which would apply to all railways coming under its jurisdiction.

Experience following the introduction of the Uniform Code fully vindicated this theory. In the calendar year prior to the introduction of the Uniform Code of Operating Rules, 35 people were fatally injured in collisions which occurred on Canadian Railways, while 396 persons were injured. In the year in which the Uniform Code became effective, there were only 12 fatalities and 165 people injured in similar types of accidents. As a matter of fact, in the third year of operation under the Uniform Code of Operating Rules, Canadian Railways came very close to producing an all-time minimum of fatal accidents involving collisions. In that year the Board's records indicate that there were only three persons killed in railway collisions. While, of course, it is not claimed that the introduction of the Uniform Code of Operating Rules was solely responsible for this improvement, I think it can be assumed that it played its part in this commendable achievement.

Within the past year conferences have also taken place with respect to the proposed adoption of Uniform Air Brake Regulations. As a result of these negotiations it is anticipated that a Uniform Code of Air Brake Rules, acceptable to the Board, will be introduced on Canadian Railways very shortly.

In some instances, this informal approach to safety objectives has involved a committee comprised of representatives of the Railways, Railway Employees and the Board contacting manufacturers and suggesting improved safety factors in the design and structure of certain components of railway equipment.

As a case in point, I might mention the strengthening of the nose door on diesel electric "A" units designed to provide greater protection for the occupants of

the cab in the event of a collision at a public crossing. This action, which was instituted in Canada in 1954, was timely indeed. Although we had remained comparatively free of such accidents in Canada up to the end of 1955, the past year has witnessed 10 serious collisions at public crossings involving highway vehicles carrying gasoline and other dangerous commodities. It is gratifying to find from the investigation of these accidents that where diesel "A" units were involved, the strengthening of the nose door did play a significant part in providing some additional protection to the employees in the cab.

Incidentally, this was accomplished without the necessity of any formal action on the part of the Board. May I say here that such an approach to the development of uniformity and safety in railway operation does place a much greater burden on the Board's technical staff. On the other hand, we are not unmindful of the advantages of this wider participation in the problems associated with technological changes which are currently taking place in the railway industry.

A retrospective view of our experience in this venture reveals, without doubt, some gratifying results. In face of these modest achievements we are encouraged to pursue our efforts in the direction of promoting greater safety in Railway Operation.

At this point I should like to pay tribute to the excellent co-operation which we have received from the officers of the Railways, the Transportation Brotherhoods, and the Railway Supply Industry in facilitating the development of this co-operative approach to safety in railway operation.

We are not, of course, suggesting that such an approach can be universally adopted outside Canada. One of the factors which facilitates such a procedure in Canada is that most of the railway mileage is embraced within two great trans-continental systems. It must also be recognized that under our regulations, such a procedure is possible and we are simply giving this new approach a reasonable trial.

May I conclude, Mr. Chairman, by extending to you and through you to your Convention Committee, my very best wishes for the success of the 1957 Meeting. (Applause)

PRESIDENT DALEY: Thank you, Mr. MacDonald.

Gentlemen, I deliberately withheld Mr. MacDonald's background because I first wanted you to hear him. After I tell you a little something about him you will readily understand why he was invited to join the staff of the Board of Transport Commissioners of Canada. I want you to listen to this background. As I say, I deliberately withheld it for that reason.

Mr MacDonald was born at Spring Hill, Quebec in the Eastern townships of the Province of Quebec on August 28, 1903. After graduating from high school he completed a business course at the Ontario Business College, Belleville, Ontario. Upon graduation from business college, Mr. MacDonald served as student law clerk in the law firm of W. C. Mickel at Belleville, and in 1923 he entered the service of the Canadian National Railways on the Belleville Division.

Mr. MacDonald's subsequent service with the Canadian National Railways covered a period of twenty-five years, all of which was served in the Operating Department of the Railway. A review of this record of service indicates that during his Rail-

J. T. Daley presenting life membership plaque to R. M. MacDonald.

way career he filled such positions as Traveling Inspector, Montreal Division; Trainmaster, St. Lawrence Division; Assistant Superintendent, Montreal Terminals and St. Jerome Division; Supervisor of Transportation, Montreal District. In 1944 he was appointed Labor Relations Representative of the Canadian National Railways at System Headquarters in Montreal.

In 1946 Mr. MacDonald joined the staff of the Board of Transport Commissioners. Prior to being appointed to the position of Director of Operation, he served as District Inspector and Assistant Director of the Board's Operating Department.

Now you can readily understand, gentlemen, why a man with a background like that fits well into the job he is doing.

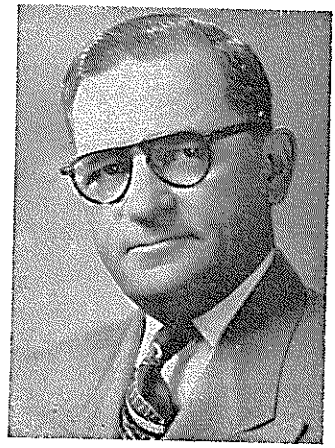
Mr MacDonald, it is the wish of the Locomotive Maintenance Officers' Association to present to you a Life Membership in this organization, and I have the honor of presenting this to you at this time. I hope that we can expect a visit from you to our meetings for many years to come. (Applause)

MR. MacDONALD: Mr. Daley, in acknowledging the honor which you have so generously bestowed upon me, I do so with a sense of humility. A glance at the names of the men who have served and are now serving on your Executive Committee gives some indication of the top-level talent which has guided the destinies of this reputable Association over the years. Having spent some twenty-five interesting years in the operating department of one of Canada's major railways, I am all the more conscious of the significance of this honor.

You may be sure that as the years go by I shall cherish with a great deal of pride my honorary membership in the Locomotive Maintenance Officers' Association. (Applause)

PRESIDENT DALEY: Thank you, Mr. MacDonald.

Now I would like to call on Mr. O. L. Hope to give us a few remarks on the membership situation.



O. L. HOPE
General Membership Chmn.
Mechanical Superintendent
Missouri Pacific Railroad
Little Rock, Ark.

MR. O. L HOPE (Mechanical Superintendent, Missouri Pacific Railroad Company, Little Rock, Arkansas): Gentlemen, we had hoped to present President Daley with a peak membership of 4007. However, we are going into this meeting with 2850.

You will find membership blanks on your chairs. Let's try to get 300 or 400 more members before the close of this meeting. Of course it is a little late to get membership from the railroad world, but we have a lot of supply friends who might help you out.

Gentlemen, I want to encourage you to visit the supply booths. I want to thank you for your help in the past year, and

for making the membership what it is. I also want to solicit your help in increasing the advertising in this magazine. It is far short of what it should be. So, with your help let's get the thing on a paying basis.

I appreciate very much what you have done in the past year in keeping the membership as high as it is, but I think we can do better. I want to earnestly solicit your support in doing it. I also want to extend appreciation to my Railroad for permitting such a large delegation of people to attend this meeting.

I believe the potential in the country for membership in this organization is perhaps 5000. The 2850 people represent the supervision and management of the mechanical organization in the United States.

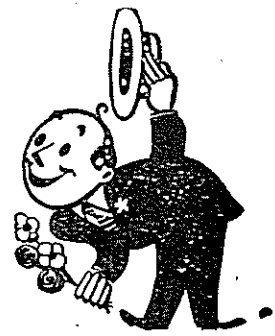
May I say again, gentlemen, that I appreciate your help during the past year, and I earnestly ask for your support to help get the membership up to where it should be. We appreciate every name on the President's Honor Roll for sending in members this year; let's have everyone make the "Honor Roll" in 1958 by sending in at least one member.

LOCOMOTIVE MAINTENANCE OFFICERS' ASSOCIATION

PRESIDENT'S HONOR ROLL

Period Ending September 31, 1957

A "Bouquet" to these fellows who brought in the 1957 membership!



West Coast Region:

H E Carter	4
Edw O Fink	1
J L Gibboney	1
O T Gutsch	7
R E Harrison	3
Donald A Keating	1
M B McCracken	2
R L Mankins	7
W P Miller	1
F E Molloy	15
L P Oberkamp	8
F R Olds	4
E F Peters	4
J W Ronan	1
C W Wilson	5
L E Lonergan	2
D J Ritchie	5

Central Western Region:

F D Acord	1
M B Adams	1
J E Allen	1
H E Anderson	1
T T Blickle	6
P A Buckman	20
H N Chastain	13
R C Cochran	3
W R Cowdrey	14
H L Crane	1
L E Edwards	2
L B English	32
D J Everett	2
S L Hanan	1
A J Hartman	1
W L Huebner	2
B O Lewis	1
John W Luke	33
George J Lyman	1
W W Lyons	15
A F Mansheim	1
D M Miller	3
W H Plath	1
D L Quaney	3
L F Rader	1
A E Rice	4
Chester T Richmond	4
M F Smith	3
A R Snyder	4
P D Starr	9
E C Wagner	43
E B Wood	2

Eastern & New England Region:

R E Baker	1
W A Baker	7
E K Bloss	1
Edw A Campney	35
F G Fisher	12
F R Fouts	1
R P Glose	11
H G Hook	2
H J Koch Jr	26
V F Leitz	1
H E Mathay	16
F B Rykoskey	2
Erich M Scherch	1
C P Soffel	7
T T Vandergrift	1
G C Wilms	6
C H Lockhart	1

Great Lakes & Canadian Region:

A C Allen	1
H M Bell III	5
E R Buck	13
L A Burns	1
W H Chidley	2
Harvey Clark	1
G C Drake	1
A W Godwin	9
F A Godwin	1
C L Hall	16
E D Hall	25
A B Harris	6
J H Hastings	1
F A Henry	4
J A Jones	1
J J Keating	1
Roy D King Jr	4
W E Lehr	3
L C Lytle	1
H P MacDonald	10
J U Neill	8
R E Pastre	3
H W Rasor	1
L G Robinson	1
F C Ruskaup	1
W E Travis	14
H R Whiting	9
L N Winslade	2
David B Wood	1
E H Wright	2

Central Region:

C D Haner	4
H W Hartshorne	60
W H Haynes	20
C D Hunter	2
W E Olds	1
V L Smith	11
Paul H Verd	1

Northwestern Region:

H G Cronnoble	2
E R Henkle	3
J H Heron	2
R B Jones	6
F H Oshlo	1
R H Seitz	1
C P Stendahl	1

HONOR ROLL (Continued)

Southern Region:

C D Allen	1
H L Anderson	1
R E Austin	1
L H Booth	7
F R Denney	9
C T Eaker	2
M L Gould	1
P R Humphreys	1
R W Llewellyn	1
P O Likens	1
W L McGowan Jr	2
E C Martin	3
H S Mercer	1
F A Murphy	1
W W Osborne	4
J A Parrish	29
R A Parrish	1
K L Pollitt	7
J B Quiggins	1
W C Rollings	34
J F Ryan	2
E K Shaffer	12
F D Sineath	48
J W Stephens	12
H C Taylor	2
A G Waldrupe	5
J A Welsch	5

Southwestern Region:

L Bechel	4
T W Bellhouse	1
J C Boughers	4
W Combs	3
G J Coasit	2
C W Cramer	2
J T Daley	3
J J Daughtery	1
J L Fertig	2
S J Fuller	8
Michael Gogol	1
E C Harris	1
J E Hayes	1
O L Hope	26
E E Long	7
M H Losch	6
L B McCall	20
Thomas Murray	5
E V Myers	1
George W Niemeyer	9
O C Pearce	1
J A Reed	1
F E Russell	2
Ted Sprott	22
J B Stark	4
B W Swain	10
M D Thompson	1
J H Webb	3
F C Whitlock	8

PRESIDENT DALEY: Thank you, Mr. Hope. We always have this little talk, and at the end of the year we wind up with membership higher than what we had hoped for. Now I would like to introduce Mr. E. V. Myers to give you a few comments concerning the discussion on the program. Mr. Myers.

E. V. MYERS
Third Vice President
Supt. Motive Power
St. Louis - Southwestern Ry.
Pine Bluff, Ark.

MR. E. V. MYERS (Superintendent, Motive Power, St. Louis-Southwestern Railway, Pine Bluff, Arkansas):

Thank you, Mr Daley.

Gentlemen, we are here again at one of our annual meetings. There will be brought before you today many fine papers which the chairman of each technical committee will present. He will briefly outline his report, which has already been published in our pre-convention publication that you have had an opportunity to read.

After the chairman has presented his preliminary remarks, the discussion will be opened for your benefit. The purpose of these meetings in Chicago each year is to give each of our people an opportunity to come forward with any progressive thinking they may have.

As officers of this Association know, these technical chairmen can only draft a preliminary report, because of the vast expanse of the subjects they deal with. It would take a tremendous amount of writing and treatment to prepare the report. There could be a book on each subject alone.

The best way we know to get the most out of these meetings is for us to enter into them. You are sent here by your railroad in recognition of your services, and you want to get the most you can out of these sessions.

Our Association, therefore, is made up of the contributions of each individual and what he can offer that will lend itself in some way to the problem of some other railroad rather than his own.

When we look at our problems we find they are mutual as long as we are dealing with the same type of power. We have represented here today enough talent to solve almost any problem. I see here men who, like myself, have spent their lives in this business. You will learn many things from them.

We are not building for ourselves alone, but for the progress of the American railroad system, and we should be contributing something to it because of the others who are coming our way.

On your chairs you will find blanks prepared for the purpose of writing the questions you want to ask There are microphones in the aisles, so arranged to be near you when you stand and ask your question. It is very important that when you do ask a question you identify yourself and your railroad in order that

our stenotypist can properly enter your question and your railroad affiliation in the record.

It is not necessary that you ask the question yourself. You may pass it to someone else to ask it for you. The idea is to get the question before the meeting.

The panels have been so arranged that each of the technical chairmen will have his committee with him on the platform, and they will be in a position to answer your questions.

We invite you to make this meeting the best ever. It is through discussion that we all learn. Sometimes we learn through an argument, but sometimes the argument may go the wrong way. Keep your questions pertinent to the subject, and we will be glad to have you join in with us now in making the most of this meeting.

Mr. Daley, I appreciate very much the quietness in the back of the room. We haven't always had that before now. Talking in the back of the room confuses the people who are trying to hear.

I know this is your meeting and that you are proud to be a member of it. Let us now be proud to contribute something to it when the time arrives to ask questions or join in the discussion. (Applause)

PRESIDENT DALEY:

Gentlemen, I would like to introduce to you now a man who is representative of the railroad industry, and who has the experience necessary to head up a study such as was assigned to him.

Mr. Tom Murray was born in Ash Grove, Missouri on August 16, 1898. He was educated in the Springfield public schools and Drury Academy. He was in service with the St. Louis-San Francisco Railway from 1916 to 1919. Between 1919 and 1923 he worked for the Chicago-Alton in Venice, Illinois; the Terminal Railway, Brooklyn, and the Pennsylvania Railroad at Roselake, Illinois. He re-entered the service with the St. Louis-San Francisco Railway at St. Louis, Missouri in November 1922. He was appointed Night Roundhouse Foreman in 1924, and has held various positions in the capacity of Supervisor up to this date. Let me tell you something, gentlemen. You have never been anybody or done anything until you have been a night roundhouse foreman. (Laughter)

Mr. Murray has held various positions in the capacity of supervisor. He was appointed Master Mechanic of the Southwestern Division in 1945.

He says he fishes and plays bridge. I can do a fair job of playing bridge, but I get seasick watching my wife do the dishes. I am not a fisherman.

I would like to introduce to you Mr. Thomas Murray, who will present his report to this organization. I would like to see it well discussed, because we have people here who have problems and who can offer some discussion.

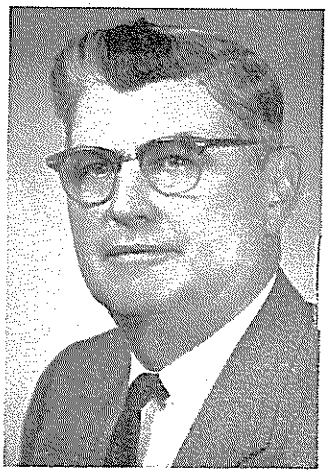
Mr. Murray.

MR. THOMAS MURRAY (St. Louis-San Francisco Railway, Springfield, Missouri): Thank you, Mr. Daley. That introduction came at a very opportune time. My boss is in the audience, and I am certainly glad to have him hear some nice things about me for a change.

Before I summarize this paper, gentlemen, I want to make it clear that the responsibility for it is due entirely to my Committee. If it is good, I want them to have the credit; if it is bad, it takes a little of the monkey off my back.

I want to say gentlemen, that this has been one of the most cooperative committees. They have furnished a vast amount of

information. I certainly want to show my appreciation for the work they have done.



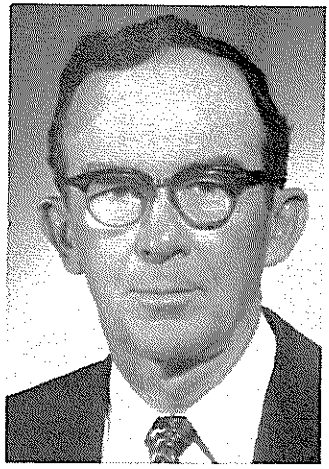
THOMAS MURRAY, Chairman
Committee on
Diesel Mechanical — Other
Master Mechanic
St. Louis - San Francisco Ry.
Springfield, Mo.

Now I want to start the discussion period, and introduce you to a roundhouse foreman with the Santa Fe at Temple, Texas. He is President of the Southwestern Railway Diesel Club. I might add that if any of you have not attended the Southwestern Railway Diesel Club you have missed a good bet, because it is certainly outstanding.

May I introduce to you Mr. M. M. Johnson, President of the Southwestern Railway Diesel Club, who will open the discussion period. Mr. Johnson.

MR. M. M. JOHNSON (General Foreman, Gulf, Colorado & Santa Fe Railway, Temple, Texas): Thank you, Mr. Murray.

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



M. M. JOHNSON, President
Southwestern Railway Diesel Club
General Foreman
Gulf, Colo. & Santa Fe Ry.
Temple, Texas

I deem it a great honor and certainly a pleasure to have the privilege of being here this morning. On behalf of the Southwestern Railway Diesel Club I want to thank Mr. Murray and his Committee for the hard work and time spent to bring their pre-convention presenta-

REPORT OF THE COMMITTEE ON
DIESEL MECHANICAL MAINTENANCE — OTHER THAN ENGINE

1957 TOPIC
"CARBODY SUPERSTRUCTURE AND AIR COMPRESSOR COUPLING"

SEE PAGE 41 OF 1957 PRE-CONVENTION REPORT
FOR FULL TEXT OF THIS REPORT

tion, "Diesel Mechanical—Other Than Engine," to our Club in Houston on April 16 of this year.

There were many vital points brought up on this subject, and various questions were asked by the members, and in turn this created a good floor discussion which brought out the answers to many questions.

Ask your questions and enter into the discussion wholeheartedly so that the various opinions and explanations may be heard by all. I am sure the meeting will be a real eye-opener for most of us, and we will agree that there is quite a bit more to a Diesel unit than the engine, which we found out in Houston.

We sincerely invite your cooperation in the meeting this morning. With the help of LMOA and their place on our program and the pre-convention presentation of various important subjects each year, we have learned much and have received a great deal of benefit in our work, which I know you will also benefit from this morning.

I am enjoying the convention very much. I am very happy to meet all these fine people here, and I want to invite all of you to visit the Southwestern Railway Diesel Club which, by the way, is the best Club that I know of in the United States.

The Club meets again in Fort Worth, Texas on October 15 of this year. Please come. Everyone is invited.

MR. MURRAY: All right, gentlemen, we are ready for the discussion period. All I can say is, cock both hammers and shoot both barrels.

MR. M. J. DUNLAP (Diesel Supervisor, Missouri Pacific Railroad, Little Rock, Arkansas): I have a question. Are there any methods used in repairing car body panels other than replacing them with factory-made panels?

MR. K. W. BATCHELLER (Diesel Locomotive Supervisor, Great Northern, Fargo, North Dakota): I feel it should be done only in an emergency, because of the cost. I feel a new panel can be installed more reasonably than building one and fitting it and applying it.

There are emergencies, of course, that occur in certain types of collisions, or even rustouts that happen to break open when they are disturbed, around sand and water receptacles. Other than that, I feel that a new panel should be installed.

MR. MURRAY: I might say a word in connection with that question, Mr. Dunlap. I think in an emergency we all renew panels by using sheet steel with a rim welded around them, but there is a limit to how far you can go, because after a while the noise will get pretty bad on the diesels, especially on EMD's, if they are completely covered with sheet iron panels and no insulation.

MR. W. F. DADD (Superintendent Locomotive Maintenance Baltimore & Ohio Railroad, Baltimore, Maryland):

On page 49, paragraph 6, what has the railroad or builder's experience indicated is expected service period for rubber bushings for Lord couplings?

MR. K. F. MILLER (General Locomotive Inspector, New York Central Railroad, New York, New York): As indicated in the report, the life of those couplings varies with the service and the type of service. In other words, where there is a continuous load or an on-and-off type of load. It would be rather difficult to put an exact time limit on the service life of those couplings. Your own particular experience or operation will determine it.

MR. DADD: The Lord type of coupling is the latest EMD production. This paper indicates that varying load applications

would not be a good application for the Lord couplings. However, they are being applied to air compressors. Since it is in production, I am interested in whether the builder or anyone else has developed any expected renewal period for them.

The coupling that we are discussing is now in production with the builder. There must be some information available that would indicate the expected replacement period of the frommets. Possibly the builder's representative can answer the question.

MR. MURRAY: My answer to your question is that it simply requires a little research and inspection at intervals until you find out about how long they will wear, and then you can set up a time limit on inspection, and renew them at that time.

MR. DADD: I think we are still interested in determining why this type of coupling is used to replace the disc type coupling, the airplane type coupling, that is also discussed.

MR. MURRAY: Our experience with the Lord type coupling has been on air compressors or in any place where the torque is not constant—in other words, where the load comes on and off. They don't last. In our case we have had some of them fail in sixty days.

MR. DADD: That is why I asked the question. They are being applied to air compressors drives by builders in production. Possibly a builder's representative can give us their experience as to what was found on their project testing of the coupling, because they have adopted this as one of their standards.

MR. MURRAY: Do we have a builder's representative here?

MR. MICHAEL B. ADAMS (General Supervisor of Diesel Engines, Atchison, Topeka & Santa Fe, Chicago, Illinois): I don't represent the builder, but we had one of these couplings on an air compressor application for about a year, and it worked okay. It doesn't survive an air compressor failure, I can attest to that, but then this subjects the coupling to excessive stresses and vibration.

MR. MURRAY: Mr. Adams, I don't believe I know of any coupling that will survive an air compressor failure. That has been my experience.

VOICE: Has anyone had any experience with Thomas couplings on road power?

MR. MURRAY: I have been making inquiries the past year trying to get some information on that, and nobody has come up with it. I have heard they have been used, but I can't find anybody to give us any information on it.

Is there anyone in the audience who knows about Thomas couplings on road power? I guess we will just have to take it up with the manufacturer. These couplings are used extensively on switch power, and very successfully, but I can't find any information covering their use on road power.

MR. GORDIE STEWART (Assistant Chief Mechanical Officer, Florida East Coast, St. Augustine, Florida): We have found that we can make our own panels from 3/16 inch sheet metal by welding a strip around the edges to firm them out to the same thickness as those of the original panel. These homemade panels have proven very satisfactory.

VOICE: In the first part of your statement you dealt with the wheel truing machine. At the present time we are putting in one of these machines at Little Rock. I want to know if anyone has had any motor support bearing trouble caused from overmileage by using the wheel tru-

ing machine, and if so whether they have set up a mileage basis for maintenance.

MR. MURRAY: Mr. Miller, I believe you have had more experience with wheel truing machines than anybody. Maybe you can answer the question.

MR. K. F. MILLER (General Locomotive Inspector, New York Central, New York, New York): We would not attribute any motor support bearing difficulty to the use of the wheel truing machine, and on that basis we have not set up a program for renewal of support bearings or felt wet lubricators due to the use of the wheel truing machine.

However, we do inspect felt wicks on a periodic basis, and I feel that if you are particularly aware of the need for oil and good felt wick lubricators you should have no troubles between wheels and changeouts.

MR. N. L. McCRACKEN (Assistant General Superintendent of Motive Power, South Pacific, San Francisco, California): Regarding your paper on the car body diaphragms, has any railroad permanently removed the diaphragms, buffers, stems, and so on, to reduce the maintenance? Have they eliminated them and taken them off the locomotive entirely?

MR. MURRAY: Is there anyone on our Committee who has removed the diaphragm push rods? Is there anyone in the audience who has done it?

We are talking about the diaphragm push rods between units and the statement has been made that some railroads are removing them. Is there anyone in the audience who can give us some information on that matter?

MR. S. C. SNOW (Superintendent Motive Power, Louisville & Nashville Railroad Company, Louisville, Kentucky): There seems to be some reluctance to answer the question. The Pennsylvania Railroad, as I recall it, didn't remove them—they just didn't have them put on when they had the locomotives built. I believe the New York Central may have removed some.

About three years ago, after seeing some Pennsylvania locomotives without diaphragms at the time of construction, I got interested in the idea. It is an expensive maintenance item. We elected to start in a small way, and we now have removed quite a number.

The purpose in back of it is this: GP7's and GP9's operating with an A or B unit don't have diaphragms, and we feel that if we operate in that manner it would be pointless to have diaphragms between A and B units. We have had no complaint.

MR. MURRAY: Have you had any complaints from the federal inspectors? Another question is, do you make any provision to close up the space between the units other than using a curtain?

MR. SNOW: We put chains on the diaphragm head. We simply remove the Duofold curtain and face plate leaving the main frame member, and put a chain from that to the RS3 or GP7 or GP9.

MR. ROY L. MANKINS (Master Mechanic, Pacific Electric, Loe Angeles 14, California): Regarding noise from engines on Diesel locomotives as far as the car body hoods are concerned, has there been any development by insulation to confine the noise to the engine compartment? We have had complaints in cities regarding the amount of noise in the locomotive, and I would like to know if anybody has insulated the car body in order to reduce the amount of noise. Principally, it is SW1's and switch engine type locomotives.

MR. R. E. HARRISON (Super-

visor Diesel Locomotive Maintenance, Southern Pacific Company, San Francisco, California): This question deals with wheel truing: How large a volume is necessary to make a wheel truing machine worthwhile? What should be the volume?

MR. F. F. MILLER: I think the question can best be answered by the data that is incorporated in our report, wherein we report that the value of the machine is in the neighborhood of probably $125,000 installed. With the manhours involved in truing wheels versus manhours and facilities required for dropping out and turning wheels on the wheel lathe, I think it is just a matter of arithmetic to come up with an answer as to the volume required.

With the operation on a seven-day basis, and passing two to three units across it daily, I believe we will come up with an amortization figure or around two to two and a half and possibly three years.

MR. FRED BURCHETT (General Foreman, Atchison, Topeka & Santa Fe, La Junta, Colorado): Does anyone have a successful method of cleaning corrugated car body panels?

MR. E. SCHULTZ (General Foreman, Missouri Pacific, St. Louis, Missouri): I think I can answer that question. We have had considerable experience with car body panels and the various methods of making repairs. Some were good and others were not so good.

As far as cleaning the panels is concerned, for the inside work some people use a spray. I know one railroad that uses an acid solution affair, and a mild solution to counteract it, and sprays with a spray gun and air, and lets it dry itself. Others use a hand mop arrangement.

We have found some cleaning mixtures that do very well when there is a flat surface to clean, but on a corrugated panel the best thing is just to use a spray with your own approved cleaning solution. Cut out the spray solution on the spray gun. You can't get in there with a rag or mop, use the air off the spray gun and blow the thing dry. I believe that will do a pretty good job.

The big thing is cleaning those planes is to get the bottom clean. Get down in the corners and the channels and angles where the holes are. That is where they leave the stuff. They wash it off the wall but leave it on the bottom. The trouble starts on the bottom.

MR. C. L. HALL (Supervisor Locomotive Maintenance, New York Central, New York 17, New York): With regard to the types of air compressor couplings requiring lubrication such as the Falk and Fast, how often should lubrication be checked on air compressor couplings?

MR. JOHN SIMS (Assistant Master Mechanic, Florida East Coast, Miami, Florida): Mr. Hall, we grease our Falk type couplings every three months. We have had very good success with the Falk type coupling. On our property we don't have the gear type any more. We have replaced that with the Falk type couplings, also.

MR. E. P. BLEDSOE (Shop Superintendent, Seaboard Air Line, Jacksonville, Florida): I would like to go back to the subject of car body panel cleaning.

We decided a very fast way to clean panels would be to put them in a lye vat. When we pulled them out we pulled out three or four pieces. They are glued together. Don't try it. (Laughter)

MR. R. W. MUSTARD (Master Mechanic, New York Central, Cleveland, Ohio): What method

does the Committee recommend for the application of bolster wear plates on Alco locomotive trucks? We have had trouble with plates loosening in the past.

MR. MURRAY: Are you talking about the bolster wear plates on the Alco four-wheel truck?

MR. MURRAY: The only answer I can give is that when it gets worn, take it off and put on a new one. Does anyone else have a better answer?

MR. MUSTARD: As they came from the builder they were supported by a different arrangement, other than welding. We have had trouble with the plates loosening.

There are two things I would like to develop here. One, does anyone in the room know of a method whereby interim repairs can be made without stripping the truck?

Two, does anyone have a method better than the builder's method of applying the bolster wear plate?

MR. MURRAY: I think you have reference to those plates that came from the manufacturer which were riveted on, and got loose on the rivets.

MR. MUSTARD: That's right.

MR. MURRAY: We don't use those rivets any more. Whenever we have to take them off we just weld the plate back on and do away with the rivet. I would say that I don't know of any method of changing them without taking out the bolster or at least lifting it up.

Is there anyone in the room who has had any experience removing bolster wear plates on Alcos without taking the truck out? Does anyone have any idea on how it can be done? I don't believe you can do a good job of welding.

Can anyone venture any information on the question before us, about the riveted plates? I just don't believe we can give you any more information, except that I might say we have had a lot better success welding them on and doing away with the rivets.

MR. H. E. WHITENER (Superintendent MP & RE, Central of New Jersey, Elizabeth, New Jersey): What material do you recommend for truck pedestal shoes and box faces? Also, what material do you recommend for spraying brake hanger pins and bushings? Also, what has been done to correct excessive breakage of coil truck springs in EMD trucks?

What type of steel do you face the pedestal jaws with on the box and on the pedestal itself?

MR. MURRAY: Are you talking about the liner?

MR. WHITENER: Yes, the liner.

MR. MURRAY: We spray those with spray bond, and then give them a coating of spray bond and build it up with stainless steel.

MR. WHITENER: Do you spray them in place, or remove them and spray them?

MR. MURRAY: We remove them. They can be sprayed in place but they can't be cleaned properly. We found that in order to make the spray bond a success on pedestal liners we have to take them off and sand them. We wait until we get forty or fifty of them, and then sand and spray them.

It is a very successful method. provided they are not worn too badly. If it is worn over 3/32 inch, the cost is prohibitive. You can build it up successfully and save money up to 3/32 inch. Other than that you have to buy a new liner.

MR. WHITENER: How much do you figure it costs to build up a pedestal liner, then?

MR. MURRAY: About $3.50 to $3.75. That is on a freight. It

costs slightly more than that on the passenger liner.

MR. WHITENER: I think that answers that part of the question. The other part of my question concerns the recommended material for hanger pins and bushings—spring and brake hanger pins and bushings.

MR. MURRAY: As far as we are concerned, we simply use the pin and bushing recommended by the manufacturer.

Just a minute. I believe Mr. Coggins has had a lot of experience with Excello pins and bushings on the trucks.

MR. E. R. COGGINS (Assistant General Foreman, Terminal Railroad Association, Lovejoy, Illinois): We use Excello pins and bushings exclusively for replacement on all of our trucks.

MR. MURRAY: Have you found it to be more economical?

MR. COGGINS: We have found them to be very economical, and they wear very well. We tried making our own bushings, and they would wear only half as long as the Excello would.

MR. J. W. MASON (Assistant Superintendent Motive Power and Equipment, Central of Georgia, Macon, Georgia): I would like to know what class of Diesel wheels your Committee recommends—whether Class B or Class C wheels, and which has the longer life?

MR. K. F. MILLER: I don't have any particular recommendation. We are using the B type wheel possibly because our service is of a nature that requires it. I think it varies with each individual road and their requirements for a particular type of wheel.

VOICE: You naturally drain the oil from the box and refill it. Now, with the wheel truing machine, you won't do that. I wonder if anyone has had any trouble due to deterioration of the lube oil in the box.

MR. MURRAY: Reports from railroads which are using the wheel truing machine or wheel grinding machine are that they have not run into any bad results along that line. Personally, I have not had any experience, but that is the report we have had.

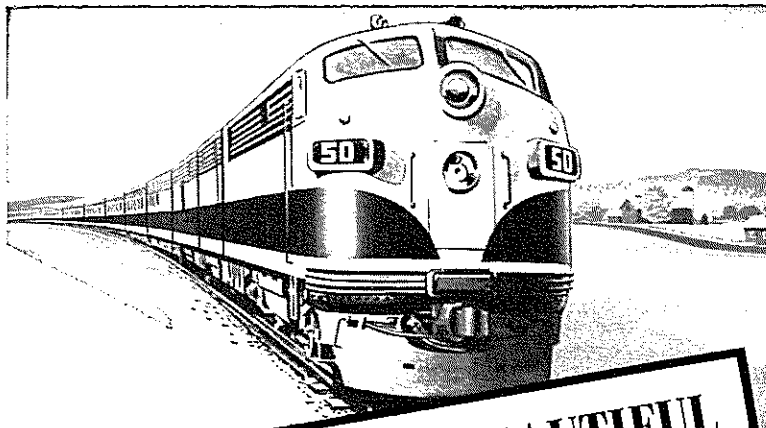
MR. C. L. HALL (Supervisor Locomotive Maintenance, New York Central, New York 17, New York): Mr. Murray, on that score the New York Central runs into a lot of snow in the northern part of the country, so we have a regular item in the winter months that the support bearing wells be drained of moisture and the oil replaced. I believe it is done on a monthly basis during the winter months. That takes care of the oil as far as the wheel truing machines are concerned.

MR. W. H. CHAPLIN (General Diesel Foreman, Boston & Maine Railroad, Boston, Massachusetts): Mr. Murray, in your opening remarks you spoke of the center casting lubrication at the time of truck overhaul on Diesel locomotives. Has anyone on your Committee or in the hall experienced any difficulty with dry center castings on rail Diesel cars which resulted in pronounced grinding or vibration?

MR. MURRAY: I would say that dry castings will cause a lot of things. Vibration and flange wear and hard riding, and whatnot. I believe I can safely say that unless the center castings are checked regularly, and lived up to pretty religiously, you are going to have trouble with dry center castings.

I am rather a fanatic on center castings, and every once in a while in my own shop I find one that is dry and has been neglected. This is something that must be followed up rigidly.

Mr. Murray explained: "Due to the sudden illness of his boss, Southwestern Regional Executive



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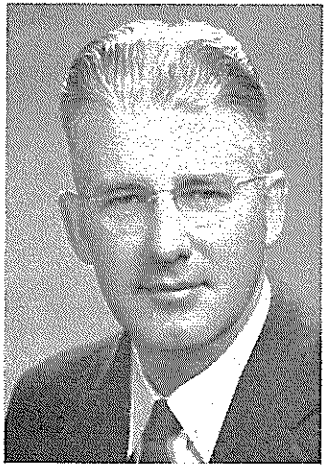
W. H. Bruening, Master Mechanic of the Kansas City Southern, couldn't be with us to help promote and close this discussion. However, from the fine discussion we have just had, it is evident that Mr. Bruening's advance planning for this session paid good dividends."

SOUTHWESTERN REGIONAL EXECUTIVE



W. H. BRUENING
Master Mechanic
Kansas City Southern R. R.
Shreveport, La.

Gentlemen, our time is up. I am going to ask Mr. Denny, our Second Vice President, to summarize this report. I will tell you now, Mr. Denny, that I have used five minutes of your time.

MR. F. R. DENNY (Supervisor of Equipment, New Orleans Union Passenger Terminal, New Orleans, Louisiana):

Gentlemen, the first session of our meeting is just about over. I think we all owe a rising vote of thanks to this Committee, which has so ably presented their report to us this morning. There was a lot of interest shown in it, and I know we all got a lot from the questions, answers and discussion on the various topics. Let's all stand and give them a rising vote of thanks.

(The audience arose and applauded.)

PRESIDENT DALEY: Gentlemen, I have one short announcement. I want to urge every member to restudy the reports before coming to the meetings, and be ready to enter into the discussion. We have had a fine demonstration this morning of what we have accomplished by those who have taken the time to study the report. It gives them a better opportunity to present their case.

Visit the exhibits. The exhibitors are the ones who help us share the load and meet some of our expenses in printing these proceedings. Make sure that you go downstairs and see all the men there, otherwise they will feel they are out of the way and aren't getting a fair share of a look from our people.

Once again, let us refrain from visiting the rooms during the meetings. There will be plenty of time for entertainment after each session. The supply men won't say "no" to you out of courtesy. Don't embarrass them.

The most important thing, gentlemen, is this: Learn all you can about what goes on at these meetings, because your boss is going to ask you for a report. Give him an intelligent report, and by so doing make it easier for you or some of your other people to return here and attend another meeting in the future. That is important.

Your boss sends you here to gain all the information and knowledge you can. In addition to that, if you have a problem he wants you to stand up and state it and get the answer to it and take it back to him. So,

give him a good report so that he will feel it is important that you attend these meetings.

We will now adjourn until two o'clock. I want to thank you all for the fine manner in which you came to the meeting this morning and entered into the discussion and asked questions. The rear of the room has been free from noise and talking, and I am sure everybody here has enjoyed the presentations this morning without interruption by those talking in the back of the room. You fellows deserve a lot of credit for keeping order.

Thanks a lot, gentlemen. Be back here in time for the afternoon session. Thank you.

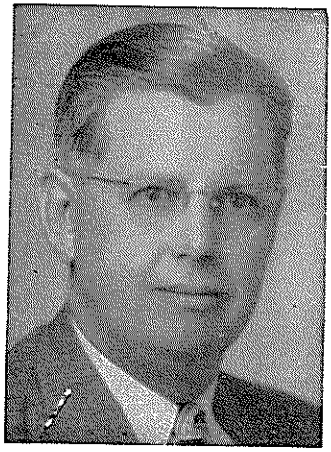
(The meeting recessed at twelve o'clock noon.)

MONDAY AFTERNOON SESSION
September 16, 1957

PRESIDENT DALEY: Gentlemen, the afternoon session will please come to order.

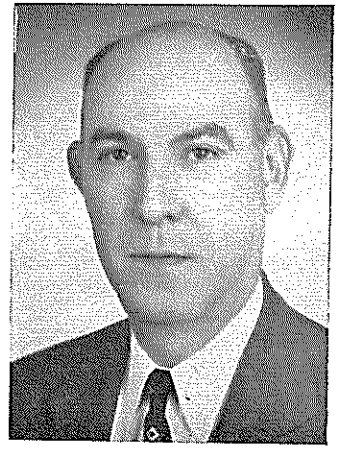
I can remember working for a top mechanical man a few years ago who took the attitude that you should never do anything you can get someone else to do for you.

I would like to introduce to you a man who is no stranger to most of you. He has been connected with the Locomotive Maintenance Officers' Association for a good many years and has done a lot of work for the Association. I would like to introduce to you the man who is going to be Queen for the Afternoon, who will handle the $64,000 quiz program, Mr. Forrest R. Denny, Second Vice President and Supervisor of Equipment, New Orleans Union Passenger Terminal Railroad. Mr. Denney.



F. R. DENNEY
Second Vice President
Supervisor of Equipment
New Orleans Union Pass. Term.
New Orleans, La.

CHAIRMAN DENNEY: This organization is fortunate in having Mr. Hall to head the Committee on General Diesel Maintenance Subjects. Mr. Hall has spent his entire railroad career with the New York Central. He served as an electrician apprentice at the shops in West Springfield, and has worked successively as an electrician, electrical inspector, special engineer diesel inspector, assistant master mechanic, general diesel supervisor, and is now Director of Diesel Methods and Procedures. He has been directly in diesel locomotive work since 1939, having railroaded a total of thirty-four years. I present to you Mr. C. L. Hall.



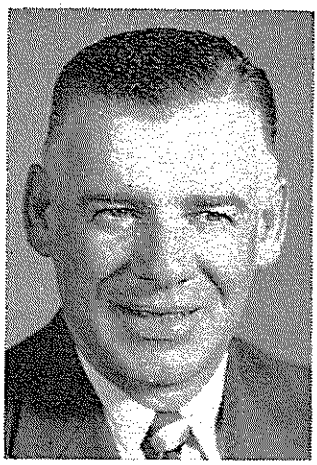
C. L. HALL, Chairman
Committee on
Diesel Maintenance — General
Dr. Diesel Methods & Procedure
New York Central Sys.
New York 17, N. Y.

MR. HALL: Thank you, Mr. Denney.

Members of the Locomotive Maintenance Officers' Association.

I would like at this time to introduce the Committee.

MR. HALL (continuing): Now I would like to call on Mr. Ernest J. Freeman, President of the Great Lakes Railway Diesel Club, Cleveland, Ohio, where I had the privilege of delivering the full paper last April.



ERNEST J. FREEMAN, President
Great Lakes Railway Diesel Club
Asst. Mech. Officer
River Terminal Ry.
Cleveland, Ohio

MR. ERNEST J. FREEMAN (Assistant Mechanical Officer, River Terminal Railway, Cleveland, Ohio): Thank you, Mr. Hall.

It is indeed an honor for me to represent the Great Lakes Railway Diesel Club at your annual meeting. Some of you probably know about our Club, and perhaps some of you haven't heard of it.

We meet the fourth Thursday of every month, starting this month, and continuing through next May, at Cleveland, Ohio. I want to extend an invitation to every member of the Association. Any time you are in the vicinity of Cleveland may I invite you to drop in at our meetings. We will be very glad to see you. You will find the meetings well worthwhile.

Mr. Hall and his Committee have done an outstanding job on this paper. I believe his subject is quite a big one for any committee to cover. I am sure it will merit a lot of discussion at this meeting.

So, to get the ball rolling, I would like to ask Mr. Hall and his Committee the first question: What type of oil has proved most satisfactory in coating impingement type air filters?

MR. HALL: Thank you, Mr. Freeman. That question requires a bit of tossing around.

When proper equipment is available to heat the adhesive to a temperature of 190 to 200 degrees and hold it there, the Committee would recommend a gel type adhesive. If such equipment is not available and you have to work at near room temperature, some of the other oils available—so-called tack oils—are the thing to use.

MR. H. R. WHITING (Chief Diesel Inspector, Grand Trunk

REPORT OF THE COMMITTEE ON GENERAL DIESEL MAINTENANCE SUBJECTS

1957 TOPIC
"ENGINE GOVERNORS, ENGINE AIR INTAKE FILTERS AND COOLING SYSTEM CONTROLS"

SEE PAGE 59 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

Western Railroad, Battle Creek, Michigan): Just how much temperature difference in the switch setting is necessary to smooth operation and eliminate cycling?

MR. HALL: We have found that to vary between 2 and 3 degrees. In other words, in order to prevent the two switches from cycling back and forth, at least 2 or 3 degrees, differencial setting between switches, so that there is a definite change of temperature before either the next switch picks up or the switch that has picked up drops out.

MR. H. E. REYNOLDS (Assistant Superintendent, Louisville & Nashville Railroad, Louisville, Kentucky): Is it absolutely necessary to spot the load regulator in any special position to get the correct balance point of the load regulator pilot valve on a pneumatic-hydraulic SI governor?

MR. HALL: I wouldn't say it is absolutely necessary, but it is much easier if you spot the thing around twelve o'clock, where you can see immediately if any movement starts. If it is anywhere from ten to two o'clock you will be able to notice any movement without difficulty.

VOICE: In the Woodward governor, what deteriorates the lube oil shutdown?

MR. HALL: The lube oil from the engine. As you know, it is on one side of the low oil pressure shutdown diaphragm, with relatively clean, cool oil on the governor side, the lubricating oil stiffens that diaphragm to the point where it will just not move. A constant check should be made, because I rather imagine many engines have been lost through low oil pressure due to the fact that the diaphragm stiffened up.

VOICE: How often would you recommend the low oil diaphragm be changed?

MR. HALL: We found that if the low lube oil diaphragm is flexed more or less frequently it will last a long time, so we have a standing rule that the engines will be shut down when they arrive at the maintenance point, by pressing in on the vacuum diaphragm and causing the whole setup to work.

We have found many people were merely pulling out the button and getting the bells to ring and have the engine shut down, and they would say, "Fine; the engine is all right." If they actually put low oil pressure on, or high vacuum, the device would not function.

MR. EARL D. HALL (Mechanical Engineer, Erie Railroad, Cleveland 15, Ohio): In your portion of the paper dealing with air filtration, the statement was made that particles less than 5 microns in size would not cause trouble. How do you arrive at that figure?

MR. HALL: The wear in the engine is one reason. The other reason is the fact that the particles are so very fine, and almost everything is blown out the stack with the exhaust. The fine particles are left and will just not cut the wearing surfaces.

MR. JOHN SIMS (Assistant Master Mechanic, Florida East Coast, Miami, Florida): In your paper you said that at the time of overhaul you seal the diaphragm, and so on. What has been the experience of your Committee as to the time the governor should be overhauled—when the engine is overhauled, or do you suggest a different time for overhauling the governor.

MR. HALL: We have found that the governor usually will last as long as the engine, if the governor has not been mistreated and has been kept relatively clean. It will perform as long as the engine.

We always overhaul the governor when the engine is over-

hauled. On occasion the governor starts causing trouble on the road, and then of course it requires overhaul, and then we generally find all kinds of things wrong.

MR. SIMS: Has the experience with the oil bath filter indicated the advantages of this filter warrants the expense of the application to engines?

MR. HALL:: I hate to answer that. I think I will express it this way, unless the Committee wants to change what I am going to say:

It appears up to now to be a matter of choice. If a railroad is plagued with extremely dirty conditions — sandstorms and things of that kind—they have to make a choice between the Rotonamic and the oil bath filter. There is no question but that both of them do a very good job. There isn't too much difference in the expense or initial cost.

There is a bit more maintenance required on the oil bath filter because of the changing of the oil and the occasional cleaning of the bowl. I do believe the oil bath filter has a little edge on any of them as to efficiency.

Does any member of the Committee wish to comment to the contrary?

MR. H. J. SAWSON (Diesel Instructor, Illinois Central Railroad, Chicago, Illinois): I think that was a very diplomatic answer.

MR. HALL: It was the best I could do. (Laughter)

MR. DAWSON: Due to the fact that we are still interested in finding out, one of the things entering my mind right now is the possibility that certain people in the room can answer this question of micron size.

In regard to micron size, what is cement dust?

MR. HALL: I am going to make a guess. Forty microns. Does anyone have any facts on that? I don't know the answer. I am just guessing.

MR. R. B. JOHNSON (Diesel Foreman, Louisville & Nashville, Shepherdsville, Kentucky): Are other railroads having trouble with single spring pilot valves hunting in the 8 throttle position? That would be EMD.

MR. HALL: I will ask the Committee. I don't know of any trouble we are having.

MR. SIM: We have had no end of trouble with the single-spring pilot valve on E-6 and E-7 locomotives, and we were unable to correct the condition until we insisted the manufacturer put two springs in the pilot valve. We experienced hunting in all throttle positions, not just No. 8 position, to the extent that it affected the operation of the locomotive.

MR. HALL: The bushing was floating up and down in the pilot valve?

MR. SIMS: Yes. If you will remember, in the early days there were two springs on the compensating sleeve. About two years ago the manufacturer went to just one spring. We sent all our pilot valves back to them and insisted that the two springs be reapplied to the pilot valve, which they did, and it corrected our trouble.

MR. HALL: The friction between the pilot valve and the pilot valve bushing pulls the pilot valve against the spring. It might be due to dirty oil.

VOICE: We have both types. I have found that you can correct the single spring. The question was, why does it hunt? I am sure a lot of us have had the experience that some will hunt and some will not. There has to be a contributory cause. Just to go back to two springs to overcome it does not tell you what was wrong. What was wrong is what we would like to know.

MR. HALL: I haven't come in

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contact with that problem, but it appears that any excessive friction between the pilot valve itself and the bushing would cause the pilot valve to move against the spring, and then the spring probably all of a sudden jumps right back to the stop, where probably with two springs it would bounce so rapidly that you would not notice any slow hunting.

VOICE: I would like to ask an additional question on the subject of air filter maintenance.

We have toyed with the idea of using throw-away car body and engine air intake filters. I wonder if anyone here has had any experience with throw-away air filters.

MR. HALL: Recently I heard of them being available for locomotives. Does anyone on the Committee use them? Does anyone in the audience have any experience with throw-away type air intake filters?

MR. K. W. BATCHELLER (Diesel Locomotive Supervisor, Great Northern Railroad, Fargo, North Dakota): We have used them on coaches in the past, Mr. Hall.

MR. R. I. FORT (Electrical Engineer of Equipment, Illinois Central Railroad, Chicago 5, Illinois): We recently completed a study on throw-away versis reclaimable filters on passenger cars. They have a little different application of the same filter. Our study indicated that the reclaimable filters were going to be cheaper than the throw-away type.

MR. F. A. UPTON (Superintendent of Motive Power, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wilconsin): I noted in your report under maintenance for Rotonamic filters that they are to be blown out on a semi-annual basis. What is the Committee's opinion relative to the EMD recent instructions to remove the filter for cleaning?

MR. C. A. WILSON (Assistant General Supervisor of Diesel Engines, Sante Fe Railway, Chicago, Illinois): We have used the Rotonamic air filters for a number of years, and it has been our practice to blow the filter on semi-annual inspection or whenever it is needed. So far there has been no detrimental effect on the Diesel engine.

We will continue to do this even though EMD has come out with this other bulletin. What their thinking is on that, I do not know.

MR. HALL: It may be that Electromotive feels that with the blowing of the filter some of the dirt that is dislodged may be sucked right into the engine.

Mr. Shea, do you have a comment on that?

MR. F. X. SHEA (Vice President, Farr Company, 51 East 42nd Street, New York 17, New York): Our experience so far is in line with Mr. Wilson's, that apparently the dirt that is blown off the face of the filter will be the same as the dirt entering the filter, and that the major proportion that enters the engine will be in the zero to 5 micron range; so whether you save it on the face of the filter or separate it continuously won't make a great deal of difference.

MR. T. H. PATTERSON (Foreman, Louisville & Nashville Railroad, Polisville, Kentucky): What is the best means for checking hot engine alarms and shutter control on GP 7 and GP 9 locomotives?

MR. HALL: Our method is to remove the bulbs and put them in a little tank with a heater and a mercury column thermometer to bring the water temperature up. If you try to do it by bringing the engine temperature up, it is going to consume an awful lot of time.

MR. H. J. DAWSON (Diesel

Instructor, Illinois Central Railroad, Chicago 5, Illinois): In removing these units, is it the general practice to clean the bulb surface of the unit before it is reinstalled, or in the opinion of the group here is there a necessity for cleaning those things periodically to give us a proper temperature control?

MR. HALL: In the event the bulb has scale on it or residue from water treatment, or something of that kind, I would strongly recommend that they be clean before testing, and then be replaced. Up to now I have yet to see, on our road at least, a bad bulb.

MR. DAWSON (Illinois Central): I think I misstated the question. My desire was to find out if anybody thought it was necessary to clean those bulbs periodically, to properly control engine temperature.

MR. HALL: We have not found that to be the case on the New York Central. How about the Committee? Apparently with modern water treatment the bulbs stay sufficiently clean to perform properly.

MR. MICHAEL B. ADAMS (General Supervisor of Diesel Engines, Atchison, Topeka & Santa Fe, Chicago, Illinois): I am curious about the treatment of the oil bath filter in freezing weather. I understand that in cold weather climates there is some difficulty with moisture getting into the oil bath and freezing. Do you have to take precautions to avoid that?

MR. HALL: The only experience we have had with oil bath filters doing that was on the Budd RDC cars. Have you had any such trouble, Mr. Wilson? We haven't had any trouble on locomotives equipped with oil bath filters, with freezing or water in the filters except one very disappointing case recently. They washed the inside of the engine room after the filter had been serviced, with the engine idling, and we really had a filter full of everything—water, soap, suds and oil.

If the drive gears are worn appreciably there are manufacturer's limits (if they are adhered to), usually resulting in pretty good operation. If an extreme amount of slack is involved, the governor will go into a very rapid hunt. You can recognize it immediately. I have heard fellows call it a jiggling power piston. That will be the indication of such a condition.

MR. ANTHONY ARMISTEAD (General Foreman, Louisville & Nashville Railroad, Mobile, Alabama): What is the best method of testing Vernatherm controls, and how often would you recommend the test be made?

MR. HALL: The answer to that question is similar to these bulbs on temperature switches. The quickest and most positive way is to take the unit off of the header and submerge the bulb in a little tank with a heating element and thermometer, and put it through its paces. We have not found it necessary, with that particular instrument, to make that test more than once a year.

MR. E. P. BLEDSOE (Shop Superintendent, Seaboard Air Line Railroad, Washington Avenue, West Jax Shop, Jacksonville 5, Florida): What has been the Committee's experience with the diaphragm and the shutdown device on the Woodward governor? Do you have a specific recommendation for testing and inspecting this shutdown device?

MR. HALL: Yes, sir; we have the specific recommendation to have the engine, each time it is at its maintenance point, shut down by the actual operation of the low oil protective device. On an EMD it is very simple by merely pressing in on the suction

diaphragm. That causes the whole system to function. There also has been a tendency to cause the diaphragm to move occasionally to keep it from stiffening up.

MR. BLEDSOE: Does that give you the proper test for the suction portion?

MR. HALL: Yes, sir.

MR. BLEDSOE: Do you feel it does? You don't have to put a suction pump on it to test it?

MR. HALL: If the low oil pressure device was set up properly in the first place, no. It is just a case of seeing that the diaphragm is not stiffened up.

MR. BLEDSOE: Would you still have any specific time limit to offer? Would you still say you check the operation of the suction portion the same as you do the low oil?

MR. HALL: Yes, sir. When you press in on the suction diaphragm you unseat the ball check. That bleeds the oil pressure off the engine side of the diaphragm, causing the unit to work exactly the same as it would if the oil pressure were down.

MR. BLEDSOE: Doesn't the EMD have a pump to use to test that?

MR. HALL: I believe it does. We put a "T" in the line with a drain-off pipe and valve and gauge so that you can actually check the low oil pressure at which the device will trip.

MR. FRED A. LOVELL (Diesel Electric Instructor, Baltimore & Ohio Railroad, Baltimore, Maryland): I believe the last question was referring to whether or not a defective suction diaphragm would be tested when shoving in on the Allen screw. Any defects in the diaphragm, such as, a hole would not be noted. Consequently, a suction device will create suction on the diaphragm, will still have to be used to test the suction device.

MR. HALL: That's right, but this method I was speaking of was something to assure you that the oil diaphragm which has given us the difficulty—was functioning—I have seen practically no trouble with the suction diaphragm, although of course, it can happen.

MR. W. F. BOWERS (Supervisor, Diesel Locomotive Maintenance, Western Maryland Railroad, Hagerstown, Maryland): Does your Committee feel that temperature regulation on EMD Diesels has any connection with runaway fires, and, if so, how much?

MR. HALL: Let me see if I understand the question. Do you mean the temperature of the cooling water having anything to do with the runaway fires?

MR. BOWERS: Yes.

MR. HALL: Personally, I don't know.

MR. V. L. SMITH (Superintendent Motive Power, Belt Railway of Chicago, Chicago, Illinois): Only as far as starting with cold engines and accumulating exhaust gas in the manifolds is concerned, which is true of all makes of power.

MR. HALL: That wouldn't have anything to do with the control system. Mr. Smith said that starting cold engines and filling the manifold with exhaust gas might throw off some flaming carbon particles, but that would not be a function of the engine temperature control system.

MR. BOWERS: What I meant was that the engine is running on the cool side. Would that have a tendency to make the engine throw sparks?

MR. HALL: I haven't experienced it, but I do believe that if the engine is running on the cool side you would find a tendency to build up carbon particles in the exhaust ports of the stack and manifolds, and so on, and

when you did go after it and put it up to full load those carbon particles might be discharged under that condition.

MR. G. S. BARRIS (Electrical Foreman, National Railways, Canadian National Railways, Moncton Shops, Moncton, New Brunswick): I would like to know if you put a mileage limit for basic overhaul on the GE 17, MG 6 or 3 governors, either one?

MR. HALL: We do not have a mileage limit, but we do make a thorough inspection of the condition of the governor at the time of the assembly changeout.

MR. BATTIS: There is no mileage limit?

MR. HALL: No.

MR. RAYMOND J. SNANICK (Assistant Diesel Electrical Foreman, Central Railroad of New Jersey, Elizabethport Shops, Elizabeth 1, New Jersey): On the EMD Model F3 Locomotive cooling elictrical circuit, a relay called TCR is used. We have had temperature control relay failure.

Now we find removal of it can cause a delay in cooling timing; also improper shutter sequence.

Therefore, we are testing a multi-contact Vapor contactor to replace the original bottle type relay which is very fragile.

MR. HALL: That is quite involved. That is a bit off the subject of the paper. We did some thinking about that recently on the New York Central, and some tests were run with the light engine. We have automatic train stops on our railroad, and in the event a break-up is noted from the automatic train stop and the throttle is at 8.

MR. SNANICK: The temperature control relay, the TRC.

MR. HALL: I thought you said PRC.

MR. SNANICK: I beg your pardon. The temperature control relay—

MR. F. A. ROBINSON (Assistant Electrical Engineer, Denver & Rio Grande Western Railroad, 1531 Stout Street, Denver, Colorado): We put in a relay, a regular "horse" type relay, the large relay, to hold the cooling controls in until the temperature of the engine has gone down to its minimum, in the same manner that the F-7 is equipped, as we had to get away from the TCRs. We have had success with the new application.

MR. W. L. FRANCIS (Machine and Erection Foreman, Nickel Plate Road, 707 Rossville Avenue, Frankfort, Indiana): Will the governor oil pipe from the oil strainer to the governor cause a locomotive shutdown from full throttle to idle due to an air leak or loose connection?

MR. HALL: If it is the vacuum pump it would have no effect on it at all, except that you would lose the vacuum shutdown if you have any appreciable leak.

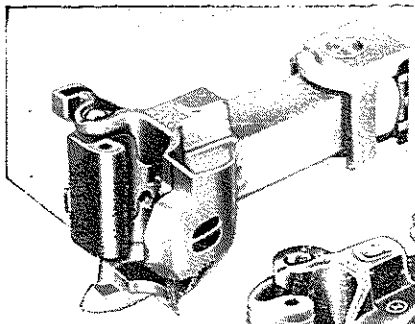
MR. W. L. FRANCIS: The cause of our shutdown was hot lube oil. We are now removing the oil cooler and cleaning same.

MR. BATTIS: On the GP-7 everyone likes to keep the lube temperature control switches. From what I hear now, no one seems to like the Vermatherm or those other devices. I would like to know why EMD insists on putting it on when everybody is happy with what they have on the GP type locomotives.

MR. HALL: I would like to know that, myself.

MR. IVAN L. FRYE (Maintenance Supervisor, Baltimore & Ohio Railroad, Baltimore & Charles Streets, Baltimore, Maryland): I would like to get somebody's advice and opinion.

If you send a unit to EMD which normally has a 567-A or 567-B engine, the conversion comes back as to AC or BC engine. When this unit was operating as a 567-A or 567-B we



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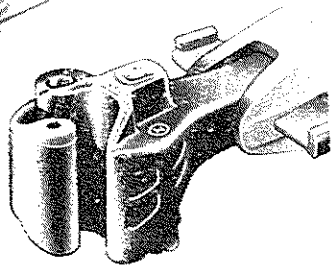

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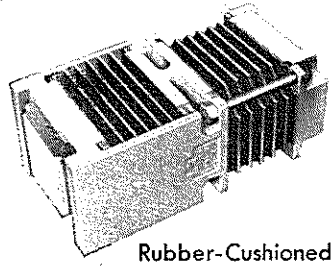

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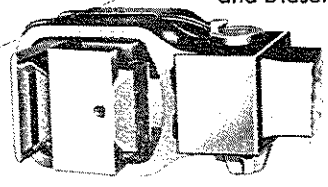
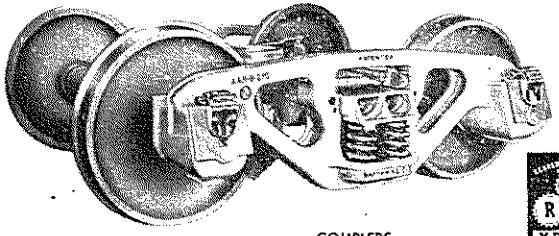


Freight Car Trucks



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had a volume of water passing along the bottom of the crankcase, on both sides, and the water in the water manifolds had some effect on the lube oil temperature because it acted as a coolant. Now we convert to AC or BC and no longer have that volume of water, moving in the bottom of the engine, and we put this AC or BC engine back in the carbody and it in service.

I am wondering whether anybody has had any experience along these lines and knows what the effect would be on the oil temperature, when we no longer have that large volume of water in the bottom portion of the crankcase of the engine.

This is a question we are just getting into, has any of your gentlemen had any experience along that line?

MR. HALL: We have a large number of AC and BC engines in service on our railroad, and we have not noticed any difficulty from this conversion or the loss of that extra cooling afforded by the low deck, but we have not made exhaustive tests to see if there is really any appreciable change in oil temperature. Has anyone run a test of that kind? Is there anyone here from EMD to answer that question?

MR. BLEDSOE: Mr. Hall, I have a file two inches thick on it. Something is happening. We have a meeting with EMD Thursday morning to see if we can find out what is happening.

We put three engines in one position, all AC, and we are still trying to get 21 lb. oil pressure, 180 degrees and, if my memory serves me right, about 200 degrees oil temperature.

We have used every type of oil cooler that EMD has thought of and that we have thought of, and with those three engines we still get 21 lb. oil pressure, 180 degrees temperature of water, and the temperature of the oil is 210 or 220.

The boys today are putting a 567-A engine in, and we hope to get results. Right now we are in one heck of a mess.

I might add that somewhere along the line someone has got to give some thought to oil cooling on EMD locomotives. I think it is a crying shame that we have the temperature we are running. Maybe Mr. Sims, of the East Coast, and we on the Seaboard, are the only roads having this trouble, but I think the fellows on the West Coast have the same condition. Oil coolers are a problem, and somebody has to correct it. Does anybody have any trouble with oil coolers? Do you have to clean them every six months on the GP-9 locomotive?

VOICE: On the Illinois Central we had something of the same problem when we converted from the B to the C type. We did have higher oil temperatures, and we thought the trouble was in the cooling system, and we cleaned it and changed it several times. We partly overcame it by cleaning, but we still run temperatures that we think are a little too high, and the oil pressure is a little too low.

MR. H. J. DAWSON (Diesel Instructor, Illinois Central Railroad, 109 East Roosevelt Road, Chicago 5, Illinois): Every once in a while you find that comebody has the same trouble you have.

MR. BLEDSOE: Yes, but on EMD nobody is having it but Bledsoe. (Laughter)

MR. DAWSON: In the discussion about the water manifolds, we have gotten to the point where we thought that if we did get 0.5 degree change in the temperature of the oil we might keep the oil button in at the time we shut the throttle off. In addition, some of the things we

might not be doing, we find out we have to do, with the type of cooler we now have. It was considered that possible the B engine, where we use the portion of the water manifold that might give us 0.5 degree lower temperature of the oil, we would keep the button in.

MR. HALL: That is what it looks like. As you know, they have increased the oil cooling capacity on the C engine, and it looks like it is going to have to be done on E power as well as converted F-3's and F-7's when we go to AC or BC engines.

MR. G. R. OESTERREICH (Regional Service Manager, Electro-Motive Division, General Motors Corporation, 135 South LaSalle Street, Chicago 3, Illinoise): I know one railroad that doesn't have any oil cooler problems. It is the Denver & Rio Grande.

To come back to the cooling on AC and BC conversions, I believe there is a point there. The large oil cooler is supposed to be used on AC and BC conversions. I think you all should be acquainted with the publication. It was issued some time ago.

MR. HALL: How about the E power? Nothing has been said about that.

MR. OESTERREICH: I do not have any information concerning the E power. The lube oil coolers on GP-9's are in trouble and usually in about six months have to be taken out. Here again it depends entirely, or a great deal upon the condition of the lube oil you are using. This has a great effect on the condition of the lube oil cooler. I inspected some on the CB&Q, and there was no dirt evident. I believe Mr. Williams, of the CB&Q was with me when we removed one. It happened last year. Is Mr. Williams here?

MR. BLEDSOE: I was speaking of the E-4 or E-6 locomotive. I don't think we have anything that increases the size of the oil cooler on those locomotives, and we still get carbon deposits, no matter what size cooler we put into the GP-9. We still get carbon deposits that restrict the oil.

MR. OESTERREICH: The E-6 and E-7 had the old square type cooler. They always did plug early, and it hasn't changed so far. The only thing I can recommend is that you watch the temperature and then clean them up. If you wait too long you will suddenly bypass all the oil. This is an old issue—ten or twelve years old. I don't think there is anything we can do about it with the space available in the unit. I haven't heard of E-8 or E-9 oil coolers being in trouble. If so I would like to hear about it.

VOICE: Mr. Hall, on our railroad we are operating with Mr. Bledsoe. We are not confronted with overheating of the lubricating oil and water temperatures on any of the G class locomotives or the F-3's, F-7's or E-9's, but the E-3's, E-6's and E-7's are doing it. We are already removing the square cores and applying the agitators in them, and they are running hot, too.

MR. OESTERREICH: You will admit we tried everything and so far I don't know of anything that can be done to help the situation. Here again you must admit that part of it has to do with the condition of the lubricating oil, just as on the GP-9 and GP-7. I know some have had trouble with the FT's. This type of locomotive did not usually get into trouble with the coolers, but when they did a lubricating oil condition was involved.

MR. H. C. TAYLOR (Diesel Superintendent, Southern Railway, Washington, D. C.): Mr. Hall, we have experienced similar troubles with engines overheating on the E-6 type EMD

passenger locomotives. We are now conducting tests by applying an additional radiator cooling coil on top of the car body roof. With limited tests at the present time the results look very promising.

MR. HALL: That is very interesting. We do not know that the E-7 power—we don't have any of the older ones on the New York Central, but the E-7 power is certainly critical on cooling water capacity, and with the slightest irregularity in fans or belts or anything else, or even a high ambient temperature the engine just will not run in the No. 8 notch at 90 to 95 degree ambient without getting up to high temperature.

MR. FRYE: After you have done everything on the A-6, in case you go to an AC or BC, after you have done everything else—I don't know whether Mr. Bledsoe will agree with me, but what you have to do on a temporary basis to get along, is to take the 50-lb. relief valve, set pressure up to 65, jack the engine rpm to 275 or 300, and you can live with it then, especially in July or August.

MR. SNOW: I am glad to hear the problem is so widespread. I thought it was only on the L&N Railroad.

We have just finished working with the EMD on this matter particularly on F-9 power, and I want to give this to the members for their thinking, because it is our opinion.

We have what we call a reseal program wherein we take out cylinder assemblies and oil cooler every three years, we saw the oil cooler in such excellent condition at the first reseals that we discontinued taking them out. After this we ran many units up to the sixth year, but in approaching the sixth year without cleaning the oil cooler we got into difficulty. Between the third and sixth year reseals we changed another practice. We wanted to save money on lube oil, and we elected to leave the lube oil in and let the analyst determine when it should be changed out. Formerly we washed the engine down and got it very clean. After discontinuing this practice we found that what we were depositing in the oil cooler a lot of carbon or sludge, and that it would build up so rapidly as to affect the oil cooler.

It is our thinking that if we could operate the first three years under the old practice and have clean oil coolers, we can do so again.

Then when we got out F-9's and had heard so much about the good results with the latest oil cooler, which had 900-odd tubes and fourteen fins as related to the old 400 tubes and 10-fin cooler, we began to use them in our F-9 units. The results looked good but it made a very fine screen out of the oil cooler. It was no longer only an oil cooler but a filter, and it clogged more easily. EMD recognized that the oil coolers will filter as well as cool, and they know that they have got to live with it, and they can't live with it unless they get clean oil to it.

Getting back to the E power, we had sixteen of them in 1942 that ran hot the first trip. It was due simply to an inadequate cooling water system. We have fought these units from 1942 to now trying to make them run cooler. EMD came up with some baffle plates which helped, and made some other minor changes, which also helped; but, all in all, there simply is not enough cooling in the cooling water system with the Harrison cooler to get the proper reduction in temperature of the lube oil.

The gentleman mentioned 180 degree water, 220 degree oil. I

presume he means oil into the engine. If oil went into the cooler at 230 degrees and came out at 220 degrees, the oil cooler did its job. The answer to the question is the temperature drop in the cooler. It tells you that the cooler is doing its job, and it tells you that you have to work on the cooling system to reduce the water temperature, and thereby you can reduce the oil temperature to a liveable level.

We hope that by going back to oil change periods, washing down the engines and watching the filter changes, we will be able to send to the engine, oil that is cool enough. With the 14-fin 900-odd tube cooler we are going to have quite a problem keeping the oil clean enough to prevent cooler plugging.

MR. W. A. GRIGG (Assistant Superintendent of Motive Power, Virginian Railway, Princeton, West Virginia): Do you find the Woodward governor needs general overhaul at a specified time? If so, do you find it can be overhauled at railroad level or is it necessary to return it to Woodward?

MR. HALL: First, we have found that the governor will last as long as the engine under ordinary conditions. In other words, from general overhaul of the engine to general overhaul of the engine. A railroad shop properly fitted up to make the repairs can make those repairs locally, but they must have a good test stand to properly test out the governor and make the repairs, unless you want to go through the difficulty of applying it, running it, and then taking it off if it doesn't behave itself.

MR. D. M. CLOUGH (General Diesel Supervisor, Duluth, Missabe & Iron Range Railroad, Proctor, Minnesota): In checking time of shutdown, does not the bypass value O ring give trouble?

MR. HALL: I don't quite understand the question.

MR. CLOUGH: In checking the shutdown by pressing in on the Allen screw, doesn't the O ring sometimes give trouble and you have to change the bypass valve?

MR. HALL: Yes.

MR. M. H. HAMMETT (Manager, Spencer Shop, Southern Railway, Spencer, North Carolina): I would like to extend Mr. Taylor's remarks a little further in regard to the oil cooler trouble.

We had a representative of Mr. Bledsoe's railroad who came over and looked at the water cooler radiator on top of our engine, and he said they had done identically the same thing on the Seaboard and that they had dropped the water temperature successfully, but they still were not able to drop the oil temperature.

I wonder if Mr. Bledsoe would like to comment on that, or any other Seaboard man.

MR. BLEDSOE: I wasn't going to bring that up. We think the idea basically is good, but we did experience that. Our oil temperature is still running high, and we have gone so far as to go back to the old flat type core, which I think we will all agree that the flat type core is a much more efficient core than what we are now using.

The railroads complained about the inability to clean the cooler core, so Electromotive, who cooperated with us, gave us a core that does not do as efficient a job, but is easier to clean. Therefore, we are in another rut.

To get back to your question, we tried that. What is wrong with it, I couldn't say; but basically the idea of the additional cooling on the roof seems good to us, and we will follow it through.

MR. HAMMETT: I will admit we don't have any E-3's. We

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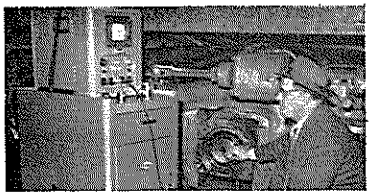

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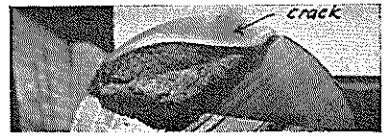

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started with an E-6, so there may be some difference there.

MR. BLEDSOE: We were blessed with the first 567 locomotive that EMD ever built, the 3000, and we could talk to you about any problems you want to mention with the EMD.

(Laughter)

MR. H. V. TAYLOR (Diesel Superintendent, Southern Railway, Washington, D. C.): As information, I would like to know if other roads are using the 20% increased capacity lubricating oil circulating pump on the E-6 type locomotives?

MR. DAWSON: Mr. Taylor, have you tried a 16-cylinder engine scavenging and pressure pump on a 12-cylinder engine?

MR. TAYLOR: Yes, we have.

MR. DAWSON: It works pretty well.

MR. TAYLOR: You have to watch that it does not rob. If the present scavenging pump is not up to capacity you are liable to rob the tank. We have one that has been running two years on an engine. We put on the small size 6-cylinder pump.

MR. HALL: I thought everybody had the 20% larger pump on the E power by now, Mr. Taylor. That may have something to do with some of this trouble we are hearing about.

MR. TAYLOR: That may be. I am just wondering if some of them did have the larger pump.

MR. BLEDSOE: Yes, Mr. Taylor, we have the larger pump, and we also have the engine with a 16-cylinder pressure and scavenger pump. I am still open for suggestions.

MR. HALL: I think EMD had better come along with a bigger oil cooler.

MR. BLEDSOE: I think they have been with us and they are going to stay with us.

MR. KRAFT: I would like to know if any of the railroads present are having difficulty with sticking overriding solenoids on governor power packs, and if so, what they did to get out of it if they did get out of it.

MR. DAWSON: Would you also like to include the whole power pack?

MR. KRAFT: We don't have too much trouble with the other solenoids in the power pack, but the overriding is the offender.

MR. HALL: I think that is all we have time for, gentlemen. George Beischer, will you come up and summarize?

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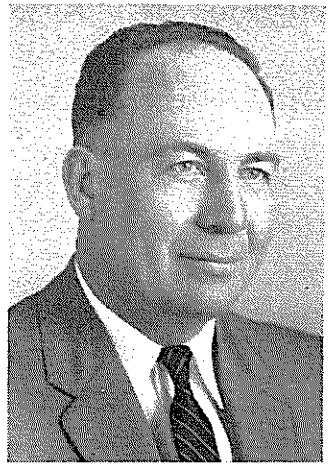


G. M. Beischer
Asst. Merchanical Supt.
New York Central System
Cleveland 13, Ohio

MR. G. M. BEISCHER (Great Lakes & Canadian Regional Executive, Assistant Mechanical Superintendent, New York Central System, Cleveland, Ohio): Thank you for your technical paper and so able a discussion. I am certain that all of us in the room have an appreciation of the very considerable amount

of work that Mr. Hall and his Committee have performed to bring us such a controversial and difficult subject.

At the close of each of these technical sessions I am always reminded of the farmer in Missouri, who a number of years ago, raised some very remarkable mules. He sold them to the U. S. Army with the one stipulation that the mules must be treated with the utmost kindness, as they would not respond to any other type of treatment.

Some days after he delivered the mules to the Army he received a very agitated call. "You'll have to come down at once. We have tried every known brand of kindness on these mules and they still refuse to leave the feed bins."

So, down went the farmer. The first thing he did was to stride up to those remarkable mules and lash upon them the most unkind treatment anyone could possibly administer. He gave them a lashing that was terrible to see. He called them every name in the book and even some that were new to the Army.

Finally the Army man said, "Hold on. You told us these mules would respond only to kindness."

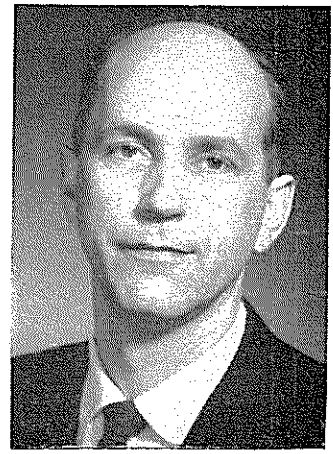
"That's right," said the farmer, "but first you have to give them some harsh treatment so they will appreciate the kindness you are going to give them."

So, gentlemen, this is an appropriate time to show our appreciation to Mr. Hall and his Committee for the kindness they have shown us in bringing this subject to us.

CHAIRMAN DENNY: This meeting reminds me of some we have had in the Southeastern and Southwestern Diesel Clubs. It has been very interesting, and I know we have all learned a lot from it. There is still a lot to learn, With that I shall dismiss the Committee and will ask the next Committee to come to the platform.

Gentlemen, the Chairman of our Committee on Diesel Electrical is most ably qualified to present his paper on this subject. Mr. Stendahl served an apprenticeship as a terminal electrician, and following a hitch in the Navy he went to work for the Great Northern Railroad. In 1951 he was moved to St. Paul as the Diesel Locomotive Supervisor, after serving as foreman and assistant Diesel supervisor. One of his chief forms of relaxation is reported to be his attempts to design new electrical circuits.

At this time may I present Mr. C. P. Stendahl.



C. P. STENDAHL, Chairman
Committee on Diesel Electrical
Diesel Locomotive Supvr.
Great Northern Ry. Co.
St. Paul 1, Minn.

C. P. STENDAHL:

It is a fine privilege and a pleasure for me to serve as one of your Technical Committee Chairmen, and to be here today before such a large fine audience.

I certainly enjoyed meeting with the fine group that makes up our Committee. Their big help to me has been most gratifying. I want to express my sincere thanks to each and every member. We feel we should be able to get answers to most of your questions during the discussion period, and it is our sincere hope that our Committee may add something to your experiences concerning the maintenance and rebuilding of motors and generators.

I would like to introduce members of the Committee at this time.

Next I would like to introduce Mr. E. R. Henkle, Northwest Locomotive Association of the Twin Cities—Minneapolis and St. Paul.

On behalf of our Committee I want to express our thanks to the Club for the fine reception given us when we made the Pre-Convention presentation there at St. Paul Hotel, May 28th, and for the very good discussion period following.

It gives me great pleasure now to introduce to you Mr. Henkle.

MR. E. R. HENKEL (Assistant Mechanical Superintendent, Minneapolis, St. Paul & Sault Ste Marie Railroad, Minneapolis, Minnesota): Mr. President, Members of the Locomotive Maintenance Officers Association and Guests:

It is indeed a pleasure to represent the Northwest Locomotive Association at this annual meeting.

Our Club originated about ten years ago, and today we have approximately 1500 members. Our Club meets on the fourth Tuesday in September, November, January, March, May and June, alternately holding meetings in Minneapolis and St. Paul.

Mr. Stendahl and his Committee presented this paper during the May meeting in Minneapolis. The meeting was well attended, followed by a very lively floor discussion. Let's have the same today.

MR. C. P. STENDAHL (Diesel Locomotive Supervisor, Great Northern Railway Company, St. Paul 1, Minnesota): Thank you, Mr. Henkel.

The meeting is now open for your questions and discussion.

MR. R. C. NASLUND (Diesel Electrical Supervisor, Duluth, Missable & Iron Range Railway, Two Harbors, Minnesota): What current and voltage is used for testing for continuity and shorts in jumper cables? What special equipment is used?

MR. STENDAHL: This means taking the jumper cables off the locomotive and running them through the shops, I presume.

The jumper cables receive quite a complete test on our railroad as they go through the shops. We set up a machine for testing of the jumper cables in our shops. The voltage used between conductors is 800 volts. That is to test the insulation between the conductors of the jumper cable. The current used for determining the condition of the individual conductors is around 45 to 50 amperes.

This machine is completely automatic. It was designed by

REPORT OF THE COMMITTEE ON DIESEL ELECTRICAL MAINTENANCE

1957 TOPIC
"MAINTENANCE AND REBUILDING OF TRACTION MOTORS AND MAIN GENERATORS"

SEE PAGE 91 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

one of our electricians. By placing the jumper cable in the machine it completely tests that jumper cable with oscillations also.

MR. NASLUND: Has anyone used a ripple voltmeter to detect commutation troubles?

MR. STENDAHL: I don't know of a ripple voltmeter being used. However, we might ask the panel. Has anyone on the panel had experience using a ripple voltmeter for checking commutation difficulties? We don't have an answer to that, Mr. Naslund.

MR. NASLUND: I have another question: What has been the experience with ground detectors, such as made by Ajax.

MR. STENDAHL: That ground detector for low voltage checking seems to be a pretty good method for finding grounds, although it is new on our railroad. I would like to hear comments from somebody on the panel who has had experience with it. Has anyone on the panel had experience with the new ground detector? Evidently not.

It was first demonstrated when we were watching it being demonstrated and it found the ground in the low voltage system very quickly. It is very new on our railroad, and we can't comment too much on its application as yet.

MR. NASLUND: Another question: Are motors judged to be ready for overhaul on the baris or bearings, megger readings, or strictly on a time and mileage basis?

MR. STENDAHL: From our survey it seems that the weakest point is the bearings, and they have to come out on account of possible bearing failures occurring. This is usually set up on a mileage basis, about 400,000 miles. That varies somewhat with the various railroads, but the main reason for taking the motors out and going through a complete basic on the motor is to be sure we will not have bearing failures. However, motors are also taken out because of insulation breakdown before the mileage has expired.

MR. CLOUGH: Are locomotives kept in operation after a flashover until the next test date if no more ground relays occur?

MR. STENDAHL: I believe the answer is yes to that question. If there is no more ground relay action, I think the answer is yes.

MR. NASLUND: Do the railroads who just dip armatures and spray or brush fields seem to get as good service as those who varnish with a vacuum system?

MR. C. J. FREY: (Electrical Foreman, Chicago, Rock Island & Pacific Railway, Silvis Shops, Silvis, Illinois): Naturally, the best method is to impregnate, whether it be the fields or the armature. Most railroads that are overhauling traction motors impregnate their armatures. A big percentage of them just paint their fields. However, some railroads are dipping their fields.

If you have an impregnator and you are overhauling traction motors and you feel that you want to take a chance of getting varnish all over the outside of the field frame in order to get a better seal of the field coil, it is a good idea.

On the Rock Island we use an impregnating method on the armatures, and we have a dip stand for field frames similar to the one the Great Northern uses. We raise the varnish on the inside of the frame and let the fields be submerged for 20 to 30 minutes or until the bubbles quit rising from the field coils. We have been doing this for a couple of years. The reason we started this practice was to eliminate the number of moisture grounds that we were getting in field coils.

Whether or not this procedure is going to be entirely successful will be indicated in the next year or two. We feel that we are now eliminating some of the moisture troubles. We feel that it is a good policy and that railroads should either dip their fields or impregnate them. We find it isn't economical to remove the fields to impregnate them, and naturally it is a big job to apply the whole frame to the impregnator and clean it up again. Impregnating uses up a large amount of varnish, and it takes a lot of time. We think by using the dip stand in place of the impregnator we get probably 80 per cent as good a job, for less time on material. If we can cut down the moisture grounds this way, and seal the voids in the fields where the moisture is entering, we feel we have accomplished what we should in a repair shop.

MR. R. A. HOEFT (Electrical Foreman, Chicago, Milwaukee, St. Paul & Pacific Railroad, 2933 West Chicago Avenue, Chicago 22, Illinois): I would like to get back to the grounding question. We have that type of machine where I am stationed at the present time. We use it with a good deal of success on control grounds and particularly the Erie type Fairbanks. Quite a bit of our work on high voltage equipment is used possibly to locate grounds in the clamps underneath the car body. It is very effective for that type of ground.

I have a question. I am using a DC high potential machine. What voltage should be used to accomplish the same results in comparison with an AC machine?

MR. STENDAHL: We have one of the DC high pots. We haven't put it to very great use in our shops as yet, but we find from one of the reports that the voltage on the DC machine should be approximately 1.6 higher than the AC indicated voltage. The DC tester seems to be good means of determining the condition of the insulation, because you can actually see on the microammeter the leakage of current through the insulation. Once that has been set up, as to how much leakage you get by with, you can get a better picture of the quality of the insulation than you can with the AC high pot.

MR. HOEFT: Have you found any breakdown of any of the high-voltage equipment with DC machines?

MR. STENDAHL: We have had only a little experience with that. I would like to call on anyone on the panel who has had more experience with the DC tester.

MR. E. S. KANEWSKI (Electrical Foreman, B & O Railroad, Glenwood Back Shop, Pittsburgh 7, Pennsylvania): We have had no trouble at all.

MR. J. R. MITCHELL (Assistant Electrical Engineer, Equipment, Illinois Central Railroad, Chicago, Illinois): We have a group of seventy EMD GP-9 locomotives that were delivered the early part of this year, which have developed bar edge burning on the commutators of the main generators. Approximately 90 per cent of them have bar edge burning on the D-12 generators. I wonder what the experience of your Committee has been, or the experience of any other railroad represented in this room, on main generator bar edge burning on GP-9 units.

MR. J. R. SCHOONOVER (Assistant Supervisor of Electrical Equipment, Lehigh Valley Railroad, Sayre, Pennsylvania): I think you will find that you will have bar edge burning on almost all of the generators. What we do when the commutator becomes pitted or burning, the edge is rounded with a hand stone. This

seems to help. We also apply insulating paint up to top of the commutator.

MR. MITCHELL: What is the earliest you have noticed bar edge burning developing on the generator?

MR. SCHOONOVER: It will start almost right after the first trip.

MR. MITCHELL: Visible bar edge burning?

MR. SCHOONOVER: Yes. It won't be too bad, but you will notice some ragged edges.

MR. MITCHELL: How far can you let the bar edge burning develop before machine stoning?

MR. SCHOONOVER: Usually we don't like to use a stone on a commutator unless it is absolutely necessary, but we do use a hand stone just to trim the edge.

MR. MITCHELL: Could you be a little more specific in terms of months? What has been the average time that you felt it required machine stoning to true up the commutator and relieve the bar edge burning?

MR. SCHOONOVER: Usually, if an engine comes in and has flashover, it will be much worse. It is quite noticeable. We don't pay any attention to slight bar burning on the edges. As to speak in the terms of months, I would say it will depend on the type of service.

MR. MITCHELL: To expand my first statement, on the seventy locomotives that we have received we have bar face or bar edge burning as high as one-sixth to one-third across the bar face, about every fifth bar on about 90 per cent of the locomotives. We feel that is not a normal condition.

MR. SCHOONOVER: Do you have any signs of copper drag?

MR. MITCHELL: Very little; practically none. There is very little evidence of smutting. I might add that this bar burning is not only with the standard brushes applied at EMD, but also with other brushes that we have tried.

MR. SCHOONOVER: All types? We haven't run into that serious situation as yet. But I will say this, it sounds like you are having commutation trouble either loading or brushes.

MR. STENDAHL: What type of service is the locomotive in?

MR. MITCHELL: It is mostly in a general freight pool service.

MR. STENDAHL: Would you say it is a heavy burn condition, or is there a lot of idling time? Is there a heavy current condition there, starting heavy trains, and also is there a long idling time?

MR. MITCHELL: I would say our idling time is no longer than that on the average railroad, and probably a little less. We seem to have a chronic shortness of them. Our utilization factor is relatively good. Our main generator current and train starting conditions are average to most railroads.

MR. STENDAHL: Do you have any high speed operation?

MR. MITCHELL: Forty per cent of the service is probably in the nature of freight drag service of around 30 miles an hour.

MR. STENDAHL: With 65 miles an hour gear ratio?

MR. MITCHELL: Sixty-five miles an hour gear ratio. We have been fighting this problem for several months, and we have been told by EMD that there isn't a comparable situation on any other railroad similiar to our experience of bar edge burning developing within the first six months after the unit has been delivered. We would appreciate contact with anyone who does have anything comparable to that.

MR. FREY: I would like to ask if that is just a blackening of

the edge of the bar, as if it is actually an arc mark.

MR. MITCHELL: It depends on which brush is being used. Each brush will have a little different characteristic. For example, the DE-2 brush, which is standard with the locomotive builder leaves a fairly bright etched looking area, with very little smutting. Other brushes we have used have smutted the edge of the bar first, then progress into the bar edge and bar face burning.

MR. FREY: I am a shop man, not a maintenance man, and I don't get on locomotives too much. However, I have noticed this: On motors and generators that have been loaded lightly with imporper brush for a light loaded generator or motor, it will have a tendency to get up definite smut patterns on the commutator.

For instance, on the D-27 in high speed equipment, under continuous light loading at high speed, about every third bar will have a tendency to smut over, as you say. On generators, a characteristic like that will develop also under continuous light loading. I haven't seen it on the D-12 on our railroad, but I have seen it on D-15's and D-4's. Not having been on the locomotive, I would suspect improper loading, that is, not actually loading the locomotive and getting improper commutation for the type of brush and the type of load on that particular application.

Matching a brush to a load is a tough proposition, and I think all brush men and everybody who has operated motors or generators knows that. I think I would investigate that angle. Obviously, I think it is commutation trouble, and probably it is coming from loading.

MR. MITCHELL: We have very little bar edge burning on our traction motors.

MR. FREY: In freight service?

MR. MITCHELL: Yes, in freight service.

MR. FREY: On high speed passenger service you get smutting of about ever third bar.

MR. MITCHELL: I would say we have less than the average traction motor trouble.

MR. FREY: Again that is an indication of the light load. Traction motors that are loaded will give you trouble. I believe everybody knows that. I would suspect it is due to commutation trouble.

MR. M. H. KUHN (Assistant to General Master Mechanic, Chicago & Eastern Illinois Railroad, Oaklawn Shops, Danville, Illinois): We had that condition on one of our newer GP-9's on one locomotive out of six. We called the EMD men in to look at it. As a rule the pattern was about every third bar on most generators, and in this case it was every sixth bar. It developed into a burning condition that eventually would go on around. We ground the commutator and it cleared up. We never were able to find any explanation for it, except that the EMD man gave us the story that that is the pattern of a new generator, which of course was no explanation for us. We haven't had any trouble since it was ground.

MR. R. J. MAY (Master Mechanic, Louisville & Nashville Railroad, DeCoursey Shops, Covington, Kentucky): What finish or smoothness do you recommend when reconditioning traction motor commutators? Can this be accomplished by turning and polishing, or should they be ground?

MR. STENDAHL: I don't believe it would be necessary to use anything but a fine stone on them. Do you have reference to when the motors are out, being rebuilt? You must mean when they are in the shop for overhaul.

MR. MAY: When they are overhauled.

MR. FREY: We on the Rock Island make a practice of seasoning a large percentage of our commutators, and we have found that if you have more than 0.0003 or 0.0004 inch between adjacent bars you are in trouble as for as brush wear is concerned; if it is much greater than that, you will have trouble with flashovers.

As far as out of round commutators are concerned, they can go quite a little more out than 0.0004" if you will allow the variations to be distributed through approximately one-third of the way around the circumference of the commutator, the amount depending, of course, on the speed of the armature. You can stand 0.001" to 0.002" on traction motors, but adjacent bars must not be out more than 0.0004" or you will be in trouble with flashovers.

With regard to grinding, we grind our commutators, but not with a grinding machine, as people ordinarily think of a grinder. We use a stationary stone in the compound after the commutator has been turned. We use a 120 grit, and then finish it up with a 220 grit stone. That gives an extremely fine finish, and very little commutator trouble until such time as the commutator is abused. After the commutator has been stoned, we let it run against the brushes until such time as we have enough deposit on the commutator to give it a film.

MR. FRED BURCHETT (General Foreman, Atchison, Topeka & Santa Fe Railway, La Junta, Colorado): Does anyone have a good method for cleaning brush holder insulators, particularly plastic type insulators?

MR. STENDAHL: I presume that is when they are in the locomotive?

MR. BURCHETT: Yes, when they are in the locomotive.

MR. STENDAHL: In cleaning carbon tracks from the body, you want to scrape the carbon path out with a sharp instrument and use sandpaper if there is any tracking across the new stud. That is about all you have to do —clean the track of the carbon out. The insulator then is as good as new. Any grease should be removed with a suitable solvent to get the insulator clean, besides cleaning out the carbon path.

MR. ANTHONY ARMISTEAD (General Foreman, Louisville & Nashville Railroad, Mobile, Alabama): How many railroads cut out the ground relay after flashover, and continue to operate the locomotive? (Laughter)

MR. STENDAHL: That is really dangerous business, and I don't think any railroad would prescribe such a practice. The main generator would be cremated from pulling the knife switch, and that is about what would happen if there is no protective device there.

MR. J. G. HYNES (Assistant Supervicor of Air Brakes, Atchison, Topeka & Santa Fe Railway, 805 Avenue H. Fort Madison, Iowa): My question concerns spraying versus dipping of field coils and armature. Has the Committee reviewed any of the results that can be achieved by encapsulating field coils and armatures in epoxy resins?

MR. STENDAHL: I believe there are some tests being run currently using epoxy resin spray for the field coils. It looks like it would be a very good thing, if it could be accomplished a little more conveniently. It is a little difficult to apply the epoxy resin. I believe that is the difficult part of using epoxy resins, that is, the application.

After the epoxy resin is once

applied it seems to be a very good insulator.

Does anyone on the panel witsh to comment on epoxy resins? Has it been used in any of the traction motors?

MR. B. F. LUGINBILL, JR., (General Foreman, Atchison, Topeka & Santa Fe Railway, Barstow, California): We have tested it on several motors. As you have stated, Mr. Stendahl, to make the original application is no doubt going to be the biggest problem. I think once an armature or field coils have been insulated and encased with epoxy resins, the difficulties will be practically nil. It is impervious to nearly everything you can think of, from shock to any type of grounding condition.

MR. STENDAHL: On this application did you entirely enclose the banding wire also?

MR. LUGINBILL: That is correct.

MR. STENDAHL: Everything was enclosed, and it is all a smooth surface?

MR. LUGINBILL: Yes.

MR. STENDAHL: That seems to be a very good application. Does anyone else have any comments on epoxy resin?

MR. JAMES G. NOEL (Division Electric Foreman, Elgin, Joliet & Eastern Railway, Joliet, Illinois): We have been using this for some time in clearing up moisture grounds, particularly in traction motors and field coils. I have used it where we had to get a motor ready in a hurry. Marely using what we call the blue type, applied with a brush, and baking it, has given no kickback so far. It works very well in our place.

MR. STENDAHL: You say the pole piece was removed?

MR. NOEL: Yes.

MR. STENDAHL: And it was encased in this epoxy resin?

MR. NOEL: The coil was, not the pole piece. The idea was to get the motor back in service in a hurry. We knew we had a moisture condition and a practically zero grounding reading. We use this epoxy resin and it works beautifully.

We are thinking now of encapsulating the coils as we replace them, that is, when we take the motor in for a complete overhaul we will encapsulate all the coils. I would be interested in hearing if anybody has done that.

MR. STENDAHL: Do you also encapsulate the armature?

MR. NOEL: No; we have not gotten into that as yet.

MR. VINCENT F. LEITZ (Baltimore & Ohio Railroad, Grant Building, Pittsburgh 30, Pennsylvania): We have quite a number of 370 traction motor coils, and we use epoxy. We also cast the coil to the pole heads. We haven't had it running too long, but it appears it is going to correct most of our moisture grounds.

MR. JOHN SIMS (Assistant Master Mechanic, Florida East Coast Railway, Miami, Florida): Mr. Stendahl, you mentioned in your report fifty-three bearing failures, and that a certain percentage of them were due to lack of lubrication, broken retainers, and so on. How often do you test run your traction motors since you have found this condition? Or, did they fail on line or road?

MR. STENDAHL: The test you have reference to was the use of the listening rod as a means of test while the motors are being run on the floor when the wheels were being changed; is that what you have reference to?

MR. SIMS: Yes. You ran those motors at each wheel change; is that correct?

MR. STENDAHL: Yes; when the trucks are out the motors are on the floor, and you connect a welding machine to the motor and run the motor at low

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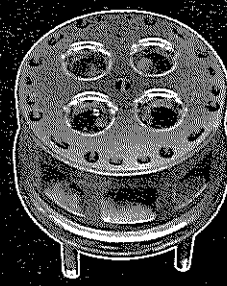

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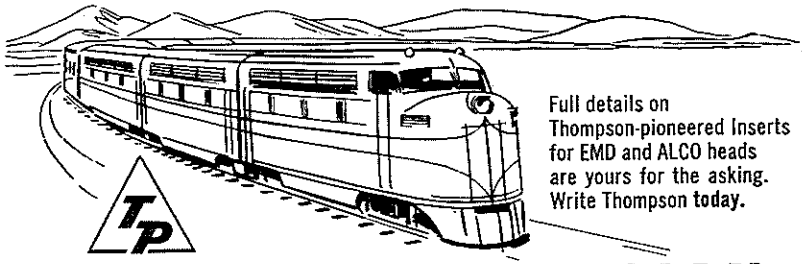

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speed to pick up any noise in the bearings, and you use a listening rod as a method of detection.

MR. SIMS: At what mileage did you do this?

MR. STENDAHL: The mileage would vary depending on when the wheels would need changing. Every time the wheels needed changing the motor would be run, and the bad bearings would be picked up that way. Some railroads remove the entire trucks for a wheel change, and some just take the wheels out. I just mean a change of wheels.

MR. SIMS: On our property we do that also. I was a little concerned about the railroads that use the wheel truing machines, probably keeping a traction motor in there for 300,000 or 400,000 miles or more. On our small railroad we found traction motor bearings that were defective after 85,000 to 90,000 miles in various stages on up to 200,000 miles. We found bearings with little minute shell spots on them at 90,000 miles, and we pulled about twelve for the noise after this test that you mentioned and found defective conditions of various stages right up to practically a failure. I am concerned about what the railroads are doing that have wheel truing machines that don't check these bearings and motors at that time.

MR. CHASTAIN: We have a wheel turning machine at our shop at the Argentine. We have had it in service since May and we have turned over 800 pair of wheels.

It seems to me that there is some thought among this group that the wheel turning machine is a cure-all for all problems. It is not. It is strictly a wheel truing machine. If it is going to be successful you must certainly comply with the maintenance schedules that you have for the other parts of the trucks, the wear plates, the boxes, the support bearings and everything else.

We have made it a fast rule in our shop that when a locomotive unit comes over the wheel truing machine, every part of the truck so far as the boxes and pedestals and support bearings are concerned must be checked.

One thing easily overlooked when we get into these modern advancements is that the remainder of the locomotive still must be maintained, and the better the maintenance schedules are the better the locomotive will perform. The wheel truning machine maintains good wheels, but the motor maintenance program assures that the motors will stay in service. They get the same maintenance and the same overhaul as they did before we got the wheel truing machine.

MR. EWALD MILKERT (Assistant to Superintendent of Motive Power, Alton & Southern Railroad, 26th & Trendley, East St. Louis, Illinois): Getting back to encapsulating of field coils, I have been reading a good bit about that, and I wonder if encapsulating of these field coils has a great effect on heat dissipation of the coils.

MR. LUGINBILL: We have noticed no appreciable difference in using the epoxy resins on traction motors.

VOICE: In your report you asked if anyone had had any experience with glass tape in place of the wire brand on traction motor armatures. I believe Mr. Wellnitz, Assistant General Foreman of the Milwaukee Road, can comment on that.

MR. WILLNITZ (Assistant General Foreman, Chicago, Milwaukee, St. Paul & Pacific Railroad): Mr. Chairman, in regard to glass tape, after making extensive research and running down the history of glass tape we believe it is one of the best and

most versatile products that has hit the electrical business in a long time.

Through all the experiments I have made in the shop on glass tape, it is holding true to form. We are putting out armatures in our shop now at the rate of about two a week with the new type glass band. We haven't had them out long enough to be able to say what will happen to them later on, but in making prechecks we find that we can eliminate insulation under the top coils, preventing chaffing under the band, preventing the movement of the coil or breakage of the coil on the throw.

We also discovered that glass tape is ideal for string band. It can be applied in the field, and it will cure itself with a little preheating of the string band to make it adhere to itself. We have found it very successful.

We also have found that it is doing a good job as far as strength is concerned.

Another thing mentioned was the balancing. As far as traction motors are concerned, I don't believe there is any problem as far as balancing is concerned and as far as the traction motor is concerned, due to the fact that balancing is done either on the rear end of the armature or under the commutator ring, where we do our balancing.

However, there is another way that has been developed, by using lead shot with another polyester base that will adhere to the tape, or you can use a lead weight and put another wrap of tape around it while in the process of balancing. So far we have discovered that it is not expensive. It has cut the cost of the particular operation almost two-thirds.

MR. STENDAHL: Would you care to comment on the application? How do you apply the band? Do you have a compression device to hold the windings in place while you are putting on the band.

MR. WELLNITZ: Yes. The application didn't turn out to be too much of a problem. One thing to bear in mind when putting it on is that the tape must be kept in a perfect line, because any deviation will throw it out of line. We found that by using crowned pulleys and a flat pulley for the guide, was ideal for putting it on the armature, a tension device developed out of an old tension device we had for wire, and is working out very successfully. There doesn't seem to be much of a problem there.

It can be converted very easily. The bigger problem is that the tape has kind of sticky substance on it, and is pretty hard to run it through a block or anything else. That is why we have pulleys. We now apply between 100 and 125 pounds on the armature with about a 7 per cent shrinkage in the tape. We find it helps a lot by pressing down the coils in the process of baking, which is very good as far as pre-banding is concerned.

We do not pre-band. It does away with all this development of re-rolling, expensive machinery, and so on. We pre-band by clamping it with steel bands, putting it in the oven and then pulling it down. We have found that to be very successful.

VOICE: What type of glass banding is used? What material is in the glass?

MR. WELLNITZ: There are two suppliers and there might be more. I understand Minnesota Mining makes one product. We are using at the present time a ⅜" resiglass made by the Chicago Printed String Company.

VOICE: It has a polyester resin base?

MR. WELLNITZ: Yes.

VOICE: What tension are you applying to your glass band?

MR. WELLNITZ: Between 100 and 125 pounds.

VOICE: Are you finishing that off with any other type of material?

MR. WELLNITZ: No.

MR. P. O. LAUTZ (Assistant Electrical & Shop Extension Engineer, Atchison, Topeka & Santa Fe Railway, Crane and Branner Streets, Topeka, Kansas): Are brake shoe and wheel wear particles getting into traction motors to the extent that they create a maintenance or failure problem? If so, are these particles paramagnetic or not, and are they iron or iron oxide?

MR. STENDAHL: Are you asking if these particles are found in traction motors?

MR. LAUTZ: Yes, to the extent that they create a maintenance or failure problem.

MR. STENDAHL: I do not believe we have that problem due to pressurized condition of the traction motor from the blower fan. One of our shop men on the panel might like to comment on any findings in traction motors that they have disassembled.

MR. FREY: If the railroad in question, the Rock Island included, will maintain their covers, they will exclude the outside atmosphere which is contaminated with these particles you are talking about. If you don't properly maintain your covers, then you can gather in all that material. Since most of it is a conductor, it will result in trouble in the motors. High resistance ground, probably.

If the railroads will maintain their covers (and I know it is a big problem), it will eliminate damage from the condition you are talking about.

What do you find in a traction motor? Everything but the kitchen sink. Parts of blowers, rocks, stones, practically everything and anything can be found in them. It gets in there mostly, I think, due to the people not paying attention to their blowers and not keeping the covers tight, and especially when they are inspecting motors, to make sure that particles of material don't drop in there.

MR. LAUTZ: Are either metallic or non-metallic particles, that accumulate in insulating varnish, a problem? If so, how small a particle must the varnish filters remove to eliminate this difficulty?

MR. STENDAHL: That is also a shop problem. The varnish is usually filtered to remove the particles you mentioned. Mr. Frey suggest that it should be filtered down to a 50 micron size. Is that a satisfactory answer to your question?

MR. LAUTZ: We have filters in our impregnating system. They don't take out particles that small. I presume that if we go down to 50 micron size it means the use of a diatomaceous earth filter. Do you have a less expensively operated filter that will take out particles small enough to eliminate the difficulty?

MR. STENDAHL: Mr. Frey, will you comment on the type of filters you have in your shops?

MR. FREY: Our varnish (and I think practically everyone is using varnish) should be tested periodically to determine its oil and dirt content. I am sorry to say I can't give you the name of the filter that we use. If you will write to me I will send you the name. I remember that the filter size is 50 microns. It is a slow process, and we don't filter that varnish every time. It is a continuous action.

We let a certain percentage of it go through the filter all the time, and by so doing we keep eliminating a little bit at a time. If there is carbon and any foreign particles in it that conduct electricity, it naturally is a bad thing.

In reworking traction motors there is naturally carbon and dirt in them, and you are not going to get them 100 per cent clean. Therefore, you have to live with a certain amount of dirt. If you could get them 100 per cent clean you would have perfect varnish. We don't have it, and I don't think anybody in the business of repairing traction motors has it, either. The best we can do is to filter a percentage of our varnish with a 50 micron filter.

MR. LAUTZ: We also test our varnish in our test laboratory, but we have not determined the criteria under which we would suggest that the varnish has to be filtered or the particles taken out of it. Is that on the basis of a certain weight per given volume of varnish, or do you dilute it or cut it with a solvent, perhaps, and take a look at the dirt particles under an optical, comparator, filar microscope or other magnifier, or how do you determine it?

MR. FREY: We send the varnish to be analyzed by the chemists of the company that makes the varnish, and they make the recommendations. How they determine it, I can't tell you; but they will tell us when they analyze our varnish. They tell us what our varnish needs, whether it needs more filtering, more body, more of anything else. After we receive their recommendations we try to follow them.

MR. JOHN SHARPLEY (Electrical Foreman, Canadian Pacific Rialroad, Angus Shops, Montreal, Quebeck): Has it been found economical to reclaim traction motor end frames?

MR. E. S. KENEWSKI (Electrical Foreman, Baltimore & Ohio Railroad, Glenwood Back Shop, Pittsburgh 7, Pennslyvania): Not particularly on EMD traction motors, but on the Westinghouse type 370 traction motors, yes, the price makes it practical to reclaim.

MR. M. B. ADAMS (General Superviscr, Diesel, Atchison, Topeka & Santa Fe Railway, Chicago, Illinois): You were speaking of the use of the DC high voltage tester in the beginning of your paper. You said something about having to use 1.56 or 1.6 times the number of volts normally used.

I think that is going to lead to a misconception here, because actually a voltage is a voltage, and if you are putting a high potential test on a locomotive, as required by ICC rules, you are required to put a specified number of volts on the various circuits. On the electrical circuits it is 75 per cent of the working voltage, and on the traction motor generator circuits it is 50 per cent of developed working voltage.

According to that requirement, using a DC high pot tester you can put that voltage on and determine what the leakage is, and you can correct the difficulty without tearing up the electrical equipment. That is one of the big advantages of this type of testing.

We don't have to do it on 1.6 times that because we can get into further trouble if we do. All we have to put on is what the government requires, which is maybe 1050 volts or whatever it happens to be for the particular circuit. We ought to get that into the record. That is my opinion of the matter, and I would like to hear if anyone else agrees or disagrees. I think we ought to reach an agreement on it.

MR. STENDAHL: I am glad you brought up this subject. For federal tests and inspections we naturally want to use the same voltage. If we were to determine the condition of insulation in the shops after overhaul, would we use the same voltage then? It would be very misleading to use

that same voltage for our own knowledge. We would want to use a voltage as comparable to the peak voltage of the AC instrument. The peak voltage of the AC instrument is quite a bit higher than the average voltage which is indicated on the meter.

MR. M. B. ADAMS: That is for shop testing. When you test a piece of equipment in the shop with a DC high voltage tester, you plot a curve showing so many milliamps leakage at various voltages, and you find the point at which it starts to break down. Then, depending on that point, you either have to fix it or you can let it go.

Does that satisfy the voltage requirements of the ICC? We only have to go to 150 volts. As I understand it, the difficulty with an AC high pot is that while you are reading so many volts on the voltmeter you get higher peak voltages than that, which does damage to insulation.

MR. STENDAHL: That is right, and therefore it would be to our advantage to use the DC tester at the specified voltage.

MR. E. O. ROLLINGS (General Foreman, Louisville & Nashville Railroad, Corbin, Kentucky): After degreasing generators and traction motor parts for impregnating, what cleaning methods are used other than compressed air to remove loosened paint and varnish, dirt and carbon deposits that the degreaser did not remove?

MR. FREY: We use the degreaser method. We have for years. Then we used to try to blow them off. Just a few minutes ago a gentleman asked me about contamination of varnish. That was one of the things that impressed us with the fact that we weren't actually getting our motors and generators clean; so, with the advent of the Cobb, and the Cobb blast machine, we put into our shop a Cobb blast booth.

The inside of the motor we blast with Cobbs at 40-lb. pressure. The outside of the motor we blast with sawdust at approximately 80 to 90-lb. pressure, and we come out with one of the cleanest frames you could get.

We don't wash or steam or clean our motors in any way before they go through the degreaser. After they come out of the degreaser we run them through the Cobb blast and then they are ready to be worked on. the outside of the frame is clean and ready for paint, and the inside is ready for electrical inspection and repair.

It does a remarkable good job. It will help to keep the varnish clean and clear of contamination. However, even with that it is imposible to get all of it off because of the fact that some of the places in motors and generators are inaccessible to blasting.

MR. C. G. REUFF (Diesel Electrical Foreman, Bessemer & Lake Erie Railroad, Greenville, Pennsylvania): We have had an increasing number of flashovers this summer. This was caused by the wheels slipping at about 40 m.p.h. due to greasy rail. Has any other railroad had the same problem, and what is the solution?

MR. STENDAHL: What type of power is it?

MR. REUFF: F-7.

MR. STENDAHL: I would like to hear comments from anyone on wheel slips that cause flashovers. Wheel slips no doubt will cause flashovers by a sudden build-up in voltage.

Flashovers are caused by a number of things, including poor commutation. The problem of wheel slip will still be with us until we have a little better device for detecting wheel slip when it first occurs.

MR. CHASTAIN: Mr. Stendahl, I think we probably have the same oily rail condition on our railroad as almost everyone

else has. I suppose we have our share of flashovers. We have our share of indications of wheel slip.

I wonder if we sometimes overlook the man at the throttle when we talk about wheel slip and flashovers. Just recently we severely burned rails by continued wheel slippage. It was clearly indicated to the man at the throttle. There was nothing wrong with the locomotive. The rail was slippery and he had the wheel slip indication, yet he burned a hole in the rail.

I think sometimes we condemn the equipment when we should be taking a look at our educational program with the man who operate the locomotive.

MR. D. M. CLOUGH (General Diesel Supervisor, Duluth, Missabe & Iron Railway, Proctor, Minnesota): What brand of solvent seems most popular for electrical parts?

MR. STENDAHL: That is very controversial subject. As mentioned in the report, we made our survey of several railroads to determine what types of cleaners are being used. Some solvents are most toxic and have to be used with more caution. Petroleum solvents are not as toxic. However, they have a poorer drying quality, so a compromise will have to be made between the two types to determine which one will be most suitable.

It is a difficult question to answer directly as to which types of solvents are most preferred.

MR. J. K. WENTZ (General Electric Company, 2901 East Lake Road, Erie 1, Pennsylvania): Mr. Stendahl, I would like to comment on the length of time it takes to rewind a traction motor armature.

I understand from reading your report that some railroads have found that it takes longer than they would like it to take to rewind a 752 armature.

We have been approached by some railroads on this matter, and we have been able to give them very substantial help. I would like to offer this help again to any of the railroads concerned that find themselves in this situation.

I might point out that at the factory a winder that is worth his salt can put in two sets of armature coils in an eight-hour shift.

MR. STENDAHL: Do you wish to tell us how many hours are involved in winding an armature or replacing the windings in the armature? We have a few statistics with us to bear out what we had in the report.

MR. WENTZ: I am not questioning your statistics at all, Mr. Stendahl. I would like very much to sit down and go over them with you. I am just offering this other comment as an indication of the speed with which it is possible to do it by one man. I am sure other factors go into making up this 70 or 100 hours, as the case may be.

MR. STENDAHL: Then you think our time, as presented in the report, is a little wrong for the application of the winding?

MR. WENTZ: I don't know just what went into the 100 hours. I am sure the 100 hours are not completely taken up in putting a set of armature coils into slots.

MR. FREY: I think what we had in the report was what we called a breakover time, where it would not longer be economical for the railroads to wind an armature. That does not necessarily mean that that is how long it takes, but that is the time that would be consumed in labor, where it would no longer be economical for the railroads in the winding of old armatures, because it would be cheaper to

send them out to the manufacturer.

Obviously, a good many of us are making money winding traction motors. Some of us may not be, but others of us are. The time we put down in the report was what we considered the maximum amount of time that a railroad could use, before it would no longer be economical for a shop to repair its own armatures.

MR. WENTZ: May I then repeat my offer. If there is anything we can do to tip you off as to techniques that are used at the factory, we will be very glad to do so.

MR. STENDAHL: The time element in the report was not only the rewinding of the armature but the entire work on the motor.

MR. SNOW: We have just removed an armature from one of our RS-3 main generators, and the coil leads connected to the risers were broken just at the bottom of the riser. I think in the armature there were forty coils broken loose from the riser.

It is going to be an expensive job to rewind or repair. Possibly there is some alternate way of making a repair. If so, I would like to know what it is.

MR. WENTZ: This is an interesting point, I wish there were a good way to repair broken armature coil conductors. I think we all know that they are just about as old as electric motors. So far, there is no way that I know of that is reliable for patching a broken armature coil conductor.

MR. STENDAHL: Thank you, gentlemen. Uow may we call on Mr. Upton to summarize.

MR. F. A. UPTON (Superintendent Motive Power, Chicago, Milwaukee, St. Paul & Pacific Railroad, Milwaukee, Wisconsin):

I think Mr. Stendahl and his Committee have done a very good job in preparing this report covering the maintenance of main generators and traction motors. A lot of time and effort must necessarily go into writing up such reports, and I believe the Commitee as a whole has done a remarkable ob.

NORTHWESTERN REGIONAL EXECUTIVE

F. A. UPTON
Supt. Motive Power
C., M., St. P. & P. R. R.
Milwaukee, Wis.

Also, the useful information developed during the question and answer period will undoubtedly benefit a great many of you gentlemen, at least we certainly hope so. I was a little disappointed that there were so few comments regarding traction motor armature bearing failures. I thought surely it would be at least on a par with the oil cooler problem.

I believe a round of applause is certainly in order for Mr. Stendahl and his Committee.

(The audience arose and applauded).

CHAIRMAN DENNY: Thank you very much, gentlemen.

Every member is urged to study the reports that will come up in the next session, so please look over your pre-Convention report book in order to assure a good discussion of those reports tomorrow. Learn all you can from the meeting so that you will be in a position to write a full report for your boss when you get back home. He has made it possible for you to be here. Remember that he always gets a copy of the reports, so give him something to discuss.

Everyone is urged to attend the exhibits. We will have tomorrow afternoon to do so, but there will be time this evening while the exhibits are still open.

(The meeting adjourned at 5 p. m.)

TUESDAY MORNING SESSION
September 17, 1957

PRESIDENT DALEY: Gentlemen, the third session of this meeting of the Locomotive Maintenance Officers Association will now come to order.

We have with us today two men from the ICC. No doubt most of you gentlemen have either had correspondence or personal contact with them. I would like to introduce both of them to you. They are both of the Bureau of Safety of the Interstate Commerce Commission. Mr. Longhurst and Mr. Hall. (Applause)

Mr. Lehr, Superintendent of Motive Power, Lehigh Valley Railroad, will be Queen for a Day and will handle this meeting to its conclusion. Ernie is one of the fellows who needs no introduction. I told some people at luncheon that Ernie always refers to me as a "white-headed old buzzard," Ernie is a typical example of what Colorbak will do. (Laughter)

Without further introduction, I would like to present my good friend and the able master of ceremonies for the day, Ernie Lehr. (Applause)

CHAIRMAN LEHR: Thank you, Mr. Daley. I have never known a man who could get out of more jobs more easily than does Daley. Any other president would be up here all day every day. Jack certainly must be a good supervisor, because he has a lot of people to do things for him.

I am very glad to see so many of you attending this session this morning. Yesterday's attendance was about the best we have ever had. I am sure that our railroads and bosses who send us to these meetings expect us to attend the sessions and to take something home with us.

I hope this morning that you gentlemen will ask questions and get the answers you want.

W. E. LEHR
Fourth Vice President
Supt. Motive Power
Lehigh Valley R. R.
Sayre, Penn.

It is my pleasure today to introduce to you Mr. Howard R. Longhurst, Assistant Director, Bureau of Safety and Service, and Chief of the Section of Railroad Safety. Mr. Longhurst was born in Neenah, Wisconsin and received his education in Stevens Point, Wisconsin. From 1920 to 1947 he was employed in the Mechanical Department of the Minneapolis, St. Paul and Sault Ste. Marie Railroad, and served in various capacities, the last several years as Assistant Supervisor of Equipment.

In 1947 Mr. Longhurst entered the service of the Interstate Commerce Commission as a Safety Inspector, acting as specialist adviser to the Commission on matters pertaining to the safety and suitability of railroad cars and locomotives and as an expert in the investigation of the more serious railroad accident investigations.

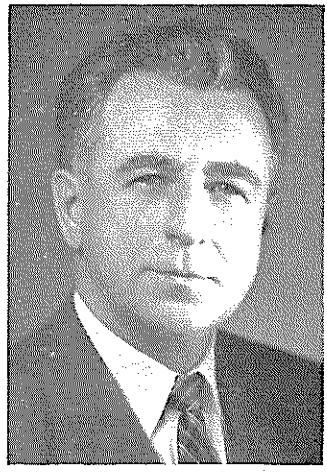
On January 2, 1956 he was appointed Assistant Director of the Bureau of Safety and Service, and Chief of the Section of Railroad Safety, in which capacity he is now serving. Since 1954 he has been a member of the Committee on Occupational Safety and Health of the International Labor Organization, and this year was appointed to serve on the subcommittee to outline a program for the 1958 President's Conference on Occupational Safety.

Mr. Longhurst is well known in the field of transportation, and as a result of his long and varied experience is a considered authority on the design and construction of transportation equipment.

It is a pleasure and privilege to introduce to you Mr. Longhurst.

It is indeed a pleasure to have this opportunity to say a few words about railroad safety to the members and distinguished guests of the Locomotive Maintenance Officers' Association. You are gathered here to discuss the varied and complex problems in connection with two great agencies in the industrial, economic and social life of the continent—power and transportation.

The primary responsibility of most of the individuals gathered here is, as the name of your organization implies, the maintenance of railroad locomotives for safe and efficient utilization of power in railroad transportation. I do not believe that any of you would question a statement to the effect that there has been in recent years an almost phenomenal development in the intensive utilization, availability and superior performance of modern locomotives. Your organization has played a very important part in this development. In my opinion, much credit is due your officers, past and present. We in the Bureau of Safety and Service of the Interstate Commerce Commission are also vitally interested in the safe and efficient operation of locomotives in railroad transportation. The hazards associated with the operation of a railroad are well known to all of us. Railroad accidents range all the way from slight cuts or even scratches to disastrous train accidents. It could be that every man here has at one or more times viewed the horrible results of some unfortunate train accident and realized how tragic and unnecessary such accidents are, as well as how easily they



H. R. LONGHURST, Asst. Director
Bureau of Safety & Service
Interstate Commerce Commission
Washington 25, D. C.

could have, and should have been prevented. Railroad managements have been very active in accident prevention work. Various associations such as yours have played a very important part in the safety movement. One of the primary functions of the Interstate Commerce Commission's Bureau of Safety and Service is to help in preventing accidents. Railway Labor Organizations are taking a keen interest in the safety movement and doing an excellent job. In order to make the progress that can and should be made in the safety movement we must have team work with every individual being an important member of that team. Unfortunately, the human element continues to precipitate accident situations. We still have a long way to go in developing all of the individual players on the team. I believe that everyone will agree that considerable progress has been made and that the safety record of most railroads as compared with the past is good. However, as an example, statistics for the calendar year 1955 show that the number of employees on duty who were killed in all kinds of railroad accidents increased in 1955 over 1954 by 44 persons. This is the first such increase since 1947. The number of employees on duty who were injured in all kinds of accidents increased in 1955 over 1954 by 1,804. Further, the rate per million man-hours increased 20.9 percent and 9.8 percent killed and injured, respectively. Statistics such as these indicate the need for greater effort in the safety movement.

Railroad safety has many ramifications yet it is fair to say that the department you gentlemen represent, the mechanical department, plays one of the more vital roles. You have many responsibilities and obligations. While it is true that many of the problems that beset you for so many years in connection with the steam engine are now rapidly fading out of the picture, it is also true, unfortunately, that modern locomotives have also brought along some modern problems. I would like to comment briefly on a few of the modern problems having a direct bearing on railroad safety.

In the course of our accident investigation activities, our attention is quite naturally directed to the causes of these unfortunate accidents and the circumstances in connection therewith. It is with regret that I must say that although the problems become quite apparent, the solutions are not so readily apparent. However, I do believe that in view of the fact that I am speaking to a group of experts in the field of locomotive design, construction and maintenance I will be making a contribution to railroad safety by merely mentioning a few of the problems in which locomotives are directly involved.

As one of the more important problems, I would like to refer you to the number of serious train accidents which have occurred in recent years in which members of the crew on the diesel-electric locomotives involved have failed, for unknown reasons, to operate in accordance with signal indications or disregard train order restrictions, apparently without taking any action to control the speed of the train or to avert the accident. In some of these accidents there were no surviving members of the crew on the locomotive. In others, no surviving member was able to give a coherent account of the events which immediately preceded the accident. These accidents have not been particular to any one railroad, nor to any particular geographical area.

They have occurred at various hours of the day and night. It would be easy enough to dismiss these accidents and some of the puzzling circumstances which surround some of them as being due to lack of alertness on the part of crew members on the locomotive. However, dismissing problems does not solve them. In many of the accidents of this nature the evidence has clearly indicated that none of the occupants of the control compartment on the locomotive involved was alert just prior to the accident. In some cases lighted fusees were thrown against control compartment windows, yet no action was taken by the occupants to reduce power or to apply the train brakes.

Several theories have been advanced as to the probable cause or causes of such accidents. I regret to say that we have been unable to develop anything conclusive in this respect. However, whether such accidents are caused by a lack of an adequate supply of fresh air; a too warm and too comfortable ride; a practice of some members of the crew to take short "cat naps"; or perhaps the hypnotic effects of motion and monotony, as some think, the problem should be given serious consideration.

Adequate ventilation, of course, is a must and there may be other safeguards which can be incorporated in the operation or control of locomotives which will give additional protection so that if the engineer is disabled from any cause, or loses consciousness, or just plain falls asleep, the power will be cut off and the brakes applied. Perhaps some of these features should require the participation of the firemen so that the duty of remaining alert and retaining control will not devolve solely upon the engineer.

One of the more difficult safety problems in connection with the transportation industry is the prevention of rail-highway grade crossing accidents. There are more than 226,000 grade crossings in the country and every one a potential source of danger, danger multiplied a thousandfold when tank trucks and trailers loaded with gasoline or other highly flammable liquids must use them in crossing tracks. In collisions of this sort members of the crew on the locomotive face not only the hazards of derailment but the addational hazards of fire or explosion. While we recognize that the prevention of such accidents is not primarily a locomotive maintenance problem we should also recognize the fact that such accidents are occurring and at a frequency rate that is becoming alarming, and therefore, consideration should be given to measures that can be taken to provide more adequate protection for members of the crew in the event of such accidents. If the front-end door of an A type diesel-electric locomotive fails under the impact of a collision with a tank truck loaded with gasoline or other volatile liquids this highly flammable material may enter the control compartment and then vaporize and explode. Canadian railroads, I understand, are taking measures to strengthen the front-end doors on this type of locomotive to prevent this very thing. Consideration should also be given to what additional measures can be taken to protect crew memberfs on road-switcher type locomotives, now widely used in both freight and passenger service on many railroads. In some of these accidents the crew on the locomotive might have had a better chance to escape the holocaust which followed a collision if additional means of exit from the cab or control compartment had been provided. We should never lose

sight of the fact that in these unfortunate matters a few seconds may mean the difference between life and death.

Another example of the way in which equipment may be improved is by the installation of additional safety devices. Some railroads place an emergency brake valve adjacent to the fireman's position in the control compartment. No one can say with certainty how often these have been used to avert accidents but there are times when the difference between transmitting a warning and taking direct action to stop a train or a locomotive may save life and property. A B type unit with an emergency brake valve located in such position that it can be operated by the person giving signals for a reverse movement at either end of the unit, gives the person directing this movement veto power that's lacking when the only emergency brake valve is located at the opposite end of the unit. The cost of equipping units with additional emergency brake valves will be saved many times over when even one accident is averted.

It has been brought to our attention during a number of accident investigations on various railroads that locomotives equipped with speed-recording devices are, as a matter of policy, being dispatched without recording tapes. Certainly it seems a strange sort of economy that would dictate such a policy, if the reason is economy. Tapes which record the speed are invaluable indices of operation, and show the variations in speed, the points at which a train was stopped, and other data, as well as compliance or non-compliance with various operational requirements. If the speed-recording device is not utilized for these purposes it may be a tacit invitation to disregard speed and other restrictions which can eventually lead to a condition that will result in a serious accident.

In closing I would like to point out that there never has been a time when inspection work was more exacting than it is at present. Extended locomotive runs, heavier trains, higher speeds, and higher utilization than ever previously known has put a burden on motive power and locomotive maintenance forces that scarcely could be imagined a short time ago. The new power does not have to be pampered. It is rugged and reliable to a degree never before known but it cannot run on its reputation. These new conditions demand the highest standards in inspection and maintenance work, as you well know. In this connection may I remind you that, while the engine crews on steam locomotives, had, g e n e r a l l y speaking, practically all machinery and running gear ahead of them and thus were in position to detect quickly the first indications of trouble, they now operate on modern power with practically all machinery and running gear behind them where detection of developing trouble is most difficult, if not impossible.

Accident prevention is something that you must work at all the time. You can't achieve spectacular results overnight; but by applying yourself to it you can make progress; steady advances and continual improvements are within your capabilities. New tools and new techniques are being developed every day and I know that you gentlemen are resourceful enough and ingenious enough to apply or adapt whatever can be utilized in the railroad field. When you look back over the years you can see that we have come a long way in eradicating the terrible

hazards that formerly were considered normal and inescapable in railroad operation. Now many of those hazards are only bad memories of men needlessly killed or maimed. At present we should be at the stage where the remaining dangers in our own bailiwick can be whittled down and licked. One thing is for sure, if you work as hard at these problems in the future as you have in the past, there is no question but that we can continue to progress toward our goal which is the end of these tragically unnecessary deaths and injuries resulting from accidents.

It has been a pleasure to talk to you about railroad safety. May your progress in the future be as pronounced as it has been in the past.

Certain changes have been made in our organization which will have a direct bearing on railroad safety. Through consideration on the part of your able President, it is now my privilege to introduce the next speaker. I am honored to present a gentleman who is performing outstanding service in his present capacity.

He was born in Little Falls, Minnesota and attended the South Dakota School of Mines in Rapid City, South Dakota. He received his law degree from Columbus University, Washington, D. C., and is a member of the District of Columbia Bar. He was with the South Dakota State Highway Commission until entering federal service in 1934 with the Homeowners Loan Corporation. He has served also in the Office of Price Administration, the National Housing Agency, the Bureau of the Budget and the Department of Justice, where he was concerned with matters pertaining to programs affecting the country's internal security.

In May 1956 he joined the staff of the Interstate Commerce Commission, where he is now performing outstanding service. It is therefore with extreme pleasure that I present to you the Managing Director of the Interstate Commerce Commission, Mr. Bernard F. Schmid. (Applause)

Mr. Schmid:

You have just heard Mr. Longhurst, the Assistant Director of the Bureau of Safety and Service of the ICC for railroad safety, tell you about the problems faced in reducing accidents and injuries on the railroads and the important part you have to play in securing improvement. I noticed that Mr. Longhurst placed a great deal of emphasis on your part in this picture, and ing the important role that the modestly refrained from describpersonnel of the Interstate Commerce Commission play in striving for an improved safety recthat I can discuss the efforts and ord on the railroads. I believe the important role of the Bureau more immodestly because I am of Safety and Service somewhat not a member of their staff.

As you know, the Bureau of represents a consolidation of all Safety and Service as of this date the Commission personnel who devote their efforts directly to railroad safety matters. This was not true before June 1954. Effective June 1954, the Commission approved the consolidation of the Bureau of Safety, Bureau of Service, and the Bureau of Locomotive Inspection into the Bureau of Safety and Service. This consolidation did not come about without considerable opposition due to the fears of some Commission personnel and various organizations that there would be a diminution or deterioration in the Commission's railroad safety program. Although the Commission said then that the purpose of the consolidation was to improve and ex-

pand the Commission's railroad safety programs, we know that there was considerable apprehension when the action to consolidate the three bureaus into one was taken. I am very pleased to have the opportunity this afternoon to tell you that these apprehensions have not been realized, and that, on the contrary, the Commission's railroad safety programs have been significantly improved. Those who were concerned are no longer worried and have fully supported the Commission in putting into effect, stage by stage, the various improvements which have occurred since consolidation. It was one of the principal aims of the consolidation to reduce, and if possible eliminate, duplicating or overlapping inspections of railroad rolling equipment. It was found that inspectors, operating under the Locomotive Inspection Act, visited railroad yards and engine houses to inspect locomotives and tenders, including appurtenances such as brakes, signal devices, and safety appliances. At the same time, other Commission safety inspectors might be visiting the same yard to inspect the safety appliances and brakes of train cars and locomotives. Still other inspectors of the Bureau were visiting offices or yards for car service, hours of service, and explosives inspections. Although we will not be able to completely eliminate overlapping inspections of locomotives, due to the requirements of the Locomotive Inspection Act (which the Commission has asked the Congress to amend), we are working to eliminating duplication of inspections by different types of personnel from the same Bureau. In the spring of this year, a new position of Safety and Service Agent was established and car service agents, explosives agents, hours of service inspectors, and safety appliance inspectors were assigned to this position. After a reasonable period of training, and with recruitment aimed at providing personnel with appropriate backgrounds, the Safety and Service Agent will be able to represent the Commission in its railroad safety inspection programs (other than locomotive inspection) and thus eliminate overlapping and duplication of inspections and visits.

Another action which flows naturally from the consolidation of the three bureaus, was the appointment in August of this year of 13 Assistant Regional Managers for Safety and Service. As you may know, we now have 13 ICC Regions, each headed by a Regional Manager. The appointments of the Assistant Regional Managers for Safety and Service were made with the objective of integrating and coordinating all the Bureau of Safety and Service programs in the field. This action, when it gets "under full steam," will also lead to a more systematic, coordinated, integrated, and effective Commission railroad Safety and Service program in the field.

Some of the changes we have made have evolved from the principles spelled out in the report of the Wolf Management Engineering Company of Chicago in 1952, prepared following a survey of the organization and operations of the Commission at the instigation of the Interstate and Foreign Commerce Committee. Apparently, the Congress had not been completely satisfied with the Commission's organization and operations, and therefore arranged for the survey. Spokesman for the Congress suggested that the Commission improve its organization and operations. For a number of years before this study Congress had been appropriating "bed rock" budgets for the Commission.

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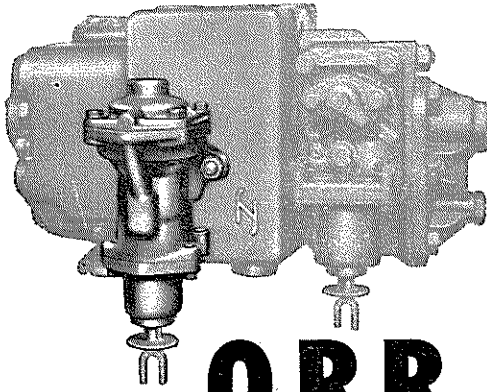

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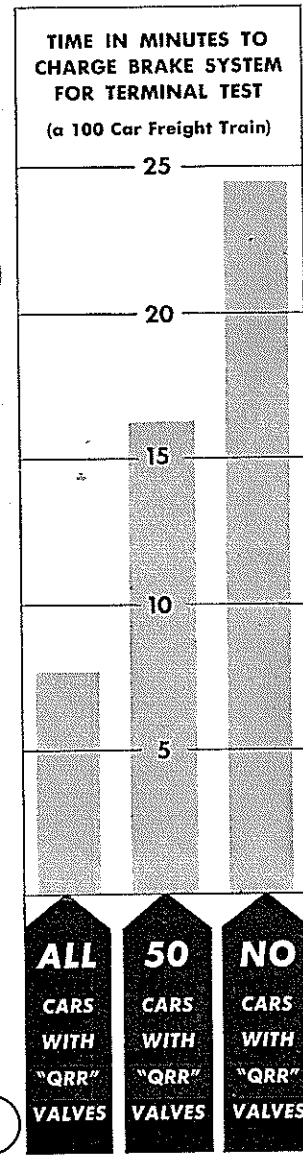

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Following the establishment of the Office of the Managing Director in August 1953, the consolidation of the Bureau of Safety and Service, and the consolidation of the Bureau of Accounts and Cost Finding with the Bureau of Valuation, the Commission's budgets improved significantly and this improvement has continued in the last four years. Availability of additional funds for personnel, travel, equipment, supplies, etc., has been a major factor in the improvement of the Commission's railway safety programs.

The Commission efforts during the last 4 years have been aimed at improving the railway safety program in all its aspects. Despite doubts as to its objectives, it has never veered from this aim and the Commission stands "four-square" behind the activities of the Bureau of Safety and Service as it does behind all other activities of the Commission. It is our objective to help you to do your job as safety is concerned and I feel certain that your objective is to help us to do ours.

CHAIRMAN LEHR: Thank you, Mr. Longhurst and Mr. Schmid. May I take this opportunity to assure you that we on the American railroads and all of us in maintenance departments will cooperate with you heartily in the promotion and development and maintenance of any devices we can to promote safety.

At this time I would like to introduce to you a gentleman who has been a hard worker for our organization. Remember, these papers that are presented require a lot of work and study on the part of the various committees. A lot of time and work is also required to be done to participate in one of these programs.

The gentleman I am to introduce to you today, is a hard-working individual by the name of Herman. Mr. Herman was born in Sunbury, Pennsylvania, and was educated in grade schools and high school and received his BS degree in electrical engineering at Pennsylvania State University in 1926.

He was employed by the Pennsylvania Railroad in the Electrical Engineer's Office at Philadelphia from 1926 to 1938. He was employed as Industrial Sales Engineer by Westinghouse Electric Corporation in Pittsburgh and St. Louis from 1938 to 1940. He entered the employ of the Southern Railway in 1940 as Engineer of Shops and Equipment at Washington, D. C., which position he holds at the present time.

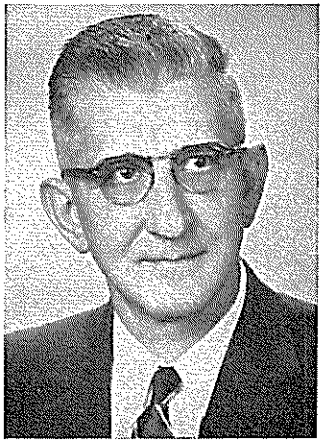
He has served as a member, Vice Chairman and Chairman of the Committee of the Electrical Section, AAR, and as a member of the various committees of the LMOA.

At this time I would like to ask Mr. Herman and his Committee to come to the platform, please. I will turn the meeting over now to Mr. Herman, who will introduce his Committee and proceed with his report.

R. H. HERMAN: The 1957 report of the Shop Equipment Committee was delivered at a meeting of the Louisville Railroad Diesel Club on April 10, 1957 in Louisville, Ky. The meeting was well attended and from the discussion following the presentation of the paper and slides, I believe it was well received.

Mr. J. Page Walker, Assistant Mechanical Engineer of the L&N Railroad is the President of the Club. Unfortunately Mr. Walker could not be present. Mr. S. C. Snow, Superintendent of Motive Power of the L&N is representing the Louisville Railroad Diesel Club and I am going to ask

him to tell you something about the meeting.



R. H. HERMAN, Chairman
Committee on Shop Equipment
Engineer Shops & Equipment
Southern Railway Company
Washington, D. C.

S. C. SNOW: Mr. Page Walker, President of the Louisville Diesel Club, and the associate officers thereof, extend their greetings and standing invitation to attend meetings of the club any time you are in Louisville. The Club meets on the second Wednesday of each month.

The Louisville club is very active, its meetings are well attended as was the case when Mr. Herman gave the pre-convention presentation of the Shop Equipment Committee paper at Louisville, Ky., April 10, 1957.

The slides used in conjunction with the paper made a good presentation. The meeting was open for questions and discussion while the slides were being shown as well as afterwards. We found that more questions were raised while the pictures were upon the screen. This we attributed to the fact that when a question was raised in connection with some phase of operations shown by the slide that question led to another which resulted in a lively discussion. For that reason we invite discussion while the slides are being shown at the close of these remarks.

The questions that were raised when discussing wheel turning or grinding without removal of the wheels from the locomotives were:

"What experience have you had with regards to traction motor suspension bearings and axle lubricators by leaving them in from wheel application to removal?"

"What troubles have been experienced with brake rigging, journal boxes and traction motors when left under the locomotive for the entire life of the wheels?"

"Do you believe you get longer wheel life?"

The wheel cleaning machine provoked considerable discussion as the cleaning of wheels is tedious and expensive when done manually. Some doubt was expressed as to the savings made when cleaning wheels by special equipment as contrasted to manual cleaning. Due to lack of experience and established facts this discussion was left open awaiting further experience.

REPORT OF THE COMMITTEE ON SHOP EQUIPMENT
1957 TOPIC

"MACHINERY AND EQUIPMENT FOR CLEANING, TESTING AND OVERHAULING OF DIESEL LOCOMOTIVE COMPONENTS"

SEE PAGE 115 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

The discussion raised on air filter cleaning equipment and diesel parts cleaning equipment was interesting. Due to the lateness of the evening and the fact train reservations had been made for those that had traveled to Louisville for the evening, the meeting was closed.

The fact this committee was so well received and the presentation was such as indicated we feel the work put into the preparation was well rewarded.

Thank you on behalf of the Louisville Diesel Club also for your attention to this report. Mr. Herman will now take charge and start the slides. Please ask any questions that you wish on the subject matter during the showing and immediately afterwards.

MR. HERMAN: Thank you, Mr. Snow.

There are a number of microphones around the room. Don't hesitate to break in if you have a question or comment.

(Slide) This is a typical installation of a wheel tread turning machine in a railroad shop. The machine itself is installed in the pit. It features essentially a heavy C-shaped frame that carries the centers as well as the motor-driven milling cutters. There are retractable rail sections so that the locomotive can be moved over the pit.

When a pair of wheels is centered over the machine the grooved rollers are raised to contact the flanges of the wheel, and carry the weight of the locomotive, raising it a short distance above the rail. Retractable rail sections are then withdrawn, the milling cutter is raised, and the milling of the wheels is started. The wheels are rotated by drive motors, and of course the milling cutters themselves are motor driven.

Normally an operator is located at the control stand on each side. You can see from this picture the control position for the one man. There is a control position on the other side, either one of which can be used to control all of the functions.

(Slide) The primary reason for this slide is to show the adapter that must be used when the roller bearing boxes are of such design that the machine center cannot be brought into the wheel center. The adapter is the U-shaped fixture on the head. That takes over the function of the wheel center and holds the wheel in position.

The picture also shows a better view of the milling cutter, which I think you can see under the tread of the wheel. The grooved rollers support the flanges when turning.

(Slide) This is another view of the same operation. It shows the operator in the work position. He of course is down in the pit so that he can see clearly the cutters in operation on the tread of the wheel. It also shows the adapter for the roller bearing journal boxes of the type mentioned above.

(Slide) The wheel truing machine can be installed in an existing shop building or it can be installed as shown in this view—in a building constructed entirely for that purpose. Most railroads, I believe, consider it more desirable to locate the truing machine close to the Diesel running repair operation, because there are certain operations and maintenance that can be carried on while wheels are being turned. In this particular case the building is apparently just long enough to take one unit.

It was brought out at some of our meetings that it is far more desirable to have the machine in a building sufficiently long to enclose the complete unit. For example, if you are turning single unit switcher locomotives

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you might need space approximately 100 feet long. If you are going to turn the wheels on a four-unit locomotive you possibly would need a building as much as 600 feet long to be sure that the unit is inside and is protected from the weather.

We discussed wheel grinding in our report, but unfortunately we have no slides on that. There is a picture in the report itself. They are being used on several railroads for tread truing, and from the reports that have been received they are doing a very satisfactory job.

I think it is admitted and is safe to say that the wheel truing machine is possibly more satisfactory for removing heavy cuts, whereas the grinding machine can be considered more as a maintenance tool.

The one railroad using this grinding machine try to bring their locomotives in every 20,000 or 30,000 miles to maintain the flange contour and the tread taper, and in doing so they feel that they secure quite a big improvement in wheel mileage.

Are there any questions on either the wheel truing machine or the wheel grinder?

MR. GEORGE W. NIEMEYER (Master Mechanic, Missouri Pacific Railroad, North Little Rock, Arkansas): Concerning this C clamp you have on the EMD journal box, can you put a hole in the outside surface of the box so that the center of the axle will go through it?

MR. HERMAN: I am going to ask Mr. Waltman if he will answer that question.

MR. WILLIAM H. WALTMAN (Engineer, Shop Plants and Machinery, Chicago Rock Island & Pacific Railway, LaSalle Street Station, Room 900, Chicago, Illinois): Yes, that can be done. Some railroads have done it.

MR. NIEMEYER: Is that more satisfactory than the C clamp?

MR. WALTMAN: Yes, it is.

MR. NIEMEYER: I have another question in regard to the cutter. You have these bit inserts, and you are instructed to use them in their entire circumference and then send them back. It is possible to grind them?

MR. HERMAN: I believe the answer is that it is not economical to grind them. By turning them a few degrees at a time you can get ten cutting surfaces per side, which would be roughly twenty different surfaces on the one insert. In view of the labor and time involved to grind those inserts even on a diamond grinding wheels I just don't believe it would be worth-while.

MR. NIEMEYER: Are there some railroads that do it?

MR. HERMAN: Not to my knowledge. If any railroad is doing it, I would be glad to have their representative speak up.

I think the general practice at most of the points represented by members of the Committee is to replace the inserts. If you get an edge broken off you simply rotate the cutter to another surface. After you have used both sides in this manner, I think you have had the full life out of that insert.

(Slide) This view shows a shop-built wheel cleaning machine. This machine is manually operated. The wheels roll in on a hinged section of rail, and by means of an air cylinder the back end of the rail is lifted up and the wheels roll into the machine, onto power-driven rollers. The wheel pair is turned as a motor-driven pump pumps cleaning solution through the spray nozzles. At the finish of the cleaning operation the operator manually raises the doors and kicks the wheel pair out of the cleaning machine.

(Slide) This is simply another view of the same machine, show-

ing the wheel pair on rollers inside. You can see the power-driven rollers at the bottom across the drive shaft. You can see the arrangement of the spray nozzles for the high-pressure cleaning solution.

(Slide) This is another view of the same machine, showing the pair of rails, elbow-shaped, that are raised to lift the wheel pair and roll the wheel pair into the cleaning machine.

(Slide) This is a manufactured machine for the same purpose. The principal difference in these two machines is that the machine you see on the screen is designed for automatic cycling operation. The only thing the operator must do here is to load the track leading to the machine. There is an escapement device just ahead of the entrance to the machine.

The cycle is started by the operator simply pressing a button. The doors to the machine are raised. If there is a pair of wheels inside, a device kicks the pair of wheels in the cleaning machine outside. Immediately following, the escapement device operates to release another wheel pair. That wheel pair rolls into the machine. It is stopped on rollers. The doors close, the motor-drive pump starts and the pair of wheels is rotated.

The pump pumps the hot solution spray on the pair of wheels for a given cycle. At the end of that cycle, steam nozzles are turned on and the steam thoroughly heats up the wheel pair to insure rapid drying of the pair after it is released from the machine. At the end of the steaming cycle the doors open, the escapement device kicks the wheel pair out, and another wheel pair is kicked in.

While the wheel pair is being cleaned there are cleaning vats at each end of the machine, and two journal boxes that have been removed from the journals can be cleaned at the same time. The advantage of this cleaning machine is that it is controlled by an automatic cycle. It does not depend on an operator who may run his cleaning cycle too short or too long. It is the type of equipment we are trying to emphasize in the report. By speaking a little money for this type of equipment you can secure automatic operation and reduce the labor cost.

MR. JOHN SIMS (Assistant Master Mechanic, Florida East Coast Railway, Miami, Florida): I noticed in the slide that they are apparently cleaning car wheels. Does that cleaning device clean the inside of the wheel between the traction motor axle gear and wheel as well?

MR. HERMAN: The machine can be supplied with nozzles to direct the cleaning spray to cover the entire area. A high jet nozzle is provided to insure thorough cleaning between the gear and the axle. It is designed, of course, to clean the heavy compound off the gears on these wheels.

MR. SIMS: About how long does the cleaning cycle take?

MR. HERMAN: As I recall, the cycle is 20 minutes. The operator, of course, does not have to stand around while the machine is in operation.

(Slide) This slide is another view of the same machine. At the bottom is the bath for cleaning journal boxes. The automatic control push buttons are located on the end. You get some idea of the number of cleaning nozzles that are provided inside.

VOICE: What is the approximate cost of that machine?

MR. HERMAN: The cost is in the neighborhood of $15,000.

MR. H. E. WHITENER (Central Railroad Company of New Jersey, Elizabethport Shops, Elizabeth, New Jersey): I would like to ask about wheels that

have the Timken roller bearings. What do you do about the boxes on them? How do you clean the boxes and wheels?

MR. HERMAN: I am sorry, but I can't answer that question. We have none of these machines in operation.

MR. BLEDSOE: Going back to John Sims' question, we have a similar machine that will clean the gear job just as though it were taken off and cleaned in the vat. We have a similar operation in our wheel shop.

To answer Mr. Whitener's question, we find it is a good practice to pull that box and look at it. We run it through the machine after we remove the box.

MR. HERMAN (Slide) Before the next slide, I would like to mention briefly that the report discusses air filter cleaning machines. The practice, as a lot of you may recall when we first got our Diesels, was to use a series of three or four large vats. We took the filters and placed them in a basket or in some sort of holding frame. We immersed them first in the vat of cleaning solution, steam heated, and boiled them for quite a long time. Then we lifted them out either with an electric hoist on an overhead monorail or in some cases by an air cylinder hoist, and put them in a rinse bath. Finally they were put into a vat of oil. After that they were taken out of the carrier and put in a steam-heated oven. There was a lot of time, labor and expense involved inthat operation.

The report in the proceedings lists some of the types of production conveyorized cleaning machines for filters. Several different manufacturers have developed them. They can be loaded at one end and either unloaded at the same end, in the case of one design, or unloaded at the opposite end, and will clean up to 100 filters an hour with no attention from the operator other than the loading and unloading.

The design is to coat the filters with the heavier gel type oils. The machines are furnished with heating or drying ovens to dry the moisture off either before they are dipped in the gel type oil or, in one case, to secure drying action after the dipping. I think you can justify them in shops where you have a sufficient volume to take care of the original cost.

We also discussed parts cleaning machines. Originally we put our Diesel locomotive components into cleaning vats, steam-heated, and boiled them for hours at a time. Then we took them out and had an operator who used a steam hose or a hot water hose to rinse them off. There are on the market, as most of you know, various types of agitating machines which greatly reduce the time and labor required for cleaning these Diesel parts.

The slide on the screen is that of a cylinder assembly changeout shop. The first thing I want to talk about is the parts cleaning machine that we have installed there. It is a completely conveyorized cleaning machine. The parts are put in special baskets or hung on hooks at one end of the machine as they come from the disassembly point.

The conveyor carries the parts progressively around a U-shaped bend and in through a vestibule into the machine itself, which is located along the wall. The parts on the conveyor are carried progressively through a series of hot solution sprays. A large motor-driven pump supplies this hot solution under pressure to the sprays, and they are so directed that every portion of the part gets a thorough cleaning.

You will notice we put cylin-

der heads, liners, connecting rods, pistons, and just about any Diesel part that requires cleaning through the machine. The solution spray under high pressure effectively removes all of the soil, oil, grit, dirt, and so on. After it passes through the solution chamber it goes through a hot rinse chamber, where we have another series of sprays with a motor-driven pump supplying high-pressure water. The conveyor comes out through a so-called exit vestibule, where we have exhaust fans to prevent the escape of steam and vapor into the room; to the unloading position at the other end of the machine.

The operation is such that from start to finish it takes approximately one hour for a part. Conveyor travel is about one foot per minute. Therefore, there is a part coming off the machine about once a minute. It has proved to be a very effective cleaning setup for a large shop. Of course you must have the volume to be able to justify a machine of this size.

On the conveyor system just following this we have a shot blasting machine for our pistons. There are two things, first of all, that we try to do in cleaning pistons: We want to remove the hard scale and rust in the piston ring grooves. We have done that by manufacturing a shop-built machine. It is a simple rotating device, power-driven. The piston is placed over the head and is rotated by a motor. Fingers that are exactly the proper width for the piston ring grooves thoroughly clean the scale out of them.

The next operation, and the most difficult one, is the removal of the hard carbon on the inside under the crown. If this is not satisfactorily removed, sooner or later there is a good possibility of developing hot spots in the head of the pistons. The machine we use for that is manufactured.

This picture is the package power pack or cylinder assembly changeout shop. It is something we have had in operation for about six months, and I think it is more or less new in railroad work. We are very fortunate in having Mr. K. L. Pollitt, Superintendent of the Shop in the audience. If there are any questions about it and its operation, I will be glad to hear them. If I can't answer them I am sure Mr. Pollitt can.

MR. H. R. WHITING (Chief, Diesel Inspection, Grand Trunk Western Railroad, Battle Creek, Michigan): Just where is this shop located?

MR. HERMAN: It is located in Chattanooga, Tennessee.

MR. WHITING: How many locomotives do they have to maintain to warrant such a shop as this?

MR. HERMAN: As I said before, this shop was designed and laid out to maintain a fleet of 762 units.

MR. WHITING: Do you have any idea of the total cost of a layout like that?

MR. HERMAN: I am going to mention a figure of approximately $250,000. That did not include the building, but did include revamping and reworking an existing building.

We depressed two tracks for a distance of about 100 feet inside the building. Over those tracks we erected two tram rail cranes. We have electric hoists as well as trolley carriers that support impact wrenches and certain other tools that are needed for the removal of the power pack.

I wonder if Mr. Pollitt would care to go to the microphone and say a word about this.

MR. K. L. POLLITT (Superintendent, System Assembly Shop, Southern Railway, Chattanooga,

Tennessee): In regard to the shop discussion and getting locomotives in and out of the shop, it was necessary for us to depress the tracks 4 feet 7 inches. The reason was that we had a 25-ton crane already installed in this building, and we had to have that depression in order to clear a GP-7 or GP-9 hood with that crane. It was more economical for us to depress the tracks than to change the building construction.

MR. BLEDSOE: May I make a humble observation, not as a member of this Committee?

I had the pleasure of visiting this shop, and to me as a locomotive maintenance man it was like what a symphony is to a musician. It is certainly worthwhile for every maintenance man to go down there and see it, because it is the most significant step in what we have to do in the future if we are to live with the money we are making.

This shop is "it," and it would be worth anyone's time to visit it because it is perfect as far as railroads are concerned.

MR. HERMAN: Mr. Bledsoe, Mr. Pollitt and I appreciate those kind words.

MR. R. E. HARRISON (Supervsor Diesel Locomotive Maintenance, Southern Pacific Company, San Francisco 5, California): What portion of this cleaning layout is manufactured by the railroad, and what is purchased from outside manufacturers, or is it all purchased?

MR. HERMAN: Essentially, Mr. Harrison, I would guess that approximately 80 to 90 per cent is purchased. The roller conveyors were all purchased and designed to suit the distances involved. We had manufacturers design the machinery especially for us. It it costly equipment; you must all appreciate that. At the same time, however, we had a sufficient volume of work to justify an expenditure of this kind.

(Slide) This is simply the entrance vestibule to the large cleaning machine that I am talking about. You see a blower housing hanging from the hook going into the machine. There is a large exhaust fan that maintains a vacuum in the entrance vestibule so that we don't have an excessive amount of steam and fumes coming out into the shop itself.

(Slide) This is a better view of the same cleaning machine. You can see the water storage tanks in the front. They have hinged covers where we add our chemical or solution-mixed chemical. It gives a better view of the size of the machine, the conveyor that carries the parts, and so on.

MR. POLLITT: I would like to point out, on the cleaning machine, that the material we use is a caustic cleaner in a 2900-gallon storage tank. It was borne out that this cleaner is usable on all types of metals, so we don't have to differentiate between blowers and air compressors and liners. We can send them all through the same cleaning tank.

Referring to the conveyor, I would like to correct your statement of a while ago. The conveyor moves 18 inches a minute. When we first started this operation it was recommended that we move the conveyor 6 inches a minute with 3 oz. per gallon of cleaning material. After investigating we stepped it up to 12 inches a minute with 4 oz. of material, and now we are operating 18 inches a minute with 5 oz. material. I hope soon we can move it up to 24 inches a minute with 6 oz. of material.

MR. HERMAN: That is a very good point, Mr. Pollitt.

MR. P. J. FINCH (Assistant Superintendent Motor Power Diesels, Chesapeake & Ohio Rail-

way, Richmond, Virginia): That sounds pretty good. It's like feeding a horse straw. However, how many pounds of steam does this machine use per hour?

MR. HERMAN: Initially, with the machine cold, it will take approximately 100 boiler horsepower. As soon as the solution tank is heated up the requirements are reduced I would guess that it might run somewhere around 25 boiler horsepower, which would be equivalent to 750 lb. steam an hour.

(Slide) This is the shot blast cleaning booth for cylinder heads. Because of the irregularities, this is a manual type booth. The operator stands at one side. He inserts his arms and hands into the rubber gloves and sleeves; and closes the door. The single shot blast hose is counterweighted. There is a rotating table inside. With one hand he rotates the cylinder head and operates the nozzle with the other hand. It takes something like seven minutes to clean a cylinder head. That is thoroughly removing all the hard scale and carbon around the air ports.

(Slide) This is another view of the interior of the shot blast booth for cylinder heads.

(Slide) The white doughnut-shaped circle represents the top of the piston cleaning machine. This is the machine we use for shot blasting and removing the hard carbon deposits on the under side of the head.

(Slide) This is a specially designed machine for cleaning valves. It consists of a motor-driven rotating table with ten chucks having rubber grommets. The valve stem is pushed down into this grommet so that only the head and the upper 5 inches of the stem project out. The table rotates. The valves are carried progressively through a series of sprays. These sprays use a very finely divided abrasive mixed with water to remove the hard carbon, but at the same time it does not destroy the finish on the valve.

After it is blasted, the valve moves into another section where it is rinsed with water, and into a third section where it is blown off with compressed air.

The production on this machine is approximately three to four valves a minute, or about 18 seconds.

(Slide) This is a view of the loading and unloading position on the valve cleaning machine.

(Slide) This is the back of the machine and is an attempt to show some of the nozzles, they are covered with abrasive.

(Slide) This is another cleaning booth that we had designed. The purpose of this is to spray finished parts with water-soluble oil to protect the finish as they go on through other operations or are shipped out to other shops. It is supplied with a roller conveyor, and the parts automatically going through are sprayed and released.

(Slide) The last two slides are more or less a follow-up on the report of the Committee last year. These are shop-built devices. There was some interest, in one of our Committee meetings, in a traction motor turnover stand. The slides here show a stand of this type which was developed by the Rock Island for traction motor maintenance. Its purpose is simply to turn over the motor so that the armature can be removed.

(Slide) This is another view of the same thing, with the motor turned into the upright position.

This concludes our slides.

VOICE: Did I understand you to say that the same cleaning solution is used in all those different cleaning vats, for cleaning all those parts?

MR. HERMAN: Mr. Pollitt made the statement that they use

an all-purpose cleaning solution in the conveyorized spray cleaning booth, and that that solution is suitable for aluminum and bronze as well as steel.

Are there any other questions we might answer? Our time is almost up.

MR. FINCH: Do you know of any type of cleaning equipment that will eliminate the use of this large cleaner by cleaning the parts, getting the hard carbon off, such as builds up on valves, such as builds up on cylinder heads and liners, without having to re-clean it, like we do on the cylinder head? A one-shot operation where you put the cylinder head in and it gets the loose oil and carbon off, and then gets the hard carbon off? The idea is to eliminate the first operation of cleaning with a solvent. Clean it with something like vapor sanding or vapor blast machine.

MR. HERMAN: I don't know of any equipment of that type, Mr. Finch. We had some discussion at last year's Committee meeting on ultrasonic cleaning. Since that time there have been tests made on several railroads, and I think the consensus of opinion is that it is probably very satisfactory for small parts, where you have a number of cavities, but it is very questionable as to whether it is going to be the answer for large, heavy parts such as you are talking about. I don't know of any equipment of the type you mentioned.

MR. FINCH: Would there be something that would be the ultimate in cleaning—just a one-shot operation that does not reuire a second cleaning?

MR. HERMAN: I agree with you, Mr. Finch, that it certainly would be fine if there were something like that.

MR. EDWARD H. WRIGHT (Mechanical Superintendent, Eastern District, New York Central Railroad, 910 Erie Boulevard East, Syracuse, New York): We thought we could do something like that. We put in an agitating machine using a very expensive material for cleaning, and it did almost a perfect job. We still had a little hand cleaning to do. Isn't it possible to get a cleaning material that will take it all off?

MR. HERMAN: I don't know of any cleaning material of that type. I don't profess to be an expert on that.

I am sorry, but we are going to have to close the discussion. I want to thank you for your attention. I hope we have brought you something that may be of some value to you. If there are any questions that haven't been answered, please write me and I will be very happy to answer them.

MR. J. P. McGREGOR (Superintendent, Diesel Power, Wabash Railroad, Decatur, Illinois): Mr. Herman, do you ship the power assemblies from outlying points to that shop?

MR. POLLITT: Yes. All liners, heads, blowers and air compressor parts that are used on the Southern Railroad are received from this shop in Chattanooga, and defective parts are sent back for repairs.

MR. McGREGOR: Do you ship the assemblies out, assembled, to those points?

MR. POLLITT: To the running repair shops we ship the individual pieces of the power pack in their respective cartons. Liners are placed in a regular liner carton, and we invert the piston assembly inside the liner and ship it as a unit. The cartons are placed in standard skids, and we ship six liners and pistons per skid and six cylinders per skid. In our heavy repair shop we ship complete built-up power assemblies for direct application to the locomotive.

MR. HERMAN: Thank you for your attention.

CHAIRMAN LEHR: Mr. Love, will you come up, please, and sum up the presentation?

SOUTHERN REGIONAL EXECUTIVE

C. A. LOVE
Asst. Chief Mech. Officer
Louisville & Nashville R. R. Co.
Louisville, Ky.

MR. C. A. LOVE (Assistant Chief Mechanical Officer, Louisville & Nashville Railroad, Louisville, Kentucky): Unfortunately, our time schedule won't permit us to continue this very important discussion. I know there are a lot of questions still to be asked about this very important report that has been given by our Committee on Shop Equipment.

As Mr. Herman said, it has always been our policy, when we have to discontinue a discussion, that if you do have any unanswered questions you send them to either Mr. Herman or Mr. Lipscomb, and we will see that they are answered and printed in the annual proceedings.

CHAIRMAN LEHR: Our time is almost up. We want to thank you for attending this session. May we remind you that the exhibits are open this afternoon and tomorrow. Our suppliers have gone to a lot of trouble and expense to get them here this year. We owe it to them to visit their booths and ask questions and show them we are interested in their work they have done. At the same time you might take your book along and see what you can do toward next year's advertisements. That is what Charlie wanted me to say.

Thanks very much.

Coordinated Mechanical Association

LUNCHEON

★

Principal Speaker

J. P. NEWELL, Vice President
Pennsylvania Railroad
Philadelphia 4, Penn.

Honoring All Railroad Presidents

NEW HORIZONS FOR THE RAILROAD INDUSTRY

Remarks of
J. P. Newell, Vice President,
The Pennsylvania Railroad Co.
At Luncheon Meeting
of
THE ALLIED RAILWAY SUPPLY ASSOCIATION
and
THE JOINT COORDINATED RAILROAD ASSOCIATIONS
Hotel Sherman, Chicago, Ill.,
September 17, 1957

Mr. Robson, Members of the Allied Railway Supply Association, and Members of The Joint Coordinated Railroad Associations:

You and your fellow members represent a vitally important segment of the railroad transportation industry in this country. Consequently, I deeply appreciate this opportunity to meet and talk with you concerning the successful operation of our railroads and their future growth.

Our railroads could not run for one day without the supplies and equipment that some of you develop and sell, and without the supplies and equipment that some of you put to work—and the growth of our railroads is entirely dependent upon the quality and quantity of what they are able to buy from you of the Supply Association, and the mechanical skill with which this material and equipment is used by those of you who represent the railroads. You may think that my mention of the direct connection between purchases and the future growth of the railroads is merely a flowery compliment from a guest speaker. Actually, it *is* a steel-hard fact of railroad life that is too often overlooked—both in the railroad industry itself and by those who regulate it, those who tax it, and those who patronize it. Indeed, it is so overlooked that our railroad industry today is in a position where it can buy only a portion of the many things that it should be buying if it is to keep pace with the increased transportation which will be required by our growing economy. I want to discuss that further with you in a moment.

It might interest you to know how the subject of my discussion here today developed. I began, logically enough, with some questions to my immediate colleagues. They suggested such topics as roller bearings on freight cars, standardization of freight cars (which is a subject very close to my heart), federal legislation covering power brake rules, and so on. But in reviewing your programs for the past few years I noted that most of your guest speakers directed your attention to similar subjects directly related to your day-to-day activities. Furthermore, I realized that in these highly technical matters many of you know a great deal more about them than I do, and therefore I could contribute very little.

In occurred to me that you might be interested in one man's answer to two questions—because both questions definitely relate to your sucess and economic wellbeing. The first—"What is the future of the railroad industry?"—was selected in the belief that many of those engaged in railroad transportation either do not have a clear picture of the future of our industry, or have a pessimistic outlook. The second question—"What is the greatest single major problem confronting the railroads?"—is obviously of interest to us all.

Mr. next step was possibly somewhat unusual—I decided to consult the public, since the public repreesnts our patrons. I don't mean that I conducted a massive public opinion survey.

What I did was to contact six people entirely outside of the railroad industry—the judge in a small county seat, the presidents of two banks—one a small town bank in the Midwest; the other president was the head of a large eastern bank—a metropolitan lawyer, and two industrialists in widely divergent lines of business. I told them about your meeting here today and asked them to give me their personal answers to these two questions. "In your opinion, what is the future of the railroad industry?" and "What do you think is the greatest major single problem confronting the railroad industry?" Their replies were quite illuminating and indicate that these two questions are so interrelated that they could well be considered together. Their replies provided interesting information on what outsiders—for, after all, it is outsiders who are our patrons and who buy our service—think that we railroaders should be doing to improve our industry. Their replies suggested my topic —"New Horizons for the Railroad Industry."

Now let's drop the figures of speech and start looking at facts. The first is that the railroad industry has all the makings of a growth industry and it is going to grow. I know that there are times when some of you must wonder if that is so, for your sales and your improvement projects are the first to feel the pinch when industry slows down a bit and traffic falls off. But, at the same time, you know from experience that these slowdowns, although unpleasant and damaging, always prove to be temporary. Please don't think I am trying to dismiss them with a wave of the hand. I know what such things mean to you personally, and to your profesional pride in your business and in your railroad. I also know what they mean to a railroad as a whole in terms of business and money.

For the past 20 years we have experienced a car shortage every time that railroad business has been good. The railroads have not had the funds to buy sufficient equipment to take care of the peak demands, nor the earnings position to own such equipment and store it in good order when business was not booming—and it is not only equipment programs that suffer.

As some of you know, the Pennsylvania Railroad has been working for some time on a new thirty-four million dollar classification yard at Conway, just outside of Pittsburgh—which is expected to produce savings of about ten million dollars a year. It should have come into full operation twelve months ago, and it would have if business conditions, the lack of available cash and labor regulations had not forced delays. So, a twelve-month delay has resulted, with a resultant loss in savings and with a delay to improvements in our service. At long last, the yard was placed in full service two months ago.

But despite such temporary setbacks and delays, we are a growth industry and we are going to grow. Let me give you some of the reasons why I think this is so.

The railroads of this country now handle about one-half of the Nation's intercity freight and two-fifths of its fare-paying travel. This is so despite all of the billions of public money that have been poured into the airways, the waterways and the highways.

Our country will continue to grow and expand. The population has increased beyond expectations, and it is expected to increase by twenty-one million in the next seven years to one hundred ninety-two million in

1965. Additional transportation will be required in proportion, and our subsidized competitors cannot possibly absorb all of the increase that this expanding economy and growing population will require. There just isn't the time, space or money available to provide all of the additional highways, waterways and airways that would be required if railroads stood still.

So there have to be railroads and they have to grow in carrying capacity to handle their share of the increase. And with proper attention, our railroads should be able to improve their over-all position by getting more than half of this increase in traffic. If we will keep that in mind, it puts a different face on our problem. For our problem becomes not "Will we grow?" but "How can we get started now as fast as we should?"

Let's stop right here and look at what we mean by railroads growing. I don't know how much you encounter it, but I am always meeting people who think rather vaguely of us as a business whose chief product is a multitude of statistics. They may ride an occasional passenger train, they may see a few freight trains, and they may bewail the passing of the steam locomotive and know what the new diesel looks like. Of course, they are all what I call "unqualified railroad experts," but they have no real knowledge of our industry, no basic interest in it, and no appreciation of its problems—and therein lies one of our major weaknesses.

They don't know—as you and I do—that railroads are an industrial plant worth some 27 billion dollars, much of it iron and steel manned by a million or so men like ourselves, using thousands of trains aggregating millions of tons, to do a hauling job which the Nation vitally needs, supported by the supply industry which works hand-in-glove with us to effect improvement and provide better transportation.

So when you and I talk here today of our industry growing, we know just what we mean. We mean more road trains, moving them more efficiently, and with earnings which will permit us to buy still more trains and run them still more effeciently. In plain English, we are thinking of more railroads doing more work—and, frankly, making more money.

Why, then, the word "frankly" in front of making more money? It is for two reasons. One is that at the present time we can't buy enough trains and improvements to grow as fast as we should until we do make more money. The other is that there are a surprising number of people who don't think we should make money — particularly if some of it comes out of their pocket. They think our job is just to serve.

The fact that our industry averages a net return of 4 per cent, as against the 10 per cent, 15 per cent and 20 per cent that many industries earn, to them seems relatively unimportant. It is well indicated every time we make an attempt to make commuter fares realistic or to take off a losing passenger train that practically no one is using. The attitude is—"Look, it's not your job to make money—your job is to serve." What this attitude fails to recognize is that we can't serve as we should unless we can make enough money to buy all of the equipment and technology we need to do it right. The alarming thing is that this attitude—that we don't need to make money—is quite often assumed by the very people who need our services most—including the Post Office and the Defense Department.

We have a major problem ahead of us to properly educate our patrons, our friends and the public—to acquaint them with the fact that, as a service industry, we not only have to provide service, but we are also a growth industry and should be allowed to behave as a growth industry. And, if we are to grow with the economy we must have money to do it.

There are two specific ways to meet this problem. One is to get the public to understand how it is to the public's advantage that we be allowed to earn the money we need to do a better and more efficient job for the public. The other is by doing our own day-to-day job better with the specific aim of producing more satisfied customers and, at the same time, making or saving more money from our particular railroad.

That was just the advice I received from the six individuals to whom I wrote in connection with the future of the railroads and our major problem—the lawyer, the judge, the bankers and the industrialists. It was interesting to note how clearly these men understood the obstacles to our growth which were imposed upon us from the outside. By that I mean such handicaps as inequility of regulations, government help to our competitors but not to us, taxation of our facilities but not of theirs, inflation which we are not permitted to offset properly with increased rates, and a continuation of unnecessary passenger losses. What is still more important is that these men indicated they knew that by handicapping our industry these things were hurting the public. But, with cause for much concern, none of these six men indicated too much sympathy for any immediate action to correct these undesirable situations.

The reply from the metropolitan lawyer hit the nail on the head in outlining not one but five major problems. He wrote, and I quote, "there are a number of major problems confronting the railroads which, to my mind, are (1) inequality of regulations, (2) subsidized competition, (3) state taxes on fixed property, (4) costly labor regulations, and (5) losses on local and commuter passenger business." Mind you, these suggestions come from a man who is not closely associated with the railroad industry and whose reaction represents only "what he has read in the paper" or learned from his day-to-day contacts with businessmen.

While these problems are primarily the responsibility of railroad management, every employe of the railroad transportation industry — our railroad, suppliers and our railroad employes—can all be of great assistance in supporting management by keeping themselves posted on these problems and spreading information to the general public on the importance of corrective action.

The small town banker, who by the way has been a tremendous success financially, has taken an entirely different approach to my questions. His comments hit directly at every one of us when he says (and again I quote)—"It seems to me the all-consuming problem confronting the railroads is their seeming inability to compete with other means of transportation in (1) train schedules, (2) cost to the shippers, and (3) condition of merchandise when received by the consignee. Competition in industry was never keener than now, and regardless of the troubles that confront the railroads, shippers will buy transportation at what they think is the lowest cost to them." The duties of most of the railroad employes in this room can direct-

ly affect the first item—time schedules and dependability of our service. The quality of our work and the efficiency with which that work is performed by us and those under our supervision, directly affects the cost of service to the shippers. There can be no question but that the condition of merchandise when received by the consignee is a matter directly related to the performance of duty by railroad employes. So that, in the main, this more practical approach of the small town banker covers three items which can possibly be solved by proper and cooperative action by the railroad employes themselves, particularly with the benefits which accrue from research and development, and the production of better equipment by the supply industry.

Frankly, I was quite surprised at the understanding of the railroad situation by these six non-railroaders. It would be heartening to think that there is a similar appreciation on the part of the millions of citizens and voters in this country who do not work for the railroads—but that isn't the case. It seems to me, therefore, that our greatest single major problem is to bring about that understanding on the part of the majority of those people. We have a wide-open opportunity for each of us. The railroads have a million employes. If each of us would make five other people aware of their stake in this matter—make them willing to demand their rights about it—there would be six million voters that the authorities would not dare ignore. The supply industry, directly and indirectly, could add another million or two—and don't forget that enlightenment has a way of spreading, especially when it takes the form of enlightened self-interest—one convert makes another.

Please don't misunderstand me. I am not proposing that we run down other forms of transportation. What I am proposing is a crusade to convince the public that it is in their interest that the railroads be given the proper kind of a deal—call it what you will—a square deal, a new deal, or a fair deal.

For a moment let's look at what the railroads have been able to accomplish in the last few years without this kind of support. Since about the depression years of the Thirties, this country has witnessed a complete revolution in railroad motive power—far beyond anything ever experienced by any other industry in this country—both as to the extent of the change and the time required. We all thought we were buying a lot of steam engines in the boom period between 1923 and 1930. Expenditures by Class One railroads for locomotives during that period averaged almost ninety-six million dollars a year. In terms of 1947 and 1955 prices, it would be one-hundred and seventy-five million a year. The actual average expenditure by Class One railroads for locomotives during the 1947 to 1955 period (when practically all locomotives purchased were diesels) amounted to over three-hundred and fifty-two million dollars. In order to change our motive power from steam to diesel, we increased our annual capital expenditures for motive power by 100 per cent in terms of equal dollars and by almost 300 per cent in terms of actual dollars. That has been quite an accomplishment—such a tremendous increase in expenditures for one particular part of our railroad plant during a period of inflation when we were trying to rebuild our property after the ravages of World War II. It is only natural that these increased expen-

ditures for locomotives have adversely affected railroad expenditures for other purposes, particularly for other equipment. While annual expenditures by Class One railroads for diesel locomotives were increasing 100 per cent in the 1947 to 1955 period compared with the 1923-1930 period (in terms of equal dollars), all other railroad capital expenditures were decreasing by almost 53 per cent—from approximately one billion six hundred and sixty-two million to seven hundred and eighty-eight million.

It is a tribute to the railroad industry that it has been able to go as far as it has in modernization and new freight equipment since World War II in view of these restricted expenditures. It might be anticipated that with the completion of the transition to diesels on most railroads they can devote that money to other capital improvements in the years to come. That is true, but to date both inflation and the lack of adequate earnings have not permitted the expansion in capital improvement programs which are required to keep pace with modern transportation practices, newer and better freight cars, special types of equipment to better suit the needs of our patrons, centralized traffic control, improved retarder yards and terminals—these are but a few of the items demanding heavy capital expenditures from us in the next few years. As has been noted by several high railroad officials, we should be spending approximately two billion dollars a year for capital improvements during the next ten years. This compares with an average expenditure of one billion one hundred forty-nine million dollars during the past ten years, 1947 to 1956, inclusive. The problem is to find the money. One bold approach—by the Eastern railroads—is the proposal for a Railway Equipment Agency which has been placed before the Senate and the House of Representatives in Washington. Not fully understood by most people—but to be fully explained during the coming months—this program does not contemplate that the Government will subsidize the railroads. It recognizes the public necessity for railroads to grow with the expanding economy if we are to avoid putting all of the increased traffic on the higher cost forms of transportation. It recognizes the need for capital money by the railroad industry and the inability of the industry to secure that capital money in the open market. It would provide for a Government agency which would purchase equipment for long-term lease to the railroads—with the railroads paying in full all costs including interest, amortization and operating charges.

With this Plan in effect, you and I can well visualize the capital money that is now earmarked for equipment purchases which could then be released for improvements to roadway facilities, terminals, tracks, etc., and the resultant benefit to our industry. Sufficient equipment, better equipment and improved facilities would place the railroads in a position to capture even more than half of the increased traffic which is bound to develop during the next ten years. It would definitely rule out any continuation of the trend of the past ten years which has resulted in a continuing decrease in the railroads' share of the total transportation of the country and a loss of the more remunerative transportation to our competition despite an overall increase in the total volume.

A number of other develop-

ments during the past few years indicate that the climate in which the railroads operate is beginning to improve. We are getting a much better understanding of the fact that the people who will benefit most if transportation regulation is modernized are the users of transportation. The President's Cabinet Report pointed that out. We are beginning to make some progress also in an understanding of the need for tax relief, particularly in passenger services and commuter services. We are beginning to see some evidence that the long needed railroad consolidations will become realities. We have made a great deal of progress in the streamlining of railroad facilities and we have the technical knowledge to effect improvements that will greatly increase efficiency as soon as we have the cash to buy them.

Also "Piggy-back" has now become an integral part of the operations of many railroads and its possibilities are almost unlimited.

Yes, there is a great future for the railroad industry, particularly as a growth industry and the horizon is bright.

WEDNESDAY MORNING SESSION
September 18, 1957

The meeting reconvened at 9 a. m., Mr. J. T. Daley, President, presiding.

PRESIDENT DALEY: Gentlemen, the third and final day of our LMOA annual meeting is here and is gradually coming to a close.

The morning session will be conducted by a man from the St. Louis Southwestern Railroad and Vice President of the Locomotive Maintenance Officers' Association. He has been connected with this Association for a good many years. All of you know who he is if you have been coming here for the last ten or fifteen years.

However, for the benefit of the new young men who are getting ready to push us old guys into retirement—and understandably so, and who I expect will do a much better job than we have done because they have a lot better things to work with than we had—he is Mr. Elmer Myers, Superintendent of Motive Power of the Cotton Belt Railroad. Mr. Myers.

CHAIRMAN MYERS: Thank you, Mr. Daley.

Gentlemen, this is the final day of our meeting. We are looking forward to some very constructive things today. I was particularly impressed with the manner in which we have thus far progressed in our work. I am sure that many of the papers you have had the opportunity of listening to and the discussions, will be very profitable.

Having served as a committee member in the past on these technical papers, I happen to know what work lies behind their preparation. They require a lot of concentrated effort and assimilation of information, and a technical chairman, of course, is always mindful of the fact that he can prepare only some of the brief highlights of the information that has to be acquired.

E. V. MYERS
Third Vice President
Supt. Motive Power
St. Louis - Southwestern Ry.
Pine Bluff, Ark.

When we consider who we are, and what we are, we have a vast knowledge, and we who have been here for the last two days have tried to bring together our thinking in order to improve ourselves in the operation of Diesel power.

The meetings thus far have been conducted in a very orderly manner, and I hope that today we will have the same good behavior on the part of everyone. I know all of us will remember that the matters coming before us are of importance. Visiting

among ourselves is secondary. If we will just remember that and keep quiet in the rear of the room, everything will go along fine.

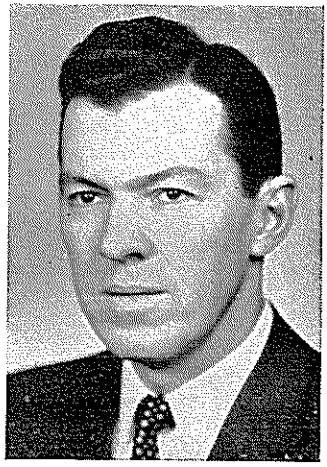
Today we have a very interesting paper to be presented by Mr. Adams' Committee. Mr. Adams is no newcomer to our Association. He has worked here for a long time. I have been particularly impressed with the manner in which Mr. Adams has always presented his information.

Mr. Adams was born in Newton, Kansas, July 16, 1916. He attended elementary school at Newton and graduated as a Mechanical Engineer from Kansas State College. He spent three and a half years in the Army Air Corps and was discharged as Captain. Employed by Atchison, Topeka, & Santa Fe at Newton, Kansas on June 12, 1940. He served three years as Special Apprentice; two years as Test Department Assistant; four years as Assistant Supervisor of Diesel engines at various points on the system; one and a half years as Roundhouse Foreman at Slaton, Texas, and has been General Supervisor of Diesel Engines since June 1, 1955. He is also a bell ringer of note, and quite a golfer, after a fashion.

You will be favorably impressed with the manner in which Mr. Adams presents his information, and after he has presented it and introduced his Committee I know we will enjoy a well-prepared presentation.

I now present to you Mr. Adams of the Santa Fe.

MR. M. B. ADAMS (Atchison, Topeka & Santa Fe Railway, Chicago, Illinois): Thank you, Mr. Myers. Mr. Myers judiciously left out a few highlights, and I am just as happy that he did.



M. B. ADAMS, Chairman
Committee on
Diesel Engine Maintenance
Gen. Supvr. Diesel Equipment
A. T. & Santa Fe Railway
Chicago, Ill.

First, I would like to introduce the members of the Committee.

MR. ADAMS: Now I would like to show you some slides.

(Slide) This is a slide showing pinpoint porosity in a liner. You can see the honing lines here on this particular liner. You can see that these pockets are large but not connected. While there

REPORT OF THE COMMITTEE ON DIESEL ENGINE MAINTENANCE

1957 TOPIC

"CHROME-PLATED LINERS AND CRANKSHAFTS; AND LUBE OIL COOLING AND FILTERING SYSTEMS"

SEE PAGE 131 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

are a few of them fairly good size, there is no connection. They don't actually run into one another, so you are not prone to get too much oil consumption in this type of engine.

However, because it does have the larger pockets, it is a little better for an engine that is hard to lubricate.

(Slide) These are 120 magnifications, I might add. This is a view of the intermediate porosity, which is sort of approaching the channel type porosity. It has very good wearing qualities because of the larges areas of chrome.

These channels, while they are approaching the channel-like appearance, are not connected to other sections of the channel, so there isn't much tendency to carry oil on up in these channels. However, the channels or cavities do retain the oil to give you proper lubrication on the liner.

(Slide) This is a 120 magnification of the channel-like porosity. These have very good wearing qualities, too. You can see the honing lines. You can see that the channels are interconnected and sometimes can cause difficulty on oil consumption. However, records indicate that, if properly done, this type of plating too is very good.

(Slide) This is a view of a honeycomb liner. I wanted to get a little better picture of this but was unable to do so. You may have seen this liner outside. These dimples have a porosity similar to the intermediate or porous chrome.

(Slide) This is a failed crankshaft. There is little doubt about this one because it is broken right through. However, the report indicates that the point of failure was in the area right here, the fillet area, which was improperly treated in plating and caused a stressed area here, which resulted in this.

(Slide) This is a view of the cross-sectional area of the failed journal. You can see the very smooth chrome plating around the periphery. That is a constant thickness all the way around. That is something that I want to stress—that a crank shaft should not be ground out of its positional dimension and then plated back and ground in its true positional dimension, because that produces a varied thickness plating which stresses unequally and results in failure of the plating.

The next slide is a view taken up under here. You will see the fillet area. It is a little hard to see here because this is lying down. If it were standing on end it would be easier to see.

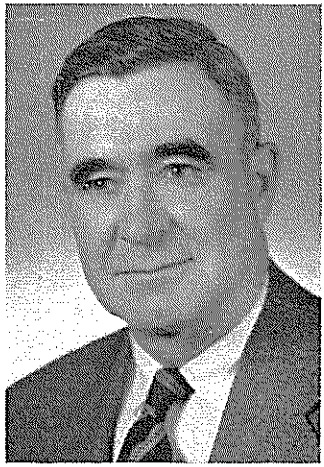
(Slide) Here you can visualize this fillet area, and over on the other side there is a fillet area. This cut is a little bit at an angle, so you can see some of the face of the fillet. You can see here where the chrome plating did extend into the fillet area, and the metallurgist who examined this shaft tells us that he feels from his examination and microscopic inspection of the shaft that the plating in the fillet was the direct cause of the fatigue failure.

(Slide) I mentioned chrome crackle briefly. This is a slide showing chrome crackle. It is not a very good slide, I'll admit, but that stuff is hard to see. We were lucky to see what we did. We got it on what is called a Fax Film, and a fellow helped us get this, and we really do appreciate his help.

These lines are so fine that you can barely see them. I think chrome platers will tell us that they are most probably caused by the finish grind and hitting the chrome a little too hard, and overheating and setting up these stress relief lines. You can see this little plate more or less look-

ing like the pores on the back of your hand. They are so fine that you can't feel them, and you can't always see them.

These holes are 120 magnification or greater. You can see that this is really a very small hole, maybe 0.001 inch in diameter or something like that. They tell me that is a normal occurrence in chrome plating.



R. E. HANSEN, President
Rocky Mountain Diesel Club
System General Foreman
Colorado & Southern R. R.
Denver, Colo.

Now I would like to introduce Mr. Hansen, President of the Rocky Mountain Diesel Club. He was our host when several of the Committeemen and I went out there to give the pre-convention report. I would like to have him make a few remarks at this time.

MR. R. E. HANSEN (General Foreman, Colorado & Southern Railroad, Denver, Colorado): Thank you, Mr. Adams, for your introduction.

I would like to take this opportunity to thank the LMOA Committee and members and officers, in behalf of the Rocky Mountain Diesel Club at Denver, Colorado.

We meet every fourth Monday of every month, from September through May, and one meeting is set aside for the Locomotive Maintenance Officers' Association, which is always very well attended and most interesting. I wish to extend an invitation to any of you who may be in that vicinity at any time, to attend. You are very welcome.

M. Adams will continue the discussion on the oil filters, which no doubt you are very much interested in.

MR. ADAMS: Now is the time for question and objections or comments. Hop to it.

MR. P. J. SASGEN (System Diesel Supervisor, Pennsylvania Railroad, 6 Penn Center Plaza, Philadelphia, Pennsylvania): The Committee has done a wonderful job on this reclamation of liners by chrome plating, and you do bring out the point that chrome plated liners do have less wear per 100,000 miles or per month than a cast iron liner.

I am wondering—and, believe me, I am seeking information—if the Committee has done any work to develop what effect certain factors in the engine have on the average service life of a chrome plated liner versus a cast iron liner.

What I am referring to is an EMD engine. For instance, you will have water leaks, and you are faced with cracked cylinder heads, broken valves and broken rings. I am quite sure we are not the only railroad faced with those factors.

How does that affect the service life of a chrome liner versus a cast iron liner and the economies thereof?

MR. ADAMS: That is a tough question. I don't believe we have done anything specifically on that. However, chrome, of course, does not scuff easily, and

with a broken ring you probably will get by a lot longer with a broken ring in a chrome liner than you would in a cast iron liner.

Differences in the amount of dirt the engine gets, and the water, and the difference in the quality of fuel injection—maybe if you have a drippy, leaky injector you certainly would increase the wear at the top of the liner. I think it would generally increase proportionally, that is, the ratio between a cast iron liner wear and chrome wear would be proportional for any given situation.

MR. SASGEN: When you do have a broken ring which scuffs or scores a cast iron liner, it is very easy to hone it out. On a chrome liner it is rather difficult. If you have a hone you have it tied up pretty well trying to hone out one chrome plated liner, that is, if you can get the right stones.

Generally, from the experience on our railroad, we find that with broken rings the score marks are such that it does not pay to hone the liner. These score marks are "0.003" or "0.004" or "0.005," and when you get to that depth there is very little you can do with it, as you are generally through the chrome plate. That does bring down the average service life of a chrome liner.

Another factor is that although you get that 0.003 to 0.004 wear per 100,000 miles or 24 months that you spoke of, it is necessary and it is recommended by EMD that you pull the engine apart approximately every twenty-four months, you have 0.005 or 0.006 wear on the liner, that means another hone job.

It is rather difficult to get that much wear off the top of the liner and put it back in service if the chrome has failed. I wonder if your Committee is going to develop further the economies of chrome plating versus cast iron under those conditions?

MR. ADAMS: We use chrome plated liners. I am speaking for the Santa Fe now, and from my experience and not from the experience of the Committee.

We have used chrome plated liners for a considerable length of time, and we have no difficulty removing the ring ridges, which probably are what you are talking about. We have found that we remove it best with tools that we make ourselves. The manufacturer's tool does not work too well, and we use the grinder and grind the ridge off, and we go right on with it, and wear the liner until it is worn 0.010 or until you can't get the piston to liner clearance as required. The honing we do is just a preparation hone to seat the rings.

MR. SASGEN: In view of the high rate of piston ring breakage, has the Committee developed the average number of liners you would have to send back to the plater because of the score marks?

MR. ADAMS: No. We don't have that information classified as to why they were sent back. I can tell you that we have been using chrome plated liners for probably six or seven years, and of the liners we are sending in today only about 30 per cent of them have been previously chrome plated. If you would like to talk to me later, I may have something in my file on it.

MR. SASGEN: Does anyone else in the audience have anything to add that would help us? We certainly would appreciate it.

MR. FRANK H. McHENRY (Shop Superintendent, New York Central Railroad, Cleveland, Ohio): Has any railroad found the "C" EMD oil engine to have an expected longer service life

over the 567-B engine prior to shopping?

MR. ADAMS: I really don't think anybody has found a C engine to have a longer life than a B engine between shoppings, but I am sure some people here would be glad to have someone stand up and say so. (Laughter)

MR. C. L. HALL (Director, Diesel Methods and Procedures, New York Central Railroad, New York 17, New York): In cases where the 567-C engine is being operated underrated, as in the case where one is put in an F-3 or T-7 or one of the Christines we were talking about the day before yesterday, I believe the answer is yes, a 1500 HP output probably will give us a better cylinder life. I am speaking now about wrist pins and thrust washer wear.

MR. ADAMS: That's right, and I am glad you brought that up. The C engine at 1750 HP wouldn't have, but the C engine at 1500 HP may well have a better life because of the seals, and so on, than the B engine.

In fact, now that Mr. Hall brought it up, we do have ten 567-C engines in GP-7 locomotives that run at 1500 HP and they do a good job. These engines were delivered as 1500 HP.

MR. O. H. GUTSCH (Master Mechanic, Southern Pacific Company, 201 North Piedras Street, El Paso, Texas): Why is trouble experienced with loosening of chrome plating around the ports of cylinder liners on switchers, particularly Fairbanks-Morse?

MR. ADAMS: I really can't answer that. If the plating is properly done, it should not loosen around the ports. We don't have any personal experience with that.

Does any of the Committee have any information on that, on the Fairbanks-Morse engines, or anyone in the audience?

MR. H. N. CHASTAIN (Master Mechanic, Atchison, Topeka & Santa Fe Railway, Kansas City, Kansas): Mr. Adams, as you know, we have a number of Fairbanks-Morse engines in Kansas City, 1200 HP switchers and 1600 HP road switchers. Of those engines there are three operating with chrome plated liners of three different types. All of those, with one exception on a 1200 HP switcher, are quite successful. Two engines have been through major overhaul and the liners returned to service. We have had no breaking away of the chrome around the ports that this gentleman mentioned.

MR. GUTSCH: What is the difference in coefficient of heat expansion between chrome and cast iron cylinder liner?

MR. VAN DER HORST (Van Der Horst Corporation of America, % Glenn Pendley, Sales Engineer, Box 443, Terrell, Texas): There is a definite difference in coefficient of expansion of chrome and the cast iron base metal—usually this will tend to form some cracks in the chrome. However, they are not harmful at all.

MR. E. R. COGGINS (Assistant General Foreman, Terminal Railroad Association of St. Louis, Lovejoy, Illinois): Have there been many instances when the chrome plating has come loose, with resulting damage?

MR. ADAMS: If you are talking about cylinder liners, I know of one case where the chrome came loose. I won't tell you whose engine it was, but the chrome plating came clear out of the liner, and we kept accusing—somebody kept accusing—(Laughter)

Anyhow, we kept accusing the maintenance point of putting in an oversize liner in a standard piston. Finally we did discover that the chrome had peeled clear out of the liner. Somebody down the line heard the engine

pounding and felt something was wrong, so he looked in and found a piston with broken rings and the piston scratched up a bit, and so he shut the engine down. We didn't lose anything, but it will come clear out of there, fellows, no question about that.

Actually, you aren't going to get anything for nothing, and there are going to be cases like that. I don't say that chrome is the cure-all for everything, but it is going to help, and it will do a good job for you, but you have to watch it. You can't just turn it loose.

MR. H. E. REYNOLDS (Louisville and Nashville Railroad, Louisville, Kentucky): Is it imperative to remove the crank shaft at six-year reseal intervals? In other words, how long will an EMD and an Alco crank shaft run in an engine?

MR. ADAMS: An Alco shaft, I think should come out periodically, depending on the service. You might want to pull it out every year or two or four. An EMD shaft—I would hesitate to say how long it will work. We pulled one out the other day on an engine program we have. When they get fifteen years old we feel they ought to come out just to be looked at.

We pulled this one out, and it looked like somebody had been in there with either a peach weevil or something like that had eaten holes in the crank shaft. Apparently when EMD built the engine this shaft had some cracks in it and they ground them out.

This shaft had several small holes around it, and had been in the engine for fifteen years. There was no record of that crank shaft being removed from the crankcase. Of course there are others that will come out a lot more often than that.

MR. O. A. LANGE (Assistant Superintendent of Shops, Baltimore & Ohio Railroad, Baltimore 23, Maryland): Does chrome plating affect the fatigue life of a crank shaft?

MR. ADAMS: That is one of the reasons why we set limits. I think it does. It depends on the shaft and the service it is in.

On an Alco crank shaft Alco will tell you (and it is no secret) that there are a lot of stresses in that shaft when it is running at 1000 rpm, and also when it is running perhaps at 600 rpm. The shaft is always flexing. If you grind and take off, say, 150 or 200 thousandths, maybe the limit is 100 thousandths. Whatever the limit is, somewhere there is a limit where you will make that shaft too flexible, and I don't believe the chrome will stay on. I think there is a limit. You would simply twist the steel out from under the chrome. The chrome would stay there until its support was taken away from it.

That limit may be 125 thousandths. Some platers say 125 thousandths and others say it is less. Others will tell you that they will go 125 thousandths or 150 thousandths without being worried about it, but we aren't sure about it. It is a point to consider.

VOICE: Can you give us any information as to the oil consumption on chrome liners versus cast iron liners on the Fairbanks-Morse switchers?

MR. ADAMS: No, I don't have any statistics on that. I can give you an opinion, but I don't have any statistics on it.

MR. PARKER BROWN (Service Manager, Fairbanks Morse, Beloit, Wisconsin): I don't have actual gallonages, but we have definitely experienced considerably higher lube oil consumption on our engine with chrome plated liners than we have with cast iron liners. There are cases where the chrome plated liner

has resulted in good lube oil consumption, but it has been so erratic that two liners in a 10-cylinder engine that are oil eaters are enough to put the oil consumption of that engine up to a point where it is prohibitive, and as a result that is one of the contributing factors to our decision to leave chrome plating of cylinder liners.

FROM THE FLOOR: This subject of chrome plated liners is very interesting. As you know, certain builders build their locomotives with chrome plated liners.

Our people (and some others) are thinking about using plain liners in Alco engines; in fact, we are doing it right now, and there seems to be quite a movement toward that line because of the failure of chrome plating on particular liners.

At the beginning we had very good success with chrome plated liners, but then we got into some trouble possibly because of the replating of the liners the second and third time.

I just wonder if you have had any experience along that line?

MR. ADAMS: As I said earlier, we have replated liners over the years and we don't have any difficulty. Sometimes the plater has told us he had been getting into a little trouble because the older the liner gets the more oil soaks into it, and they have a heck of a time sometimes getting the oil out of it before they plate it.

If you are located and you have a plater close to you with whom you can work, I think your chance of working out the problems are a lot better. You can get together with him any time and talk the thing over, and take care of any discrepancies that show up.

Actually, we don't have any trouble with replated liners when we have had to replate them. 30 per cent of the liners that are going in for plating now have been previously plated. While those liners are six or seven years old now, they are still going, and only 30 per cent of those that are that old are going in for plating.

That is a pretty broad statistic, but it is just another one that will tell you that chrome liners will work a lot longer.

MR. SASGEN: What is the comparative rate of wear of cast iron rings in chrome plated liners versus chrome plated rings in cast iron liners?

MR. EWALD MILKERT (Assistant to Superintendent of Motive Power, Alton & Southern Railway, East St. Louis, Illinois): We have used the chrome plated ring with the unplated liner. We have used the chrome plated liner with the unplated ring. As far as we are concerned, we don't find too much difference; that is, the wear on the ring is approximately the same.

MR. ADAMS: How about the wear in the liner?

MR. MILKERT: Well, there is a case where I can't agree with you 100 per cent on what you said. You told us that you have had better service from chrome plated liners. So far our experience has been that the unplated liner has given us very good service. There are exceptions in both cases, of course, but the main thing that we have noticed about the unplated liner is this: It wears more round than the plated. In almost all cases, when we pull out a plated liner it is worn more in a line parallel to the crank shaft.

MR. HALL: Are you talking about Alco's?

MR. MILKERT: Yes, I am talking about Alco engines.

Another thing you will have to consider too, I suppose, is the service of the locomotive. All I can give you is our own experi-

ence. I don't know what anyone else is experiencing.

MR. F. B. RYKOSKEY (General Superintendent Motive Power and Equipment, Baltimore & Ohio Railroad, B&O Building, Baltimore & Charles Street, Baltimore, Maryland): Would it be the recommendation of this Committee that chrome plating of crank shafts is the best method for the reclamation of crank shafts?

MR. ADAMS: It depends on what is desired. My own personal opinion, not the opinion of the Committee—and we are not all agreed on it, and chrome plating of shafts has not been done by enough railroads to get a consensus of opinion—but my opinion is that in the way we have to make locomotives today, we want to have locomotives that are the same so that the men who are doing the work can get a bearing and put it on; they can take one out and put one in, and they know what size it is, and things are consistent.

I think that by restoring the shaft by chrome plating you will get consistency. If you grind it undersize you are laying yourself open to failures when a man puts in an oversize bearing perhaps in a standard shaft. That is one of the things that I think standardization prevents. Also, of course, the wearing quality of the chrome on the shaft. It doesn't wear.

MR. RYKOSKEY: I don't agree with you as far as putting an undersize bearing on a standard shaft is concerned. After all, we are here to learn so that we can educate our people, and I think they know what they are supposed to do. They know the difference between one size of bearing and another. I think that is a poor argument to use in bringing shafts back to standard.

My problem is this: If you are going to chrome plate shafts that have a certain percentage of failures—and you said a while ago that you have had shafts that ran fifteen years—is it economical to have shafts chromed and have them fail and then have to replace them with a new shaft after all?

MR. ADAMS: No, it isn't. I can't do anything but agree with you on that. However, the chrome shafts that I think we should get, and that the processor intends to give us, are shafts that won't fail. We have a lot of chrome shafts that run without difficulty and that don't fail.

One thing that came up a while ago was lubrication failure on a chrome shaft. It destroyed the finish of the chrome, of course, but it did not thermal crack the shaft.

The way things stand, I think if you do have a percentage of failures with chrome shafts, we don't want chrome shafts. As far as I am concerned, I think they can give us chrome shafts that won't fail. There has been some chrome plating done in the past that was not inspected properly, and that has led to the appearance of excessive numbers of failures in chrome shafts; but the problem, I believe, is better understood now.

MR. RYKOSKEY: Then would you say that if you have six chrome shafts that fail out of twenty-two, it would be economical to continue chrome shafts?

MR. ADAMS: I would not. I would change platers. (Laughter)

MR. P. J. FINCH (Assistant Superintendent Motive Power-Diesels, Chesapeake & Ohio Railway, Richmond, Virginia): Mr. Rykowskey mentioned the fact that an oversize bearing could be put on the shaft. I think the important thing is to try to keep the stock of bearings of the same size, and not get the wrong bear-

ing on there. The idea is to always keep the stock of bearings in the inventory down if you have all the crank shaft journals the same size on all of your locomotives. The same thing is true with chrome plated liners. If you work your pistons you can have everything standard. That is very important in a shop operation.

MR. S. C. SNOW (Superintendent of Motive Power, Louisville & Nashville Railroad, 9th and Broadway, Louisville, Kentucky): Mr. Rykowskey brought up a subject that is rather interesting to me, and that is, the economics of what we are talking about.

We have gone into the plating of shafts in a very small way, to try to develop the economics of it, but not with the thought of trying to maintain standard bearing sizes. I hope that we as supervisors can properly train our employees to use parts in the proper manner, and to use the argument that we will use standard sizes to avoid misfits is avoiding our duties as supervisors.

Regarding the plating of liners, and I want to bring this in on EMD engines only, as you know we can get three sizes of pistons. There is a question in my mind as to whether to wear liners to the third size and plate back, or whether we should plate back from the first or second size. Where is the true economy in it?

Has your Committee made a study of the economics of what we are speaking of?

MR. ADAMS: No, we don't have a true economic study of this. We had more or less intended to give you the wearing characteristics. We have obviously reported these characteristics to you. What your wear rates are is something we can't determine for you. That is something like this wheel truing machine economic study talked about the other day.

If your wear rate is such-and-such and you know you can get this kind of work which we have reported for chrome plating, then you can develop your own economic picture.

I would like to say that I will concede that the point was poorly taken, that one of the reasons for chrome plating a shaft is to maintain standardization sizes. Perhaps supervisors should be there to see every bearing that goes in. It has been our experience, or at least my personal experience, that a supervisor has a heck of a lot of ground to cover, and if he gets to everybody he will be a busy boy. I will say, however, that that is his job and is what he is supposed to do, and I will not defend him or myself either. The point was not too well taken.

For true economics, Mr. Snow, it costs you $4500 or $4600 or $4200, depending on the shaft, to get a new crank shaft. You can get one that is as-new, and one that I think, if properly done, will give you as-new or better service by getting it chrome plated, and you can get that for $1750 or $1800 or whatever the going price happens to be for chrome plating.

If you have six failures out of twenty-two, that is too many. The chrome plater, I think, is directly responsible for it, and I have no sympathy for him. I think he will not ask for sympathy under a condition like that. He expects to do better work than that. If he doesn't, he should not be in that business.

MR. SNOW: Then, Mr. Adams, I understand the purpose of your Committee, which is to try to find a means of running the locomotive economically and finding some means of continuing satisfactory service.

For the record there was men-

tion made of a fifteen-year crank shaft. I don't like using extremes. Averages are much better. I don't think if we took a vote and asked the members on the floor, any of us could say we are averaging fifteen years on crank shafts.

Actually, our experience on crank shaft removal does not indicate that we can ever attain such a condition as that on the average. I wonder if you would straighten out the record by using an average figure instead of an extreme figure, if you please.

MR. ADAMS: The Santa Fe started out with 320 FT units, and they range today in age from 17 to about 12 years of age. In the last year (and I am not going to tell you what the average is because you can figure it out yourself) we set up a program to pull out and overhaul one engine every month. Our average is going to be pretty high.

Those failures that we experience and which make us have to rebuild the engine, of course, are added on top of that. However, as a program to pull the engine out, tear it completely apart, check the crank shaft, check everything and rebuild it, we do it one a month, and it will take a lot of months to go through those engines. We don't figure we are laying ourselves open to any excessive maintenance because of it.

MR. RYKOSKEY: I would like to go back to those economy figures of yours, on the crank shaft. You say that on a reclaimed crank shaft for $1750 you can get an equivalent to a new one, and that a new one would cost you around $4500.

If I have six failures out of twenty-two, it is going to cost me about $15,000 per engine. Six times fifteen is $90,000. I could have bought twenty-two new crank shafts for that money, and for the same price.

MR. W. E. LEHR (Superintendent Motive Power, Lehigh Valley Railroad, Sayre, Pennsylvania): In answer to Mr. Rykoskey, he had six failures out of twenty-two. I think some of us would like to know if those crank shafts were chrome plated by the manufacturer or by some outside concern.

We have had a number of crank shafts chrome plated, and I don't know of one that has failed. For the information of all of you, we were one of the first who started to use the manufacturer's chrome plated crank shafts.

We haven't had them all turned back to us. I don't know who did the crank shafts for Mr. Rykoskey — whether the manufacturer did them or some outside concern—but I do think a lot has to do with how they are done, if they chrome plate too much, if they thoroughly inspect the crank shaft before they send it back to you. The manufacturer won't chrome plate a crank shaft if it is worn too much. Some other manufacturers (I think there are two or three) might chrome plate a little too much, or they might chrome plate over a crack, or something like that. Maybe that had something to do with the six Mr. Rykoskey had. I know we haven't had over 60 per cent of the crank shafts returned to us that have been chrome plated. They turn them down on inspection before we get them back. By the way, they still charge $100 for scrapping them for you. (Laughter) I do think the manufacturer we got ours from stood behind the crank shaft that failed. They would have made good on it if we had proved it was their failure.

MR. ADAMS: There are a lot of inaccuracies in the crank

shaft business. What caused the failure? Perhaps it was the chrome plating, it could have been something else.

Gentlemen, I want to thank you very much for the discussion. I really appreciate it. It would have been very embarrassing just standing here looking at you.

I am sorry we didn't get to talk about lube oil filters and lube oil cooling systems. I would like to suggest that you read the report concerning these 6 1-2 inch filters (I am not selling them) that don't need the can. I want to see you boys make some money, and that's one way you can do it.

Now I would like to introduce Mr. Harrison, who will cap this meeting off. (Applause)

WEST COAST REGIONAL EXECUTIVE

R. E. HARRISON
Supvr. Diesel Loco. Maint.
Southern Pacific Railroad
San Francisco 5, Calif.

MR. R. E. HARRISON (Supervisor Diesel Locomotive Maintenance, Southern Pacific Company, San Francisco 5, California): After listening to the discussion today, I can say we have made progress by the experiences of various railroads with chrome plating.

I can recall when this subject first came on the floor some years ago. There was very little interest, and a lot of men wondered what chrome plating would do in reclamation. After listening to the discussion today, I know it is quite an active subject with all of us, and should be pursued.

I wish to say a word on behalf of the Committee: They are entitled to their variances of opinion because their experiences are widely distributed over the United States.

As to my own experience with the Southern Pacific Company, I can say that we are continuing to chrome plate various engine parts and have had very good success. Our percentage of failures has been very, very low.

I believe we should call for a rising vote of thanks, because Mr. Adams and his Committee have done an outstanding job. They have worked hard and diligently. They have written the various railroads, and accumulated a cross-section of the experience of all of us in the presentation of their paper.

(The audience arose and applauded.)

CHAIRMAN MYERS:

The next report is by the Committee on Diesel Material Reconditioning and Control.

Mr. L. H. Booth was born on November 1, 1914 in Huntington, West Virginia and graduated from the Huntington High School. He entered apprenticeship in 1934 in the Huntington Shop, C&O Railway, as Boilermaker Apprentice. Transferred to Machinists Apprentice in 1935. In the interim of apprenticeship he was temporarily transferred to Mechanical Engineer's office, Richmond, Vir-

ginia, and also to the Chief Mechanical Engineer's office, in Cleveland, Ohio. He served briefly as Test Observer for Engineer of Tests at Huntington.

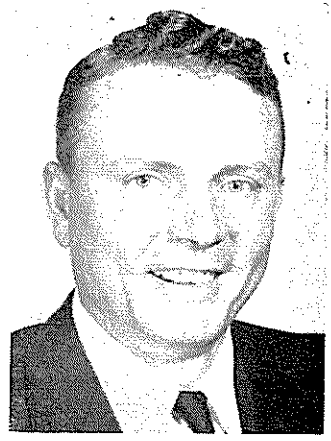
Appointed Assistant Mechanical Inspector in 1940; Assistant Foreman, Huntington Shops in 1942; Assistant Roundhouse Foreman, Hinton, West Virginia in 1943; Roundhouse Foreman, Hinton, 1947 to 1948; General Foreman Roundhouse, Huntington, 1948 to 1949; Master Mechanic, Chicago Division, 1949 to 1952, and General Master Mechanic, May 15, 1952 to date.

Mr. Booth is a member of the BPOE, AF&AM, Spring Valley Country Club, and is also a member of the Railroad Community Committee of the Huntington Area of the Eastern Railroad Presidents Conference.

Mr. Booth has the distinction of being one of the youngest men ever appointed to the position of Master Mechanic on the C&O Railway. He also had the honor of being the Master Mechanic on the territory which was the first to become Dieselized 100 per cent on the C&O, this being the Chicago Division. By virtue of this fact he was responsible for and directed the transition of the mechanical department from steam to Diesel on that territory, which was accomplished with expediency and without detriment to power requirements.

It gives me great pleasure to introduce Mr. Booth, Chairman of this Committee.

MR. L. H. BOOTH (General Master Mechanic, Chesapeake & Ohio Railway, Huntington, West Virginia): Thank you, Mr. Myers.



L. H. BOOTH, Chairman
Committee on Diesel Material
Reconditioning and Control
Gen. Master Mechanic
Chesapeake & Ohio Ry.
Huntington, W. Va.

Those of you who have seen the pre-convention report will realize that this paper is in three sections. In the first section our Committee attempted to outline for you, from 1951 through 1956, the activities of the Diesel Material and Reconditioning Committee. In the second section we attempted to give you a simple formula whereby most decisions governing the question of whether to relaim or not could be used. We hope you have seen it.

In the third section of our

REPORT OF THE COMMITTEE ON DIESEL MATERIAL RECONDITIONING AND CONTROL

1957 TOPIC
"DETERMINATION OF DIESEL PARTS ECONOMICAL TO RECLAIM"

SEE PAGE 155 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

paper we dealt with some reclamation processes. We prepared a picture for you covering these items, and we are prepared to show it to you now.

(The motion picture was shown entitled, "Determination of Diesel Parts Economical to Reclaim".)

MR. BOOTH (continuing): Gentlemen, you have seen the film, and now will my Committee please come up and take their places on the platform while we continue the discussion.

A paper of this kind would have been impossible to prepare without the concerted efforts of all the members connected with this Committee. May I take a moment to introduce my Committee to you.

MR. BOOTH (continuing): This Committee had the pleasure of presenting a pre-convention report before the Southeastern Railway Diesel Club at Jacksonville in the early part of April. Mr. G. T. Strong, Master Mechanic of the Virginian Railway Company, Mullens, West Virginia, is President of that Club, and I would like to call on him for a few comments at this time.

MR. G. T. STRONG (Master Mechanic, The Virginian Railway Company, Mullens, West Virginia): It is indeed a pleasure to be present at this meeting, Mr. Chairman. As Chairman of the Southwestern Railway Diesel Club I bring you the best wishes of our Club.

Our association with the LMOA over the past years has been very pleasant and profitable to our Club, and I hope in some way it has been of some help in the work being carried out by your various committees.

I wish to extend to all of you an invitation to visit our Club, which meets on the second Tuesday of each month during the year. It is a full-day meeting, normally held in Jacksonville. Occasionally, for the benefit of our members, we have held our meetings at other locations such as recently in Chattanooga, when in connection with our meeting we visited the Southern System Assembly Shop.

G. T. STRONG, President
Southeastern Railway Diesel Club
Master Mechanic
The Virginian Ry. Co.
Mullens, W. Va.

I think you are acquainted with a good many of the members of our Club, and I know that in these meetings you all realize the extent that certain members perform their work in our Club when you have heard Mr. Taylor of the Southern, Mr. Bledsoe of the Seaboard, and Mr. Jack Sims of the Florida East Coast, and others enter very vigorously into discussions, not only asking questions but giving information pertaining to certain questions that may be raised.

It was certainly a pleasure on Tuesday, April 9, 1957 to have Mr. Booth and the members of his Committee appear at our meeting in Jacksonville and make the presentation of their

report entitled, "Economics of Material Reclamation and Control." We didn't have the pleasure of seeing the finished film at that time, but by means of slides and other ways, Mr. Booth brought to our attention the various matters which were discussed in this film. He has pointed out to you and to us the importance of material and parts reclamation, which becomes more and more important on our railroads, and more and more the responsibility of the mechanical officers in determining what parts could be most economically reclaimed and therefore could be of considerable economic value to your respective railroads.

May I say that we of the Jacksonville Club had a very vigorous discussion of the various items presented by Mr. Booth, and I would suggest that inasmuch as he and his Committee consumed considerable time and effort in accumulating the various data, you give him every question that might come to your mind that would be of benefit to the men in the field. I am sure he and his Committee will give you good and substantial answers.

We were particularly interested in his presentation of the means of determining what parts might be economically reclaimed from the simple formula that was given to you.

In turning this meeting over to Mr. Booth, I want to ask him this question: Does he consider it advisable for a small railroad with a small number of Diesel units to consider reclamation of Diesel parts seriously?

MR. BOOTH: Thank you, Mr. Strong. I am going to open the discussion by calling on Claude Fisher to answer Mr. Strong's first question.

MR. CLAUDE E. FISHER (Engineer of Tests, The Virginian Railway Company, Mullens, West Virginia): To economically reclaim Diesel parts on a small railroad, the various reclamation factors as stated in this report should be carefully considered. If the volume of work was small and retooling expense considerable, then reclamation should not be considered. If the volume of work would be large and retooling expense small in comparison and the reclamation factors justified the work then reclamation of worn parts should be considered.

MR. FRANK A. LONGO (General Welding and Boiler Inspector, Southern Pacific Company, 65 Market Street, San Francisco, California): I noticed in the movie, on Alco's practice in regard to alumunum pistons, that Alco's recommended practice is to heat the ring carriers in an electric, thermostatically controlled furnace. I notice that you had a welder working with a torch. How does he know when it gets to 400 degrees? Isn't that getting into what we call bad practice—doing something manually and going against the recommended practice of the locomotive builders?

MR. E. P. BLEDSOE (Superintendent of Shops, Seaboard Air Line Railway Company, Jacksonville, Florida): That is a good question. We didn't have an electric furnace. We tried hot oil, and it works very well but takes longer. It is not as safe a practice.

I would like to give you a very good answer, but I can only tell you that we have been doing this for about three years and we have had very good success. The boys seem to have the knack of getting to the proper temperature and putting it on.

We do use the thermostat pencil, which helps, but the boys can put it on. I don't know of any difficulty they have had

putting it on, nor have we experienced any trouble with it.

MR. O. A. LANGE (Assistant Superintendent of Shops, Baltimore & Ohio Railroad, Baltimore 23, Maryland): In pre-heating and applying babbits to suspension bearing, does any distortion occur to the outside diameter of the bearing?

MR. BLEDSOE: That was a problem we expected the most when we started. Believe it or not, it does not affect you one bit. We don't even try to true up the outer surface of the bearing. It comes right into place, presenting no problem whatever.

MR. MILKERT: The figure in excess of $100 was used as the cost of a new Alco piston. It should be pointed out that the manufacturer of the locomotive and others are rebanding pistons at a somewhat smaller cost.

Do you want to bring to the attention of those present the fact that other railroads are rebanding at a lower cost than shown in the film?

MR. BOOTH: Do you have that cost, for the benefit of the members?

MR. MILKERT: It varies with the people who do it. The Ohio Piston Company does our rebonding for us, and American Locomotive Company also does rebanding for us. There is just a little difference in the price. The cheapest, I believe, was in the neighborhood of $67.50 for the rebanding of the pistons.

MR. BOOTH: The cost to prepare, as Mr. Bledsoe pointed out, is $43.65, so you can see we are still effecting quite a saving.

MR. MILKERT: I just brought out the point for the benefit of some who might not have known that the service is available.

MR. BLEDSOE: That brings up another subject with me. We happened to be in the Alco plant several years ago, and I saw them very simply applying this carrier. I don't think they have any machines we don't have on the railroads, nor more men to do it. It took us exactly three years before they would even talk to us.

We wrote the Ohio Piston Company, and I got one of the most round-about letters that I have ever received in my life as to how we could not do it, and finally they told me they were on strike and could not give us any information.

We continued to push Alco, and they furnished us the carrier. We have had very good success. I guess the moral to the story is that we still have to do a little pushing, whether it is chrome plated crank shafts or ring carriers, if we are to make much progress in this business we are engaged in.

MR. A. E. MORRISON (Ralph Stark Inc.): Since we are mutually interested in finding the best process for rebuilding Diesel engine cylinder heads, we would like to make the following comments, speaking from the experience of having rebuilt over 200,000 Diesel cylinder heads.

1. On making visual inspection for fractures, we have found that especially in the exhaust passages, cracks exist which cannot be detected by a visual inspection.

2. Valve guides should not be reused as they are usually worn out of round in service. If reused, they would have to be reamed and this would make them oversize.

3. Use of the heli-arc welding process makes milling of cracks necessary, and since not all cracks are visible or accessible, this process has an important disadvantage.

4. Fractures on the underside of the bridge can be welded when the head is placed with the valve seat surface down, if using

the oxyacetylene welding method. Only this method permits welding of cracks that penetrate the inner water passage, as before doing the welding, the crack can be melted out. One-half of all cracked heads received are cracked in the water jacket.

5. Removing the head from the preheating oven and then placing it in an insulated container will cause uneven cooling of the casting, and this can cause internal cracks and strain.

6. Building up the valve seats with any material but a special Chrome-Nickel Alloy, or something similar, results in the seats being too soft for service.

7. Repeated heating, cooling, reheating and annealing that results from moving the head from one operation to another, carbonizes the metal which greatly weakens it.

8. Installing of studs and valve guides and then heating the head to a 490 degree F temperature removes the heat treatment from the studs and scales the valve guides. This scale would have to be removed by reaming which would make the guides uneven and oversize.

9. Flame hardening of the valve seats results in checks (invisible to the eye, but apparent under magnifying glass) which leads to early cracking. Subsequent grinding of valve seats removes flame hardened material.

Experience from any qualified sources has found nothing to equal the process of reheating the entire head, and doing all welding by oxyacetylene process while the head remains in the oven at all times, and is not removed until the following day.

VOICE: What is the failure rate on welded cylinder heads versus new heads, expressed in either miles or months of service? What is the cost per failure?

MR. M. A. LANG (General Foreman, Great Northern Railway, St. Paul, Minnesota): We do not have a record on failure rate of welded cylinder heads versus new heads, but we do have heads in service that were welded in 1951 and 1952 and returned to the shop for reconditioning and put back in service.

MR. SASGEN: I don't intend to stir up a controversy here, gentlemen; however, if I may, I would like to mention our experience with welded heads.

We have found that the failure rate of welded heads, whether we have welded them or someone else has welded them, has been about one-half or less mileage than on a new head. In other words, where you can get at least 400,000 miles on a new head, you will get less than 200,000 miles on a welded head.

Generally they will fail well beyond the warranty period of 100,000 miles. Secondly, for every five heads that fail or crack, you will lose at least two pistons and two liners. At that rate the cost per failure is roughly $58.00.

Add to that $58.00 your cost of reclamation by welding, plus the cost of lube oil, treated water and gaskets.

One other aspect should not be overlooked. It is safe to say that out of 1000 cylinder heads which fail, one will cause a damaged engine. At an average cost of $10,000 per damage, you draw another $10.00 charge against the heads that fail, so you wind up with $68.00 per head that fails.

With all these costs added together your savings are soon wiped out and you might as well buy a new head. These figures cover the EMD cylinder and heads only.

VOICE: In building up armature bearing shafts with spray metal, have there been any in-

stances of the spray metal flaking off and causing failure?

MR. BLEDSOE: As stated in our report, we have been very cautious and careful in the application and very vigilant in inspection afterwards. In seven years we have yet to be able to attribute any bearing failure to the metal-sprayed shaft. I do not know of any time that it has even come loose from the shaft. We have had wonderful success with that operation.

VOICE: In other words, if you get the proper advance you don't have any trouble?

When you are applying a pin, if you have the proper advance, you don't have any trouble. Once it is on good and right, it is not to come off?

MR. BLEDSOE: I would not recommend the metal spraying of an armature shaft on the portion that has to have a pinion applied. It is the inner race fit on either the pinion or commutator end bearing. I would not try to metal spray a pinion fit.

MR. BURT ST. VINCENT (Superintendent, Mechanical and Electrical Shops, Columbia-Geneva Division, U. S. Steel Corporation, P. O. Box 510, Peoco, Utah): Has the Committee information on valve seat inserts for Baldwin 600 Model cylinder heads?

MR. BOOTH: No, I am sorry, but this Committee does not have any information in connection with that. However, there might be someone in the audience who can answer the question. Would anyone care to make a few remarks about that? I am sorry, sir, but I can't answer your question.

VOICE: Getting back to the traction motor armature spray welding, did I understand correctly that this is done after a bearing failure, or after a fit didn't measure up to what it should be?

MR. BLEDSOE: This particular operation is merely to restore the shaft. This particular tolerance for inner race on the shaft is very close. What we do is merely to build up the metal and machine so you can shrink the inner race on the shaft itself. I believe you would find that if it had been damaged in a condition that very seldom exists in our business—that of a bearing failure—we don't try it. It is strictly to restore the shaft back to its size to allow the inner race to fit properly.

VOICE: Then I misunderstood the film. I thought it said after bearing failed. I couldn't imagine reclaiming a shaft after the bearing had failed.

MR. BLEDSOE: It could happan, but not probably.

MR. F. A. LONGO (General Welding and Boiler Inspector, Southern Pacific Company, 65 Market Street, San Francisco, California): I just want to go on record that on the Southern Pacific we have had the same experience as the gentleman from Pennsylvania had with his heads, and we stopped welding them.

While I am at the microphone I would like to say that I understand the Pennsylvania has had wonderful success with fabricated steel heads. I wonder if we could ask him to give us the results of that test.

MR. P. J. SASGEN (System Diesel Supervisor, Pennsylvania Railroad, 6 Penn Center Plaza, Philadelphia, Pennsylvania): We have nothing today to offer in the way of success or failure of the cast or fabricated steel heads. It is still on trial. I don't know how far we are going to run it. Personally, I don't think it is going to be a success.

MR. G. F. BACHMAN (Chief Mechanical Officer, Elgin, Joliet & Eastern Railway, Joliet, Illinois): Regarding the fuel oil filters, has any test been made to

see if the reclaimed filters would run as many miles as a new filter? In other words, I notice you reclaim these filters every month. I think the general practice is to run them about three months when they are new. Will these reclaimed filters run as long as new filters?

MR. BOOTH: Definitely. As a matter of fact, we change the fuel oil filters on our road power every thirty days. As we mentioned in the paper and also in the film, these filters go thirty days and have been reclaimed up to three times, and they will give the service that a new filter will give, very definitely.

MR. H. E. WHITENER (Superintendent MP & RE, Central Railroad of New Jersey, Elizabethport Shops, Elizabeth, New Jersey): I was a little disappointed about the question of valve seat inserts on certain locomotives, because I have visited some of the shops and have seen them doing it. I understand they are continuing to do it.

Would any of those people care to comment on that?

MR. BOOTH: Are you referring to the inserts in the Baldwin heads?

MR. WHITENER: Yes, that was the subject. I understand other manufacturers do the same thing.

MR. GEORGE W. NIEMEYER (Terminal Master Mechanic, Missouri Pacific Railroad, North Little Rock, Arkansas): We have been applying Thompson inserts to Alco cylinder heads for approximately two years, and we have over 2000 inserts applied at the present time, with very good results from them.

Also, I guess we are one of those fortunate people who can get service life out of these heads, because we have been welding Alco cylinder heads for over four years, with very good results. We have had no engine failures that could be attributed specifically to failure of a welded head. We have had Alco heads that have been welded once and that have now come back in because of low valve seats, to be rewelded and Thompson inserts applied.

We do weld a few EMD's, but not many. We have been sending the style 1-E EMD heads in for reclamation to style 3 heads, and so far our service life on them has been fairly good. Our Thompson insert has reduced the wear that we have on Alco heads to the point where we don't have to adjust the valve every thirty days.

MR. BOOTH: Are these Alco engines you are referring to?

MR. NIEMEYER: Yes, both 12-and 16-cylinder 244, both road and passenger.

MR. VINCENT F. LEITZ (Baltimore & Ohio Railroad, Grant Building, Pittsburgh 30, Pennsylvania): We also applied the insert for about three years in the Alco 244 head. We had no failures that we could attribute to the insert.

Also, I wish to mention that Thompson furnishes inserts for all of the locomotives, Baldwin 600s or any others.

MR. BOOTH: I wish we could speak with the same results, but I am afraid we can't on the 244 engine.

MR. LEITZ: On the 244 engine, I might mention that we seem to feel that our success comes from the way we apply the insert. It is shrunk into 3 thousandths now. If it is too tight you will have trouble, but it seems to hold very well without any trouble at 3 thousandths fit.

MR. ERNEST O. ROLLINGS (General Foreman, Louisville & Nashville Railroad, Corbin, Kentucky): Are these gentlemen re-

ferring to only rebuilding the valve seat, or welding cracked heads?

MR. LEITZ: We have only inserted heads that were not welded. I do not believe it would be a good practice to weld heads and apply inserts. There has been some question about that. The welding of heads, as far as I am concerned, has not been much of a success all the way round.

MR. NIEMEYER: We do weld cracked heads. However, we have developed a system of doing it. First we remove approximately 3-16 inch of the metal through the valve seat and then reweld that metal in. Of course, thanks to the Frisco, we did a lot of original work on that, we had developed a system whereby we normalize the head, first heat-treating it before we weld it. After welding it we normalize the head, and we have had very, very few failures.

MR. BOOTH: Thank you. Our time is running out, and we have time for about one more question.

MR. S. H. SHAH (Electrical Engineer, North Western Railway, 3 Begum Road, Lahore, Pakistan): To what temperature are the bearing seats of armature shafts preheated before they are sprayed?

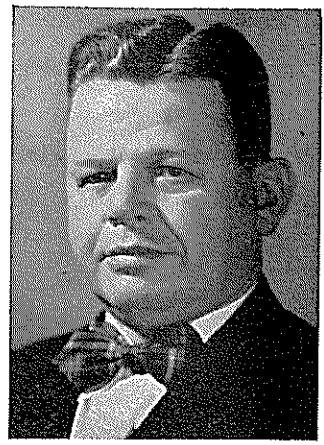
MR. BLEDSOE: You boys are pinning me down tightly today. I can't tell you. The operator is familiar with it, but I don't have the slightest idea. It would merely be a guess, so I had better not try to guess.

MR. BOOTH: The heating is done to prevent oxidation.

Gentlemen, we have run out of time. I would like to call on Mr. J. J. Ekin of the B&O to summarize this Committee's discussion.

MR. J. J. EKIN, JR. (Superintendent of Shops, Baltimore & Ohio Railroad, Baltimore 23, Maryland): Thank you, Mr. Booth. I don't think we have much time for a summary of the questions. I know there are still about two dozen more around in the audience.

EASTERN & NEW ENGLAND REGIONAL EXECUTIVE



J. J. EKIN
Superintendent Shops
Baltimore & Ohio R. R.
Baltimore 1, Md.

This is a very live subject for all of us. This is my old Committee that I had for several years, and feel that the addition of Mr. L. H. Booth as member of this Committee has been a tremendous improvement.

There is a great amount of money that can be saved if each railroad will put a little time and effort into seeing what can be done economically, and what cannot. The size of the railroad has a lot to do with it. The type of locomotive you have has a lot to do with it, too.

As Mr. Bledsoe pointed out, that is another way to keep the pressure on the builder to continually improve his product.

I think Mr. Booth is to be

complimented for a very fine paper and also a good moving picture, both from the photography standpoint and the information it conveyed. Let's give him a rising vote of thanks.

(The audience arose and applauded.)

CHAIRMAN MYERS: This morning you have heard two very fine papers. When I come to these annual meetings every year, I am always reminded of the challenge for all of us.

Gentlemen, we have some business to transact, and I will call for it immediately. I want to introduce to you now a gentleman who needs no introduction—our former President and now General Manager, Mechanical, Santa Fe System, who will give the report of the Nominating Committee. Mr. Blickle.

T. T. BLICKLE
Immediate Past President
General Mgr.—Mechanical
A. T. & Santa Fe Sys.
Chicago 4, Ill.

Mr. T. T. BLICKLE:

Upon arriving at this year's meeting, your nominating committee received the bad news that First Vice-President F. E. Molloy, Supt. Motive Power, Southern Pacific Company, Sacramento, California, has become ill to the extent that he has advised he will be unable to serve as President this year, as you would have expected him to be elected to serve in line with the past practice of the Association.

Two committee meetings were held to discuss this matter, and it was the unanimous opinion and wish of those present, that in view of his long and faithful service to the Association as a Technical Committee Chairman, Executive Committee Member, and as Fourth, Third, Second and First Vice-President; that the Officers and Members of the Association extend Frank Molloy best wishes for a speedy and complete recovery and that the Association elect him as President, accept his resignation due to illness; then vote him an Honorary Life Membership and Past President's Award in order that he may have the honor he has already so well earned.

The Nominating Committee then selected the following slate of officers to serve you in the new Association year.

PRESIDENT: F. R. Denney, Supervisor of Equipment, New Orleans Union Passenger Terminal, New Orleans, Louisiana.

FIRST VICE PRESIDENT: E. V. Myers, Superintendent Motive Power, St. Louis-Southwestern Railway, Pine Bluff, Arkansas.

SECOND VICE PRESIDENT: W. E. Lehr, Superintendent Motive Power, Lehigh Valley Railroad, Sayre, Penn.

THIRD VICE PRESIDENT: O. L. Hope, Mechanical Superintendent, Missouri Pacific Railroad, Little Rock, Arkansas.

FOURTH VICE PRESIDENT: R. E. Harrison, Supervisor of Diesel Equipment, Southern Pacific Company, San Francisco, California.

SECRETARY - TREASURER: C. M. Lipscomb, General Clerk to Terminal Master Mechanic, Missouri Pacific R. R. North Little Rock, Ark.

GENERAL MEMBERSHIP CHAIRMAN: C. A. Love, Asst. C.M.O., Motive Power, Louisville & Nashville R. R., Louisville, Kentucky.

REGIONAL EXECUTIVES

EASTERN & NEW ENGLAND REGION: J. J. Ekin, Superintendent Shops, Baltimore and Ohio Railroad, Baltimore 23, Maryland. (2 years).

NORTHWESTERN REGION: F. A. Upton, Superintendent Motive Power, C.M. St. P. & Pacific Railroad, Milwaukee, Wisconsin. (1 year).

GREAT LAKES & CANADIAN REGION: G. M. Beischer, Assistant Mechanical Superintendent, New York Central System, Cleveland 13, Ohio. (1 year).

CENTRAL WESTERN REGION: H. N. Mhastain, Master Mechanic, A. T. & Santa Fe Railway, Kansas City, Kansas. (2 years).

SOUTHWESTERN REGION: W. H. Bruening, Master Mechanic, Kansas City Southern Railroad, Shreveport, La. (1 year).

SOUTHERN REGION: R. H. Herman, Engineer of Shops & Equipment, Southern Railway, Washington, D. C. (2 years).

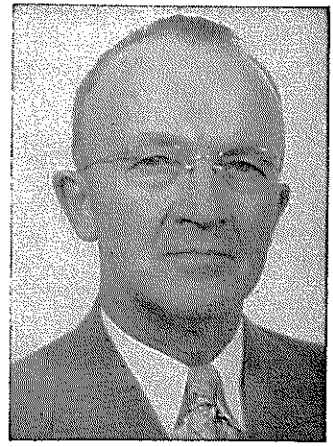
CENTRAL (CHICAGO) REGION: G. F. Bachman, Chief Mechanical Officer, Elgin, Joliet and Eastern Railway, Joliet, Illinois. (1 year).

WEST COAST REGION: E. L. Neeley, Mechanical Superintendent, Union Pacific R. R., Salt Lake City, Utah. (2 years).

ADVISORY BOARD: (One Vacant Position) E. Wynne, Chief of M. P. & R. S. Canadian National, Montreal, Canada.

We move the adoption of the above action and the election of these gentlemen to serve as your Association Officers for the new year beginning September 18, 1957.

T. T. Blickle, P. H. Verd, G. E. Bennett, C. D. Allen, F. R. Denney, E. V. Myers, W. E. Lehr, O. L. Hope, Nominating Committee.



F. E. MOLLOY
Past President
Supt. Motive Power
Southern Pacific Co.
Sacramento, Calif.

(President Daley resumed the Chair.)

PRESIDENT DALEY: Gentlemen, you have heard the report. What is your pleasure?

MR. LONGO: I move that the report of the Nominating Committee be accepted and that the unanimous ballot be cast for the entire slate.

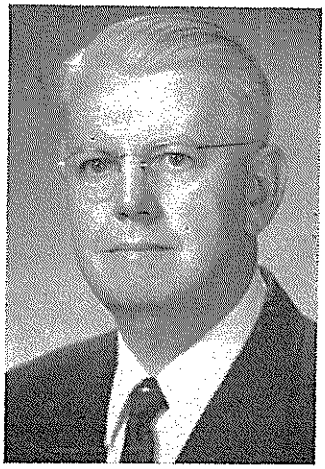
(The motion was severally seconded, was put to a vote, and was carried unanimously).

PRESIDENT DALEY: At this time I would like to introduce your new President, Mr. Forrest Denney. (Applause)

"LOOKING AHEAD INTO 1958"

MR. F. R. DENNEY (Mechanical Superintendent, New Or-

leans Union Passenger Terminal, 3319 Earhart Boulevard, New Orleans 13, Louisiana): Thank you, gentlemen. It is with mixed emotions that I accept this very high honor .you have accorded me. I had not known about Mr. Molloy's health, and consequently this promotion came as a complete surprise. I hope that my very dear friend Frank Molloy will get well soon, and again show his smiling face at our conventions for years to come.



F. R. DENNEY
President-Elect
Mechanical Superintendent
New Orleans Union Pass. Term.
New Orleans, La.

I feel it is a wonderful thing for this convention to pay tribute to Mr. Molloy in appreciation of his years of hard work.

In taking over as President of the Locomotive Maintenance Officers' Association, I suppose the natural thing is to tell you what we propose for the future. I believe we as mechanical officers will face the greatest challenge in railroad history during the next few years. Not only will our maintenance problems increase, but the ever-rising costs will likewise add weight to our burdens.

The officers and Executive Committee have tried during the past years to smoke out the toughest maintenance problems our members had. How well we have succeeded in doing this is attested by the membership of our Association, the attendance and the discussion at our meetings.

This year we have been most fortunate in having excellent committee reports. We must recognize and thank the committees for their untiring work.

Railroad managements have been most kind in sending their men to our meetings. The railroad supply industry this year has provided exhibits to show us some of the new products and the technological developments in our field.

In looking ahead to the new year, I want you to know that we will continue to have papers and discussions on our most pressing maintenance problems. I ask each of you to help us select those things which are causing the most trouble on Diesel locomotives, and send them to us so that we can assign them to the proper committee. We will welcome your suggestions and help.

We are also faced with another challenge, and that is how to improve our Association and its work. The idea of having our committee chairmen present their papers at Diesel Clubs in all corners of the country not only helps us in preparing the reports but also gets our work across to more people who need help.

This idea came during a discussion of the Executive Committee several years ago. We know that there are many other ways that our Association can

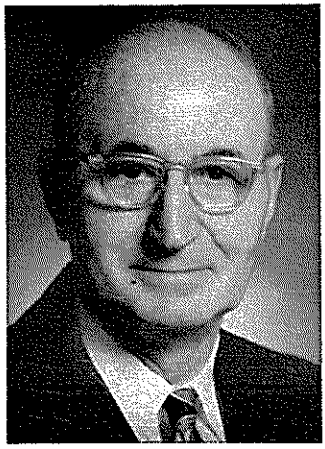
be of help, and it will be our aim to develop new suggestions.

Again let me thank you for the confidence you have shown in me by electing me your President. I solicit the help of everyone here in keeping the locomotive Maintenance Officers Association the largest and best railroad Association in the United States.

With your continued interest we will move ahead.

At this time it gives me pleasure to introduce a man who has served our Association for many years in the past. He has been retired for some years, but he always comes to our meetings, and I always enjoy seeing him. I know he will have a word for us at this time. He has the distinction of being our oldest Past-President; had much to do in building the LMOA from the small organization over which he presided to the great group it is today.

SENIOR PAST PRESIDENT



J. C. MILLER
Master Mechanic (Retired)
N. Y. C. & St. L. R. R. Co.
419 Libert Street
Conneaut, Ohio

MR. J. C. MILLER (Master Mechanic (Retired) New York, Chicago and St. Louis Railroad, 419 Liberty Street, Conneaut, Ohio): Before making this presentation I should like to congratulate Mr. John Daley for the outstanding job he has done as President during the past year in carrying out the activities of this Association.

I also want to extend my congratulations to the various committee chairmen and committee members for the constructive and informative knowledge they have presented in their reports. As a matter of fact, my analysis of these reports develops that a lot of study was done in order to produce such comprehensive reports.

Last, but not least, I would like to take this opportunity to congratulate our Secretary, Mr. Lipscomb, for the outstanding way he has established the dissemination of the contents of these reports.

However, we have another great leader who is well versed in Diesel locomotive maintenance, who will take over the duties as President of this Association in the coming year. He is none other than Mr. Denney, Mechanical Superintendent on the New Orleans Union Passenger Terminal.

Mr. Daley, on behalf of the members of the Association I have the honor and privilege of presenting you with this Past President's Award and this very fine badge. May you continue to serve in the future as well as you have in the past. (Applause)

PRESIDENT JOHN T. DALEY (Superintendent, Motive Power, Alton & Southern Railroad, East St. Louis, Illinois): Thank you.

Well, gentlemen, I have arrived at the point of being a "hasbeen." It took eight to ten years to do it. I want to say that you fellows could not pos-

JOHN T. DALEY
Past-President
Supt. Motive Power
Alton & Southern R. R.
East St. Louis, Ill.

sibly have enjoyed me as much as I have enjoyed you. I have yet to meet a man in this organization who would say "no". He might say he is busy, but he will do the job assigned to him.

I am looking forward to a good many years in either active railroad service or, even after retirement, coming to Chicago and renewing acquaintance with you each year in this Association's meetings.

I want to thank you for all the support you have given me and making it possible for me to attain these honors. I accept this on behalf of all the people who have helped me to arrive at the honorable estate of Past President.

Thank you.

WEDNESDAY AFTERNOON SESSION

September 18, 1957

The meeting reconvened at 2 p. m., Mr. J. T. Daley, President, presiding.

PRESIDENT DALEY: Gentlemen, this is the final session of the 19th annual meeting of the Locomotive Maintenance Officers Association. I am sure that each and everyone of us who has attended the sessions in the last two or three days will leave here with some knowledge of what the other fellow's problems are, and some new ideas and answers to some of our own problems that are annoying us in everyday maintenance of a Diesel locomotive.

I would now like to introduce to you a man who, like others, has done a lot to make this Association a success, and who has made a good many meetings more interesting for the rank and file through his work in local Diesel Clubs.

Mr. O. L. Hope, Superintendent of the Missouri Pacific Railroad, Southern Line, Little Rock, Arkansas, will be the Master of Ceremonies for the afternoon.

Incidentally, as my last official act as President of the LMOA, I want to again thank everyone of you men for making my reign a success.

CHAIRMAN HOPE (Mr. O. L. Hope, Mechanical Superintendent, Missouri Pacific Railroad, 302 Union Station, Little Rock, Arkansas): Gentlemen, I would like to call on Mr. C. D. Allen, our Past President for a few remarks.

MR. C. D. ALLEN (Superintendent, Motive Power, Chesapeake & Ohio Railway, Richmond 10, Virginia): Thank you

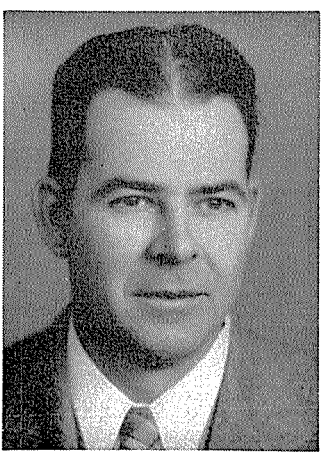
O. L. HOPE
General Membership Chmn.
Mechanical Superintendent
Missouri Pacific Railroad
Little Rock, Ark.

Mr. Hope. I want to give the Report of the Committee on Resolutions.

RESOLVED: That the Locomotive Maintenance Officers' Association express its appreciation to:

Messrs. R. M. McDonald, H. R. Longhurst, Bernard F. Schmid, J. P. Newell, the large delegation from Canada, the fine group from Pakistan, the splendid representatives from Thailand, the Alaskan members present, and the member from "way down under" Australia, for their special participation in our program and for the encouragement and inspiration of their several messages; and to the various committee chairmen and members who through their efforts during

the past years have made possible the greatest meeting enjoyed this year and to The Hotel Sherman for the Excellent service and hospitality extended us; and to The Allied Railway Supply Association for the invaluable assistance, evidenced in many ways that have contributed as much to the success of this Annual Meeting; and to our Advertisers who exhibited both at the meeting and in the pages of our 1957 Pre-Convention Report, providing very helpful assistance to the work we are doing.

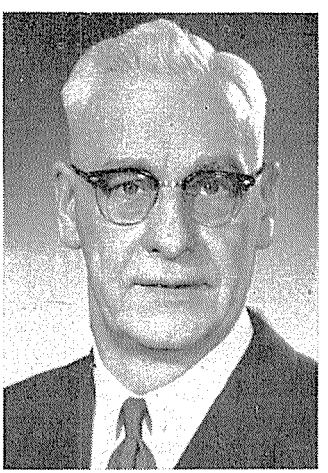


C. D. ALLEN
Supt. Motive Power
Chesapeake & Ohio Ry. Co.
Richmond 10, Va.

CHAIRMAN HOPE: Now I would like to introduce the speaker on the first topic of this afternoon. He is Mr. F. E. Godwin, Master Boilermakers Association Section. Mr. Godwin started his railroad career on the Grand Trunk Railway, which was later named the Canadian National Railways. He completed his apprenticeship in 1920, years has held the following positions:

Shop Boiler Inspector; Assistant Boiler Foreman; District Boiler Inspector; System Mechanical Inspector; System Chief Boiler Inspector. The latter position is now being held by Mr. Godwin, with headquarters at Montreal, Quebec. He also served in the Canadian Air Force.

Mr. Godwin's subject is the report of the Committee on Steam Generator Maintenance. We consider him a very capable man to discuss economical methods of cleaning steam generators and their appurtenances.



F. E. GODWIN, Chairman
Steam Generator Committee
Chief Boiler Inspector
Canadian National Rys.
Montreal, Que., Canada

MR. F. E. GODWIN (Chief Boiler Inspector, Canadian National Railways, Montreal, Quebec, Canada): Thank you, Mr. Hope.

Since the time the Master Boilermakers merged with this

ored with Mr. Harold Sudlich, Engineer of Water Service of the Northern Pacific, handling our reports. Unfortunately, illness has prevented him from carrying on, and President Daley, in looking for a successor, put the pressure on me to take over as Chairman. I am very pleased to report that Harold has now regained his health, and is with us today, ready to help if needed.

May I introduce the members of the Committee on Steam Generator Maintenance.

We enjoyed a splendid discussion on this subject at the St. Louis Railroad Diesel Club Pre-Convention Presentation; we are now ready for your questions on the report.

MR. S. S. SNOW (Superintendent of Motive Power, Louisville & Nashville Railroad, 9th and Broadway, Louisville, Kentucky): Mr. Godwin, I like the tone of your paper and want to congratulate you because you did not take a decided position without having the facts.

I would like to ask you a question a little aside, being particularly on your operation in your climates. If the question is not proper, don't hesitate to say so.

We are faced with the problem of operating locomotives in passenger service from freight service on short notice. In the past we have operated those locomotives from passenger service to freight service, letting the steam generator cycle for several hours while it is on the freight run until it returns to the terminal; then it takes out on passenger service again, and the steam generator has never been stopped other than blown down or in some manner handled so as to keep the separator from slidging up.

Do you operate any of your steam generators in that manner? If so, what has been the result?

MR. GODWIN: The reason we adopted the engine hourmeter was primarily because of the fact that our units are all equipped with three steam generators, one in the A and two in the B. We could not control the generators actually doing the work. For example, in our transcontinental service, operating from home terminal to home terminal, 6500 miles, seven days at one turn-around and nine days at the other, we could not determine to any extent the number of generators that were actually operating.

So, by instituting the engine hourmeter system we were able to determine just how much maintenance was required and on which generator, and when washouts would be required.

MR. SNOW: If you will pardon me, I would like to make the intent of the question a little clearer. I mentioned that we have units that operate in passenger service, of course the requirements are quite severe in the winter months, but in the winter months we take them from passenger service and put those same locomotives in freight service, let them cycle on low fire while they are on freight

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REPORT OF MASTER BOILERMAKERS' ASSOCIATION SECTION

1957 TOPIC
"ECONOMICAL METHODS OF CLEANING STEAM GENERATORS AND APPURTENANCES"

SEE PAGE 179 OF 1957 PRE-CONVENTION REPORT

service, and then they return to the terminal.

I was asking if you operate any of your locomotives in passenger service and then in freight, and leave the steam generators running while they are in freight service.

MR. GODWIN: No, we do not.

MR. SNOW: Could any of your Committee give me the benefit of their experience, if they have such an operation?

MR. GODWIN: I might answer you this way: It is quite possible that we will be operating under the conditions that you have mentioned, but at the present with about 50 per cent of the equipment changed from steam to Diesel, the conditions do not warrant passenger locomotives going into freight service, not under our operating conditions.

MR. ANSREW J. RITTER (Supervisor, Steam Generator Maintenance, New York Central Railroad, 466 Lexington Avenue, New York 17, New York): We operate in the same manner as you just described, Mr. Snow, but we have the 380-J standby on the Vapor steam generators in DRSP units which fails very often. So, we usually leave them cycling. That is what the firemen have been doing.

MR. SNOW: I would like to know what Mr. Ritter's experience has been with such an operation, good or bad, and whether he has had any trouble. I would like to know if they have any conditions develop while they are cycling that gets them into trouble. In passenger service do they have any failures?

MR. RITTER: We do occasionally, yes. It is not a good practice, but there is nothing else you can do.

MR. GODWIN: Mr. Longo, do you operate your steam generators at standby?

eral Welding and Boiler Inspector, Southern Pacific Company, 65 Market Street, San Francisco, California): No, we do not. We have several units that are equipped with steam generators on the Southern Pacific, and the reason we equip them with generators is in case we have to use them on passenger service. All we do is to file an out-of-service report when they are not in use. We take advantage of out-of-service. Of course, they are drained to keep from freezing.

MR. SNOW: I believe Mr. Ritter is quite competent to answer the question in its entirety, and I appeal to him again, if you please.

Our experience has been that when we let our steam generators cycle in freight service over prolonged hours, we get into trouble when that locomotive goes back to a passenger run, with subsequent failure. That doesn't happen all the time, but it happens too often to be a successful operation.

Will you tell me whether your operation has been parallel with ours, or do you have 100 per cent success?

MR. RITTER: I can say that we do not have 100 per cent success. The worst beating you can give a steam generator is to keep it cycling on and off. If you keep it cycling you are more apt to run into trouble than if you keep it operating furnishing steam.

As I said before, we have the 380-J standby which Vapor has offered as a protection to the generator while operating in switch or freight service, and we have a great deal of difficulty with it. Because of these difficulties, the crews now, without instructions, leave the generator cycling rather than operate in

MR. GODWIN: All of our steam generators are equipped with standby.

While they do not operate in freight service, we have a parallel to that: When operating in passenger service the generators in the B unit supply steam for train heating, and the A unit generator, not being required, is placed in standby, and operates for long periods on a four-day trip to the coast and return.

I am not aware that the standby equipment on Canadian made generators differs from that on generators made in the United States. However, our experience with standby is quite favorable, with full protection from freezing.

MR. H. M. SCHUDLICH (Engineer of Water Service, Northern Pacific Railway, Northern Pacific Building, St. Paul 1, Minnesota): We are talking about cleaning with hydrochloric acid, and the infusion of hydrogen in the steel coils during acid treatment. Why don't we retain the stability against hydrogen infusion? To prevent infusion of hydrogen in steel during acid treatment, a proper inhibitor should be used so that the steel retains its original ductility.

After all, when we treat or clean steel with hydrochloric acid do we not get hydrogen instability. At least let's put it that way. I still think we do not have an answer to hydrogen embrittlement commonly called caustic embrittlement.

MR. J. J. DWYER (Chief Chemist, Chesapeake & Ohio Railway Company, Huntington, West Virginia): This is the first time I have been confronted with that question in connection with the steam generator. Personally, I am afraid I cannot answer it. We have had a number of coil fractures, although on the C&O, with which I am affiliated, all of coil, with one or two exceptions, in the six years or so that we have had our steam generators in our major passenger service.

We have had some cracks, and we examined several of them. They all had the same pattern. We examined these cracks microscopically, and they were definitely not embrittlement cracks. They were trans-granular, straight through the crystals, commonly referred to as thermal or heat cracks. That has been our experience up to now.

Does anyone else on the Committee care to comment? I am sorry, Mr. Schudlich, but I personally don't have any more information.

MR. GODWIN: I have heard that discussed many times. I don't think there is anyone more qualified to discuss caustic embrittlement than the Master Boilermakers. We have had many papers on that subject, and at no time have I heard that caustic embrittlement is present in the steam generator coil. However, I will call on Mr. Koyl. Do you have any information on that, Mr. Koyl?

MR. J. E. KOYL (Manager, Railroad Department, Bird-Archer Company, Cobourg, Ontario): Harold, I have never heard of caustic embrittlement or intercrystalline corrosion in a coil. There are two things necessary for attack to proceed. First, a leak; second, a concentration of the solids in the leak to aid and abet the active corrosion. I don't think that can happen in a steam generator coil.

MR. SCHUDLICH: We have had or rather I have seen a lot of caustic or hydrogen embrittlement. I would like to hear someone on the floor speak about this.

MR. GODWIN: What type of

MR. SCHUDLICH: Where hydrogen embrittlement is a factor?

MR. GODWIN: Is it a Vapor generator?

MR. SCHUDLICH: That's right, Vapor.

MR. GODWIN: I think we have a very able gentleman right here who can answer my question.

MR. V. C. BARTH (Chicago & North Western Railway Company, 4200 West Kinzie Street, Chicago 24, Illinois): I think what Mr. Schudlich is actually referring to is the hydrogen migration into the steel of the coil and, as a result, giving what we normally would call caustic embrittlement.

Perhaps the thought behind this is that in cleaning the coils we generate considerable hydrogen due to the reaction of the muriatic acid with the scale in the coil. The migration of hydrogen into the steel, at least in my opinion, would require temperature. I doubt this very much if we clean our generators, under 120 degrees. At the high temperature the rate of hydrogen migration could be detrimental.

On our railroad I don't recall any failure that I would attribute as being due to hydrogen migration. At higher temperatures it certainly can happen, but I don't believe it will happen at the relatively low temperature at which we clean the boiler.

If Mr. Schudlich has had a lot of failures, I wonder where there is a condition similar to caustic embrittlement or possibly some other cause for it in the actual operation of the boilers, rather than the acid cleaning of the boilers.

MR. W. E. TRAVIS (Superintendent Diesel Locomotive Maintenance, Delaware, Lackawanna & Western Railroad, Scranton 5, Pennsylvania): I would like to know what, in the opinion of the [illegible] for determining the condition of coils and scale build-up than the water pressure gauge indication.

I realize that you are acid washing on a time basis, with the various types of waters and conditions that we have across the country, how do you determine just what the time is?

MR. GODWIN: Would you mind repeating that, please? The Committee does not quite understand your question.

MR. TRAVIS: I noticed that in your report you do not think too highly of using the water pressure gauge as a determining factor for acid washing. I would like to know what you do recommend.

MR. GODWIN: The water pressure gauge, in my opinion, is abused because of the shut-off valve located under the gauge being allowed to operate in the full open position. The shut-off valve is equipped with a round type handle which identifies it as a closed valve while operating, and to be opened only for test purposes.

Unfortunately, everyone has a desire to have the gauge operating continually, and in my opinion the gauge will not stand up to this type of service.

Mr. Scott of the Vapor Corporation might help us by answering that question.

MR. G. C. SCOTT (Vapor Heating Corporation, 6420 Howard Street, Chicago, Illinois): I didn't get the entire question. I was concentrating on the previous question on caustic embrittlement, and for a moment I would like to go back to it.

Mr. Heasom, of National Aluminate, in conjunction with our people, some time ago made an exhaustive study of what we thought was perhaps caustic embrittlement, and we found it was not caustic embrittlement.

In our method of operation we [illegible]

so that we would have saturated steam, and if we go into superheat condition we might get thermal cracks in the coils. The cracks are such that they might lead someone to believe that they are caustic embrittlement cracks.

If the gentleman who said he has had numerous failures due to caustic embrittlement will give his name and railroad to me, I will be glad to have someone go down and see what is happening down there.

Now, if I can answer the other question on steam or water gauges—

MR. GODWIN: The gentleman wants to know why we can't use the water pressure gauge as a true indication of conditions.

MR. SCOTT: First, you have to have a standard or criterion to go by. In the early days we used to use the water gauge when we were filling the steam generator with water, to determine what condition the coils were in as far as scale deposits were concerned.

With the steam generator going into the field in such great quantities, it was impossible to follow the same procedure with the different types of generators and the different types of steam and water gauges that were recommended, so we put a shut-off valve underneath the gauges to stop vibrations and to use the gauge only as a test gauge.

As you said, Fred, everybody wants to see what the water pressure is, and consequently, the wear in the gauge is such that it is not absolutely reliable.

Does that answer your question? Is that what you wanted to know?

MR. TRAVIS: It doesn't give me an alternate solution. If we cannot use the gauge indication or any means of measuring the pressure of the feedwater, under fixed operating conditions or while filling we have to have some other method. I would like to know what the Committee recommends.

MR. GODWIN: I don't think the pressure gauge can be used as a true indication of conditions. Let's assume for the moment that the water pump is in a poor state of repair. How can the gauge give you an indication of the coil condition that you speak of unless we first know that the pump is in good condition. We have noted instances when the gauge pressure would register 300 p.s.i. and the condition of the coils reported good, only to find later that the condition of the coils was poor and the false indication of conditions invariably would be traced to leakage at the water pump. Some effort will have to be made to determine the condition between the pump and the gauge, and in my opinion a pretested gauge should be used in addition.

MR. SCOTT: I think you will find that if you have a gauge that has been worked on in the last year, tested in the last year, you will find it is fairly accurate. You can go by this, following the pressure that we state in our own manuals as the normal operating pressure for that particular generator.

If you are beyond the set limits, we say that if a certain pressure is reached it indicates that there is some obstruction in the path of the water from the pump to the gauge location or behind it, and I think if you follow the gauge it will be a fair indication.

However, there still is that possibility of scale incrustation that could happen to build up very rapidly in a short period of time due to some water condition; so the recommendation from the Committee, as I understand it, is to use a time clock or a meter of some kind to indicate the number of hours that the

generator has been in operation, and schedule your washing from that.

MR. GODWIN: Gentlemen, that is the general opinion of the Committee.

To use a pre-tested gauge to support the other recording. Many railroads do not rely on the gauge on the water pump, and many use a pre-tested gauge to support that.

MR. TRAVIS: At periodic intervals we put the generator through an orifice test, and we do put other gauges on it. We feel that in this way we can get an accurate picture of the fire transfer rate and the coil condition with regard to the scale build up.

I have another question. I would like to ask the Committee to discuss the method used for cleaning the boiler water tanks.

MR. RITTER: In washing out the water storage tank you have to make sure that you have a sufficient number of holes to wash through so that you will be able to wash out each section thoroughly. That is the No. 1 thing.

You must be sure that you can place the water nozzle into all sections of the tank, so each section can be thoroughly cleaned. The early locomotives had only about one-third the number of plugs they should have had. We on the New York Central have just completed water storage tank drawings for all classes of locomotives that we have, to apply the washout holes into the tanks, so that we will be able to thoroughly wash each section. Without those holes there is no way of cleaning them.

MR. S. A. JONES (General Inspector of Diesels, Canadian Pacific Railway, 104 Fullham Crescent, Winnipeg 9, Manitoba): May I go back to a previous question?

As you know, we operate a number of our units in pool service, and these units are equipped with steam generators. From the discussion it would appear that it is the Committee's opinion that the time these steam generators are in operation is to determine washout periods.

In standby service, naturally, the condition under which a steam generator operates is entirely different from the condition when it is running. Draining the steam generators on a portion of the locomotives that are not immediately needed has not proven very successful on our railroad. We didn't find a sure-fire method of draining the generator, and the water pumps offered considerable difficulty. We could not get the water out of them entirely, and found that we had suffered from freeze-ups later when the units were put back into operation.

We tried injecting an anti-freeze, and that partially helped the situation, but there again it is unwieldy and not applicable generally in operations. Beside that, if you drain a locomotive, you are immediately in trouble when you lose adhesion from loss of weight and that immediately becomes apparent in the tonnage ratings.

So, I would like to have the Committee direct more definite advice as to just how far they think this method of determining washout intervals would apply in steam generator service with standby.

You are making it quite clear as to what you think about running, but with a locomotive that is operating in pool service, it could be in continuous standby service, and as I have explained, we find standby is a necessity. I think you should give a little more direction along that line, if you can.

MR. GODWIN: I am afraid I don't know who is qualified to

answer your question, but I can appreciate your problem.

I am inclined to feel that the standby position should not be too much of a problem as far as descaling of coils is concerned, because standby changes the steam system into a hot water system. I just can't follow why you would expect to have trouble in standby. Have you experienced the trouble you are referring to?

MR. JONES: You are connecting an hourmeter up across the fuel spray head; is that right?

MR. GODWIN: That is correct.

MR. JONES: Then you are going to measure every time that generator is being fired.

MR. GODWIN: That is correct.

MR. JONES: We don't know when it is being fired in standby or in running, but from the application proposed, you would be measuring all the time.

MR. GODWIN: Yes. When the generator fires for any period of time, that period will be recorded on the meter, and as soon as the pre-determined setting of the aquastat is reached, the generator immediately shuts down and the meter stops recording.

MR. JONES: Isn't it true that that would record on the meter?

MR. GODWIN: Yes. When the generator fires in standby that will record on the meter; then the meter stops recording.

MR. JONES: But would it still be recording on the meter? If the unit operated over a 30-day period, let's say, all of the time recorded could be recorded in standby, and you would neglect that entirely; right?

MR. GODWIN: As soon as the fuel gets to the spray head she automatically records at the meter.

MR. JONES: Further to this, it is our considered opinion that a generator in standby service is actually being subjected to far more severe conditions than ever occur in running. Take low-fire operation on a steam generator: The tendency of the coils to soot, and all the other conditions you run into, are far more severe than running. Once you put a unit into running operation, and it works, you don't have too many problems. In standby, a generator is really being put to a severe test.

I believe further consideration should go into estimating the time the steam generator is in standby when considering servicing requirements.

MR. GODWIN: I believe we overcame the standby and low-fire problems when we started adjusting our generators to show a greater amount of return water than recommended.

In other words, the recommendation of the Vapor Company that the return water indicator show four cycles per minute on low-fire has been changed by our railroad to show returns of eight cycles per minute.

When our generators are being tested, the setting of the Servo in low, medium or high-fire must be 8 cycles per minute. A more accurate setting is obtained when the volume of return water is measured into a container before going to the storage tank. It was found that the cycles were not always equal, and by measuring the water returns the fuel setting can be made very accurate, and will take care of any change in feed water temperature.

By using this method of adjustment it is impossible to operate with no water in the coils. The chances of super-heat have been eliminated and our records over the past 12 months show the greatest improvement possible.

It might be said that the excess returns may cause feed water temperatures to rise, but this is not so, as we have experi-

enced that the heat exchanger will perform satisfactorily with the greater flow of water.

MR. SNOW: I think this gentleman has the same problem I have, and he is quite as concerned with it as we are. If you don't mind, would you ask Mr. Scott to discuss this?

I don't understand returning that much water in the manner you speak of, nor do I understand returning that much water in high fire, because it has been our experience that with that much water return the storage tank gets so hot that the pump becomes vapor locked and can't pick up the water.

This has made me rather confused as to actually what we are saying and what we mean. If Mr. Scott can clear it up, I think we will all feel much better about it.

MR. SCOTT: As I said, we don't give you any arbitrary figures—gallons per minute, or anything like that. We ask for 10 per cent. Ten per cent of 3000 lbs. would be 300 lbs. of water per hour in a 3000-lb. boiler.

There is a condition that comes up in the heating of the water storage tank, and that is the question of whether the heat exchanger is clean so that we are taking the heat out of the water as it is being returned. Second, where the steam generator is set so that you are operating on high fire with a feedwater temperature of approximately 150 degrees before you make your fuel adjustment.

If those conditions were brought into the picture, I am pretty sure you won't experience any extremely hot water in the water storage tank. When in standby, set the figure for temperature of the water storage tank at 140 degrees. We don't have any difficulty using the water at that temperature. If it gets beyond that, I would look into it and see if you are returning way beyond the amount of water you should be returning. We ask for 10 per cent. I think if you do that you will find that the excessive heating of the water storage tanks will be done away with.

I believe Mr. Snow has a considerable number of units that have below-deck tanks, and CFK boilers on them. I think his railroad is one of those that has changed over from CFK operation to OK on those particular jobs.

It is a ticklish job to set the Servo control. However, if care is taken in setting it, the return water will be in the right proportion and the overheating of the tanks will be done away with.

MR. W. C. ROLLINGS (Shop Superintendent, Louisville & Nashville Railroad, Louisville, Kentucky): Mr. R. B. Johnson, Diesel Foreman of our railroad, wants to know this: Are other railroads using a test gauge to set and test their pumps besides the steam generator gauge on the steam generator?

MR. RITTER: According to ICC rules, you have to apply another steam gauge beside the one on the steam generator. We have been getting away with it for a number of years by not applying the second gauge. I was told yesterday that from now on we had better start applying this second gauge.

MR. ROLLINGS: Do they anneal the gauge pipe between separator and gauge?

MR. GODWIN: I believe the general practice regarding certain copper tubes which are subject to failure from vibration is to protect them by annealing at least once a year. In other cases, where the tubing is not subject to movement and the generators remain in service for long periods, we recommend that all cop-

per tubing be removed and annealed at each 24-month period.

MR. TRAVIS: I have been handed this question: "Do you have any suggestion for a rule of thumb to use in determining when the strength of the various acids has reached the end of their scale-cutting ability?

MR. GODWIN: Our laboratories have developed a method of titration to determine the strength of the phosphoric acid. I am referring now to acid used after one washout. These titrations determine the condition of the acid through a color range of reagents.

If my memory is correct, if the sample turns green, the acid is of no value and should be discarded. If the sample turns blue, it can be economically adjusted for further use.

A second titration is used to determine how many gallons of concentrated acid are to be added. During this titration, if the sample turns red, we must add one gallon to adjust it. If the sample turns yellow, add two gallons to restore the original strength.

This titration method is controlled by our laboratories. I cannot tell you what it consists of, but it does tell us whether the used acid can be adjusted economically for further use.

MR. TRAVIS: We use a different method, involving more than a rule of thumb arrangement. We find that our men are able to determine, by appearance, the relative effectiveness of the muriatic acid as it discharges from the coils during the wash-out period. We get a good job of descaling, within a reasonable time, using this method.

MR. J. E. KOYLE (Manager, Railroad Department, Bird-Archer Company, Cobourg, Ontario): Effervescence is a fairly good rule of thumb for muriatic acid, but it is not a very good test with phosphoric or sulfamic acid. Success has been achieved by titrating the acid solution with normal N/1 sodium hydroxide, using phenolphthalein as an indicator. If the acid solution is not less than 50 per cent of its original strength it can be made up to a re-usable acid solution by adding fresh acid to it.

MR. H. E. REYNOLDS (Assistant Superintendent Motive Power, Production Control, Louisville & Nashville Railroad, Louisville, Kentucky): Do you recommend at any time the hammering of coils to help in cleaning the coils?

MR. GODWIN: No, I would not recommend that. I don't think there would be any value in hammering the coils to help you in cleaning them. You could use hammering to determine the condition of the coils, but I doubt very much if any improvement would be made by hammering the coils.

Does any member of the Committee have an answer?

MR. RITTER: Not while it is on the unit. If you have the coil out of the generator in the shop, and you are able to get at the inside and outside of it, by hammering it a little bit to determine what the wall thickness is, you may knock some scale loose, and that might speed up the washing action a little. That is about all the help it will be.

MR. GODWIN: I would like to ask a question and see if I can get an answer to it.

In regard to the types of acid being used for various tests, has anyone tried through the complete water system the use of muriatic acid or a similar type of acid—any of the hydrochloric acid types? Has anyone used it through the entire system, similar to what we are doing with phoshoric acid? I would like to know if any tests have been conducted along that line.

We hear much about the value and speed of muriatic acid; in most cases we are reluctant to use it in view of having to resort to pump or tank off the locomotive. If this acid can be used in the pump on the locomotive, I would like to know. Has anyone done this yet?

MR. F. H. McHENRY (Shop Superintendent, New York Central Railroad, Cleveland, Ohio): At the present time we are using a muriatic type acid with the same operation that we use the phosphoric—pumping it through the entire system, using the circulating pump as the pumping device, and as of this date we have had no detrimental effects that we can determine on the parts, nor any checks in the steam generator equipment.

MR. GODWIN: Can you add to that? I would like to know what type of acid you are using. Is it a specially inhibited hydrochloric acid?

MR. McHENRY: We are using a DuPont acid at the present time. It is classified as Dukleen No. 2. I believe DuPont has been asked to take special pains to raise the inhibitor in this particular cleaner so that it will do the job we expect it to do.

MR. GODWIN: Is this under test?

MR. McHENRY: Yes.

MR. GODWIN: How long has it been used?

MR. McHENRY:: We have been using it for the last three months.

MR. GODWIN: That is about three washouts?

MR. McHENRY: That's right; that is conclusive.

MR. GODWIN: You are not in a position to give us any answer to the condition of the components inside on the stripped-down job?

MR. McHENRY: No, we are not. However, from our laboratory tests they feel that we won't have any more trouble using this type of acid with the proper inhibitor than we would have with the previous acid we were using to do the same job.

MR. GODWIN: That is very good news. We have been looking for that for a long time. We will rely on the New York Central to keep us well posted on that matter.

MR. SCOTT: Mr. Godwin, may I say something about the use of the steam generator pump to circulate acid of any kind?

Our Metallurgist, Benny Freeburg, has just completed a very conclusive test on the various acids and their actions on our water pumps and other appliances that might be harmed by acid. The recommendation of the Engineering Department of the Vapor Heating Corporation is that the water pump on the generator is not to be used for the circulation of acid for washing purposes.

MR. GODWIN: We will be able to answer you six months from now, Scotty, when the New York Central tells you that you are wrong.

MR. SCOTT: I hope they will tell me I am wrong.

MR. CECIL A. WILSON (Assistant General Supervisor of Diesel Engines, Atchison, Topeka & Santa Fe Railway, 1700 South Wentworth Avenue, Chicago 16, Illinois): What is the best method you have found for storing used acids to maintain their strength?

MR. GODWIN: I understand that recently the people who supply the Steamright 14 came out with some specific drawings to show the construction of the various types of storage tanks with a slope type bottom, channeled to one common point where the sludge or the suspended material can be removed at very little cost.

By having the slope type bot-

tom tank, you can dispose of the greater amount of sludge and suspended matter that would be normally fermenting in the tank, destroying the solution strength. This is the only approach that I know of that will get rid of the sludge quickly.

I might add that is a very desirable, in the initial stages of washing, that at the first sign of sludge and scale through the return hose, it should be directed to the sewer. This normally represents an appreciable amount, and in some instances as much as one quart of sludge in 5 or 10 seconds. We recommend, therefore, that every effort be made to keep this sludge out of the storage tank where possible.

MR. V. C. BARTH (Chicago & North Western Railway Company, 4200 West Kinzie Street, Chicago 24, Illinois): I would like to ask Mr. Scott why he said the pumps should not be used to pump acid. I would like to know.

MR. SCOTT: I don't make the laws, and I don't make the rules or anything alse that apply to the operation of the generator. I take the recommendation of our Engineering Department which are passed on to us.

We received a directive just recently, together with sheets showing the corrosive effects of acids. I don't care if it is vinegar taken out of a bottle—it is corrosive. The directive from our Engineering Department said that the Vapor Heating Corporation does not recommend the use of the water pump on the generator for circulating acid.

It is the recommendation of our Engineering Department as a result of their research. It is not my directive by any means. I would like very much to be able to recommend that any acid can be used from a vat anywhere, and can be pumped through the unit. It would simplify the washing very much.

MR. BARTH: That answers my question. However, when you consider the pumping of acids and the type of acids we are talking about, the inhibited muriatic or the phosphoric or sulfamic, we know they are extremely poor lubricants.

I am inclined to overlook the corrosive effects except for the packing. I wonder whether the packing can take it. From the other aspects we know these acids are very poor lubricants, and therefore our pumps may score. Is that the reason?

MR. SCOTT: No, I don't think that is the reason. The test Mr. Freeburg ran was on the corrosive effects of the various acids on the different metals that we use in the pump and appurtenances on the boiler before the acid reaches the coil. The ruling is not mine. The Engineering Department makes the rules and passes them on to us, and we try to see that information is passed out to the field.

I don't mean to discourage anybody in their practices if they are trying to simplify the washing conditions. I am for that 100 per cent—but that was the directive given to us. We are told to follow it in the field.

MR. GODWIN: I can well recall the condition that we experienced some two years ago when using the Vapor Company acid pump. It was the most deplorable condition to experience. That pump could never be used because something had corroded and had gone wrong.

I am wondering what the pumps will be like on the New York Central after acid washing for a year or so with this type of acid. In most cases the generator pump is located in a position far from satisfactory for cleaning and inspection.

MR. RITTER: When you use

a pump day after day for nothing but acid washing, for five to six washouts a day, you can't expect the pump to last too long without repair work on it.

When you use the pump on the steam generator, wash perhaps twelve to fourteen times a year, the effect the acid might have would be so little that it would not be noticed, before you got around to reworking the pump for something else. In this way you eliminate the pump on the floor.

MR. FRANK UPTON (Superintendent of Motive Power, Chicago, Milwaukee, St. Paul & Pacific Railroad, Milwaukee, Wisconsin): I would like the Committee's opinion on the average life of boiler coils on a Vapor 4625 boiler.

MR. GODWIN: I don't think anyone has correct answer to that question. However, there are many approaches to it. If I am not mistaken, Mr. Ritter of the New York Central has some figures that he could give us to answer the question.

MR. RITTER: That, of course, depends on the type of water being used, and the service the generators are in.

MR. UPTON: This is passenger service.

MR. RITTER: It still depends on the type of boiler being used, and how well it is treated. As everyone knows, with a steam generator you cannot operate and expect to get good service out of it unless you have the best possible water. Do you want me to tell you what the time figures we have arrived at are? I can do that.

We have found through records we have kept over a number of years that on a 4625 steam generator, we have to renew the outer coil after three years of service, and all other coils in the 4625 after six years of service. That does not mean they will all last than long. (Laughter)

MR. GODWIN: We are presently weighing all of our coils, and according to the figures shown in the reports, I am convinced that the material weight can be used to advantage. The weights of the various coils after 30 to 36 months' service show the material loss as follows:

The outer and inner coils have a 20 per cent material reduction, the intermediate coil 15 per cent, and the economizer coil 40 per cent.

If the material reduction continues, I believe in the near future we can arrive at a predetermined weight that will satisfy us that it is economical to dispose of the material and reduce the failures that develop when poor material is returned to service.

MR. UPTON: This question is directed to the floor: Is there any railroad using standby heaters throughout the winter months without idling?

MR. P. J. FINCH (Assistant Superintendent Motor Power Diesels, Chesapeake & Ohio Railway, Richmond, Virginia): I believe Mr. Upton is referring to a standby heater protected when the engine is dead, to protect the engine cooling system in the wintertime. We use them on the Chesapeake & Ohio.

MR. GODWIN: He is talking about the 4915's.

MR. FINCH: That's right. Ambient temperature when these locomotives are stored gets down to zero sometimes, or not much higher than that.

MR. GODWIN: Do you want to comment on that, Mr. Scott?

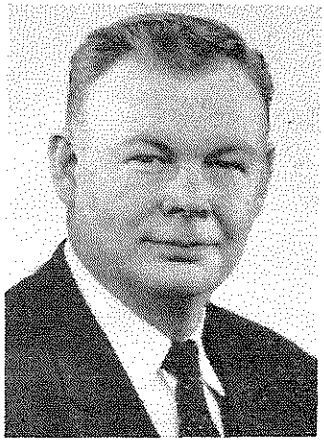
MR. SCOTT: I would like very much to have those gentlemen at the Vapor meeting tomorrow. The meeting is specifically for that purpose.

I will say, however, that last winter I had some experience on the GM&O on some Alco loco-

motives, where we had temperatures 34 degrees below zero, and the watchman maintained temperatures between 140 degrees and 150 degrees on the locomotives for overnight service at one end of the line, and from Saturday night to Monday morning on the other end of the line.

MR. GODWIN: I am afraid our time is up. If there are no other questions, I will then call Mr. Bachman to summarize and close the discussion period.

CENTRAL (CHICAGO) REGIONAL EXECUTIVE



G. F. BACHMAN
Chief Mechanical Officer
Elgin, Joliet & Eastern Ry.
Joliet, Illinois

MR. G. F. BACHMAN (Chief Mechanical Officer, Elgin, Joliet & Eastern Railway, Joliet, Illinois): Gentlemen, in summarizing this paper I would say that the subject matter has been very well presented, as judged by the fact that only a few of the questions concerned matters in the paper itself. The predominant questions from the floor seemed to be about what to do about standby service of locomotives in freight and passenger service. It seems to me that question is pretty much still unanswered. I think it ought to be a question that the Committee should consider for its presentation next year.

Inasmuch as there were not too many questions on the subject matter contained in the report, I was particularly impressed with the question by the gentleman from the North Western, on why the Vapor Corporation takes the stand that you cannot clean steam generator coils with the circulating pump. That is a traditional stand taken by members of the LMOA. In times passed we have continuously questioned the "why" of directives from the various builders, and I think that makes for progress. I am sure at next year's meeting something is going to be reported by someone on the "how". I am looking forward very much to hearing that discussion.

Mr. Godwin and his Committee have presented a very good paper and I believe they deserve a rising vote of thanks.

(The audience arose and applauded.)

CHAIRMAN HOPE: Gentlemen, the Chairman of our next Committee, Mr. Charles Voitelle, Chairman of the Committee on Fuel and Lube Oil, has another highly controversial subject.

Mr. Voitelle is Fuel Inspector, Research Department, Baltimore & Ohio Railroad, Baltimore, Maryland.

Mr. Voitelle attended West Virginia Wesleyan College and Duke University, where he graduated in 1940 with a BS degree. He was employed by Pardee and Curtin Lumber Company at their mine at Lost Creek, West Virginia to develop a card index of mining supplies and machine parts. Two years later he was made foreman in charge of their

cleaning, loading and coal haulage, as well as being in charge of outside equipment.

In 1947 he went to work for the B&O Railroad as Coal Inspector. In 1951 he was transferred to the Diesel Fuel Section, and after two years of extensive training was assigned to the position of Diesel Fuel Inspector, which position he now holds.

CHARLES VOITELLE, Chairman
Committee on
Diesel Fuel and Lube Oil
Diesel Fuel Inspr., Research Dept.
Baltimore & Ohio R. R.
Baltimore 23, Md.

MR. CHARLES VOITELLE (Diesel Fuel Inspector, Research Department, Baltimore & Ohio Railroad, Baltimore 24, Maryland): Gentlemen, the subject of economy fuels is very broad and a good argument can be started on nearly any phase of it. The subject "Economy Fuel—Its Effect on Diesel Locomotive Maintenance," is surely no exception. However, I think we are very fortunate in having an outstanding committee to develop this subject and present it to us.

At this time I would like to introduce the members of the Committee who are on the platform.

(Mr. Voitelle introduced his Committee.)

GENERAL

"Economy Fuel—its Effect on Diesel Locomotive Maintenance" is timely as this subject is widely discussed and very controversial. The term "Economy Fuel" is used loosely and it is defined in different ways.

Let us begin, then, by defining economy fuel as any distillate or residuum with which a saving can be made in the over-all cost of utilized horsepower, and which can be burned in railroad diesel engines—with or without —fuel additives, engine modifications or adjustments, or additional handling facilities.

There are many properties involved in the composition of fuel oils, and there are a great number of different crude oil sources and refining methods that effect these properties. Variance of any of the prescribed properties from their specification limits, as established by engine builders, may automatcally cause a fuel oil to be classified as "Economy Grade."

REPORT OF THE COMMITTEE ON FUEL AND LUBE OIL
1957 TOPIC

"ECONOMY FUEL — ITS EFFECT ON DIESEL LOCOMOTIVE MAINTENANCE"

SEE PAGE 199 OF 1957 PRE-CONVENTION REPORT FOR FULL TEXT OF THIS REPORT

We all know that *huge quantities of economy distillates are being used,* and nearly all railroads are burning at least some. A recent survey of the railroads in the U. S. and Canada revealed that over 50% of the volume of fuel consumed was economy distillate. The main difference between these fuels and the regular distillates was lower cetane, lower API gravity and a wider viscosity range.

We also know that *great many of these economy fuels cause no noticeable additional engine wear or deposits.* However, some fuel properties may affect locomotive maintenance practices and require engine modifications and adjustments to utilize the fuels to the best advantage. This has been proven by Field Service Tests of long duration where accurate records were kept of wear rates, engine deposits and other factors which effect engine maintenance.

It is this type of economy fuel that is discussed in this report so that the mainteance forces will be alerted to look for and minimize any adverse effects these fuels may have on the engines.

We have divided the fuels into three main groups so that they may be more easily identified. These groups are:

1. Light distillates
2. Recycle Stocks and No. 4 Residual Blends
3. Heavy residuals and residual blends.

FIELD SERVICE TEST RESULTS OF HIGH SULFUR DISTILLATES

Road tests of long duration have been run using fuels in the range of 40 cetane 1.0% sulfur, and 700°F. maximum end point. Much is known about the effects of fuel of this type on locomotive maintenance. The *General results* of the tests are, as follows:

1. It is possible to operate diesel locomotives on fuels of this type.
2. Engine maintenance may be increased due to higher wear rates or deposits.
3. Fuel properties other than sulfur content, cetane number and end points may adversely affect locomotive operation or maintenance.

Many of these fuels are not stable and corrective measures must be taken, such as the careful selection of a fuel additive, to combat the products of fuel instability which plugs filters and causes deposits to form on injector plungers and barrels, causing them to stick.

It may also be necessary to supply heat to the fuel to combat cloud and pour points.

4. This grade of fuel may cause a higher rate of crankcase lubricating oil deterioration as indicated by oxidation, additive depletion and increased oil consumption.

When using low API gravity—low cetane fuels, engine adjustments may be necessary.

Tests have been made on railroad diesel engines to determine whether or not adjustments of the engine power pistons and inector timing settings were necessary to obtain a horsepower output equivalent to that of regular diesel fuel.

It was found that in order to obtain full economy of the fuel, minor adjustments may be necessary on both EMD and Alco engines for optimum horsepower and fuel consumption.

There is usually an increase in fuel consumption when changing from 42 to 35 cetane fuels. This increase in consumption is accompanied by a resultant increase in horsepower, so that an improvement is actually obtained in fuel consumption on a horsepower basis.

There are some economy fuels

on the West Coast, our committee members inform us, which do not affect Diesel engines in this manner. But there have also been a great number of long-duration field service tests run in the east and in the midwest and in nearly every case it was found that the use of these fuels resulted in higher wear rates, more deposits, and that there are other properties in fuels which can adversely affect Diesel engines.

FIELD SERVICE TEST RESULTS OF RECYCLE STOCKS AND NO. 4 RESIDUAL BLEND FUELS

There are large quantities of very light recycle stocks and cracking unit bottoms being burned as railroad diesel fuels, but actual measured wear rates and other data is not available on the effects of these fuels. As nearly as can be *determined by visual inspection, wear rates and deposits are similar to that of low grade distillates having the same sulfur content.*

Road service tests have also been run on light residual blends having viscosities of 45-120 *SSU at* 100°F. by the use of heat exchangers on the engines. No additional engine modifications were made. *On at least two of these tests the engine performance was not satisfactory.*

You can readily see, by the following photographs, the reason the tests were discontinued: *Figures* 1, 2, 3.

This test was discontinued after 19,060 miles. During this period of time a large number of injectors and valves had to be changed due to build-up or carbon.

The railroad making this test concluded that if fuels of this type were to be used, it must be in dual fuel oil systems.

RESIDUAL FUELS—300 SSU AT 100°F.

Several attempts have been made to burn fuels of this type without extensive engine modifications such as dual fuel systems. However, to date, these attempts have not been successful. It was found that the engines cannot digest the fuels at low engine speeds and loads as excessive wear and severe engine fouling results.

Packing units have been developed to heat, filter and supply the residual fuels to the engines at the desired throttle positions. The two principal systems are the *On-Off and the Proportioning Systems.*

DETAILED EFFECTS OF THE RESIDUAL BLEND FUELS

Wear rates on dual fuel engines, as compared to low cost economy grade distillate fuels, indicate, as follows:

Ring breakage and excessive ring wear—four times as great.

Valve failures occur approximately five times more frequently.

The wear rates of the following parts are approximately twice as great:

Cylinder Liners
Wrist Pin Bushings
Top Compression Rings

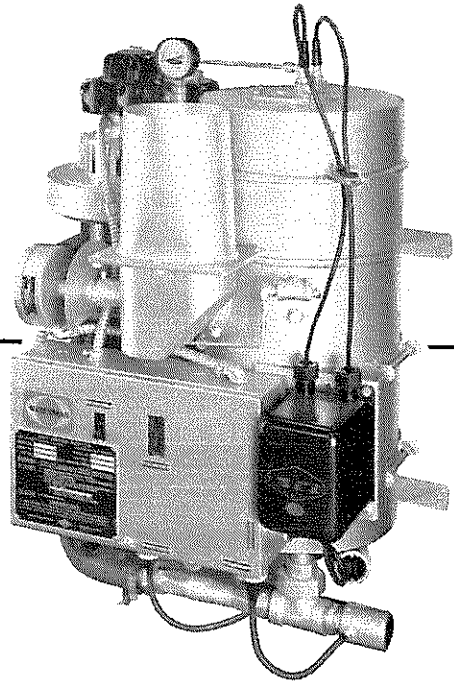
Lube oil must be changed two to three times as often.

The wear rates of the following are similar to engines burning low cost distillate fuels:

Injectors
Cylinder Heads
Pistons
Piston Pins
Connecting Rod Bearings
Main Bearings
Piston Carriers

The calculations are based on standard engine parts and represent a relatively short period of time as related to expected locomotive diesel engine life. As engines accumulate mileage some of the wear factors will undoubtedly vary.

Through the use of stellite faced exhaust valves, chrome



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liners, the careful selection of lube oils and proper filtration, a large railroad operating 50 EMD units on this type of fuel does not expect it to be necessary to shorten their two-year engine maintenance period. Whether or not this period could be considerably extended with distillate fuels is not known.

The following Photographs show some diesel parts removed from test locomotives using 300 *viscosity fuel after* 26,000 *miles of service.*

(Slide) You can see there were valve deposits which did not contribute to good locomotive operation.

(Slide) Notice the air ports on the liners, especially in the view to the left. You can see they are nearly clogged. That engine was starved for air because the fuel ran down on the outside of the engine, and vapors passed through the air filter and coked in the ports. This slide is a good example of that condition.

(Slide) There is also extensive injector trouble on engines burning fuel of this type. This slide shows the tips of the injectors after being removed from the engine.

This test was discontinued in an engine, having only approximately 19,000 miles run on this type of fuel, because the railroad running the test decided that if this fuel was to be burned in Diesel locomotives a dual fuel system must be used.

Heavier residual fuels in the 300 *to* 7000 *viscosity bracket.* Several attempts have been made to burn these fuels without the use of dual fuel systems, but in nearly every case it was found that the results were not satisfactory because the engine would not run.

There has been a great deal of work done on these fuels in dual fuel systems, and the results of these tests are as follows:

The wear rates on dual fuel engines, as compared to the low-cost economy grade distillate fuels, indicate that ring breakage and excessive ring wear is approximately four times as great. The valve failures occurred about five times more frequently. The wear rates of the following parts were approximately twice as great: Cylinder liners, wrist pin bushings and top compression rings.

The lube oil had to be changed two or three times as often as with the light distillate fuels.

These engines were equipped with standard locomotive parts, and the calculations I have just given you are based on that type. They represent a relatively short period of time as related to the expected life of the engine, and as the engines accumulate mileage some of these wear factors undoubtedly will vary.

Through the use of stellite faced valves chrome liners and careful selection of the fuels and lubricating oils, one large railroad running 50 units on this type of fuel expects their maintenance to be much better than is indicated in this report. Whether or not this maintenance period could be considerably lengthened with the same engine modifications if they were burning lighter economy type fuels, is something to be considered. We don't know.

The following photographs show some Diesel parts removed from a test locomotive using 300 viscosity oil after appriximately 26,000 miles. Most of the parts look very good.

(Slide) Valve trouble was one of the worst offenders in this type of fuel. They had corrosion from the vanadium and sodium in the fuel, and there were a great many burned valves.

(Slide) The injector shows quite heavy deposits on the tip, but this railroad had very little

injection trouble because the intermittent service between the No. 5 and No. 2 fuels allowed the No. 2 to wash out, and clean up these injectors.

(Slide) This shows the air ports and liners.

(Slide) These heads look very good.

Of course, there is much yet to be learned about the burning of some of these fuels, but when the obstacles are overcome, railroads can save considerable amounts in their annual fuel costs.

The Maintenance Department has a large responsibility in using economy fuels. It should be understood that good maintenance practices are essential for the proper burning of both economy and premium fuels:

However, with some of the economy fuels more serious trouble may be expected and extra maintenance may be necessary. Particular attention should be given to the following:

Rings: Worn rings may cause contamination of the lube oil and depletion of the lube oil additive. It results in gums and lacquers being formed in the lube and allows the entry of sulfur products and heavy fuel ends which may cause corrosion and wear of bearings and other engine parts.

Worn rings may also cause loss of compression which results in loss of horsepower, increased lubricating oil consumption and exhaust smoking.

Injectors, if not properly maintained, cause excessive ring and lined wear, engine deposits and contamination of the lubricating oil. As with worn rings, injector maintenance is critical when high sulfur fuels and fuels having heavy ends are used.

Insufficient heat is one of the worst enemies of a diesel engine. Cold engine operation greatly increases engine wear and is especially pronounced during the start and warm-up periods, and with the use of high sulfur and heavy fuels.

The maintenance forces when using economy fuel may prolong the life of engines by using chrome plated rings, chrome liners, Ni-resist ring carriers, stellite valves and high dome pistons. However, it has been found that chrome plated rings and chrome plated liners cannot successfully be used together.

CONCLUSION

The demand for economy fuels by the railroad industry has increased rapidly in the past few years and the railroads have learned to burn many of these fuels without affecting locomotive availability. However, there is still an urgent need to fully evaluate each type of fuel on a horsepower versus over-all cost basis. When classifying these fuels more concrete data is needed to fully evaluate the effects of each fuel characteristic involved. This can be done only by field service testing and keeping accurate records of measured horsepower output, wear rates, engine deposits, and other factors affecting engine operation and maintenance.

Results of economy fuels tested indicate that in many cases there has been no noticeable increase in wear rates or deposits. However, it has also been clearly shown that economy fuels, which have certain properties, can cause engine wear and fouling. This, when coupled with poor maintenance, can be detrimental to diesel engines and their operation.

This paper, as far as brevity will permit, gives a picture of the subject of economy fuels. However, for a railroad to establish whether or not economy fuels are suitable for their particular operation the decision

must be based on the use of selected economy fuels which are available in their territory. If their use entails extra maintenance, then the following economic problem is involved: Will the saving in the cost of fuel compensate for the extra maintenance and also give a substantial saving over the cost of premium fuel.

MR. VOITELLE (continuing): At this time I would like to present the President of the Chicago Railway Diesel Club who extended to us such a cordial invitation, and who had such a good membership at the pre-convention meeting here in Chicago. May I present Mr. R. A. Hoeft, of the Milwaukee Road.

MR. R. A. HOEFT (Electrical Foreman, Chicago, Milwaukee, St. Paul & Pacific Railroad, Chicago 22, Illinois): Thank you, Mr. Voitelle.

Mr. President and gentlemen, I deem it a great honor to be here and to help this Committee in what little way I can.

As most of you may know, the Chicago Railroad Diesel Club meets in this hotel the first Thursday after the first Monday of every month. There is an application blank in your report book, and you can join the Club. We will send you the proceedings and an announcement of each meeting.

Mr. Voitelle and his Committee presented their report on March 7, 1957. We had quite a floor discussion; in fact, we had to adjourn the meeting so that some of the members could leave to catch their trains.

We know you will have a good discussion here this afternoon; so shoot the questions at him.

MR. VOITELLE: Gentlemen, no doubt there are a great many questions in your mind about economies in burning some of these fuels. This Committee does not go into the economies of any particular railroad as to whether or not they can burn a certain type of fuel. Our topic concerns economy fuels and their effect on Diesel locomotive maintenance. If there are any questions, let's have them.

MR. THOMAS MURRAY (Master Mechanic, St. Louis, San Francisco Railroad, Springfield, Missouri): Mr. Voitelle, I note in the residual fuel section of this report you mentioned one railroad proposed to test residual blend fuels with low sulfur and vanadium content. Is this test in progress? If so, what has been the result so far of these engine inspection?

MR. C. M. ANGEL (Engineer of Tests, Chesapeake & Ohio Railroad, Huntington 3, West Virginia): We have been testing on the Chesapeake & Ohio some fuel that contains 100 parts per million vanadium and 1.2 per cent sulfur. We thought it well to test some similar fuel that contained 7 parts per million vanadium and .54 per cent sulfur. This test has run 40,000 miles, which is not yet long enough to give any conclusive information, but I will say it is showing a trend of less engine wear.

MR. BLEDSOE: Mr. Chairman, you are speaking of fifty locomotives. We had experience with about 500.

First, I would like to know, this locomotive you operated on some railroads for $2940 a year cheaper on economy fuel for maintenance: What type fuel were you burning?

MR. VOITELLE: That locomotive was burning a 300 viscosity residual blend fuel.

MR. BLEDSOE: Was that a No. 4 fuel?

MR. VOITELLE: That would fall in the classification of a No. 5 fuel.

MR. BLEDSOE: What percentage blend did you have in the No. 2?

MR. VOITELLE: Truthfully, I can't answer that question.

MR. BLEDSOE: Did you use a heater?

MR. VOITELLE: We used a dual fuel on-off system which includes the two heaters; yes sir.

MR. BLEDSOE: A railroad that I have been rather closely associated with for a number of years used heaters, additives, anything else you want to mention. We used stellite valves and it did a fine job. The only thing was that the heat would blow under the stellite, between it and the parent valve metal.

It is hard for me to understand how you can say you can operate a locomotive for $2840 a year less, when openly you say it takes four times the number of ring breakages, five times the number of valves, three times the lube oil changes, filter changes, and so on.

To go even further, we did just what you say: We took two Alco locomotives and two EMD locomotives. We measured the parts that went into them. We tied them together in the same service. One was on a No. 2 fuel and the other was on a blend of No. 5 and No. 2. We ran them for six months. The mileage has slipped my mind, but on the EMD engine, for example, we went from 0.025 gap on a ring to anywhere from 0.100 to 0.150 in six months.

MR. VOITELLE: As we stated, there are certain fuel properties that affect the engine in different ways. As Mr. Angel just told us, he is trying to eliminate two of the properties that he thinks are causing him trouble.

MR. BLEDSOE: We too, according to our understanding, have a test. We measure the fuel and weigh compression. We can tell you anything you want to know. According to what I have heard, we can burn this fuel. We have found additives to put in it, but when we do it costs so much that we can't afford to use it.

MR. FINCH: I would like to ask Mr. Bledsoe one question. I believe he is talking about a blended fuel oil burned in an engine without any particular changes made on the engine itself; isn't that correct? You are not talking about the use of dual fuel? He says he uses dual fuel on 500-odd locomotives.

I know something about the trouble he has had. I have seen some of his locomotives. I have seen some of the parts that were removed from them. I think that is one reason why he is having trouble with those oil coolers.

My question is this: In some instances we are running a dual fuel system on the locomotive, trying to maintain a horsepower of something close to 1500 or 1750 or whatever horsepower the engine is rated for. In trying to burn the residual fuel in the positions 5 to 8 we are finding that we do get ring wear, valve blow, and increased wear of the liner. Then, when we drop the horsepower a little, we find that the wear rate and the breakage of rings and ring wear and valve blow decreases.

Has any railroad de-rated the horsepower down below, say, 1400 HP and thus are getting a better service, less wear on the engine parts and better combustion than what has shown on the slides?

MR. BLEDSOE: May I clear up one question, Jerry? I might have misinformed this group. The only units we had the dual fuel on were those that were under strict control in the same service. One was No. 5 and No. 2 and the other was No. 2. All the other locomotives were operating with heaters.

MR. SNOW: I had the oppor-

tunity of being on Mr. Bledsoe's railroad, and I bled for him. (Laughter)

The true criterion of fuel, and whether it is economical to use cheaper fuel is whether in the end you will spend more money in the over-all picture or less than you did when you used the higher priced fuel.

In your remarks on the dollars saved, did you take into account the capital investment in locomotives that would have to be maintained in order to haul like tonnages, when setting out tonnage, when having train delays and train failures? Would you answer that question first?

MR. VOITELLE: I am afraid this Committee is unable to answer that question. The member of the Committee on whose road these locomotives were run is not here to defend himself. We may not give the answer he would want given. I would rather not discuss that at all.

MR. SNOW: I appreciate that view and will accept it and will progress to the next question.

You have in your paper the influence of fuels on maintenance. I am going to quote some figures which are relatively accurate: In 1955 we pulled 1408 pistons from our locomotives in running repair. We pulled 350 for broken rings, we pulled 600 for worn rings. 350 x 4 is 1400. If we were to increase the ring wear by four, that would be 2400. We talk about removal of cylinders in a volume of 3800 per annum for the two items alone.

Frankly, our problem is to obtain enough mechanics to run the railroad today with what problems we have, and to increase the parts pulled in our work means that we will have to employ more help. Therefore, I wonder if in the study of the fuels and their influence on maintenance it would be better to take a much broader view of this, and isolate our tests on given fuels in some one spot, and actually measure what they are going to do in some laboratory before we ever put them on the railroad, and cause our men to suffer the tremendous problems of maintenance that go with such a method of testing. I wonder if that would be a recommendation from you.

MR. VOITELLE: That is a very good thought. Yes, I think all fuels of that nature, especially the heavier fuels, should be tested before they are put into regular service on the railroad. There is no doubt about that. You can test them by your own method.

I want to point out that the residual fuels are still in the experimental stage. We don't know too much about the fuels, but we are learning. What the particular railroad that we were discussing is attempting to do is to extend their maintenance, through changes in fuel composition (which was done at one time) and by modification of engine parts to allow these engines to run the full two year maintenance period, as has been set up by that railroad.

As we said, had they used the same engine modifications, and so on for the use of light distillate fuels, they may have been able to extend the maintenance period to 36 months or some other period. These fuels are certainly still in the experimental stage, and if we just pick up a residual blend, a No. 5 fuel, and put it on the railroad and expect to run with it, I would say we are extremely optimistic.

MR. BLEDSOE: Mr. Chairman, may we get to the point I would like to make. You have stated in your report that this railroad is operating on $2940 a year cheaper per locomotive. That report was very positive on

fifty locomotives. Personally, from my experience I would look at it dubiously.

Will the men who operate our railroads financially look at it from the point of view that we have to look at it, or will they look at it from the wording in the report? When we make a report, which has an effect on the maintenance of our power such as this has, let's put a more detail of the experimenting into the report. I think that would help us all.

MR. VOITELLE: If you would like to have further details on how this saving was calculated, I am sure Mr. Garin can furnish you with that information if you will contact him by mail.

MR. FINCH: Mr. Chairman, may I have an answer to the question I asked a while ago?

MR. VOITELLE: Are there any volunteers to answer Mr. Finch's question on wear rates when you cut the horsepower?

MR. MATHIAS A. LANG, JR. (General Foreman, Great Northern Railroad, St. Paul, Minnesota): I believe that question asked by Mr. Finch concerned turning down the horsepower on the engines. We keep our horsepower down to 150 to 100 h.p., and we have no valve troubles. We have all the other troubles, but no valve troubles.

The intent of the above question is confusing and I don't believe I could give a qualified answer unless it were more specifically stated. Possibly Mr. Finch would state what type of engine he is referring to and whether he is cutting down on horsepower to reduce cylinder head failure.

MR. SNOW: I insist on staying on that point. If we cut the horsepower of the engine, are we figuring in the economies we obtain—the reduced ability to perform the same work in our train operations?

MR. VOITELLE: It has to be figured on the basis of utilized horsepower. That is the only basis I know of to figure it. The economy of the fuel would not be so great if you cut back the horsepower and burn the same amount of fuel.

Some railroads would not need the full horsepower. Others need all they can get out of the engines and just a little bit more.

With residual fuels and dual fuel systems the type of operation enters into it to a great extent. If you have intermittent service, it would not be at all economical. Whether or not it would be economical, if you put the engine into No. 8 notch and leave it there for four hours as is done in the test that we have been discussing, is up to each individual railroad for the fuels that it has available to it. We can't say whether it will be of benefit to you or any other railroad.

MR. SNOW: Then can we go on record as saying that in order to obtain the same wear rates as with the better grades of fuel that we all would like to use, it is necessary to reduce horsepower to stay on the same wear level?

MR. VOITELLE: No. Truthfully, I don't know about that. There doesn't seem to be that very many people here today are familiar with that.

MR. SNOW: Then, if we don't know that we have to reduce horsepower to obtain the same wear rates, we still are laboring in the dark and cannot be positive. Therefore, I think it would be better, as Mr. Bledsoe said, that we leave ourselves a sufficient margin of doubt in this report, and give ourselves more opportunity to really develop the values of these fuels.

Naturally, we desire to use the cheapest product we can and yet get the optimum results. We all

want to do that; but we must approach it carefully, because the experience that has been obtained throughout the country has brought up so many terrific problems for the maintenance men and the operating departments as to denote this careful approach to the problem.

I think Mr. Bledsoe's thought is not to jump in so rapidly. That was the purpose of mentioning a broader scope in this analysis of fuel, and maybe assigning such fuels to a laboratory, and wear the engine out at that point, and then evaluate what the railroad will need to operate with a given class of fuel in a given territory.

MR. VOITELLE: I think you are quite right. There is still much to be learned. Surely it is still in the experimental stage. Anyone who uses or attempts to use these fuels should go into it with his eyes open. It may be a complete failure.

MR. R. E. HARRISON (Supervisor Diesel Locomotive Maintenance, Southern Pacific Company, San Francisco 5, California): I would like to have you recall some of your Committee's opening remarks in regard to the so-called degraded or economy fuels; that is somewhat an area problem. We have been trying various fuels on the Southern Pacific with varying degrees of success. We are faced with the problem on the Pacific Coast of burning fuels which are available on the market. Fuels that we originally used when we put Diesels into operation are no longer available. They cannot be purchased at any price. So, we are confronted with the problem of working out and burning those fuels which are available, and also looking into the future as to the fuels that we will thenceforth be required to burn. We are testing fuels at the present time, and what the results will be only time and test will show.

Some railroads located in the Middle West are not confronted with fuels that we are confronted with on the Pacific Coast. So, I think a lot of this will go back to not only the question of economies or the amount of engine wear, but to what you can obtain and what you must burn from a market standpoint.

That is the problem that confronts us, and that is the problem we are trying to solve in the burning of these various fuels. I commend this Committee for the fine report and would like to see their good efforts continued.

MR. E. R. HENKEL (Assistant Mechanical Superintendent, Minneapolis, St. Paul & Saulte Ste. Marie Railroad, Minneapolis, Minnesota): Do all fuels containing 1 per cent sulfur and 40 cetane number of 700 maximum end point adversely affect engine maintenance?

MR. VOITELLE: We should have an expert here who can answer that. Doc, will you come up and tell us about sulfur?

MR. L. C. ATHISON (Assistant Director of Research, Denver & Rio Grande Western Railroad, Denver 1, Colorado): I don't believe that question covers enough different things for an answer. If you want to know whether all such fuels cannot be burned, the answer would be no, because you have to take something more than just the sulfur content. If that fuel had 1 per cent sulfur you could burn it. If, in addition to the 1 per cent sulfur it had 100 parts per million of vanadium, you could not burn it. In other words, on any fuel you have to know what the ash is and what the ash metal is.

These people over here, as I understand it, attempted to burn a No. 5 and a distillate blended together, and to burn it at all

throttle positions. That you cannot do. All that will happen will be that you will get nice, large daisies on your injectors. A lot of fuel will get up in the exhaust barrel, and when you open the throttle all hell will break loose.

There have been two papers published on what you can burn in those locomotives. One of them is by George Neeley, an SAE paper, and the other is a paper by Ray McBrian on "Burning Economy Fuels". We worked out in detail the exact viscosities that could be burned in those EMD engines. At idle it cannot go over 40 seconds. A full throttle you can go to 1000-second fuel. If you put 300-second fuel in it and try to idle, look out.

Everybody says we don't have figures as to what the maintenance cost is. We do have those figures. We were over 14 1-2 cents per unit mile in 1952 when we started to burn economy fuel, and today we are down to 11.9 cents. In the meantime our operating ratio has dropped over 2.5 per cent.

They say, "Why do you advocate these economy fuels?" We are not advocating economy fuels. Let's take a look at the picture.

If a full-scale war breaks out, one of these jets burns more in four hours than your locomotive will burn in three weeks, and the jets would get the fuel. Then, let's look at the airlines. Those people have the money, and they are going to buy the good fuel. They drink it. In other words, we are the people who, both from the standpoint of an emergency and from the standpoint of the trend of the market and our own pocket book nerve, who have got to learn how to burn these things.

Vanadium is bad. Sulfur is bad. However, if you go at it intelligently and study each particular fuel, and follow Mr. Finch's suggestions, you can do it. We did it. We ran one locomotive on 32 cetane. Along side of it we ran another on 42 cetane, and another one along side of that on 50 cetane. We ran them for a year. Three other corporations were with us in the test. We took measurements. We mixed up the parts, and you couldn't tell the difference between the 32 and the 50 cetane. We caution you to stay away from sulfur and vanadium or any other heavy metals.

You have to watch some other things. Filter changes on the lubricating oil won't worry us the least bit if you give us No. 1 or No. 6 fuel. We are still going to change the filters on the railroad I am on, every week, and we use nothing but cotton.

On the fuel filters, let's admit it: The fuel filters on those engines are marginal. If you are putting 16,000 gallons through a freight unit per month, if the railroad lets you use them that easily, you will stay out of trouble. However, if the transportation department puts the throttle on the floor board and starts to use 25,000 gallons per freight unit per month, the string filter will not work. In other words, you do need bigger filters to take care of it.

As an additional experiment, we have two locomotives running in which we have taken the sintered bronze filter and removed it and put the empty case back on. One of those locomotives has been running six months and the other one month, and to date we have had no trouble from that viewpoint.

MR. VOITELLE: I have something to add on the subject of 1 per cent sulfur in light distillates. There have been extensive field service tests run in the eastern part of the United States and in the Midwest on

these fuels. Wear rates were recorded, and the engines were inspected once each month; not only th CRC but other tests were run on this type of fuel. It was found that the fuels being tested cause slightly more wear in the engines and more engine deposits. However, on the West Coast there have been several reports that there is less (and unnoticeable) wear rate increases with the use of this type of fuel, and this is the type generally available to them. They can't get any better fuel. They should know what these fuels do in their engines, so it may depend on the crude course.

MR. FINCH: I would like to ask the gentleman from the Denver & Rio Grande to quote his figures again. Am I correct in stating that this repair cost was 14 1-2 cents per mile in 1954? Was that the repair cost per mile?

Mr. Atchison's notes show that in 1952 the repair cost per mile per EMD unit was 14.59 cents; in 1956 it was 11.95 cents. That is a wonderful record. What is the mileage? These are year average figures, aren't they?

MR. ATCHISON: That is correct; they are yearly averages.

MR. FINCH: Did you increase your unit mileage from 1952 to 1956? The unit mileage is increased?

MR. ATCHISON: Yes.

MR. FINCH: Therefore the cost per mile decreased. That is a wonderful record. I don't know of anybody who could equal that. That is tremendous. That is a 27 per cent reduction in repair costs, labor charges and material costs. That is wonderful.

MR. ATCHISON: That report, by the way, is prepared for the President of the Railroad for exactly the thing that is in the minds of many of you fellows. In other words, we say we save so many thousand dollars on the fuel bill. We want to know if we are turning around and spending it on maintenance. Our figures show we are not spending the extra money on maintenance.

MR. W. E. LEHR (Superintendent Motive Power, Lehigh Valley Railroad, Sayre, Penncylvania): Mr. Voitelle, I have more questions to ask than we could ever get around to.

One question is in regard to Mr. Atchison's remarks: Is it a fact that by going to this low-grade or economy fuel oil you decreased your costs of maintenance and dropped it from 14.5 cents to 11.95 cents? Did you then make a cost reduction per unit mile, even though the economy fuel is a transportation charge and we have reduced the cost 4 or 5 cents per unit mile?

MR. VOITELLE: Economy fuel isn't economical unless there is an over-all saving, maintenance and everything else included. If it costs you more to burn this type of fuel than you save on purchases, it is not an economy fuel.

MR. ATCHISON: These cost figures include all of the repairs. The point I am trying to make is to show you the drop in repair costs. This is not because we burned the fuel. Over that period of time (and there have been changes in the back shop procedures) this item has been changed and that item has been changed. In other words, we constantly strive to get our costs down.

The point is that these costs have come down in spite of or because of (either way you want to look at it) the economy fuel. In addition, the transportation department ratio (those are the people, by the way, who pay for the fuel oil) has dropped from 31.86 in 1952 to 29.91 at the present time. In other words, those people are paying less money for their fuel bill.

MR. LEHR: I have another question. When you talk about economy fuels and reduction in costs, and about not being able to get fuel oil, you state that is one of the reasons we will have to go to an economy fuel. We have heard a report that the railroads, even though they are all Dieselized, will use only about 7 per cent of the fuel oil in this country; is that correct?

MR. ATCHISON: Yes.

MR. LEHR: Don't you think that before they would allow us to run out of fuel they would stop some of the home heating or some of the automobile fuel or the regular fuel?

MR. VOITELLE: They certainly won't cut home heating fuel supply. You know what an uproar that would cause.

In order to get more gasoline and more Diesel fuel they are cracking. A large percentage of these cracked products are light distillates. The Diesel engines will run satisfactorily on many of these distillates without any noticeable increase in maintenance or wear rates. This is the type of fuel that most of the railroads are burning today. These other heavy fuels are in the experimental stage.

No, I don't think that either the government or the oil companies would let the railroads run out of Diesel fuel; but if we were to go out and try to buy premium fuel for all the railroads in the United States at the present time, we would find that is just couldn't be done in all areas, because it is not available.

MR. LEHR: We have a lot of research being done by the larger oil companies. It seems that in operating our railroads we generally listen to our research engineers and our engineers of tests. Sometimes they make recommendations that we have to follow.

When you talk to the mechanical officer, after he gets the engine in service and tries to get it working on the recommendations of the research and test departments, he finds that his cost has increased considerably, and he has to be the one who suffers with the engine. Those costs never go into the final costs. Is that a fact?

MR. VOITELLE: Yes; unfortunately, it is a fact. The research department as well as the operation and maintenance departments should work hand in hand on this or on any economy fuel problem or engine modification—in order to get the exact cost, or extra cost, of maintentenance. It certainly should be considered in the budget of the people who are operating the Diesel engines. Unfortunately that is not always the case.

MR. LEHR: Here is a question I have been requested to ask:

"In the stability and compatibility section I see no mention of the probability of different types of so-called economy fuel in storage. What has your Committee developed with respect to the storage of these fuels in extremely large quantities?"

MR. VOITELLE: I think Mr. Barth has had a great deal of experience along that line. I would like to ask him to explain it.

MR. BARTH: I think our discussion this afternoon hinged pretty heavily on economy fuels. I want to call them distress fuels. They are not economy fuels until they save your company money, so let's call them distress fuels—heavy residuals.

Although our paper actually dealt with other fuels, that is, the cycled and the catalytic cracked fuel, and even mentioned many of the straight-run fuel, when we discuss stability we must recognize that at least today in the railroad industry most of us are buying, if we are

fortunate, some straight-run distillate. The majority of us are buying cycled or cat cracked stock of pretty good grade, and there is also the thermal cracked stocks.

Generally speaking, if the fuel oil is properly refined the straight-runs are fairly stable. We do find unstable fuels in this category.

We go on to the cycled and the cat cracked stocks, and find that we have somewhat less stable fuel, more gum formation, more sludging out, perhaps a little more filter trouble, and the same goes for the thermal cracked fuels.

I don't want to talk too much about the residuals that we have been tossing around here this afternoon, which actually are in the experimental stage. About all we can do with these is to change filters, as far as I am concerned.

Even with our better fuels today we are not out of the woods on clogged filters. We are still having clogged filters. We know that in the straight-run distillates the fuels are predominantly paraffinic. They are beautiful fuels to burn, but the solubility of such a fuel is relatively low because of its nature.

When we get into the cat cracked fuels, the aromaticity goes up and the solubility also goes up. Therefore, it will hold more of these unstable hydrocarbons in solution until perhaps there is an interreaction between oxygen, and then they start sludging out.

We have done considerable work on this, and have recognized for the last ten years that the only way to get around this is to use stabilizing additives and, possibly, a metal deactivator to retard the formation of gum, and these gums may form ahead of the filter on the locomotive, in the storage tank, or they may even form on the injector plunger and cause injector sticking.

This happens in storage, particularly in the large storage tanks. The products sludge out. It is particularly aggravated when we mix fuels in large storage tanks, and purchased from several sources. We purchase from twenty to thirty sources, and it is necessary to mix fuels. Some of the sources furnish stable fuel. If we dump stable fuel into the storage tank, and the next source is a little less stable, the two are mixed and then we have a worse mess than we would have had if we had put each into individual tanks.

Some people feel that by treating the unstable fuel with an additive you can dump it in with other stable fuels and come up with a stable fuel that will not sludge or lacquer the plunger. That isn't true. If you are going to mix fuels in the storage tanks you had better add additive to both the stable fuel and the unstable fuel, and I'll tell you why:

If you dump in one carload of stable fuel and then dump in a carload of unstable fuel with additive in it, what have you done? You have reduced the concentration of the additive in half, and get right back to sludging because of reduced additive level. Therefore, every gallon of fuel should be stabilized that goes into your storage tanks, to prevent any later formation of sludge.

It is unfortunate that sometimes we must throw away our money to treat these stable fuels, but we must do it in order to keep up the concentration of the additive.

Many of the railroads are adding their own additives. However, I think that is the responsibility of the petroleum sup-

plier. When we buy fuel and put it in a storage tank or wayside tank, we ought to be able to burn it in our locomotives without at least doing any more than filtering it, rather than having the difficulty of running into engine trouble.

That brings up another problem, and one that a few of the railroads are working on. Can we allow one oil company to put in one type of stabilizing additive, and another oil company another type of additive, making two different additives, and the throw them into the storage tank and hope they do what perhaps one single additive would do in the two fuels? As I say, that is a question we are working on.

Evidence indicates that we are having trouble from that angle as far as stability is concerned, and we hope it will not be necessary to require the use of one stabilizing additive or its equivalent. That will tie down the oil companies pretty tight.

MR. G. M. LEILICH (Vice President of Operations, Western Maryland Railroad, Baltimore 2, Maryland): If the maintenance cost per unit mile on the road cited dropped from 14.5 to 11 cents per unit mile during the period of change in fuel and maintenance practice, what would it have been if the fuel had not been changed? The transportation ratio relates to average revenue per ton mile and operating practices, and it not a solid statistic to evaluate this question.

MR. ATCHISON: Obviously, in a thing of this sort there are many items that need various ratios, and there are changes in practice. Incidentally, our transportation department becomes more expert in keeping the throttle on the floorboard.

Possibly this figure may help the questioner somewhat. The gross ton miles per freight train hour went from 53,000 in 1952 to 63,000 in 1956. Our men do an excellent job of keeping the throttle on the floorboard in using these locomotives, but this sort of thing has to be combined effort.

Most of you men are against it because you are in the mechanical department and your don't want to spend money, say, for filter maintenance. The department that reaps the benefit is the transportation department.

The figures we have assembled (and this is done monthly) are merely to find out if we are penalizing ourselves. As I stated before, there are many factors to be considered. There are additional machines and better machines in the back shop. There are improved practices in depatching trains. All those items enter into this picture.

The point, to us, is that we cannot prove that the fuel penalizes us. We are not alone in that. The Swedish Motor Ship Lines, that run a rather large number of Diesels, will not accept high cetane fuel. You can't even give it to them. That has been thoroughly published in the magazine, SCIENTIFIC LUBRICATION, which is published in Great Britain.

In other words, those people simply don't want a 50 cetane fuel. We ourselves threw away the cetane specifications over four years ago. As I have indicated, we follow and try to increase the efficiency of every item, such as the overhaul time, our transportation practices, and so on. There are a thousand items and little changes mixed up on this sheet, but to us they indicate that certainly we are not hurting ourselves with this fuel.

MR. H. N. CHASTAIN (Master Mechanic, Atchison, Topeka & Santa Fe Railway, Kansas City, Kansas): Mr. Voitelle, I would like to suggest to this

convention that there are many mechanical department men in the audience who are gravely concerned about the effects of economy fuel on the operation of their Diesel engines and are much less concerned about the ton mileage and would suggest we get the facts as to the physical effects of the economy fuel on Diesel engines.

On our railroad we have almost every type of locomotive that is manufactured and we use low cetane fuel, it has been necessary for us to use this fuel and I am particularly concerned about its effects on Diesel engines, without any disrespect to the people in the operating department or the people who hold the purse strings. It is necessary for us to use low cetane fuel, it is also necessary to determine what must be done in order that we can use this fuel. We have had trouble with it and would like to know how these fuels can be used to the best advantage and at the same time keep our maintenance costs reasonable.

In the pre-convention report, it was mentioned that in using these fuels, one of the problems that was encountered first was that of stuck inectors. We had that very problem on our railroad; in fact, we had it to the point where it became my middle name, "stuck injector." I should like to ask this committee what corrective measures they took (as they reported) to overcome the trouble with stuck injectors.

If we can solve that one, we can solve the more serious problems.

MR. VOITELLE: In the instances cited in the report, the cause of stuck injectors was incompatibility of the lubricating and fuel oils. In that particular case a different brand of lube oil was used in the engine, and they had no more stuck injectors.

However, it was found that there were a great many other fuels which were compatible with this particular lube oil. Had the fuel been changed the same results would probably have been obtained.

When we are faced with an incompatibility problem such as that, there are two things we can do—change the brand of fuel or the brand of lube until the combination of the two is compatible. Of course we can encounter instability products and incompatibility of fuels which will stick injectors, too. However, in that particular case it was the incompatibility of the fuel and the lubricating oil.

MR. BACHMAN: This figure you quoted of 14.5 cents and 11.9 cents per unit mile, is influenced a great deal by the amount of tonnage handled behind the unit. I would like to know, during that four-year period, what the change was in the number of gross ton miles per unit mile. Did that go up or down or did it remain stationery? I mean gross ton miles per unit mile.

MR. ATCHISON: The loading increased.

MR. E. R. HENKEL (Assistant Mechanical Superintendent, Minneapolis, St. Paul & Sault Ste. Marie Railroad, Minneapolis, Minnesota): Mr. Atchison, at the present time is your maintenance based on a time basis?

MR. ATCHISON: Yes, it is.

MR. HENKEL: In 1952 was it on a mileage basis?

MR. ATCHISON: No, from 1952 on we had what we called our three-year overhaul program. The locomotive, regardless of its condition, come into the back shop at the end of three years and is completely overhauled. At that time we threw away the rings, the valve, and all the loaded half of the bearings.

MR. LEHR: Has the mechani-

cal department, as a servicing agency, and the transportation department taken into consideration whether any more locomotives will have to be purchased if they go to this so-called economy fuel, due to the fact that the locomotives are out of service more often and are in for heavy overhaul and filter changes and so on?

MR. VOITELLE: Gentlemen, I hate to interrupt, but our time is up.

MR. SNOW: I would like to have this meeting close, if you please, on a slightly different note from what was injected at the beginning.

I am a maintenance man, pure and simple. The purpose of my being here this week has been to find ways and means to operate locomotives more cheaply and better.

I do not feel that any of the maintenance men here who are responsible for the maintenance of locomotives are against economy fuels. What we want to do is to work it out in a way that will render satisfaction to ourselves and the public, without any impairment or increase in cost.

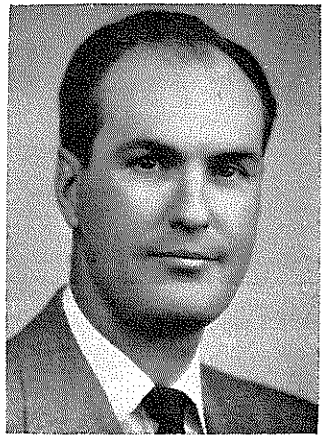
It has been pointed out on the floor that in many cases the cost had been tremendously out of line with former fuels used. I happen to be on the one railroad that is very fortunate in having very good fuel, and I hope we can maintain using it, but we may perforce have to use other fuels.

We would like to work with anyone on the use of these fuels, but we must apply them intelligently or we will wind up with an operation and maintenance program that will be so erractic that it will be hard to bring it out of chaos.

MR. VOITELLE: The sole purpose of this paper is to point out that there are fuel properties and types of fuel that may affect locomotive maintenance. We do not wish to discuss the economies of these types of fuels for any individual railroad. However, we wish to make the information available that has been obtained through the experience of the railroads represented by this Committee.

This information may be of value in pointing out what to look for when individual roads are evaluating the fuels which are available to them.

At this time I would like to ask Mr. Chastain to close the discussion.



CENTRAL WESTERN REGIONAL EXECUTIVE
H. N. CHASTAIN
Master Mechanic
A. T. & S. F. Ry. System
Kansas City, Kans.

MR. CHASTAIN: In closing this discussion I would like to suggest to this Association and Mr. Denny, our new President, that this topic be referred back to this very capable Committee for further study and further presentation next year.

I am sure everyone here will agree that the questions present-

ed to this Committee from the floor were widespread. There are many people here this afternoon who have specific and pertinent questions that have not been answered, and they have not had an opportunity to present them.

The vast field represented by Mr. Voitelle and his Committee is considerable, to say the least. The knowledge and experience that these men have at their command can be invaluable to locomotive maintenance officers and this Association.

I would like to suggest that this Committee work very closely with their respective mechanical departments. The man in the roundhouse who is trying to despatch an engine that won't run has his problems. He has a laboratory of his own, and that laboratory is the engine. If the engine doesn't like it, it will let him know about it.

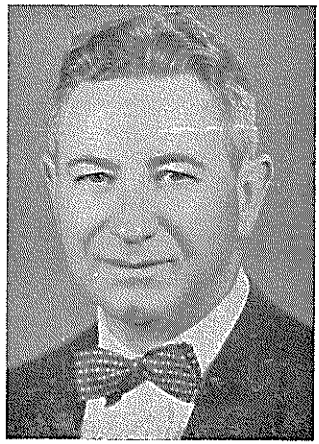
The people on Mr. Voitelle's Committee have the background and knowledge and technical information which can be invaluable to the mechanical man. If properly presented after further study, and in cooperation with the mechanical departments, I am sure much value can be derived from their efforts. I sincerely suggest that this be done and be referred for further study and presentation next year.

I am sure that the discussion here this afternoon is indicative of the interest in so-called economy fuels. Mr. Voitelle and his Committee have spent considerable time in preparing their report. I would suggest that we give them a rising vote of thanks and appreciation for their efforts.

(The audience arose and applauded.)

CHAIRMAN HOPE: Gentlemen, I would like to call on the General Manager of the EJ&E Railway and Past President of this Association, Mr. P. H. Verd, who will make the report of the Auditing Committee.

PAST-PRESIDENT



P. H. VERD
General Manager
Elgin, Joliet & Eastern Ry. Co.
Joliet, Ill.

MR. P. H. VERD: (Past President) Mr. Chairman and gentlemen, in 1951 it was my privilege to be President of this Association. We had a bang-up convention that year, but it seems that each year the conventions get better and better.

I would like to say to the past officers and the committees that worked so hard, and to you people who have taken part in this convention, that this has been a wonderful meeting. It has been one of the smoothest running and efficiently handled meeting we have ever had.

The Auditing Committee finds that all funds of the Association are deposited in the bank as received, and all disbursements are made by check drawn thereon; such checks being supported by properly itemized bills, approved by the President of the

Association and the First Vice-President as Chairman of the Executive Committee. We recommend acceptance of the Secretary-Treasurer's Report that will be presented next.

P. H. Verd—Chairman.

MR. VERD (continuing): Presidents come and Presidents go, and somehow or other our organization gets better and better. A lot of credit, of course, is due to the Presidents, but they get their picture on the letterhead and they get some worries and they get to conduct meetings and to sign a lot of papers that somebody else prepares.

I want to officially introduce to you the fellow who runs this this organization year after year and who does such a marvelous job of it. If you read your mail you know who works out all those letters and encourages you to get more members, to pay your dues, and so on. Without this gentleman we could not have the organization we have. That man is Charlie Lipscomb. (Applause)

SECRETARY LIPSCOMB: Thank you, Mr. Verd. Gentlemen, you couldn't agree on economy fuel, but this is one thing I believe you will buy 100 per cent.

The LMOA is proud to have the newest grandfather in the United States. If Mr. O. L. Hope will stand I shall read a telegram I received pust a few minutes ago:

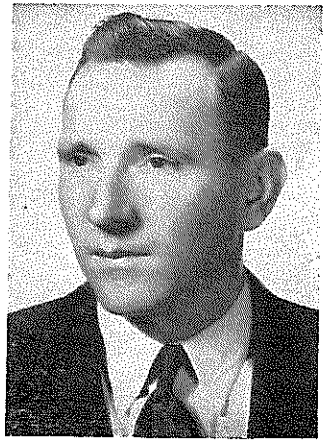
"Jimmy Jr. arrived about 5:30 p. m., the 17th. Weighed in at 7 lb. 11 oz. Congratulations!" (Signed) J. D. Hope.

Gentlemen, let's give him a hand!

(Laughter and applause)

CHAIRMAN HOPE: I guess all of you know what is going on in Arkansas, particularly Little Rock, if you read the headlines. If we can't whip 'em we'll outnumber 'em. (Laughter)

This has been another great meeting, one packed full of ideas producing action right down to the quitting whistle. Many are due credit for the grand sessions we have had this year. We could name many who have helped, but some of you have to be back to work before Thanksgiving rush sets in, so we just won't have time to name names, but we do want to say a great big "thank you" to every one for what you have done.



C. M. LIPSCOMB
Secretary-Treasurer
Gen. Clerk to Terminal M. M.
Missouri Pacific R. R.
1721 Parker Street
North Little Rock, Ark.

PAST PRESIDENTS, no longer in the spotlight, but what a real power you are behind the scenes.

GENERAL EXECUTIVE COMMITTEE, made up of the Officers, Advisory Board Members, Past Presidents, Regional Executives, Technical Committee Chairmen and Publications Chairmen, your team-work just

cannot be equalled in any league.

OFFICIAL FAMILY, the Regional Executives Committee Members, the Technical Committeet Members, with the General Executive Committee, representing practically every railroad on the continent, numbering some two-hundred fifty people; you get the job done in the field throughout the year and at the Annual Meeting, too.

RAILROAD MANAGEMENT, we need a lot of help; we ask for it, and you give it to us; we couldn't function without it.

RAILROAD CLUBS, Chicago Railroad Diesel Club, Southwestern Railway Diesel Club, St. Louis Railroad Diesel Club, Louisville Railway Diesel Club; Great Lakes Railroad Diesel Club, Northwest Locomotive Association, Rocky Mountain Diesel Club and Southeastern Railway Diesel Club; you help us with "trial runs" on these committee reports, you provide a real help.

RAILROAD PUBLICATIONS, Diesel Power & Transportation, Diesel Progress, Modern Railroads, Railway Age, Railway Locomotives and Cars; you lend a big hand with your publicity.

ADVERTISERS: You are always trying to give us better parts; best of all, your advertising support pays a great part of our bills.

ALLIED RAILWAY SUPPLY ASSOCIATION: you provide interesting exhibits, you pick up the check for entertainment and registration.

MR. AVERAGE MEMBER: More than 3000 of you in number; you, you, and you, 700 men

REPORT OF SECRETARY-TREASURER FOR YEAR ENDING 8/31/57

RECEIPTS:		
Balance 9/1/56		$ 234.50
DUES:		
From Active Members	$11,758.00	
From Associate Members	2,330.00	
Total Dues	$14,088.00	14,088.00
From Advertising	11,854.06	11,854.06
TOTAL RECEIPTS AND FORMER BALANCE		$26,176.56
DISBURSEMENTS:		
OFFICE EXPENSES:		
Secretary-Treasurer for 1957 and Office Assitance, Office Expenses, Printing, Postage, Stationery and Supplies	$12,313.02	
CONVENTION EXPENSES AND PROCEEDINGS:		
Pre-Convention Reports, Annual Meeting Expenses, and Annual Proceedings	13,629.04	
TOTAL DISBURSEMENTS	$25,942.06	25,942.06
Balance on hand 8/31/57		234.50
TOTAL DISBURSEMENTS AND CASH BALANCE 8/31/57		$26,176.56

Approved: J. T. Daley, President
Approved: F. E. Malloy, First Vice President and Chairman of Executive Committee
Audited and Approved this 17th day of September, 1957, Chicago, Ill.
Auditing Committee: P. H. Verd, Chairman of Auditing Committee.

and 400 ladies, 1100 in all, of you registered at this meeting, 3200 have enrolled so far for this year, YOU ARE THE ASSOCIATION. Your membership thruout the year, your attendance and activity here have given us another great meeting; great, but not great enough so we would ask that you do three things:

1. Write a report to your "boss" when you get home, tell him of the good ideas you received at this meeting; if you find some of them especially productive tell him of the results obtained.

2. Get a new member whenever and wherever you can; we need his ideas, we also need his dues.

3 Come back next year, bring all the people you can with you, for an even greater meeting on September 15, 16, 17, 1958.

THANKS AGAIN FOR ALL YOUR FINE HELP THIS YEAR AND FOR THE BIG HAND YOU WILL GIVE US IN THE YEAR AHEAD.

SECRETARY LIPSCOMB: This is the report of the Secretary-Treasurer for the year ending August 31, 1957.

MR. P. H. VERD: Mr. Chairman I move we accept this report.

MR. HALL: I second the motion.

(The motion was put to a vote and was carried unanimously.)

(President Daley assumed the Chair.)

PRESIDENT DALEY: Gentlemen, this brings to a conclusion the 1957 meeting of the Locomotive Maintenance Officers' Association. It has been a great pleasure to have been here with all of you, and I will look forward to seeing each of you again next September.

Thank you for coming.

(The meeting adjourned sine die at 5 p. m.)

MEMORANDUM

1957 ACTIVE MEMBERSHIP

5 — 5 AKRON CANTON & YOUNGSTOWN — 1
* H B Stewart Jr President Akron 8 Ohio
* H G Watkins Vice Pres Operations Akron 8 Ohio
* H L Bullock Supt Motive Power Okron 8 Ohio
x E H Davidson Jr Diesel Supvr Akron 8 Ohio
Ivor G Williams Gen Fmn Akron 8 Ohio
11 — 5 ALASKA — 0
* J H Lloyd Gen Mgr Anchorage Alaska
* R H Bruce Supt of Operations Anchorage Alaska
* G V Randall Supt MP & Equip Anchorage Alaska
* J W Miles Supt Strs & Pur Anchorage Alaska
Cary D Everhart Relief RH Fmn 206 Birch Govt Hill Anchorage Alaska
3 — 1 ALGOOMA CENTRAL & HUDSON BAY — 0
R Anderson Supt MP & Rolling Stock Sault Ste Marie Ont Canada
7 — 7 ALTON & SOUTHERN — 3
* James Davies President St Louis Mo
x*A L Lenny Gen Mgr East St Louis Ill
x*John T Daley Supt Motive Power East St Louis Ill
J C McCracken Gen Fmn 26th & Trendley East St Louis Ill
x Ewald Milkert Asst to Supvr Motive Power East St Louis Ill
W R Simpson Asst Fmn East St Louis Ill
LesterN VanPelt Loco Shop Fmn 26th & Trendley East St Louis Ill
4 — 4 ANN ARBOR — 1
* A K Atkinson President St Louis 1 Mo
* J F Nellis Asst Gen Mgr Oper Ry Exchange Bldg St Louis 1 Mo
* E R Buck Gen Supt Motive Power Decatur Ill
x Donald E Drake Water Engineer Owosso Mich
275 — 334 ATCHISON TOPEKA & SANTA FE — 48
* F G Gurley President Chicago 4 Ill
* C R Tucker Vice President Chicago 4 Ill
x*T T Blickle Gen Mgr Mech Dept 80 E Jackson Blvd Chicago 4 Ill
* F J Steinberger Gen Purchasing Agent Chicago 4 Ill
H K Abbitt Diesel Gang Fmn San Bernardino Calif
x Michael B Adams Gen Supvr of Diesel Engines Chicago Ill
Edgar L Allred Power Plant Supvr 24th & Argentine Blvd Kansas City Kans
H E Anderson Master Mechanic Slaton Texas
A Andel Machinist (Relief Fmn) Highland Calif
Leonard C Anderson Asst Roundhouse Fmn Bakersfield Calif
C R Atkinson Relief Fmn Kansas City Kans
M C Barton General Fmn Waynoka Okla
C M Basye Asst Fmn San Bernardino Calif
R B Bechtel General Fmn Amarillo Texas

NOTE —

Number at extreme left of railroad name indicates total number of prospective members on our lists.

Number at left of railroad name indicates total number of 1957 members.

Number at middle right of railroad name indicates total number of members attending 1957 meeting.

x At left of name indicates his attendance at our 1957 Annual Meeting.

* Indicates Honorary Membership.

E C Bender General Fmn Clovis N M
W Benge Apprentice Instructor San Bernardino Calif
R H Berry Asst Supvr Diesel Engs 1300 E Aztec Gallup N M
T H Bickerstaff Gen Supvr of Air Brakes Topeka Kans
W D Black Rd Fmn of Engines 700 S Chester Ave Bakersfield Calif
Carroll G Blandon Asst Elec Foreman Topeka Kansas
Charles C Blanton Relief Fmn Kansas City Kans
R W Booth Asst Supvr Diesels Oklahoma City 7 Okla
Thomas L Bosworth Asst Roundhouse Fmn Wellington Kans
Clifford E Bowman Working Fmn Wickenburg Ariz
Charles C Boyce Boiler Fmn San Bernardino Calif
D H Brewster Asst Supvr Diesel Engines Arkansas City Kans
Dean H Bristow Diesel Gang Fmn Kansas City 11 Mo
H E Bristow Asst NRH Fmn Barstow Calif
R N Brodnax Asst DRH Fmn Barstow Calif
L W Brooks Asst Supvr Diesel Engines 319 Raton Ave La Junta Colo
Walter E Brown General Loco Fmn Richmond Calif
F H Bryan Roundhouse Fmn Altus Okla
P A Buckman Master Mechanic Arkansas City Kans
Philip E Burbank Night Roundhouse Fmn Ashfork Ariz
John R Burch Loco Fmn Kansas City Kans
x F T Burchett Gen Fmn La Junta Colo
C H Burgett Jr Asst Day RH Fmn Barstow Calif
John L Burgett Div Fmn Ash Fork Ariz
P W Burkett Gen Fmn Chillicothe Ill
William R Bunten Asst Supvr Diesel Engines Wellington Kans
James G Carr Electrician Cleburne Texas
Ford F Challis Night RH Fmn Bakersfield Calif
x E E Chapman Ret Mech Asst Oak Park Ill
x H N Chastain Master Mechanic Chicago Ill
John M Chate Rd Fmn of Engines c/o Supt's Office Emporia Kans
C H Clawson Roundhouse Fmn Kansas City Kans
R G Clevenger Electrical Fmn San Bernardino Calif
Gerald C Coakley Foreman Loco Richmond Calif
R W Coburn Apprentice Instr Colton Calif
J F Colties Mach Fmn Clovis N M
K E Combs Apprentice Instr Topeka Kans
William D Comfort Asst Supvr Diesel Engines Amarillo Texas
R H Conroe A S D E Emporia Kans
Clifford C Cook Working Fmn Riverbank Calif
Carl L Cook RH Fmn Albuquerque N M
John A Cooley Rw Fmn of Engines Wellington Kans
x S E Corsbie Car Fmn Fort Madison Iowa
W R Cowdrey Master Mechanic Newton Kans
D M Craine Asst Supvr of Diesel Engines Barstow Calif
H H Cramer Elec Fmn Kansas City Kans
x Dan Culbertson Gen Material Inspector Chicago 4 Ill
W D Curtis Asst Supvr Air Brakes Newton Kans
x P J Danneberg Mech Supt Topeka Kans
Ronald B Davis Asst to Gen Supvr Diesel Engines Chicago Ill
T M Day Car Fmn Guthrie Okla
x S H Dean ATC & ATS Supvr Topeka Kans
Clifford G Decker Relief Fmn Newton Kans
Fred B Dickens Asst Diesel Supvr San Bernardino Calif
J Q Dixon Relief Fmn Oklahoma City Okla
F F Donahue Asst Day RH Fmn Barstow Calif
H A Douglas Gen RH Fmn Albuquerque N M
H J Dyer Gen Fmn Wellington Kans

Roy F Eckart Asst Supvr Diesel Engines Albuquerque N M
L E Edwards Night Fmn Purcell Okla
W C Ellison Master Mechanic Clovis N M
L B English Supt of Shops P O Box 606 Barstow Calif
J O Evans Loco Painter Fmn Fontana Calif
x D J Everett Supt Shop MM Albuquerque N M
x Philip Dwight Falkenstein A S D E 1700 S Wentworth Chicago Ill
A E Fay Night RH Fmn Emporia Kans
Clyde F Felts Night RH Fmn Dodge City Kans
M H Felts Asst RH Fmn Clovis N M
Bill Fesler Mach Fmn Kansas City Kans
x E B Fields Mech Asst Chicago 4 Ill
C J Fischer Relief Fmn Barstow Calif
Robert O Fletcher RH Fmn 3901 Vind Fresno Calif
M Flory Traction Mtr Shop Fmn San Bernardino Calif
J F Frame Rd Fmn of Engines Needles Calif
E F Frederiksen Diesel Fmn San Bernardino Calif
Harry P French Diesel Shop Fmn Kansas City 6 Kans
x W K Fry Rd Fmn of Engines Slaton Texas
J C Garren Shop Supt 1300 Hiram Wichita 13 Kans
Gerald H Gately Asst RH Fmn Amarillo Texas
R D Gidney Day Machinist Gang Fmn Arkansas City Kans
J R Giersch Asst Supvr Diesel Engines San Bernardino Calif
x H V Gill Supt of Shops Topeka Kans
x J W Gill Asst Engr Tests Topeka Kans
C J Gillespie RH Fmn Ranta N M
Tim F Gillespie Erectin Fmn Back Shop Albuquerque N M
J D Gilpin Asst Supvr of Diesel Engines La Junta Colo
Edw W Glatz Night RH Fmn La Junta Colo
Arthur C Goodall Apprentice Instructor Albuquerque N M
G O Graefe Apprentice Instructor Rialto Calif
Robert L Gragg Asst Supvr of Diesel Engines Winslow Ariz
W A Grant RH Fmn Clovis N M
J L Gray Relief Fmn Barstow Calif
E L Green Supt Diesel Engines Las Vegas N M
H L Greer Asst to Car Fmn Arkansas City Kans
L R Gregory Night RH Fmn Slaton Texas
John C Griffith Jr Diesel Fmn 2300 Argt Blvd Kansas City Kans
John M Grubbs RH Fmn Los Angeles 21 Calif
J O Haberman Asst RH Fmn La Junta Colo
x Elmer R Hafling Asst Supvr Diesel Engines Shopton Iowa
E H Hahn Diesel Gang Fmn San Bernardino Calif
Harry Hall RH Fmn El Paso Texas
Wm J Hallman Night RH Fmn Chicago Ill
S R Hamilton Asst Night RH Fmn Barstow Calif
S L Hanan General Fmn Belen N M
M L Harbour Rd Fmn of Engs Kansas City Kans
x Arthur E Harris Asst Supvr of Air Brakes San Bernardino Calif
W D Hart Asst DRH Fmn Barstow Calif
Albert D Hartline RH Fmn San Bernardino Calif
J R Hartline Diesel Gang Fmn San Bernardino Calif
x A J Hartman Mech Supt Amarillo Texas
Harley L Hawkins RH Fmn Kansas City Kans
G B Hay Diesel Shop Fmn Chicago Ill
Elmer Heckathorn Gang Fmn Emporia Kans
x H G Hefner Asst Diesel Supvr Chicago 16 Ill
D K Henry Asst NRH Fmn Barstow Calif
J R Hess Asst Supvr of ATS & ATC Barstow Calif

W F Heustis Storekeeper Kansas City Kans
E M Hiatt General Fmn Argentine Kans
Edwin Hill Night RH Fmn Waynoka Okla
x E E Hine Asst Supvr Diesel Engines Chicago 16 Ill
G D Hobbs A S D E Clovis N M
L W Hoff Elec Fmn San Bernardino Calif
G M Holt RH Fmn Carlsbad N M
R E Horner Night RH Fmn Las Vegas N M
James G Horton DRH Fmn Tulsa Okla
J R Hoskins Gen Car Fmn Winslow Ariz
P L Hubby Asst RH Fmn Clovis N M
x W L Huebner Asst to Gen Mgr Mech Dept Chicago 4 Ill
x A T Hunter Gen Boiler Inspr Topeka Kans
x J G Hynes Asst Supvr Air Brakes Fort Madison Iowa
x Peter I Isaacson Engr Shop Extensions Topeka Kans
Horace C Jackson Rd Fmn of Engines Pueblo Colo
Norman T Jennings Elec Fmn Kansas City Kans
Emmons O Johnson Gen Fmn San Bernardino Calif
Jack K Johnson Diesel Gang Fmn Newton Kans
L B Johnson Master Mechanic Wellington Kans
Sherman Johnson Rd Fmn of Engines Raton N M
W H Johnson Trainyard Fmn Arkansas City Kans
J D Jones Asst Supvr Air Brakes Bakersfield Calif
P A Jones Asst NRH Fmn Barstow Calif
J F Kanive Asst Supt of Shops San Bernardino Calif
Edmund Keller Night Boiler Fmn Kansas City 6 Kans
x E J Kelly Asst Engr Shop Extensions Topeka Kans
W A Kelly Car Fmn 2311 West Pueblo Colo
Paul Kimbrel RH Fmn Hutchinson Kans
F C Klein Asst RH Fmn Bakersfield Calif
D E Knight Night RH Fmn Barstow Calif
R J Kuhlmeier Gen Fmn Arkansas City Kans
D O Kuhn RH Fmn Loco Los Angeles 21 Calif
E A Kuhn Div Fmn Prescott Ariz
Vernon C LaPrade Asst RH Fmn Winslow Ariz
C F Lamb Night RH Fmn Amarillo Texas
x H K Lanning Mech & Research Eng Topeka Kans
x P O Lautz Asst Elec Shop Extension Topeka Kans
Curt Lawhon Asst Supvr of Air Brakes Albuquerque N M
x Lester S Lawrence Rd Fmn of Engines Ft Madison Iowa
A S Leard Night RH Fmn Richmond Calif
W R Leonard Asst Supt Diesel Engines El Paso Texas
W B Lester General Fmn Purcell Okla
Barton O Lewis Gen Fmn El Paso Texas
x Jesse H Lewis Boiler Shop Supvr Topeka Kans
Kenneth P Liddle Div Fmn Phoenix Ariz
D O Lloyd Road Fmn of Engines Chanute Kans
George O Lotspeich Rd Fmn of Engines Albuquerque N M
W K Ludden R F E Amarillo Texas
x B F Luginbill Jr Gen Elec Fmn Barstow Calif
John W Luke M M Kansas City 6 Kans
G R Lungstrum Asst Supvr Diesel Engines Los Angeles 27 Calif
George J Lyman Asst Supvr of Diesel Engines Raton N M
W W Lyons M M La Junta Colo
C W McCoy RH Fmn Topeka Kans
John E McGaffin Day RH Fmn Wichita Kans
x George McNeish Asst Supvr Diesel Engines Kansas City Kans
x H F Mackey Mech Supt Chicago Ill

J A Mackey RH Fmn Los Angeles 21 Calif
August M Mader Gen Boiler Fmn Clovis N M
W D Major Supvr Mech Training Topeka Kans
Robert H Mallett Roundhouse Fmn Amarillo Texas
A F Mansheim Div Fmn 3901 Vine Fresno Calif
L E Mark Asst NRH Fmn Barstow Calif
x V L Marlo M M Chicago Ill
H E Marshall Relief Fmn Kansas City Kans
Jimmie D Martin Mech Fmn Colorado Springs Colo
R C Mashburn Asst Day RH Fmn Barstow Calif
L B Mast Night RH Wmn Gallup N M
Ray E Maxwell Car Fmn El Paso Texas
M E Melvin Asst RH Fmn Lynwood Calif
Robert L Mercer Elec Relief Fmn Argentine Kans
Leo Michaels Machinist Gang Fmn Kansas City Kans
D M Miller Gen Fmn Dodge City Kans
M J Milroy Relief Fmn Barstow Calif
C P Monzingo Apprentice Instr Barstow Calif
A E Moon Asst RH Fmn Dodge City Kans
L A Moon Asst Diesel Fmn San Bernardino Calif
J E Moore Gen Fmn Newton Kans
J R Morgan Asst Supvr of Diesel Engines Barstow Calif
R K Mullins Gen RH Fmn Bakersfield Calif
A F Murdock Rd Fmn of Engines 2435 E Washington Blvd Los Angeles Calif
B F Murphy Asst RH Fmn La Junta Colo
Alva D Nelson Gen Boiler Fmn Kansas City Kans
J W Nish Day Fmn Oklahoma City Okla
Joseph E O'Donnell Asst Supvr of Diesel Engs Gallup N M
W F Osburn Diesel Fmn (Relief) 525 Dearborn St Redlands Calif
E M Oliver Diesel Gang Fmn Fontana Calif
S B Orosz Diesel Gang Fmn San Bernardino Calif
Walter Milton Orr Rd Fmn of Engs Dodge City Kans
Joe Palmer Diesel Gang Fmn 23rd & Argentine Blvd Kansas City Kans
M W Patrick A S D E Barstow Calif
x H A Patterson Supvr of Welding Topeka Kans
L E Perkins Relief Fmn Barstow Calif
H W Peterson RH Fmn Phoenix Ariz
J P Phillips Diesel Gang Fmn San Bernardino Calif
E W Pike Asst Supt Diesel Engines Slaton Texas
A R Piper RH Fmn Albuquerque N M
W H Plath Asst Supvr of Diesel Engines Dodge City Kans
Robert H Plough Relief Fmn Kansas City Kans
x Ralph F Pollmiller Asst Supvr Diesel Equip Chillicothe Ill
H T Powell RH Fmn Slaton Texas
O J Prather Asst RH Fmn Chanute Kans
Charles E Pratt Wheel Shop Fmn Albuquerque N M
Louie C Pratt Apprentice Instr Amarillo Texas
E A Pribble Asst Supvr of Diesels San Bernardino Calif
Archie W Price Asst RH Fmn Albuquerque N M
x W P Price Boiler Fmn La Junta Colo
D L Quaney Master Mechanic Los Angeles Calif
P A Quarles Asst Supvr Air Brakes Amarillo Texas
L F Rader RH Fmn Wellington Kans
Earl J Rae Water Service Fmn 24th & Argentine Blvd Kansas City Kans
W F Rahn Asst DRH Fmn Barstow Calif
x Paul L Ramussen Night RH Fmn Fort Madison Iowa
C H Ray Asst Supvr of Air Brakes Amarillo Texas
E P Reese Diesel Gang Fmn San Bernardino Calif

Chester T Richmond Asst RH Fmn Kansas City Kans
x Glenn E Rodgers Supvr Diesel Instructor Car Chicago 16 Ill
C B Root Day RH Fmn San Bernardino Calif
George Rumsby Apprentice Instr La Junta Colo
W J Eallen Mach Gang Fbn Ft Madison Iowa
E G Sanders Gen MP Asst Topeka Kans
J E Savington Asst RH Fmn La Junta Colo
J Y Scarlett Asst Supvr ATC TS Ft Madison Iowa
A E Scheppers Diesel Gang Fmn San Bernardino Calif
Charles N Schneider RH Fmn Chicago 29 Ill
x J A Schneider Lubrication Supvr 181 E 6th St Los Angeles Calif
x A J Schulte Lubrication Supvr Topeka Kans
x Wm E Seagraves Asst Supvr Diesel Engines Chicago Ill
H J Seals Car Fmn Arkansas City Kans
Thomas W Seery Apprentice Instructor Clovis N M
H W Sellards Diesel Gang Fmn San Bernardino Calif
x Henry H Service Retired Gen Boiler Inspr 1515 MacVicar Ave Topeka Kans
Paul J Seydel Asst RH Fmn Albuquerque N M
x G F Sgitcovich Asst Supvr Diesel Engines 1700 S Wentworth Chicago 16 Ill
x Roland E Shaw Asst Supvr Diesel Engines Chicago Ill
R G Shaw Rd Fmn of Engines 604 Colorado Ave La Junta Colo
G H Simpson Chief Engineer Rialto Calif
M L Simpson RH Fmn San Angelo Texas
E O Smalley Day RH Fmn Newton Kans
H G Smedley Working Fmn Blythe Calif
A K Smellie Rd Fmn of Engines Needles Calif
C J Smeltzer Diesel Fmn Kansas City Kans
S S Smeltzer Machinist Gang Fmn Emporia Kans
Albert Smith Apprentice Instr Kansas City 6 Kans
F M Smith Wheelhouse & Planing Mill Fmn 701 Edison Ave La Junta Colo
Hugh H Smith Div Fmn Raton N M
J R Smith Asst NRH Fmn Barstow Calif
M F Smith M M Bakersfield Calif
J T Smith M M Amarillo Texas
B W Souther Welding Fmn Colton Calif
Orville Spahr Night RH Fmn Clovis N M
E E Spangler Night Fmn Oklahoma City Okla
E G Springhorn ASDE Wichita Kans
x M P Starke Gen Diesel Fmn San Bernardino Calif
Roy Frank Stock Asst RH Fmn Winslow Ariz
Edwin C Stotler Asst Air Brake Supvr Newton Kans
W E Strack A S D E Waynoka Okla
B G Sullivan Apprentice Instr Barstow Calif
Wade H Summers Asst Supvr Diesel Engines Kansas City Kans
M V Swearingen NRH Fmn Arkansas City Kans
Roy O Swearingen Asst RH Fmn Clovis N M
J E Swillum Apprentice Instr Albuquerque N M
R B Tackett Asst RH Fmn Winslow Ariz
G L Tarr A S D E Bakersfield Calif
C H Tasker Div Fmn Needles Calif
Robert J Thelen Asst Supvr Diesel Engines Chicago Ill
T F Thimm General Fmn Emporia Kans
Clyde F Thudin A S D E Newton Kans
Ed Timmons Material Supvr Kansas City Kans
Clyde E Todd Asst Supvr of Air Brakes La Junta Colo
D K Tossetti Blacksmith Fmn San Bernardino Calif
L O Townley Apprentice Instr Barstow Calif
G C Trautman Machinist (Relief Fmn) Rialto Calif

Frank Wyndol Tye Rd Fmn of Engines Slaton Texas
A H Tynder Relief Fmn Arkansas City Kans
James L Underwood Asst RH Fmn Richmond Calif
Charles E Upham Asst RH Fmn Slaton Texas
A S Vaughan Asst Gen Boiler Inspr 908 2nd SW Albuquerque N M
R H Vaughan RH Fmn Chanute Kans
W G Vogel RH Fmn El Cerrito 9 Calif
Melvin O Wade Erecting Fmn Newton Kans
G I Walling Night RH Fmn Wichita Kans
H A Walling Night Trainyard Fmn Arkansas City Kans
Norman A Walling Machinist Gang Fmn Kansas City 6 Kans
C H Walters Night RH Fmn Newton Kans
W E Walters Air Room Fmn La Junta Colo
B L Warner RH Fmn Winslow Ariz
L M Warren Asst RH Fmn La Junta Colo
J B Waters Day Asst RH Fmn Newton Kans
Edward W Weaver A S D E 2154 S Archer Ave Chicago Ill
Fred G Wells Jr Night Diesel Gang Fmn Kansas City Kans
S C West Jr A S D E El Paso Texas
George W White Div Fmn Las Vegas N M
W G White Ch Engr Power Plant 209 N 3rd St Barstow Calif
W M White Asst DRH Fmn Barstow Calif
James A Whitlow Blacksmith Fmn Albuquerque N M
T J Willis Day RH Fmn Barstow Calif
x Cecil A Wilson Asst Gen Supvr Diesel Engines Chicago 16 Ill
K A Wolfe Roundhouse Fmn Marceline Mo
Earl B Wood M M Winslow Ariz
x Edward Paul Woolley Asst to Gen Supvr Diesel Engines Chicago Ill
C F Ziebel Asst Day RH Fmn Barstow Calif
K H Zurbuchen RH Fmn Belen N M

7 — 2 ATLANTA & WEST POINT — 0

* J C Mixon President 4 Hunter St SE Atlanta 3 Ga
* E J Haley Gen Supt 4 Hunter St SE Atlanta 3 Ga

146 — 60 ATLANTIC COAST LINE — 4

* C McD Davis President Wilmington N C
* L S Jeffords Vice Pres Oper Wilmington N C
* J W Hawthorne Gen Supt Wilmington N C
* G L Mitchell Gen Purchasing Agent Wilmington N C
J B Bagwell Loco Fmn Savannah Ga
E E Bailey Fmn Rec Shop Waycross Ga
H B Bell Gen Fmn Loco Lakeland Fla
C P Belser Elec Supvr Jacksonvile Fla
J A Bragdon Asst EH Fmn Lakeland Fla
R A Caldwell Jr Shop Engr Tampa Fla
C O Carlson Gen Fmn Waycross Ga
W W Chadwick EH Fmn Tampa Fla
x B K Conrad Engr of Tests Wilmington N C
T S Cromer Asst Diesel Fmn Jacksonville Fla
R A Crosby Diesel Fmn Jacksonville Fla
T H Dickson Relief Fmn Waycross Ga
R B DuLaney Gen Loco Fmn Moncrief Shops Jacksonville Fla
J E Dowling Asst EH Fmn Waycross Ga
Frank P Dunn Gen Loco Fmn Tampa Fla
Elbert E Floyd Traveling Elec Fmn Wilmington N C
C J Gray Air Brake Fmn Waycross Ga
F A Gray Gen Fmn Savannah Ga
J H Harper Gang Fmn Waycross Ga
x L E Hart Asst Gen Supt MP & Equip Wilmington N C

John A Howell Blacksmith Fmn Waycross Ga
Francis W Hurst Chief Clerk Waycross Ga
C Q Jeffords Loco Foreman Waycross Ga
Henry E Keniston Draftsman Wilmington N C
D B Lacy Supt MP Waycross Ga
H W Lowe Rd Fmn of Engines Florence S C
Edward A MacDuffie Elec Fmn Tampa Fla
T S McCants Loco Fmn Savannah Ga
W L Mcgowan Jr Gen Diesel Supvr Wilmington N C
W C McMillan Night EH Fmn Tampa 3 Fla
G F Mauro Asst Diesel Fmn Jacksonville Fla
D E Mullis Loco Fmn Savannah Ga
R C Nix Loco Fmn Savannah Ga
E C Outlaw Traveling Elec Fmn Jacksonville Fla
x J C Parker Gen Loco Fmn Rocky Mount N C
J Lee Parker Elec Fmn Waycross Ga
H B Parrish Asst EH Fmn Tampa Fla
J C Rogers Jr EH Fmn Rocky Mount N C
W W Shackford Fabrication Fmn Waycross Ga
J A Simmons EH Fmn Lakeland Fla
* F D Sineath Asst Gen Supt MP Wilmington N C
W H Slater EH Fmn Waycross Ga
M E Smith Rd Fmn of Engs Ocala Fla
L A Spencer Erecting Shop Fmn Waycross Ga
E L Spicer Shop Supt Waycross Ga
M C Summersett Jr Elec Supvr Florence S C
M D Thompson Rd Fmn of Engines Lakeland Fla
x R W Tonning Jr Shop Supt Rocky Mount N C
R M Vann Diesel Fmn Jacksonville Fla
Louis Wade EH Fmn Tampa Fla
A L Waters Asst EH Fmn Jacksonville Fla
C E White Elec Supvr Lakeland Fla
J D White EH Fmn Tampa Fla
W R Witherspoon Chief Clerk Jacksonville Fla
J Worster Gang Fmn Waycross Ga
H F Woodside Asst Elec Fmn Waycross Ga

305 — 87 BALTIMORE & OHIO — 58
* H E Simpson President Baltimore 1 Md
* W C Baker Vice Pres Oper & Maint Baltimore 1 Md
x*F B Rykoskey Gen Supt MP & Equip Charles & Baltimore Sts Baltimore 1 Md
* H P McQuilkin Gen Purchasing Agent Baltimore 1 Md
x Ralph W Bailey Asst RH Fmn Toledo Ohio
x William S Baker Supvr Elec & Test Equip Baltimore Md
x Albert E Beckman M M Cumberland Md
H S Bergman Supt of Shops Glenwood Pa
x C R Bloomfield Cost Study Engr Baltimore 1 Md
x W C Brown Regional Diesel Supvr Baltimore Md
x Edward W Bultman Asst Engr Baltimore Md
H J Burkley Supt MP Cincinnati 2 Ohio
Nelson A Buskey Diesel Shop Fmn Newark Ohio
x Edward A Campney Supvr of Lubrication Baltimore Md
x John T Connelly M M Newark Ohio
x Lloyd R Cornwell Gen Loco Fmn Cumberland Md
x J A F Craig M M Chicago 8 Ill
x Wm F Dadd Asst to Gen Supt MP & Equip Baltimore 1 Md
K I Davis Working Fmn Massillon Ohio
x Owen M Dorsey Reg Diesel Supvr Cincinnati Ohio
William T East Reg Boiler Inspr Baltimore Md

x Fred H Einwaechter Chief Engr MP & Equip Baltimore 25 Md
x J J Ekin Jr Asst to Gen Supt MP & Equip Baltimore 1 Md
D J Ferrell Supvr of Loco Operation Cumberland Md
x Frank B Findling Cost & Methods Engr Cumberland Md
Alvin R Frazee Gen Fmn Rowlesburg W Va
x Ivan L Frye Gen Elec Fmn Pittsburgh 7 Pa
Clifford E Gainer Master Mechanic Glenwood Pa
x*A K Galloway Ret Gen Supt MP & E Ambassador Apts Baltimore 18 Md
x F M Galloway Master Mechanic Washington Ind
A W Gibson Div M M Benwood W Va
x F C Gimbel Reg MP Inspr Baltimore 1 Md
J S Guinn EH Fmn Kenova W Va
E C Hafner Special Inspr MP Baltimore 1 Md
x G S Harper EH Fmn 10626 S Bell Ave Chicago 43 Ill
x K T Henderson Regional Elec Supvr Pittsburgh 19 Pa
x P L Hofstetter M M Cincinnati Ohio
x Claud Howdyshell Master Mechanic Chicago Ill
L B Huff General Fmn Holloway Ohio
x Edward S Kanewski Elec Fmn Pittsburgh 7 Pa
x W N Kaylor Supt of Shops Cumberland Md
A L Kerr Gen Fmn Philadelphia Pa
Kenneth K Kessler Engr of Phyiscal Tests Baltimore Md
x*O L Kinsey Sec to Gen Supt MP & E 706 B & O Bldg Baltimore 1 Md
x F C Krimmelbein Asst Engr Baltimore Md
x O A Lange Asst Supt Baltimore 23 Md
x Alden B Lawson Mech Engr Baltimore Md
x Vincent F Leitz Reg Maint Supvr Grant Bldg Grant St Pittsburgh Pa
x Paul R Lewis Gen Fmn Chicago Ill
x James H Long Reg Mech Inspr Rm 601 Temple Bar Bldg Cincinnati 2 Ohio
x Fred A Lovell Diesel Elec Instr Baltimore Md
x H L Luers Engr Power Plant & Shop Facilities Baltimore 23 Md
x John E McCabe Methods Engr Baltimore Md
M K McCormick Asst EH Fmn New Martinsville W Va
Robert K Maguire EH Fmn Philadelphia Pa
x William A Majeczky Gen Fmn Baltimore 23 Md
x C W Martin Asst Engr Diesel Elec Baltimore 1 Md
x Wm A Mullen Reg MP Inspr Baltimore 1 Md
x W M Mullinix Supt Shops Cincinnati Ohio
x F C Neugebauer Water Inspr Stow Ohio
Delmer J New M M Wheeling W Va
x John L North Supvr Apprentice Training Baltimore 1 Md
John F Peach Jr Asst M M Cumberland Md
Orrie J Rider Diesel Fuel Oil Inspr Baltimore 23 Md
x L L Robinson Jr Supvr Loco Maint Baltimore City Md
x John M Ryan Methods Engr MP Baltimore 1 Md
E M Scherch Supt of Shops Cumberland Md
x A M Schuh Spl Insp Baltimore 1 Md
R W Seniff Mgr of Research Baltimore 23 Md
x A G Shipley Mech Asst Baltimore Md
x W O Sines M M Indianapolis Ind
x Charles D Skinner Reg Mech Inspr Cincinnati Ohio
Charles R Skinner Div Maint Inspr Connellsville Pa
W R Stevens Asst to Supvr of Shops Baltimore Md
x T J Stevenson Master Mechanic Willard Ohio
x E Stimson Jr Supt MP Pittsburgh 19 Pa
x A G Tompkins Supvr of Water Treatment Baltimore 23 Md
x W O Towson Asst Engr of Tests Baltimore 23 Md
x Thomas T Vandergrift Elec & Diesel Supvr Pittsburgh Pa

x C B Voitelle Diesel Fuel Inspr Baltimore 23 Md
x John F Walsh Reg Mech Inspr Pittsburgh 19 Pa
x Carl Webster Chemist Baltimore 23 Md
x F G Weller Cost Engineer Baltimore Md
Robert A Wheeler Gen Elec Fmn Pittsburgh 26 Pa
G F Wiles Supt MP Baltimore 1 Md
x Clarence O Wise Supvr of Loco Oper Cincinnati Ohio
x Howard P Wright Elec Engr Baltimore 1 Md

15 — 5 BANGOR & AROOSTOOK — 1
* C M Hutchins President Bangor Me
* W J Strout Vice Pres Oper & Maint Bangor Me
* V L Ladd Mech Supt Derby Me
* W A Bamford Purchasing Agent & Gen Str Kpr Derby Me
x H P Butler Diesel Supvr Bangor Me

1 — 1 BAUXITE & NORTHERN — 0
James Davies Jr Gen Mgr Bauxite Ark

10—-12 BELT RAILWAY OF CHICAGO — 7
* L A Evans Pres & Gen Mgr Chicago 5 Ill
* C L Poole Gen Supt Chicago 38 Ill
x V L Smith Supt of MP Chicago 38 Ill
x Robert M Campbell Relief Fmn Chicago Ill
Harry G Conway Supvr Chicago Ill
x A W Gerdes Labor Foreman Chicago Ill
E R Kirkpatrick Diesel Supvr Chicago Ill
x Ray E McCollum Diesel Shop Fmn Chicago 38 Ill
J L Payton Diesel Supvr Chicago Ill
x Casimir Pilarski Relief Supvr Chicago Ill
x I D Stocking Supvr of Diesels Chicago Ill
x Everett Wood Asst Rd Fmn of Engine Chicago 42 Ill

25 — 31 BESSEMER & LAKE ERIE — 5
* F W Okie President Pittsburgh 30 Pa
* Roy C Beaver Gen Mgr Pittsburgh 30 Pa
* S O Rentschler Supt MP Greenville Pa
* J W Rodgers Purchasing Agent Pittsburgh 30 Pa
x E J Baer Asst Fmn Greenville Pa
C A Beaver Gen Fmn Verona Pa
Charles Bracco RH Fmn Verona Pa
C H Considine RH Fmn Albion Pa
C E Eich Diesel Elec Fmn Greenville Pa
Charles T Dapra RH Fmn Verona Pa
H S Fell Motor Car Fmn Greenville Pa
x F R Fouts RH Fmn Vernoa Pa
L J Graham Asst Gen Fmn Albion Pa
G Charles Hoey Mech Engr Greenville Pa
A E Hosford RH Fmn Albion Pa
R E Kershaw Boilermaker Fmn Greenville Pa
F W Lassalle Diesel Fmn Greenville Pa
J P McClimans Blacksmith Fmn Greenville Pa
R J McGrath Machine Shop Fmn Greenville Pa
x H E Mathay Gen Loco Fmn Greenville Pa
J W Packard Diesel Fmn Greenville Pa
H L Ramsey Diesel Fmn Greenville Pa
W G Redmond RH Fmn Greenville Pa
x Charles G Reuff Diesel Elec Fmn Greenville Pa
S C Schadt Air Brake Fmn Greenville Pa
S B Schenck Special Engr Greenville Pa
E C Sherman Relief RH Fmn Albion Pa

D L Stanley Asst Supt MP Greenville Pa
J R Stevenson Relief Diesel Fmn Greenville Pa
x M E Taylor Gen Fmn Albion Pa
O J Wathan Asst Gen Loco Fmn Greenville Pa

1 — 1 BIRMINGHAM SOUTHERN — 1

x E F Nichols Master Mechanic Fairfield Ala

60 — 11 BOSTON & MAINE — 4

* P B McGinnis President 150 Causeway St Boston 15 Mass
* F W Rourke Vice President Oper 150 Causeway St Boston Mass
* Ernest K Bloss Gen Mech Supt Boston 14 Mass
* G H Bolton Dir Pur and Strs Boston 14 Mass
x W H Chaplin Gen Diesel Fmn Boston Mass
x Earl C Cone Supt of Shops North Billerica Mass
x C W McElroy Asst M M Boston Mass
D McKeown Mech Engr Boston Mass
Walter H Osnesorge Ret Shop Supt 68 Willow St West Acton Mass
x Walter E True Gen Fmn Boston Mass
Walworth B Williams Gen Fmn Mechanicville N Y

1 — BUFFALO CREEK & GAULEY — 1

x George R Manning Gen Supt Dundon W Va

2 — 3 CANADA & GULF TERMINAL — 0

* J A Brillant President Rimouski Quebec Canada
* L P Dancose Supt Mont Joli Province Que Canada
Albert Lavoie Diesel Maintainer Mont Joli Prov P Q

400 — 20 CANADIAN NATIONAL — 6

* Donald Gordon Chairman & President Montreal Quebec Canada
* S F Dingle Vice President Operations Montreal Quebec Canada
* L B George CMO 360 McGill St Montreal Quebec Canada
* E A Bromley Vice President Purchases & Stores Montreal Que Canada
* R W Barrett Ret Chief Boiler Inspr Stratford Ont Canada
x G S Battis Elec Fmn Moncton New Brunswick
C R Buskard Wks Mgr Montreal Que Canada
Ralph P Dunbar Fmn Diesel Shop Moncton NB Canada
David A Foster Mech Engr Moncton N B Canada
x F E Godwin Chief Boiler Inspr Vindun Quebec Canada
H H Hicks Gen Supt MP & CE Moncton N B Canada
Ernest Burt Hobbs Dist Boiler Inspr London Ont Canada
B E Lockhart Loco & Car Fmn Charlottetown PEI Canada
Lawren E Matthews Asst RH Fmn Truro NS Canada
x V E Morton Div M M Toronto Ontario Canada
x Wm Ritchie Reg Diesel Supvr Rm 390 Union Depot Winnipeg Manitoba
John D Spidle Asst Fmn Halifax N S Canada
J D Sylvester Elec Engr 20 York St Rm 1455 Toronto 1 Ont Canada
x James Taggart Mech Engr - Diesel Montreal Que Canada
x William J Tostevin Reg Boiler Inspr Rm 1455 20 York St Toronto Ont Can

200 — 19 CANADIAN PACIFIC — 8

* N R Crump President Montreal Que Canada
* R A Emerson V P Oper & Maint Windsor Sta Montreal Prov Que Canada
* F A Benger Chief of MP & RS Montreal Que Canada
* B W Roberts Vice President Montreal 3 Que Canada
x A R Bacchiochi Asst Engr Montreal Que Canada
x R A Bailey Master Mechanic North Bay Ont Canada
O R Barefoot Supt MP & Car Dept Toronto 1 Ont Canada
* E R Battley Ret Chief of MP & E 25 Braemar Ave Toronto 12 Ont Canada
x J H Chisholm Gen Inspr Diesel Equip Toronto Ont Canada
x John H Hastings Asst Gen Boiler Inspr Rm 244 Union Sta Toronto Ont Can
x S A Jones Gen Inspr Diesels Winnipeg 9 Manitoba Canada
A W Lourie Asst Dist Diesel Inspr Union Sta Rm 342 Toronto Ont Canada

* F R Milligan Gen Boiler Inspr Toronto Ontario Canada
Donald V Rose Diesel Supvr Chapleau Ontario Canada
x John Sharpley Diesel Elec Fmn Montreal Que Canada
E B Wheeler Div M M Toronto Ont Canada
x D M Williams Gen Loco Fmn 1273 O'Brien Blvd St Laurent Que Canada
x L Winslade Asst Supt MP Montreal Que Canada
B B Woodland Asst Engr MP Montreal Que Canada

2 — 3 CEDAR RAPIDS & IOWA CITY — 2
* Sutherland Dows President & Gen Mgr Cedar Rapids Iowa
x W M Schneider Supt Cedar Rapids Iowa
x J E Kelty Diesel Supvr Cedar Rapids Iowa

10 — 7 CENTRAL OF GEORGIA — 3
* W E Dillard President & Gen Mgr Savannah Ga
* W H Mims Supt Motive Power Savannah Ga
* C A G Blomquist Purchasing Agent Savannah Ga
x E T Harrison Jr Asst Diesel Supt Macon Ga
x Edw W Hasler Maint & Welding Engr Macon Ga
E H Holloway Supt Diesel Maint Macon Ga
x J W Mason Asst Supt MP & Equip Macon Ga

28 — 28 CENTRAL OF NEW JERSEY — 4
* E T Moore President New York 6 N Y
* N N Bailey Vice Pres & Gen Mgr Jersey City 2 N J
x*H E Whitener Supt MP Elizabeth N J
* G R Merryman Purchasing Agent New York 6 N Y
E A Beers Night Fmn EH Mauch Chunk Pa
Robert J Berney Gen Fmn Diesel Elizabeth 1 N J
W F Boyle EH Fmn Bethlehem Pa
E E Cavany Gen Fmn Bethlehem Pa
G S Cooper Supvr Bethlehem Pa
Jabes F Curran Fmn Diesel Maint Elizabeth N J
William F Daley Diesel Supvr Jersey City N J
x Joseph F Deutsch Diesel Maint Bethlehem Pa
Bernard J Doneski Jr Supt Loco Shops Elizabeth 1 N J
Charles A Fagan Extra Fmn Bethlehem Pa
G Fertakos Master Mechanic 234 Communipaw Ave Jersey City 4 N J
Curtis W Forner Gen Fmn Jersey City N J
R P Glose Master Mechanic Bethlehem Pa
J M Haggerty Gen Fmn Ashley Pa
Lloyd Hoak Asst Rd Fmn of Engines Allentown Pa
W O Kisthart Supvr Bethlehem Pa
x J Kraus Elec Fmn 234 Communipaw Ave Jersey City 4 N J
L A Laffin Fmn Elec Repairs Bethlehem Pa
William V Lewandowski Loco Fmn Elizabeth Port N J
W J Lewis Supvr Bethlehem Pa
George S Milan EH Fmn Mauch Chunk Pa
x Raymond J Swanick Asst Diesel Fmn (Elec) Elizabeth 1 N J
J C Williamson Fmn Diesel Maint Bethlehem Pa
George C Wilms Jr Asst Supt MP & Rolling Equip Elizabeth 1 N J

15 — 7 CENTRAL VERMONT — 2
* D M Kerr Gen Mgr St Albans Vt
* J E Simpson Supt St Alban Vt
x*C H Lockhart Supt MP & CE St Albans Vt
P A Hakey Elec Fmn St Albans Vt
* Peter Hriz Asst Supt Mech Equip 315 Clark Ave Cleveland Ohio
x G E Spooner Chief Diesel Inspr St Albans Vt
J S Strout Instructor St Albans Vt

2 — 8 CHARLESTON & WESTERN CAROLINA — 0
* C McD Davis President Wilmington N C

* R W Marye Gen Mgr 301 Marion Bldg August Ga
* E G Jones Supt Motive Power Augusta Ga
W C Hall Loco Foreman Augusta Ga
C L Hill Asst Fmn Augusta Ga
G R Maloney Mech Fmn Angusta Ga
G R Pearre Machine Shop Fmn Augusta Ga
T W Reese Loco Fmn Augusta Ga

100 — 79 CHESAPEAKE & OHIO — 13

* W J Tuohy President Cleveland Ohio
* M I Dunn Vice President Oper Terminal Tower Bldg Cleveland 1 Ohio
* E A Kuhn Chief Mech Officer Richmond 10 Va
* A W Hix Vice President Cleveland 1 Ohio
Alva L Alkire Fmn Electricians Columbus Ohio
x*C D Allen Supt MP Richmond Va
B M Anderson Asst Engr Shop Richmond Va
H L Anderson Gen Fmn 801 Kensington Ave Clifton Forge Va
x C M Angel Engineer of Tests Huntington W Va
W D Arnim RH Fmn Silver Grove Ky
x C R Bland Asst Elec Engr Rolling Stock Richmond Va
F S Bock Jr Elec Supvr Richmond Va
x L H Booth Gen M M Huntington W Va
R W Bowling Gen Fmn Whitesville W Va
P T Briers Master Mechanic Richmond Va
Edmund K Brown Electrician Pikeville Ky
W S C Burwell Master Mechanic Russell Ky
O T Butcher Mech Supvr St Thomas Ont Canada
E A Charlton Jr Asst Engr Shops & Loco Richmond 19 Va
C C Collins Fmn Elect Dept Huntington W Va
Harry P Comer Relief RH Fmn Columbus Ohio
F R Craft Gen Fmn Shelbiania Ky
H E Craig Loco Fmn Charleston W Va
Bernard A Cumbea Jr Diesel Maint Inspr Richmond Va
J P DeVenny Gang Fmn Clifton Forge Va
I R Diehl Elec Supvr of Diesels Richmond Va
D F Dunsmore Elec Engr System Richmond 10 Va
x J J Dwyer Chief Chemist Huntington 19 W Va
L E Elkins Gen Fmn Cane Fork Shops Eskdale W Va
L S Fidler Gen Fmn Richmond Va
x P J Finch Asst SMP Diesel Richmond Va
Wm A Foster RH Fmn 3931 Morris St Saginaw Mich
Harvey Garber Relief RH Fmn Peru Ind
x John J Glatz Diesel House Fmn Chicago Ill
Wm Guempelein RH Fmn Peru Ind
W J Gunn RH Fmn Plymouth Mich
James Edward Hall Jr Supvr Diesel Oper Clifton Forge Va
L A Hayes Mech Diesel Supvr Huntington W Va
x R L Herring Elec Supvr Richmond 21 Va
Ralph Hicks Diesel Fmn Russell Ky
A B Hinerman Gen Fmn Loco Dept Huntington W Va
E G Holderby Fmn of Elec Dept Newport News Va
x Paul R Humphreys Asst Shop Supt 27th St & 8th Ave Huntington W Va
Walter E Humphreys Shop Scheduling Engr Russell Ky
D S Johnston Gen Fmn Huntington 3 W Va
L L Keller Erecting Fmn Huntington W Va
x Charles A Kraft Elec Supvr Clifton Forge Va
J C Laramore Gen Fmn Charlottesville Va
R W Llewellyn Asst M M Newport News Va
E W Locke Supvr Diesel Loco St Thomas Ont Canada

Ed Loescher Roundhouse Foreman Cheviot Ohio
L E Lumsden Gen Fmn Ft Thomas Ky
J H Marks Gen Fmn Hinton W Va
A E Miller Elec Fmn Peru Ind
Jake Miller Gen Fmn E Rainelle W Va
C E Murphy Gen Fmn Piers Newport News Va
F A Murphy Spec Engr Mech Dept Richmond Va
x J R Powell Gen Fmn Peech Creek W Va
L P Reed Master Mechanic Columbus Ohio
W R Reid Supt Loco Dept No Region Grand Rapids Mich
G E Remy Asst Diesel House Fmn Dearborn Mich
Lee S Renegar RH Fmn Russell Ky
D H Richmond Master Mechanic Huntington W Va
J H Rickson Loco Elec Inspr Grand Rapids Mich
Marvin Riggs Relief RH Fmn Russell Ky
J L Savage Shop Supt Huntington W Va
J D Schlink Gen Fmn Toledo Ohio
x G J Sennhauser Design & Deve Engr Cleveland 1 Ohio
H G Shy Jr Asst Engr Elec Richmond Va
E E Slack Supt MP Asst Huntington W Va
J C Smith Gen Master Mechanic Clifton Forge Va
Leon Rupert Smith RH Fmn Handley W Va
Edmund F Stark Chief Inspr Shops 1st Nat'l Bank Bldg Richmond 10 Va
D C Teal Supt Water Supply Richmond 22 Va
V V Viar Master Mechanic Hinton W Va
J S Williams RH Fmn Newport News Va
x M P Winston Asst Supt Loco Dept Grand Rapids Mich
J H Workman Mech Supvr of Diesels Clifton Forge Va
A F Zipperian Diesel Fmn Peru Ind

38 — 25 CHICAGO & EASTERN ILLINOIS — 15

* C M Roddewig President Chicago 4 Ill
* C G Rodgers V P & Gen Mgr 332 S Michigan Ave Chicago 4 Ill
x*George E Bennett Supt MP Danville Ill
* L J Ahlering V P & Pur Agent Chicago 4 Ill
x D Aduci Master Mechanic & REE Dolton Ill
x R A Bardwell Engr of Tests Danville Ill
Dale Bean Loco Fmn Yard Center RH Dolton Ill
x C D Blue Supt of Safety Danville Ill
R J Bush Shop Supt Danville Ill
x Ray S Curl Asst Chief Draftsman Oaklawn Shops Danville Ill
x C G Drescher Loco Fmn Dolton Ill
x Donald L Engel Mech Engr Danville Ill
E L Harper Diesel Fmn Terre Haute Ind
x W H Haynes Gen M M Danville Ill
x Mark Hengel Chief Draftsman Danville Ill
x Manson H Kuhn Esst to Gen M M Danville Ill
x A Morrison Rd Electrician Villa Grove Ill
x C Mortell Loco Fmn Dolton Ill
James S O'Brien Relief RH Fmn Evansville Ind
x Robert J Rush Loco Fmn Danville Ill
Mrs Betty Smith Asst to Chief Draftsman Danville Ill
x R G Steele Junior Mech Officer Danville Ill
Charles L Switzer EH Fmn Evansville Ind
Elmer Thornsberry RH Fmn Evansville Ind
x Carl I Underwood Gen Diesel Fmn Danville Ill

10 — 3 CHICAGO & ILLINOIS MIDLAND — 2

* J E Dare President 821 Illinois Bldg Springfield Ill
x M N Ettinger Master Mechanic Springfield Ill

x William G Harvey Master Mechanic Springfield Ill

100 — 23 CHICAGO & NORTHWESTERN — 10

* C J Fitzpatrick President 400 W Madison St Chicago Ill
* S C Jones Gen Mgr 400 W Madison Chicago 6 Ill
* E L Walston Gen Supt MP 4200 W Kinzie St Chicago 24 Ill
* E A Busk Gen Purchasing Agent Chicago 6 Ill
x Clarence M Anderson Mechanic in Charge Chicago Ill
x George H Anderson EH Fmn Chicago 10 Ill
x V C Barth Chief Met & Engr of Tests Chicago 24 Ill
M H Crandall Diesel Supvr Chicago Ill
* E J Crawford Ret Supt MP Little Rock Ark
H G Cronnoble Gen Fmn Chicago 10 Ill
x B R Dallman Relief EH Fmn Milwaukee 7 Wisc
Frank F Donati Diesel Fmn Chicago Ill
x E C Fosdic Sec Treas Chicago RR Diesel Club Chicago 40 Ill
x*J E Goodwin Ret Vice President 163 Abingdon Kenilworth Ill
x J P Knobloch Diesel Fmn Chicago 24 Ill
George R McTwiggan Relief RH Fmn Council Bluffs Iowa
* H H Magill Asst Chief Mech Officer Chicago Ill
* John P Powers Ret System Boiler Inspr Oak Park Ill
* David C Ryberg Ret Clinton Iowa
x John C Sandon Mech in Charge West Chicago Ill
W C Sipchen Air Brake Engr Chicago Ill
x Henry A Smith EH Fmn Milwaukee 15 Wisc
x*J C Stump Ret CMO 325 Home Ave Oak Park Ill

124 — 11 CHICAGO BURLINGTON & QUINCY — 7

* H C Murphy President Chicago 6 Ill
* S L Fee Vice Pres Oper Chicago 6 Ill
* J D Rezner Mech Asst to VP 547 W Jackson Blvd Chicago 6 Ill
* J F McAlpine Dir Pur & Store Chicago 6 Ill
x A Baker Asst Master Mechanic Galesburg Ill
x R S Carter Master Mechanic St Joseph Mo
x L M Frick Chief Oil Inspr Aurora Ill
x W C Horst Supt of Shops West Burlington Iowa
x Stephen Kuzma Mech Inspr St Joseph Mo
x C A Moody Asst Gen Supt MP Denver Colo
x J R Williams Supt Automotive Equip Chicago Ill

10 — 10 CHICAGO GREAT WESTERN — 2

* W N Deramus III President 700 Mulberry St Kansas City 1 Mo
* E T Reidy Vice President and Gen Mgr Oelwein Iowa
x*Theo Olson Supt MP & Equip Oelwein Iowa
* E R Brinton Purchasing Agent Oelwein Iowa
R Alvung Mech Engr Oelwein Iowa
D R Gustafson Asst Diesel Supvr Oelwein Iowa
x Ralph S Logeman Master Mechanic Oelwein Iowa
B T Nelson Asst Trainmaster Oelwein Iowa
Frank H Oshlo Gen Fmn Council Bluffs Iowa
E D Sisson Diesel Foreman Council Bluffs Iowa

103 — 26 CHICAGO MILWAUKEE ST PAUL & PACIFIC — 18

* J P Kiley President Chicago 6 Ill
* W J Whalen Vice Pres Oper Chicago 6 Ill
x*F W Bunce Chief Mech Officer Milwaukee 3 Wisc
* V E McCoy Chief Purchasing Agent Chicago 6 Ill
x C G Benkendorf Shop Supt Milwaukee Wisc
x Wayne N Bittner Shop Engr Milwaukee Wisc
J P Crowley Chief Water & Coal Inspr Milwaukee Wisc
x R P Drew Roundhouse Fmn Savanna Ill
x A W Hallenberg Dist M M Chicago 22 Ill

x*Ed H Heidel Ret Gen Boiler Inspr 200 S Meteor Ave Clearwater Fla
x W W Henderson Master Mechanic Savanna Ill
x*R A Hoeft Elec Fmn Chicago Ill
x L H Koch Master Mechanic Bensenville Ill
x G H Koester Mech Engr Milwaukee 3 Wisc
x C L Kuhns Gen Fmn Diesels Bensenville Ill
x P J Lucas Gen Rd Fmn of Engines Milwaukee Wisc
x Robert Maas Supt Diesel Maint & Reclamation Milwaukee Wisc
x B J Maguire Train Control Inspr Milwaukee Wisc
Howard H Melzer Chief Engr of Tests Milwaukee Wisc
Albin M Mielcarek Div Fmn 2139 N Kilbourn Ave Chicago 39 Ill
Dale C Sheffield Engr Tests Diesel Elm Grove Wisc
x Ben Stroh Elec Fmn Chicago Ill
x H C Sutphin Elec Fmn Bensenville Ill
x Frank A Upton Supt MP Milwaukee Wisc
x Walter Weingart Supvr Diesel Equip Milwaukee Wisc
x C E Wellnitz Asst Gen Fmn Milwaukee Wisc

120 — 21 CHICAGO ROCK ISLAND & PACIFIC — 15

* D B Jenks President 139 W Van Buren St Chicago 5 Ill
* R E Johnson Vice Pres Oper Chicago 5 Ill
* M R Wilson Gen Supt M P Chicago 5 Ill
* H A Berry Mgr Purchasing & Stores Chicago 5 Ill
x O W Aten Diesel Supvr Chicago Ill
R H Bright Rd Fmn of Equip Rock Island Ill
x Clayton J Frey Elec Dept Fmn Silvis Ill
x J W Gann Master Mechanic Kansas City Kans
x J H Kasmeier Asst Master Mechanic Ft Worth Texas
J D Loftis Asst Gen Supt M P Chicago 5 Ill
x Raymond D McNamara Asst M M Minneapolis Minn
x E G Mangel Chief Draftsman Silvis Ill
x B B Millikan Gen Boiler Inspr Chicago Ill
x J P Muelleman Chief Inspr Material Chicago 9 Ill
x R F Newton Elec Mech Engr Chicago Ill
D H Noble Elec Research Engr Chicago Ill
x A L Olson Asst Mech Engr Silvis Ill
x M W Sibley Engr Water Treatment Chicago 9 Ill
x Albert Kay Turner Asst Ch Inspr Mat'ls Chicago 9 Ill
x W H Waltman Engr Shop Plants & Mach Chicago Ill
x Leroy Williams Diesel Supvr El Reno Okla

50 — 4 CHICAGO ST PAUL MINNEAPOLIS & OMAHA — 0

* C J Fitzpatrick President 400 W Madison St Chicago Ill
* J J Stein Vice Pres Oper 400 W Madison St Chicago Ill
* E L Walston Gen Supt MP 4200 W Kinzie St Chicago 24 Ill
Myron G France Ret Gen Boiler Fmn Afton Minn

2 — 1 CHICAGO SOUTH SHORE & SOUTH BEND — 1

x Harold Tucker Elec Engr Michigan City Ind

1 — 2 CINCINNATI UNION TERMINAL — 2

x Fred E Beyer Elec Supvr Cincinnati Ohio
x E A Dryer Master Mechanic Cincinnati Ohio

2 — 3 CITY OF PRINEVILLE — 0

* R P McRae President Prineville Ore
* C C McGlenn Manager P O Box 516 Prineville Ore
* N L Jones Master Mechanic Prineville Ore

13 — 5 CLINCHFIELD — 3

* C S Sanderson Gen Mgr Erwin Tenn
x P O Likens Supt Machinery Erwin Tenn
x D C Allen Diesel Supvr Electrical Erwin Tenn
x H V Cornett Staff Asst to Supt Mchy Erwin Tenn

C L Nelson Reconditioning Fmn Erwin Tenn

1 — 1 COLORADO & SOUTHERN — 1

x Roy E Hansen System Gen Fmn Denver 11 Colo

4 — 1 COLUMBIA NEWBERRY & LAURENS — 0

W M Campbell Master Mechanic Columbia S C

1 — 1 CUYAHOGA VALLEY — 1

x R H VanScyoc Supt of Equip Cleveland Ohio

1 — 1 D P & W — 1

x N L Behrens Stores Mgr Peoria Ill

17 — 8 DELAWARE & HUDSON — 2

* William White Pres & Chief Exec Officer New York 17 N Y
* J P Hiltz Jr Vice Pres Oper & Maint Plaza 1 Albany 1 N Y
W L Lentz Supt of Equip Albany 1 N Y
* R D Cummings Mgr Purchases & Stores Albany 1 N Y
Abram C Allen Gen Diesel Supvr Albany 1 N Y
x Arthur Bibb Mech Engr Albany 1 N Y
x Thomas J Bradley Asst Gen Diesel Supvr Albany N Y
August N Gambichler Master Mechanic Watervliet N Y

50 — 20 DELAWARE LACKAWANNA & WESTERN — 2

* P M Shoemaker President New York 6 N Y
* W G White Vice Pres Oper New York 6 N Y
* F T James Gen Supt MP & Equip Scranton 5 Pa
* C F Bayer Mgr Purchases & Stores New York 6 N Y
John J Christy Fmn Diesel Shop Scranton Pa
x C C Coult Mech Engr Factoryville Pa
Frank Davis Diesel Fmn Scranton Diesel Shop Scranton 5 Pa
James D Dougherty Loco Fmn Scranton 5 Pa
Fred C Fickus Loco Fmn Scranton 5 Pa
Harold Jones Gen Fmn Scranton 9 Pa
Ervin Masker Fmn Diesel Shop Scranton Pa
W Morgan Loco Fmn Scranton Pa
James Ratchford Loco Fmn Scranton 5 Pa
Luther Reed Loco Fmn Scranton Pa
Maxwell T Reid Gen Fmn Diesel Shop Scranton 5 Pa
John G Stahleheber Gen Fmn Scranton 5 Pa
x Walter E Travis Diesel Fmn Scranton Pa
James A Trent Fmn Diesel Shop Scranton Pa
C S Williams Supvr of Diesels S Washington Ave Scranton 5 Pa
Frederick B Wills Diesel Fmn Scranton Pa

69 — 33 DENVER & RIO GRANDE WESTERN — 3

* G B Aydelott President 1531 Stout St Denver 2 Colo
* L H Hales Vice Pres & Gen Mgr 1531 Stout St Denver 2 Colo
* A E Rice Chief Mech Officer Denver Colo
* W G Luebke Purchasing Agent Denver 17 Colo
J E Allen Master Mechanic Denver Colo
x L C Atchison Asst Eng Standards & Research Denver 1 Colo
A E Berglin Tin & Pipe Shop Fmn Denver Colo
Warren Beynon Loco Fmn Provo Utah
A Bisgard Div Loco Fmn Denver Colo
Homer R Cordry Asst EH Fmn Denver 2 Colo
Hadyn Crofts EH Fmn Salt Lake City Utah
I M Crosser Gen Fmn Minturn Colo
C W Cutshall Diesel Shop Fmn Denver Colo
Wm R Ekstrom Div Mech Fmn Denver Colo
Rober B Evans EH Fmn Denver Colo
L O Ficklin Gen Fmn Alamosa Colo
William Leroy Huffman Loco Fmn LaVeta Colo
Charles H Johnson EH Fmn Denver Colo

R E Jordan Loco Fmn Bond Colo
Henry Lebsack Boilermaker & Blacksmith Shop Denver Colo
x Ray McBrian Dir of Research Denver Colo
G H MacDonald Diesel Shop Fmn Denver Colo
James W McGinnis Diesel Instr Grand Junction Colo
Edward D Maher EH Fmn Denver Colo
Harvey Parker Eng Fmn Montrose Colo
x F A Robinson Asst Elec Engr Denver Colo
Frank H Rout RH Fmn Leadville Colo
Paul Schnek Diesel Fmn Salt Lake City 5 Utah
N J Spearman Loco Fmn Durango Colo
P D Starr Supt Diesel Equip Denver Colo
C D Waring Working Mech Fmn Denver Colo
J R Willcockson Working Fmn Phippsburg Colo
Leonard D Winckel Working Fmn Chama N M

1 — 1 DETROIT & MACKINAC — 0
M A Mallon Mech Asst Tawas City Mich

1 — 1 DETROIT TOLEDO & SHORE LINE — 1
x Ralph Thomas General Fmn Toledo Ohio

1 — 1 DETROIT TERMINAL — 0
* E F Bath Master Mechanic Detroit 12 Mich

6 — 20 DETROIT TOLEDO & IRONTON — 5
* D E Smucker President Dearborn Mich
* H J Oliver Vice Pres Oper Dearborn Mich
x A B Harris Supt MP & Equip Schaefer Bldg Dearborn Mich
Dick F Arthur Asst EH Fmn Dearborn Mich
G M Baker Asst EH Fmn Dearborn Mich
Harry E Beeson Asst Mech Engr Dearborn Mich
R L Boyd Rd Fmn of Engines Dearborn Mich
Darrel W Brammer Asst to Supt Car Dept Dearborn 1 Mich
M B Crooks Supt Car Dept Dearborn Mich
x A W Godwin Gen Fmn Shops Dearborn Mich
Otto L Hoffman Gen Car Fmn Jackson Ohio
x John S Ingles Chief Mech Engr Dearborn Mich
H H Knierim Asst EH Fmn Flat Rock Mich
Robert G Lipmyer Draftsman Dearborn Mich
x Jack E Messinger Asst Purchasing Agent Dearborn Mich
Paul J Miller Loco Foreman Springfield Ohio
x E C Raymond Chemist Dearborn Mich
Clyde Shultz PM Fmn Jackson Ohio
Ernest G Toth Asst EH Fmn Dearborn Mich
Donald H Zenz Asst EH Fmn Dearborn Mich

8 — 31 DULUTH MISSABE & IRON RANGE — 4
* F J Voss Pres & Gen Mgr Duluth Minn
x R H Seitz Supt MP & Cars Proctor Minn
John E Abramson Elec Engr Mech Dept Proctor Minn
O E Bjornaas Gen RH Fmn Proctor 10 Minn
Elie L Caron Boiler Fmn Proctor Minn
C P Christensen RH Fmn Two Harbors Minn
x D M Clough Gen Diesel Supvr Proctor Minn
Edmund J Daveau RH Fmn Duluth Minn
Terrance R DeVinck Spec Engr Asst Proctor Minn
x R M Downes Asst CMO Duluth Minn
Edward J Durand RH Fmn Steelton Minn
John Gnotta RH Fmn Proctor Minn
William S Hosking RH Fmn Chisholm Minn
A O Johnson Gen RH Fmn Two Harbors Minn
S R Johnson Gen Fmn Two Harbors Minn

R B Jones G A B S & R F L Duluth Minn
William Kilimann Mech Engr Proctor Minn
Ivar F Kjellman RH Fmn Hibbing Minn
Joseph J Korman Pipe & Tin Fmn Duluth Minn
James M Masterson Loco Fmn Proctor Minn
x Ray C Naslund Diesel Loco Elec Maint Supvr Two Harbors Minn
A B A Nelson Elec Fmn Diesel Proctor Minn
R S Nethercott Gen Fmn Proctor Minn
K R Ojard Asst Rd Fmn Locos Proctor Minn
H G Olafson Asst Mech Engr Proctor Minn
G I Running RH Fmn Two Harbors Minn
William W Saindon RH & Car Fmn Virginia Minn
Walter J Sauter Asst Gen Air B Supvr & Asst Rd Fmn of Loco Proctor Minn
Archie P Swanson RH & Car Fmn Ely Minn
Lloyd W Towner RH Fmn Proctor 10 Minn

7 — 4 DULUTH SOUTH SHORE & ATLANTIC — 1

* H S Mitchell President Minneapolis 2 Minn
* Leonard H Murray Vice Pres 1734 1st Nat'l Bank Bldg Minneapolis 2 Minn
* T F Kearney Gen Mech Supt Marquette Mich
x D L Hart Trainmaster Marquette Mich

1 — 1 EAGLE MOUNTAIN — 0

V A Fischer Cen RR Fmn Kaiser Steel Corp P O Box 25 Eagle Mountain Calif

2 — 2 EAST ERIE COMMERCIAL — 0

* J H Huntt President Erie Pa
* O E Hamrick Master Mechanic 1030 Lawrence Parkway Erie Pa

1 — 1 EAST ST LOUIS JUNCTION — 1

x E R Goeglein Master Mechanic National City Ill

58 — 75 ELGIN JOLIET & EASTERN — 39

* T D Beven President Chicago Ill
x*P H Verd Gen Mgr 208 S LaSalle St Chicago Ill
x George F Bachman Supt MP & Equip Maple Rd Joliet Ill
E Abraham Asst to Supt MP & Equip Joliet Ill
x Roy James Battis Jr Industrial Engr Chicago Ill
J V Bodine RH Fmn Gary Ind
x G W Burnett Master Mechanic Joliet Ill
L Cohron RH Fmn Gary Ind
x Glenn Comer Gen Fmn Joliet Ill
T E Condon Rd Fmn of Engs & Asst Trainmaster S Chicago Ill
M C Cram Asst Rd Fmn of Engs & Asst Trainmaster Gary Ind
x Paul Cullen RH Fmn Crown Point Ind
K P England Industrial Engr Asst Chicago Ill
x Wm J Gabel Jr Mech Engr Joliet Ill
x C A Garrett Rd Fmn of Engs & Asst Trainmaster Joliet Ill
x A Govert RH Fmn Gary Ind
R B Gray Boilership Fmn Gary Ind
L C Hahney Supt of Safety Joliet Ill
x H W Hartshorne Asst to Supt MP & Equip E Joliet Ill
x Edward Carl Hedlund Industrial Engr Chicago Ill
James Higgins Engine Fmn Griffith Ind
E M Hughes Asst to Gen Supt Gary Ind
E F Hurst Gen RH Fmn Joliet Ill
F F Hurst RH Fmn Joliet Ill
J Isascson Asst Rd Fmn of Engs & Asst Trainmaster Joliet Ill
Robert N Johnson Transportation Engr Chicago Ill
R Jones RH Fmn Gary Ind
N W Kopp Chief Industrial Engr Chicago Ill
x L Kort RH Fmn S Chicago Ill
A Krause Diesel Supvr E Joliet Ill

W E Lankford RH Fmn Gary Ind
x Willis J Le Beau Extra RH Fmn Chicago Ill
x Bruce E Lewis Mech Fmn Gary Ind
x C Luedtke Acting RH Fmn Gary Ind
Edward M McDermott Transp Insp Chicago Ill
x William J McGahey RH Fmn Joliet Ill
Robert F McNiff Asst Trainmaster & Rd Fmn of Engs Joliet Ill
x B C Magee Rd Fmn of Engs & Asst Trainmaster Gary Ind
x E G Mahoney Master Mechanic Gary Ind
Wm Mastin RH Fmn E Joliet Ill
x W G Mateer Mgr of Purchases & Stores Chicago Ill
x W C Meyer Rd Fmn of Engs & Asst Trainmaster S Chicago Ill
V K Miller Industrial Engr Chicago Ill
M Miterko Acting RH Fmn Gary Ind
x M R Nehring Asst Rd Fmi of Engs & Asst Trainmaster Gary Ind
x H R Nelson Gen Storekeeper Joliet Ill
x James G Noel Div Elec Fmn Joliet Ill
x L Norberg RH Fmn Gary Ind
x D L Novak RH Fmn S Chicago Ill
J T Pelhank RH Fmn S Chicago Ill
x C A Peterson Div Elec Fmn Gary Ind
x Glen R Peterson Machine Shop Fmn Joliet Ill
L A Peterson Industrial Engr Asst Chicago Ill
Fred C Pierce Jr RH Fmn Joliet Ill
x J Polomchak Diesel Supvr Gary Ind
P D Pryor RH Fmn Gary Ind
James H Purdy Extra Fmn Joliet Ill
x R J Regan RH Fmn Waukegan Ill
Fred H Ruth RH Fmn E Joliet Ill
x T V Schlaeger Rd Fmn of Engs & Asst Trainmaster Gary Ind
E K Schrader Asst Gen Storekeeper Joliet Ill
x George W Scully Shop Diesel Fmn Joliet Ill
x Bernard T Smith Boilershop Fmn Joliet Ill
x J T Smith RH Fmn Gary Ind
Walter J Smith Diesel RH Fmn Waukegan Ill
x W J Snell Gen Fmn Gary Ind
E Gard Slocum Chief Industrial Engr 208 S LaSalle St Chicago 4 Ill
Merle W Stitt Pipe & Tin Fmn Joliet Ill
G A Strom Acting RH Fmn Gary Ind
B J Tyrell System Air Brake Supvr Joliet Ill
W R Ware Jr Asst to Supt Car Dept Joliet Ill
x C W Weiss Transp Inspr Industrial Engr Joliet Ill
x R K Wilder Asst Diesel Supvr S Chicago Ill
J D Will RH Fmn Waukegan Ill
x C M Yahnke RH Fmn Gary Ind
x E R Zienty Supvr of Diesel Ports Chicago Ill
x Kermit Zweig Relief Fmn Joliet Ill

80 — 42 ERIE — 20

* H W VanWiller President Midland Bldg Cleveland 15 Ohio
* G C White Vice Pres Midland Bldg Cleveland 15 Ohio
* C K James Supt Motive Power Cleveland 15 Ohio
* J F Duffy Mgr Purchases & Stores Cleveland 15 Ohio
Charles R Benson RH Fmn Salamaca N Y
x E Branning Gen M M Hornell N Y
R M Brown Asst Chief Chemist Meadville Pa
x W G Carlson Asst Supt of MP Cleveland Ohio
Leon F Cleveland Gen Fmn Hornell N Y
x H F Cole Gen Loco Inspr Meadville Pa

Joseph J Collins Gen Fmn Salamanca N Y
W F Collins Gen Loco Fmn Meadville Pa
R F Connors Gen Fmn Cleveland Ohio
x C P Dillon Gen Fmn Hammond Ind
x F D Dunton M M Jersey City N J
Glenn R Ekers Office Engr Cleveland 15 Ohio
L Gebhardt Gen Fmn Secaucus N J
Paul L Green Supvr Materials & Records Cleveland Ohio
x Earl D Hall Mech Engr Cleveland 15 Ohio
Herbert Q Hopper Gen Fmn Secaucus N J
David M Huggins Asst M M Youngstown Ohio
Francis D Kennedy M M Mech Dept Buffalo N Y
x M L Larkin Chief Chemist Meadville Pa
x S S McConnell Supvr Boilers Cleveland Ohio
John McGinnis Asst Engr of Tests Meadville Pa
R C Melling Gen Fmn Kent Ohio
x H C Mortimer Gen Fmn Youngstown Ohio
x R A Mylius Asst Elec Engr Cleveland 15 Ohio
x H I Phelps M M Marion Ohio
x Loyd G Robinson M M Youngstown Ohio
C F Schwartz Gen M M Jersey City 2 N J
x C F Shultz Supvr of Mtr Equip Cleveland Ohio
x G T Singleton Boiler Fmn Hornell N Y
x R Strawser Gen Fmn Marion Ohio
C M Stubbs Asst M M Marion Ohio
R L Terry Night Gen Fmn Hornell N Y
Gray E Titus Gen Fmn Marion Ohio
x H B Trace Welding Supvr Cleveland Ohio
x Sylvester M Watkins Diesel Shop Fmn Hornell N Y
x Fred W Wendt M M Jersey City N J
x Harold C Whitford Diesel Maint Instr Hornell N Y
x H P Zydor Supvr Tools & Mach Cleveland 15 Ohio

1 — 1 ERIE MINING CO RR — 1
x Paul F Giesking Supt Transportation Duluth Minn

1 — 1 ESCANABA & LAKE SUPERIOR — 1
x Robert Rose Master Mechanic Wells Delta County Mich

20 — 7 FLORIDA EAST COAST — 2
* John W Martin Trustee St Augustine Fla
* C L Beals Chief Operating Off St Augustine Fla
* C A Gammon Chief Mech Officer St Augustine Fla
J Lembach Purchasing Agent St Augustine Fla
C T Forsythe Gen Fmn St Augustine Fla
x John Sims Asst M M Miami 37 Fla
x Gordie Stewart Asst CMO St Augustine Fla

5 — 3 FORT WORTH & DENVER — 1
James Joseph Harcrow Asst Gen Fmn Childress Texas
F J Judkins Supt of Automotive Equip Childress Texas
x F A Smerke Supt MP Childress Texas

1 — 1 GALVESTON WHARVES — 0
J E Marable M M Galveston Texas

1 — 2 GEORGIA & FLORIDA — 0
* J P Belvin Chief Oper Officer P O Box 903 Augusta Ga
* L J Waters Gen Supt Douglas Ga

6 — 3 GEORGIA — 0
* J C Mixon Pres & Gen Mgr Atlanta 3 Ga
* E J Haley Gen Supt 4 Hunter St SE Atlanta 3 Ga
R A Parrish M M Augusta Ga

25 — 16 GRAND TRUNK WESTERN — 5

* F A Gaffney Vice Pres & Gen Mgr 131 W Lafayette Blvd Detroit Mich
* H A Sanders Gen Supt Transportation 131 W Lafayette Blvd Detroit Mich
* A Selbee Gen Supt MP & Equip Battle Creek Mich
Albert Bentley Diesel Fmn Battle Creek Mich
A Bowman Machine Shop Fmn Battle Creek Mich
x William H Calladine Gen Fmn Battle Creek Mich
Zed T Cast Night Fmn Pointiac Mich
x John H Cox Traveling Diesel Inspr Battle Creek Mich
* E H Gilley Gen Boiler Fmn Battle Creek Mich
E J Hall Plant Elec Fmn Battle Creek Mich
Richard W Karbosky Supvr Loco Battle Creek Mich
x William Leys Shop Supt Battle Creek Mich
Louis Pollack Diesel Chg Hand Battle Creek Mich
W J Sealy Elec & Mech Engr Battle Creek Mich
x H R Whiting Chief Diesel Inspr Battle Creek Mich
x Frank S Widowski Car & Loco Fmn Milwaukee Wisc

120 — 28 GREAT NORTHERN — 12

* J M Budd President St Paul 1 Minn
x*I G Pool Vice Pres St Paul 1 Minn
x*J L Robson Chief Mech Off St Paul 1 Minn
* A N Crenshaw Director Purchases St Paul 1 Minn
x W F Arksey Engr Water Serv & Fuel Fac 175 E Fourth St St Paul 1 Minn
x K W Batcheller Diesel Supvr Fargo N D
H J Berkeland M M Minot N D
* E M Campbell Pres NW Loco Assn Asst M M Minneapolis Minn
Eugene C Coan Asst to the MM Willmar Minn
John G German M M Grand Forks N D
x Van B Gloth Asst RH Fmn Seattle Wash
T R Hamilton Trav Engr Williston N D
H A Johnson Travel Engr Sioux City Iowa
x W J Johnston Diesel Loco Supvr St Paul Minn
Leonard H Karl Traveling Engr Hibbing Minn
x Mathias A Lang Jr Diesel Fmn Dale St Shops St Paul Minn
Donald F Marston Asst MM Spokane Wash
Howard F Messner Asst RH Fmn Hibbing Minn
Harold S Reed Asst RH Fmn St Paul 1 Minn
x Dan R Smart Loco Fmn Whitefish Mont
R A Smith Supt MP Spokane Wash
x C P Stendahl Diesel Loco Supvr St Paul Minn
James P Sullivan Master Mechanic Superior Wisc
x Richard G Tausch Asst Shop Supt Hillyard Wash
Wallace H Tellander Gen Fmn St Paul Minn
Arthur T Walker Master Mechanic Willmar Minn
Leslie O Waxberg RH Fmn St Paul Minn
x W A Wright Master Mechanic Grand Forks N D

10 — 4 GREEN BAY WESTERN — 2

* H E McGee President Green Bay Wisc
* E V Johnson Asst to Pres Green Bay Wisc
x*Allan S Johnson Mech Inspr Green Bay Wisc
x*E V Johnson Asst to Pres Mech Green Bay Wisc

60 — 87 GULF COLORADO & SANTA FE — 3

* F G Gurley President 80 E Jackson Blvd Chicago 4 Ill
* C R Tucker Vice Pres Operations 80 E Jackson Blvd Chicago 4 Ill
* T T Blickle Gen Mgr Mech Dept 80 E Jackson Blvd Chicago 4 Ill
* A J Baker Purchasing Agent & Storekeeper Cleburne Texas
Harry L Anderson Asst Supvr Diesel Engs Houston 23 Texas
J S Arterburn Traveling Apprentice Instr Cleburne Texas
R T Bankston Diesel Gang Fmn Cleburne Texas

W P Battle Diesel Gang Fmn Cleburne Texas
W C Bawcombe Diesel Gang Fmn Cleburne Texas
G E Beasley A S D E Ft Worth 5 Texas
Arthur D Beckner Diesel Elec Fmn Cleburne Texas
J E Benfer Gen Fmn Brownwood Texas
R M Bunten Asst Supvr Diesel Engines Galveston Texas
Vernon E Boulware Diesel Gang Fmn Cleburne Texas
F H Bowles Jr Relief Fmn Cleburne Texas
J E Bratcher Diesel Gang Fmn Cleburne Texas
Clay Burns RH Fmn Sweetwater Texas
G E Chatham Mech Fmn Longview Texas
Donald M Clements Diesel Gang Fmn Cleburne Texas
W G Cooper A S D E 502 Turner Cleburne Texas
C W Cramer Asst Gen Diesel Fmn Cleburne Texas
J G Danneberg M M Temple Texas
J W Donovan Diesel Gang Fmn Cleburne Texas
A O Drake Loco Fmn Beaumont Texas
x John L Fertig Master Mechanic Galveston Texas
L P Fowler Elec Fmn Cleburne Texas
J Galvin Diesel Gang Fmn Cleburne Texas
Carlton D Garrett Asst Supvr Diesel Engines Temple Texas
Charles Clifton Gillespie Diesel Gang Fmn Cleburne Texas
Roy Gower Rd Fmn of Engines Cleburne Texas
M E Hanlon Night RH Fmn Galveston Texas
H G Hardcastle Asst Supvr of Diesel Engines Silsbee Texas
S E Hardcastle A S D E Silsbee Texas
Z Harrison NRH Fmn Brownwood Texas
E P Hinkle Night RH Fmn Temple Texas
Roy Holley Rd Fmn of Engines Brownwood Texas
C V Jackson Gen Fmn Galveston Texas
J E Johnson Rd Fmn of Engines Galveston Texas
x M M Johnson Gen Fmn Temple Texas
A W Kanewske Gen Fmn Cleburne Texas
A R Keskeys Wheel Shop Fmn Cleburne Texas
Harry L King Spl Apprentice 512 W Second Cleburne Texas
D K Kinser Relief Fmn Cleburne Texas
Allen D Langston Jr Spec Apprentice (Machinist) Cleburne Texas
F F Lanier Asst Fmn Temple Texas
C A Lee Elec Fmn Cleburne Texas
A H Lemmerman Gen Loco Fmn Gainesville Texas
H A Lemmerman Diesel Fmn Cleburne Texas
T A Lewis Relief Fmn Temple Texas
J D Loring Diesel Fmn Cleburne Texas
x Louis L Luthey M M Chicago Ill
Lane B McCall Gen Diesel Fmn Cleburne Texas
O J McCoy Asst RH Fmn Brownwood Texas
Edward McCrumb Night RH Fmn Silsbee Texas
H E Malear Diesel Gang Fmn Cleburne Texas
B L Moreland Gen Fmn Silsbee Texas
Curtis August Moser Elec Fmn Cleburne Texas
S V Mudge Diesel Fmn Cleburne Texas
C W Musson Loco Fmn Cleburne Texas
J D Nimmo Master Mechanic Cleburne Texas
P B Nix Mech Fmn Ft Worth Texas
G F Page Loco Painter Fmn Cleburne Texas
Odus C Pearce RH Fmn Belleville Texas
Ole T Pederson RH Fmn Somerville Texas
W M Pierce Diesel Gang Fmn Cleburne Texas

x O G Pierson Mech Supt Galveston Texas
Lyle Pipes Diesel Gang Fmn Cleburne Texas
George L Powers A S D E Silsbee Texas
Homer W Raney Diesel Elec Gang Fmn Cleburne Texas
J F Repman Apprentice Instr Cleburne Texas
L W Rumsey Diesel Gang Fmn Cleburne Texas
Joe Sebestik General Fmn Dallas Texas
J W Sheridan A S D E Purcell Okla
Ted Sprott Asst Supvr ATC & TSE Cleburne Texas
L N Stroud Diesel Gang Fmn Cleburne Texas
J H Thomas Rd Fmn of Engines Temple Texas
C W Underwood Jr Working Loco Fmn P O Box 329 Galveston Texas
J T Wade Asst Supvr Diesel Engines Cleburne Texas
Ralph E Wallace Gen Fmn Sweetwater Texas
L D Warren Mech Fmn Lometa Texas
D A Watson Asst RH Fmn Temple Texas
Ira R White Asst Supvr Diesel Engines Cleburne Texas
J D Whitlock Asst Supvr Diesel Engines Gainesville Texas
W T Whitworth Blacksmith Fmn Cleburne Texas
O W Williams Asst Day RH Fmn Brownwood Texas
R F Winters A S D E Brownwood Texas
J S Wright Diesel Gang Fmn Cleburne Texas

10 — 7 GULF MOBILE & OHIO — 2

* F M Hicks President Mobile 5 Ala
* G P Brock Exec Vice Pres & Gen Mgr Mobile 5 Ala
* C M House Gen Supt MP & Car Equip Mobile Ala
* H E Warren Vice President Mobile 5 Ala
x C W Esch Supt MP & Car Equip Bloomington III
x H R Kinney M M Chicago III
Otto S Tibbetts Gen RH Fmn Meridian Miss

1 — 1 HIGH POINT THOMASVILLE & DENTON — 0

L B Dutton Gen Supt Mech & Oper High Point N C

100 — 48 ILLINOIS CENTRAL — 17

* W A Johnston President Chicago 5 III
* O H Zimmerman Vice Pres 135 E 11th Place Chicago 5 III
x J A Welsch Gen Supt MP Chicago 5 III
* O O Albritton Vice Pres Pur & Stores Chicago 5 III
x O H Atkinson Diesel Elec Fmn Chicago III
T W Brown Chief Water Chemist 135 E 11th Place Chicago III
W E Brown Division Elec Fmn Paducah Ky
William Edwin Buell Jr RH Fmn Vicksburg Miss
x R W Carter Loco Engr Jackson Miss
R J Chinn M M McComb Miss
x H J Dawson Diesel Instr Chicago 5 III
A J Dietsch Gen Fmn Clinton III
W A Dodillet Gen Loco Fmn E St Louis III
C T Eaker Shop Supt Paducah Ky
R W Ellis M M Champaign III
x R I Fort Elec Engr Equip Chicago 5 III
J N Fox M M Memphis Tenn
R B French Gang Fmn Paducah Ky
H L Harrell M M Clinton III
Hugh B Herrin Asst M M Vicksburg Miss
W C Jacob Div Elec Fmn Fulton Ky
J M Jeffrey Master Mechanic Centlia III
x J W Jeffrey Gen Fmn Chicago III
x J T Jones Diesel Supvr Hazelcrest III
R F Jones Air Brake Fmn Paducah Ky

* A G Kann Retired Chicago 5 Ill
W T Kelly Gen Fmn Memphis Tenn
x Norman Lahndorff Gen Fmn Markham Loco Hazelcrest Ill
x G J Lehnerer Asst Mech Research Engr Chicago Ill
x John Martin Diesel Supvr Paducah Ky
Henry E May Shop Engineer Chicago 5 Ill
x J R Mitchell Div Elec Fmn Clinton Ill
x W C Monroe Elec Fmn Paducah Ky
x J F Morton Engineer Memphis Tenn
x L O Noakes Shop Fmn Chicago Ill
W C Norton Div Elec Fmn Centralia Ill
W D Onn Gen Fmn Centralia Ill
W A Paxton Gen Fmn Loco Dept 135 E 11th Place Chicago 5 Ill
Chas H Petty Loco Fmn Indianapolis Ind
H A Quin Jr Machine Shop Fmn Memphis Tenn
John B Schlettman Gen Loco Fmn Shreveport La
A M Taylor Acting Asst Elec Fmn Memphis Tenn
x J W Tragnitz M M Chicago Ill
B D Venable Gen Loco Fmn Memphis Tenn
Howard S West Gen Fmn McComb Miss
x V W White Div Elec Fmn Memphis 6 Tenn
P E Whittaker M M Paducah Ky
x Richard J Wright Elec Fmn Hazelcrest Ill

8 — 3 ILLINOIS TERMINAL — 1

* F L Dennis Vice Pres Oper & Maint St Louis 1 Mo
x R H Marquart Gen Supt MP & E St Louis 1 Mo
* W J Sullivan Supvr Pur St Louis 1 Mo

16 — 7 INDIANA HARBOR BELT — 4

* K A Borntrager President New York 17 N Y
x*T J Lyon Mech Supt Chicago 5 Ill
* R I Renfrew Gen Pur Agent New York 17 N Y
H C Geisen Elec Fmn Gibson Ind
x P F Hoppie Relief Fmn Hammond Ind
x C D Hunter Supvr Elec Maint Hammond Ind
x Leo A Smith Diesel Shop Fmn Hammond Ind

2 — 2 INDIANA NORTHERN — 1

* A W Phelps President 400 W Madison Ave Chicago 6 Ill
x Robert J Primrose Supt South Bend 21 Ind

34 — 6 KANSAS CITY SOUTHERN — 0

* W N Deramus President Kansas City Mo
* F H Hooper Vice Pres & Gen Mgr Kansas City Mo
* L W Van Nattan Supt Mach Pittsburg Kans
* E H Hughes Purchasing Agent Kansas City 5 Mo
W H Bruening M M Shreveport La
Lee K Smith Gen RH Fmn Kansas City Mo

1 — 3 KENTUCKY & INDIANA TERMINAL — 2

x*Carroll W Ashby President & Gen Mgr Louisville 12 Ky
* R B Emch Supt Louisville 12 Ky
x J D Speier M M Louisville 12 Ky

1 — 1 KOREAN NATIONAL — 0

Sung Ho Cho Diesel Engr 44-2 1-KA Simmoon-no Chongno-Ku Seoul Korea

30 — 18 LEHIGH VALLEY — 4

* C A Major President New York 6 N Y
* J J Swift Vice Pres & Gen Mgr New York 6 N Y
x*W E Lehr Supt MP Sayre Pa
* F J Murray Purchasing Agent New York 6 N Y
L E Broock Supvr Elec Equip Waverly N Y
Charles W Draper Gen Loco Fmn Coxton Pa

Arthur J Hickey Jr Diesel Elec Fmn Sayre Pa
Alec C Birney Gen Fmn Sayre Pa
x H P MacDonald Mech Engr Sayre Pa
Richard L McCraney Gen Fmn Perth Amboy N J
James E Mekeel Gen Fmn Buffalo N Y
Donald E Regan Gen Loco Fmn Newark N J
James J Regan Gen Fmn Sayre Pa
x Donald E Saxe Gen Boiler Fmn Sayre Pa
x John R Schoonover Asst Supt Elec Supvr Sayre Pa
Russell E Springer Engineer of Tests Sayre Pa
C P Turner Sys Supvr Diesel Oper & Maint Sayre Pa
George Voest Gen Fmn Sayre Pa

2 — 3 LITCHFIELD & MADISON — 1

* George J Leahy Chief Exec Officer Chicago 3 Ill
* J M Moudry Vice Pres & Gen Mgr Edwardsville Ill
x*W E Knecht M M Edwardsville Ill

30 — 10 LONG ISLAND — 2

* T M Goodfellow President & Gen Mgr Jamaica Station Jamaica 35 N Y
* P H Hatch Gen Mech Supt Richmond Hill N Y
* N J Aydelotte Mgr R E Pur & Insur New York 1 N Y
x A P Beck Gang Fmn Richmond Hill 18 N Y
E L Braksak Gang Fmn Richmond Hill 18 N Y
J Brannan Asst Gen Supt Equip Richmond Hill N Y
E P DeCeck Asst EH Fmn Richmond Hill 18 N Y
J P Devine Asst EH Fmn Richmond Hill 18 N Y
A Schettone EH Fmn Richmond Hill N Y
x C P Soffel MP Inspr Diesel Richmond Hill 18 N Y

20 — 4 LOUISIANA & ARKANSAS — 0

* W N Deramus President 114 W 11th St Kansas City Mo
* F H Hooper Vice Pres & Gen Mgr 114 W 11th St Kansas City Mo
* L W VanNattan Supt of Mach KCS Ry Shops Pittsburg Kans
E E Bruce Mech Fmn Hope Ark

215 — 147 LOUISVILLE & NASHVILLE — 20

* J E Tilford President Louisville 1 Ky
* W H Kendall Vice Pres Oper Louisville 1 Ky
x*J F Ryan Supt Mach Louisville 1 Ky
* J T Healy Gen Purchasing Agent Louisville 1 Ky
x J W Adams Gen M M Louisville Ky
Thomas J Adkisson Working Fmn Bowling Green Ky
x Anthony Armistead Gen Fmn Mobile Ala
H C Ash Fmn Erecting Shop Louisville 8 Ky
R L Ashley Loco Fmn Louisville Ky
H K Backherms Fmn Shop # 12 S Louisville Ky
B H Bacon Loco Fmn Louisville Ky
W R Bacon Loco Fmn Louisville Ky
E N Baskette RH Fmn Radnor Shops Nashville Tenn
M L Bevill Mech Fmn Earlington Ky
J W Boyd Loco Fmn 4725 Cavalier Drive Louisville Ky
J W Brannom Asst RH Fmn Nashville Tenn
Earl B Bridges Fmn Loco E St Louis Ill
F Broadway Fmn Boiler Shop S Louisville Ky
J L Brooks Fmn Automotive Garage Louisville Ky
R W Bryant Asst RH Fmn 811 Barbourville St Corbin Ky
J M Call Loco Fmn 5304 Westport Rd Louisville Ky
J E Calvin Loco Fmn Louisville Ky
x Curtis Cobb Asst RH Fmn Howell Ind
Roy H Cochran Loco Fmn Etowah Tenn
W F Cocke Mech Fmn Mt Pleasant Tenn

M E Collins Fmn Diesel Shop S Louisville Ky
Fitch Combs Train Yard Fmn Ravenna Ky
Herman Crouch Car Fmn Ravenna Ky
x C S Crows RH Fmn Birmingham Ala
J S Crunk Asst RH Fmn Nashville Tenn
J A Daeuble Gen Fmn Elec Dept S Louisville Ky
W R Day Asst RH Fmn Corbin Ky
R S Denham RH Fmn Corbin Ky
R B Doll Shop Fmn Diesel Louisville Ky
John A Downs Loco Fmn Louisville 14 Ky
F M Duesing Schedule Fmn Louisville Ky
Charles E Durbin Mech Fmn Madisonville Ky
Frank A Dyche Loco Fmn Louisville Ky
Harry L Dye Loco Fmn Louisville Ky
John B Elsee Night RH Fmn Irvine Ky
E L Feather RH Fmn Corbin Ky
T B Fitzgerald Loco Fmn Mobile Ala
A J Flanigan RH Fmn Evansville 13 Ind
Fred J Flaspoehler Jr Diesel Fmn S Louisville Ky
Raymond N Fogarty Asst Gen Fmn Louisville Ky
x John R Foster Working Fmn Owensboro Ky
L Goodin Loco Fmn W Knoxville Tenn
W H Gould RH Fmn Hazard Ky
Vincent A Graham Asst RH Fmn Birmingham 5 Ala
Willard T Graves Diesel Supvr Louisville Ky
Paul C Gregory Asst Dept Fmn Evansville Ind
J W Hebden Engr of Tests Louisville 8 Ky
D I Heitz Asst Gen Fmn Elec Dept S Louisville Ky
M A Hendrix Mech Fmn Mt Pleasant Tenn
George E Herbert Loco Fmn Louisville Ky
R H Hicks Fmn Elec Dept S Louisville Ky
W S Higdon Loco Fmn Knoxville Tenn
Bert P Hood Sr RH Fmn Ravenna Ky
M F Isenberg Fmn Elec Dept S Louisville Ky
Claude A Johnson Loco Fmn Louisville Ky
x R B Johnson Diesel Fmn Louisville Ky
W M Johnson Jr Mech Fmn Louisville Ky
K H Jones Loco Fmn Louisville Ky
R S Kallam Sr Night Fmn Loyall Ky
Walter H Keebler Loco Fmn Louisville Ky
H M Killinger Dept Fmn Mobile Ala
James T Kincaid RH Fmn Evansville 12 Ind
x Fred W Koch Fmn Diesel Repairs Louisville 8 Ky
R W LeMaster Loco Fmn 3326 Oleanda Louisville Ky
Clayton L Little Loco Fmn Louisville Ky
x C A Love Asst Supt Mach Louisville Ky
Paul McAllister Asst RH Fmn Birmingham Ala
R A McDaniels Diesel Fmn Louisville Ky
W D McFadden Loco Fmn Louisville Ky
E V McKay Diesel Shop Fmn S Louisville Ky
C E McNabb Gen Fmn Pensacola Fla
Ira V Maddox Asst Loco Fmn Louisville Ky
W C Marlette Gen Fmn Louisville 8 Ky
L K Marlin Asst RH Fmn Birmingham 7 Ala
Earl C Martin Gen Fmn Paris Tenn
J F Martin RH Fmn 721 Eversole St Hazard Ky
Roy C Martin Asst RH Fmn Corbin Ky
x J R Mason Tool Rm Fmn Louisville Ky

x R J May Master Mechanic Covington Ky
W H Mitchell Gen Fmn Boiler Shop S Louisville Ky
L I Mulvaney RH Fmn Boyles Shops Birmingham Ala
H U Mullenix Diesel Shop Fmn Louisville Ky
Jesse T Noland Gen Fmn Ravenna Ky
J W Oakley M M Howell Ind
R H Parham Gen Fmn Shop # 4 Louisville Ky
J A Parrish M M Louisville Ky
John E Parker Fmn in Shop 17 S Louisville Ky
x T H Patterson Loco Fmn 4209 Churchill Rd Louisville Ky
H W Poor RH Fmn Lexington Ky
T Hayes Potter Wheel Shop Fmn Louisville Ky
C M Puckett RH Fmn Paris Tenn
J B Quiggins M M Birmingham 7 Ala
x Harvey E Reynolds Diesel Fmn Louisville Ky
Orris S Reynolds Jr Asst Gen Fmn Louisville Ky
x W B Rexroat Jr Loco Fmn S Louisville Ky
x Ernest O Rollings Fmn Diesel Shop Louisville Ky
x W C Rollings Fmn Diesel Shop Louisville Ky
J H Rone Extra Mech Fmn Mt Pleasant Tenn
L K Rose Gen Fmn Louisville Ky
James F Rountree Gen Fmn Louisville Ky
R B Rudder Asst RH Fmn Nashville Tenn
L A Rusche Loco Fmn 1024 S Shelby St Louisville Ky
J P Ryan RH Fmn Covington Ky
R L Ryan Loco Fmn 1707 Richmond Dr Louisville Ky
W M Sandusky RH Fmn 701 N Court St Montgomery Ala
Julian F Sapp Asst Mgr Planning-Production c/o J F Ryan Louisville Ky
John J Schell Fmn Tool Rm Louisville 8 Ky
Leo A Schelling Loco Fmn Louisville Ky
Norwood Schukraft RH Fmn Evansville Ind
E F Schulz Supvr of Welding Louisville 8 Ky
F W Schumaker Diesel Erecting Shop Fmn Louisville Ky
A N Seitz Asst Loco Fmn Louisville Ky
C N Self Asst RH Fmn Birmingham 7 Ala
x Charles R Sengel Shop Engr Louisville Ky
W C Seward Mech Fmn Bowling Green Ky
E K Shaffer Jr M M Radnor Shops Nashville Tenn
William L Shulenberger Shop Fmn Louisville Ky
O W Silcox Fmn Boiler Shop S Louisville Ky
T T Sims RH Fmn 701 N Court St Montgomery Ala
x W J Sittloh Asst RH Fmn Nashville Tenn
B H Smith Fmn Boiler Shop S Louisville Ky
O E Smith Loco Fmn Louisville Ky
x S C Snow Gen Supvr of Diesels Louisville Ky
W R Stansberry Asst RH Fmn Corbin Ky
James H Stephens Fmn Loco Louisville Ky
J Willie Stephens Gen Fmn Corbin Ky
C E Stewart Diesel Shop Fmn Nashville Tenn
J E Stroud Elec Fmn Nashville Tenn
R F Stucker Asst to Supt Louisville Ky
G R Sullivan Fmn Diesel Shop Louisville Ky
T R Trosper Loco Fmn Corbin Ky
Clyde M Tydings Apprentice Instr Louisville Ky
x J M Vawter Asst Supt MP Prod Control Louisville Ky
J P Walker Pres Lsv Diesel Club Asst Mech Engr Louisville Ky
H R Warford Night RH Fmn Lexington Ky
W B Watson Sr Asst Dept Fmn Nashville Tenn

William V Weber Fmn Diesel Shop Louisville Ky
W H Welcker Asst RH Fmn Nashville Tenn
W D Williams Dept Fmn Locos Nashville Tenn
W T Wilson Loco Fmn Knoxville Tenn
C F Woelflin M M Birmingham 7 Ala
W J Young Loco Fmn Corbin Ky

2 — 2 L S & I — 2

x Oakes Cheill Diesel Supvr Marquette Mich
x Harold Larson Gen Fmn Marquette Mich

15 — 8 MAINE CENTRAL — 2

* E Spencer Miller President Portland 4 Me
* Roy E Baker Gen Mgr Oper & Mech 425 Deering Ave Portland Me
* Harold Hook Supt Loco Maint 193 Ocean House Rd Cape Elizabeth Me
* H M Rainie Vice Pres Purchasing Portland Me
Malcolm D Billington Gen Fmn Portland 4 Me
x Harvey S Crosby Gen Mech Instr Portland Me
x Alden H Finnimore Asst Fmn Waterville Me
Charles L Sherman Rd Fmn of Engines Portland Me

1 — 1 MANILA RR — 0

Ur C Buyser Gen Mech Manila Philippines

1 — 2 MANUFACTURERS RAILWAY — 0

* Ralph W Schmidt President & Gen Mgr St Louis 18 Mo
* J W Sargean Mech Supt St Louis 18 Mo

1 — 1 MIDLAND CONTINENTAL — 1

x L R Bryan M M P O Box 1310 Jamestown N D

1 — 2 MINNEAPOLIS NORTHFIELD & SOUTHERN — 2

x W A Hotzfield Supt MP Minneapolis 24 Minn
x Vince L McMahon Supt MP Minneapolis Minn

18 — 8 MINNEAPOLIS & ST LOUIS — 2

* A W Schroeder President Minneapolis 4 Minn
* W P Coliton VP Oper Minneapolis 4 Minn
* W W Landmesser Supt of Mech Dept Minneapolis Minn
* O W Carlson Dir Purch & Stores Minneapolis 4 Minn
Larry A Bengston Car Fmn Minneapolis Minn
x S M Carlson Diesel Supvr Minneapolis Minn
x Walter W Lovett Shop Supt Minneapolis Minn
Ernest R Standing Elec Fmn Minneapolis Minn

20 — 12 MINNEAPOLIS ST PAUL & SAULT ST MARIE — 4

* G A MacNamara President Minneapolis 2 Minn
* R L Simpson VP & Gen Mgr Minneapolis 2 Minn
* C F Guggisberg Gen Mech Supt Minneapolis 2 Minn
* T J Ruth Mgr Purchases & Stores Minneapolis 2 Minn
W O Ayers Gen Mech Inspr Minneapolis Minn
x Ira L Hancock Gen Loco & Car Fmn N Fond du Lac Wisc
x E R Henkel Asst Mech Supt Minneapolis Minn
Floyd T Irving Gen Loco Fmn Minneapolis Minn
x Roy D Johnson Fuel Supvr Minneapolis Minn
John I Lemieum Loco & Car Fmn Gladstone Michigan
x Herbert H Link MM Minneapolis Minn
Francis A Weise Supt Loco Shops Minneapolis Minn

2 — 3 MINNESOTA TRANSFER — 1

* H P Congdon VP & Gen Mgr St Paul Minn
* C L Lamphere Supt St Paul Minn
x* Robert B Merk MM St Paul Minn

1 — 3 MISSISSIPPI EXPORT — 0

* J H Luce President Point Clear Ala
* W M Dutten VP & Gen Mgr Moss Point Miss
* R L Feehan MM Moss Point Miss

66 — 4 MISSOURI-KANSAS-TEXAS — 0

* W N Deramus III Pres St Louis Mo
* Charles T Williams VP & Gen Mgr Dallas 2 Texas
* Harry S Turner Chief Mech Off Parsons Kans
* S A Hayden Purchasing Agent St Louis 1 Mo

150 — 121 MISSOURI PACIFIC — 19

* Russell L Dearmont Pres St Louis 3 Mo
* L A Gregory VP Oper St Louis 3 Mo
* L R Christy Chief Mech Off St Louis 3 Mo
* A A Taylor Gen Purchasing Agent St Louis 3 Mo
R P Austin Gen Fmn Dupo III
W H Barton Gen Maint Fmn No Little Rock Ark
C E Beasley Tool Supvr St Louis 3 Mo
L Bechel MM St Louis Mo
J D Berry Car Fmn Boone Terre Mo
E L Biery Gen Diesel Fmn Little Rock Ark
G Billingsley Gen Rd Fmn of Engs Little Rock Ark
Roy A Bland Elec Fmn No Little Rock Ark
J H Blakely Gen Fmn Gurdon Ark
J C Boughers Gen Fmn No Little Rock Ark
E A Brenke Gen Fmn Boone Terre Mo
L T Buddenberg Gen Fmn McGehee Ark
W P Butler Asst Elec Fmn No Little Rock Ark
E J Caesar Mech Fmn New Orleans 14 La
H W Caldwell Car Fmn Little Rock Ark
Geo B Cartwright Gen Car Fmn Little Rock Ark
C H Cavinee Loco Fmn Osawatomie Kansas
F E Chalfant Asst Diesel Elec Fmn No Little Rock Ark
S M Chapman Diesel Fmn No Little Rock Ark
x D E Cline Gen Loco Fmn Poplar Bluff Mo
P W Coaley Mech Fmn Wynne Ark
Stewart E Cooper Elec Fmn St Louis Missouri
John W Coors Asst Diesel Elec Fmn No Little Rock Ark
C H Coxwell RH Fmn Memphis Tenn
E B Cundiff Gen Loco Fmn Memphis Tenn
Carl H Dennington Mech Fmn Alexandria La
Eldon E Dent Rd MM Kansas City 16 Mo
J C Dietrich MM Coffeyville Kansas
Vance M Driskill Gen Fmn Gurdon Ark
x W F Duncan MM Kansas City Mo
James G Dunlap Elec Fmn No Little Rock Ark
x M J Dunlap Asst Diesel Supvr Little Rock Ark
J H Erickson Asst Supvr Diesel Equip St Louis Mo
J P Erion Mech Fmn McGehee Ark
M W Erion Chief Car Inspr Little Rock Ark
Erwin Etzold Diesel Fmn St Louis Mo
G R Fite Car Fmn El Dorado Ark
J E Flake Diesel Loco Fmn No Little Rock Ark
A G Foster Asst Car Fmn Alexandria La
L L Francis Apprentice Instr No Little Rock Ark
Cecil M Garrison Div Fmn Hurst III
G V Glenn Asst Supvr Diesel Equip St Louis 1 Mo
M J Goshen Elec Fmn No Little Rock Ark
R F Greenwood RH Fmn No Little Rock Ark
A D Griffin Asst Diesel Fmn No Little Rock Ark
x E C Harris Engr of Tests St Louis 3 Mo
H J Harvey Diesel Fmn No Little Rock Ark
x J E Hayes Dist Chemist Little Rock Ark

A B Heisler Mech Fmn Pinckneyville Ill
Fritz Henne Elec Fmn Little Rock Ark
T W Hercher Draftsman No Little Rock Ark
x R E Hixson Asst to Mech Supt Little Rock Ark
W J Hixson Relief Fmn Poplar Bluff Mo
H M Hoffmeister Asst to Chief Mech Officer St Louis Mo
H Glenn Holder Rd Fmn of Engines Dupo Ill
x E Vefn Holm Asst Diesel Supvr Kansas City 6 Mo
James D Hope Elec Fmn No Little Rock Ark
x O L Hope Mech Supt Little Rock Ark
x O L Hope Jr Elec Draftsman Bellville Ill
A Hosp Diesel Fmn No Little Rock Ark
Roberft J Huddleston Asst Loco Fmn St Louis Missouri
John E Isom RH Fmn E St Louis Ill
H E Jamison Rd MM No Little Rock Ark
x A L Kelly Elec Engr St Louis Mo
C W Keith Relief Diesel Fmn Dupo Ill
R F Kennedy Asst Diesel Supvr Little Rock Ark
R B Knight Car Fmn Little Rock Ark
H C Kobitz Diesel Fmn No Little Rock Ark
J E Lackey Asst Diesel Supvr St Louis Mo
P E Latsha MM Osawatomie Kansas
x C M Lipscomb Gen Clerk to Term Master Mech No Little Rock Ark
T M Lively RH Fmn Dupo Ill
M H Losch MM Dupo Ill
C H McAmis Term MM Memphis Tenn
J A McCoy Rd Fmn of Engs Nevada Mo
Gene McNabb Gen Diesel Fmn Little Rock Ark
Bernard E Madden Gen Fmn Omaha Neb
E C Meinholtz Mech Engr St Louis 3 Mo
H W Menge Mech Fmn Ferriday La
x C E Milberg Chief Draftsman St Louis Mo
J G Milstead Gen Fmn Alexandria La
J P Murphy Diesel Fmn Jefferson City Mo
x G W Niemeyer MM No Little Rock Ark
Norman Edwin Nutter Diesel Fmn St Louis 18 Mo
R F Olds Diesel Pipe Fmn No Little Rock Ark
D M Perry Gen Loco Fmn San Antonio Tex
C O Peterson Painter Fmn No Little Rock Ark
O E Pope Relief Fmn Newport Ark
C C Prater Diesel Fmn No Little Rock Ark
M S Reichert Gen Elec Fmn St Louis Mo
L L Richardson Car Fmn Poplar Bluff Mo
E W Roberts Asst Diesel Fmn No Little Rock Ark
x W E Robey Chief Mech Inspr Palestine Tex
x R O Rogers Car Fmn Monroe La
G A Sampson Relief Diesel Fmn No Little Rock Ark
C T Sams Rd Fmn of Engs Poplar Bluff Mo
Carl H Sander Diesel Fmn St Louis 3 Mo
x E A Schultz Gen Fmn St Louis Mo
C H Sheridan Loco Engr Poplar Bluff Mo
M W Simpson RH Fmn Memphis Tenn
L A Smith Car Fmn McGehee Ark
x A J Speer Rd Fmn of Engs Monroe La
Jack M Spurr Elec Fmn St Louis 3 Mo
John B Stark Asst Elec Fmn No Little Rock Ark
x W L Steele Chief Boiler Inspr St Louis Mo
Hershel L Strain Rd Fmn of Engs Wynne Ark

R R Stewart Mech Fmn St Genevieve Mo
E E Swafford Asst Supvr Diesel Equip Kansas City Mo
A W Talbott Gen RH Fmn No Little Rock Ark
H Thornton Diesel Fmn No Little Rock Ark
L M Towery Gen Car Fmn Alexandria La
E M Vandiver MM Monroe La
Robert J Vann Car Fmn Gurdon Ark
T S Wallace Diesel Elec Fmn No Little Rock Ark
R V Wells Asst Diesel Fmn No Little Rock Ark
A M Wilkins, Relief Elec Fmn No Little Rock Ark
* Frank Yochem Gen Boiler Inspr Delaware Ohio

24 — 9 MONON RR — 4

* Warren W Brown President Chicago Ill
x*C A Bick Vice Pres Operations Lafayette Ind
x V C Golden Supt MP & Equip Lafayette Ind
* W P Sullivan Vice Pres Pur & Taxes Lafayette Ind
x C D Haner Supvr Diesel Loco Lafayette Ind
x J F Justice Jr Diesel Elec Loco Fmn Lafayette Ind
Lewis Nicholas Retired Gen Fmn Boilermaker Indianapolis Ind
L A O'Connor Gen Fmn Lafayette Ind
A F Smith Diesel Elec Loco Fmn Lafayette Ind

15 — 4 NASHVILLE CHATTANOOGA & ST LOUIS

* W H Swiggart Exec VP Nashville 3 Tenn
* F Whittemore Gen Mgr Nashville 3 Tenn
* C M Darden Supt Mach Nashville 2 Tenn
* N C Johnson Purch Agent Nashville 2 Tenn

2 — 1 NATIONAL RAILWAYS OF MEXICO — 0

Ing Roberto Mendez S Asst to Chief Oper Officer Guadalajara Jalisco Mex

4 — 11 NEW ORLEANS UNION PASSENGER TERMINAL — 1

* C J Wallace Term Mgr New Orleans 13 La
* R R Mayhall Trainmaster New Orleans 13 La
x F R Denney Mech Supt New Orleans 25 La
Oliver P Baudouin Diesel Shop Fmn Harahan La
Charles G Havers Diesel Shop Fmn New Orleans La
O C McManus Elec Fmn Metairie La
Michael J Rooney Diesel Shop Fmn New Orleans 25 La
Joseph E Saucer Elec Fmn New Orleans La
F A Schultz Gen Fmn New Orleans La
George E Simmons Elec Fmn New Orleans La
Lloyd L Smith Gen Fmn New Orleans 13 La

325 — 82 NEW YORK CENTRAL — 46

* A E Perlman President New York 17 N Y
* J F Nash VP Oper New York 17 N Y
x*W F Kascal Chief Mech Officer New York 17 N Y
* A L Prentice VP Purchases & Stores New York 17 N Y
Frank D Abate Traveling Diesel Inspr N Bergen N J
x W A Alfke Master Mech Watertown N Y
S Clyde Allison Gen Fmn Erie Pa
x H J Anderson Welding Supvr Cleveland 13 O
x Ernest Anesi Elec Supvr New York N Y
Emil Antel Asst Eng Fmn Cleveland O
x Robert S Ash MM Indianapolis Ind
x V E Aylor Term Fmn Buffalo N Y
x S Baggott Diesel Loco Inspr Detroit Mich
G M Beischer Master Mech Cleveland O
Richard F Borsos Diesel Loco Inspr Buffalo N Y
x C H Broadbent Diesel Loco Inspr St Thomas Canada
x Franklyn C Bronson Asst Supvr of Steam Generator Cleveland 13 O

x William G Bunting Sr Chief Stationary Engr Chicago 9 Ill
x W H Chidley Mech Supt Indianapolis Ind
x C W Cole Dist Car Insp Syracuse N Y
x J F Cooney Master Mech Syracuse N Y
W D Christee Gen Fmn Charleston W Va
x R F Culbreth MM Detroit 16 Mich
E J Decker EH & Car Fmn Greensburg Ind
J E DeFreest Master Mech Albany N Y
x Joseph F Fadale Gen Fmn Syracuse N Y
x Ralph B Fathers Boilermaker Windsor Ontario Canada
L H Finical EH Fmn Minerva O
x Henry R Friel Dist Supvr Elec Equip Detroit Mich
F E Geiger Water Service Chem Indianapolis 2 Ind
x J J Gregory Asst Chief Engr Service Cleveland O
x C L Hall Director Diesel Methods & Procedure New York N Y
* Carl A Harper Retired Gen Boiler Inspr Indianapolis Ind
* H C Haviland Supvr of Boilers Indianapolis 4 Ind
W E Herold Dist Supvr Elec Equip Indianapolis 25 Ind
x F E Hesford Ind Engr Cleveland O
x Thomas W Hislop Jr Water Serv & Corr Engr Cleveland 10 O
J C Hoeger MM Springfield O
x F L Hoffman MM Indianapolis 25 Ind
x M S Hoprich Diesel Loco Inspr New York 17 N Y
x Stanley O Hughes MM Springfield Mass
x*W F Kascal Asst VP Equip New York N Y
x James T Kearney Gen Loco Fmn Niles Mich
William H Knobloch Lube Oil Tester Albany 3 N Y
S T Kuhn Chief Mech Supt New York 17 N Y
x E R Kunath Diesel Loco Inspr E Syracuse N Y
A E Lang Gen Fmn Elkhart Ind
x O A Larson Dist Loco Inspr Cleveland O
E F Lyons Asst to Supt Cleveland O
x L C Lytle Asst Master Mech Buffalo N Y
Guy McGonegal Diesel Inspr Jackson Mich
x Frank H McHenry Clere O
x Harold Raymond McIlveen Asst Supvr Loco Maint New York 17 N Y
A J McInerney Gen Fmn Jackson Mich
x I Wright Martin Supt Diesel Shop Cleveland 10 O
x Karl F Miller Dist Loco Inspr New York 17 N Y
* F K Mitchell Retired VP Dobbs Ferry N Y
Orin LeRoy Moses Jr Diesel Loco Inspr Buffalo N Y
x R W Mustard MM Cleveland O
E S Mustain Supt of Shop Harmon N Y
F P Neesley Supt Diesel Term Beech Groove Ind
Fred A Nemeth Asst to Supt Cleveland O
x Ralph E Nurse Asst Industrial Engr New York 17 N Y
J O Pearl EH Fmn Minerva O
x H W Rasor MM Chicago 5 Ill
x Louis R Raether Asst Supvr Loco Maint New York N Y
x T A Rhoads Master Mech Jersey Shore Pa
x Andrew Joseph Ritter Asst Supvr Loco Maint New York 17 N Y
x C C Ritter Gang Fmn Elkhart Ind
x L D Ross Spec Inspr Cleveland O
x H J Scholtz Traveling Engr Detroit Mich
Robert H Seemann Gen Loco Fmn Toledo O
John T Sheehan Terminal Fmn N Bergen N J
* A F Stiglmeier Retired Gen Supvr Boilers & Welding Albany 8 N Y
x H T Stonebraker Gen Fmn Cleveland O

x Anthony J Struich Asst Supvr Water Serv Collinwood O
Bert L Strohl Mech Supt New York 17 N Y
x W D Taylor Asst MM Matoon Ill
F R Waggoner Diesel Loco Inspr Elkhart Ind
W C Wardwell Gen Mech Supt ED New York N Y
x Edward H Wright Supt Coll Diesel Loco Term Cleveland 12 O
Gordon L Zeider Asst Supt Diesel Shop Cleveland O

70 — 29 NEW YORK CHICAGO & ST LOUIS — 18

* Felix S Hales President Cleveland 1 O
* M B Phipps VP Oper Cleveland 1 O
* O R Pendy Chief Mech Officer Cleveland 1 O
* R R Deahl Asst to Pres Purch Cleveland 1 O
C G Auer Gen RH Fmn Frankfort Ind
x L A Burns Supt of Shops Conneaut O
x Robert G Cassidy Supvr Diesels & Motor Equip Cleveland O
x Robert S Colquhoun Diesel Fmn Conneaut O
x C R Feagans Gen Fmn Indianapolis Ind
x W L Francis Machine & Erec Fmn Frankfort Ind
x D W Gloss Inspr of Diesel Motor Equip Brewster O
J O Hill Dist SMP Brewster O
x*R F Hillhouse Fetired Gen RH Fmn Bellvue O
Roy Hollis Gen Loco Fmn Frankfort Ind
x R J Hughes MM Conneaut O
x R A Kelley Elec Fmn Conneaut O
x Roy H Kieser MM Frankfort Ind
x J E Kloss Asst to CMO Cleveland 1 O
R J Mahoney Gen RH Fmn Conneaut O
Hugh D Miller Gen RH Fmn Lima O
x*J C Miller MM Conneaut O
x J S Morris Elec & Shop Engr Cleveland O
x D J Moses RH Fmn Frankfort Ind
x A C Robinson Gen Diesel Fmn Brewster O
x Lewis Sabo Shop Supt Brewster O
T L Seaney Gen Equip Inspr Ft Wayne 3 Ind
x R M Stimmel Engr of Tests Fort Wayne Ind
x W A Tennill Chief Chemist Brewster O

100 — 13 NEW YORK NEW HAVEN & HARTFORD — 3

* George Alpert President New Haven 6 Conn
* S J Marvey Jr Gen Mgr New Haven 6 Conn
* C H McGill Mgr Purch & Stores New Haven Conn
x W A Baker Gen Supt Loco Maint New Haven Conn
x D E Barker Engr of Tests New Haven Conn
* S R Christopherson Ret Supvr Boiler Insp & Maint E Milton Mass
x George A Clarke Mech Engr New Haven Conn
Russell H Davis Gen Shop Supt New Haven Conn
David E Glover Supvr of Loco Maint New Haven Conn
Edward M Gregerman Supvr Loco Maint Boston Mass
Robert W Hooper Gen Mech Supt New Haven Conn
Raymond G Thompson Supvr of Aux Equip New Haven Conn
Thomas W Webster Supvr Loco Maint New Haven Conn

7 — 3 NEW YORK ONTARIO & WESTERN — 0

* Lewis D Freeman Trustee Middletown N Y
* T B Girard Gen Mgr Middletown N Y
* G S Bennett Supt MP Middletown N Y

2 — 3 NEW YORK SUSQUEHANNA & WESTERN — 0

* R E Sease President Paterson 1 N J
* Otto C Gruenberg Gen Mgr Paterson 1 N J
* George Engel Master Mech Ridgefield Park N J

1 — 1 NEW ZEALAND — 0
General Manager Wellington New Zealand

20 — 8 NORFOLK & WESTERN — 3
* R H Smith President Roanoke Va
* H C Wyatt VP & Gen Mgr Roanoke Va
* C E Pond Gen Supt MP Roanoke Va
* R G Bishop Purch Agent Roanoke 17 Va
W S Garrett Elec Engr Roanoke 17 Va
x H L Scott Jr Master Mech Crewe Va
x R M Stickley Jr Asst to Supt MP Roanoke Va
x Charles S Wilkerson Asst RH Fmn Bluefield W Va

7 — 6 NORFOLK & SOUTHERN — 3
* Henry Getjen President Norfolk 10 Va
* M C Jennette VP Oper Norfolk Va
* M B Dowdy Supt MP & Equip Norfolk 6 Va
x*J S Rodgers Purch Agent Norfolk 10 Va
x Walter A Miller Mech Engr Norfolk Va
x R W Reardon Asst Gen Fmn Norfolk Va

90 — 12 NORTHERN PACIFIC — 3
* R S MacFarlane President St Paul 1 Minn
* C H Burgess VP St Paul 1 Minn
x J A Cannon Gen Mech Supt St Paul Minn
* W K Smallridge Purch Agent St Paul 1 Minn
E J Albers Gen Fmn St Paul 1 Minn
Joseph Canning Night RH Fmn Butte Montana
Morley J Kelsey Supvr of Loco Maint New Haven Conn
* B C King Retired Gen Boiler Inspr Tacoma 8 Wash
R A Norris Diesel Equip Eupvr New Haven Conn
B C King Retired Gen Boiler Inspr Tacoma 8 Wash
A J Lewis Master Mech Jamestown N Dakota
x H M Schudlich Engr Water Serv St Paul 1 Minn
x W R Shannon Asst Gen Mech Supt St Paul 1 Minn
W W Simpson System Diesel Supvr St Paul 1 Minn

13 — 2 NORTHWESTERN PACIFIC — 0
J C Hanssen MM Tiburon Calif
H H Wosser Fmn MP & C Dept Tiburon Calif

1 — 1 NORTHWESTERN RAILWAY — 1
x E B Hall Retired CMO River Forest Ill

1 — 1 N S W RAILWAYS OF AUSTRALIA — 0
Charles M Terry Pty Limited Sydney Australia

2 — 3 ONTARIO NORTHLAND — 1
* A Freeman Gen Mgr North Bay Ontario Canada
* A Jardine Supt Englehart Ontario Canada
* J W Miller CMO North Bay Ontario Canada

1 — 2 ORINOCO MINING RY — 2
x R N Bateman Asst Chief Engr Pittsburgh Pa
x H M Drane Gen Supt Maint Port Ordaz Venezuela

17 — 12 PACIFIC ELECTRIC — 1
* Geo B Hanson President Los Angeles 14 Calif
* D R Lewis VP & Gen Mgr Los Angeles 14 Calif
x R L Mankins Master Mech Los Angeles 14 Calif
Arvin F Cash Night Loco Fmn Watts Calif
T J Clifford Loco Fmn Los Angeles 2 Calif
Roy R Crowe Leader Los Angeles 14 Calif
Milton F Foster Relief Fmn Los Angeles Calif
Aage Nelson Loco Fmn Los Angeles Calif
Fred R Soule Fmn San Bernardino Calif
C A Staffler Fmn Freight Car Repairs Los Angeles 14 Calif

* E A Stevens Retired Gen Supt MP Los Angeles 14 Calif
Joseph W Wilcomb Supvr Auto & Work Equip Los Angeles Calif

2 — 7 PAKISTAN — 3
Joseph J Barry Diesel Loco Consultant New York N Y
Nayar Ul Haq Divisional Mech Engr Rawalpindi Pakistan
Z I Puri Div 1 Mech Engr (Diesels) Karachi Pakistan
x S H Shah Elec Engr Lahore Pakistan
x Musaheb Ali Siddioui Elec Fmn Karachi W Pakistan
S M Zaidi Senior Inspection Officer Brussels Belgium
x Muhammad Zakir Mech Charge Man Karachi Cantt: (w) Pakistan

1 — 1 PATAPSCO & BLACK RIVERS — 1
x Henry C Jones VP Bethlehem Pa

1 — 1 PAULISTA RAILROAD — 0
Pelagio R Dos Santos Chief Mech Engr Jundiai State of Soa Paulo Brazil

0 — 40 PENNSYLVANIA — 39
x C R Aiken Fmn Back Shop Ft Wayne Ind
x E H Brown Asst Engr Philadelphia Pa
x K E Burns Supvr Diesel Equip Cleveland O
x J M Carpenter Asst Supt Equip Indianapolis Ind
x Harry L Decker Mech Engr Philadelphia 4 Pa
x L A Dixon MM Harrisburg Pa
x J E Dolby Loco Fmn Columbus O
x Henry C Fisher Jr Loco Fmn Harrisburg Pa
x J P Francis Supt of Equip Cincinnati 30 O
x Philip Geise Master Mech Buffalo N Y
x Ray Gilmore EH & Car Fmn Grand Rapids Mich
x D L Gray Reg Boiler Fmn Pittsburgh 36 Pa
x*A J Greenough VP Philadelphia Pa
x P I Harolerode MM Ft Wayne Ind
x F C Hardendorf Asst EH Fmn Ft Wayne Ind
x Clyde E Hawbecker Fmn Enola EH Camp Hill Pa
x W L Hegerfeld RH Fmn Bala Cynwyd Pa
x C T Hunt Asst Engr Tests Altoona Pa
x John W Jackson Asst MM Harrisburg Pa
x H L Ker EH Fmn Wilmington Delaware
x D R Knoff Supvr Diesel Equip Baltimore Md
x H L Kraner EH Fmn Crestline O
x John Kuscharsey Asst System Diesel Supvr Wilmington 8 Delaware
x F G Lufcy EH Fmn Logan Sport Ind
x R R McKinney Supt of Equip Indianapolis Ind
x A R Marsh Supt of Equip Baltimore Md
x M K Mehaffie Fmn Test Dept Altoona Pa
x H S Miller MM Columbus O
x M J Mitchell Supvr Diesel Equip Buffalo N Y
x G H Newcomer Asst Mech Engr Philadelphia Pa
x*J P Newell VP Philadelphia Pa
J L Parker Gen Supt Methods & Cost Control Philadelphia Pa
x*H H Pevler VP & Reg Mgr Chicago Ill
x A S Querry Asst Engr Pholadelphia 4 Pa
x P J Sasgen System Diesel Supvr Philadelphia Pa
x P A Schubert Fmn EH Baltimore 18 Md
x John Shearer Gen Fmn Altoona Pa
x A O Taylor Supt Loco Shops Altoona Pa
x G S Webb Supt Equip New York N Y
x C W Whistler Supt Equip Chicago Ill

2 — 3 PEORIA & PEKIN UNION — 1
* G J Willingham Pres & Gen Mgr Peoria 2 Ill

* E J Brosseau Supt Peoria 2 Ill
x*R H Romann Supt MP & Equip Peoria 2 Ill

1 — 1 PERE MARQUETTE RR — 0

* W N Moore Retired Gen Boiler Fmn Grand Rapids Mich

16 — 9 PITTSBURGH & LAKE ERIE — 1

* J W Barriger President Pittsburgh 19 Pa
* D B Fleming Gen Supt Pittsburgh 19 Pa
* Robert F Batchman Chief Mech Supt Pittsburgh Pa
x H P Bender Mech Engr Pittsburgh 26 Pa
A V Hilstrom Supt Diesel Shop McKees Rocks Pa
R E Pastre Asst Mech Supt Pittsburgh Pa
G K Roush MM Loco McKees Rocks Pa
P S Tedford Asst Elec Engr McKees Rocks Pa
C F White Diesel Inspr McKees Rocks Pa

2 — 1 PITTSBURGH & SHAWMUT — 1

x Charles D Jurs Diesel Supvr Brookville Pa

3 — 2 PITTSBURGH & WEST VIRGINIA — 0

* Richard M Shields President Pittsburgh 22 Pa
* W C Kresge Gen Supt Pittsburgh 28 Pa

1 — 1 POINT COMFORT & NORTHERN — 1

x R M Scaffer Supt of Maint Lolita Tex

50 — 24 READING — 4

* J A Fisher President Philadelphia 7 Pa
x*E P Gangewere VP Oper & Maint Philadelphia 7 Pa
x*W A Fister Supt MP & RE Reading Pa
* W A Clem Gen Purch Agent Philadelphia 7 Pa
Howard S Billig Fmn EH Shamekin Pa
Robert B Bowman Office Engr Reading Pa
H E Duncan Jr Supvr Loco Perform Reading Pa
x Franklin G Fisher Asst Mech Engr Reading Pa
Joseph B Fister Asst MM Reading Pa
Ernest H Follweiler Mech Supvr Reading Pa
Leonard W Fries Junior Engr Reading Pa
H R Hanson Asst Supt MP & RE Reading Pa
George A Hess Apprentice Instr Reading Pa
John E Kramer Elec Supvr Reading Pa
D J Laudig Field & Project Engr Reading Pa
G Palmer Lerch Gen Fmn Wilmington Delaware
Anthony J Maiale Draftsman Reading Pa
Harry S Persing Asst Fmn Allentown Pa
x Charles C Quell Jr Project Draftsman Reading Pa
Cletus C Ringenary Printer & Tracer Reading Pa
Robert M Rice Gen Fmn Tamaqua Pa
A C Roppel Loco Foreman Tamaqua Pa
Willard O Stemler Relief Fmn Wilmington Delaware
Ryle L Wagner Supvr of Diesel loco Reading Pa

14 — 11 RICHMOND FREDERICKSBURG & POTOMAC — 4

* W T Rice President Richmond 25 Va
* Stuart Shumate Gen Supt Richmond 25 Va
* Leigh Budwell Chief Mech Officer Richmond 27 Va
* A S Wilkinson Purch Agent Richmond 20 Va
C D Aiken Mech Engr Richmond Va
S D Bryan Asst Mech Engr Richmond Va
x C M Dickinson Chief Elec Richmond 20 Va
x G A Kidwell MM Alexandria Va
Robert E McGahey II EH Fmn Alexandria Va
x Morris E Nuchols Diesel Supvr Richmond Va
x James A W Smith Spec Engr Richmond Va

1 — 1 RIVER TERMINAL — 1
x Ernest J Freeman Asst Fmn Lakewood 7 O
1 — 1 ROCKDALE SANDOW & SOUTHERN — 1
x J R Goley Jr Supt of Maint Rockdale Tex
1 — 2 ST LOUIS & BELLEVILLE ELECTRIC — 0
* T C Kelce President Chicago 1 Ill
* C V Campbell Supt E St Louis Ill
40 — 42 ST LOUIS - SAN FRANCISCO — 11
* Clark Hungerford President St Louis 1 Mo
* R J Stone VP Oper St Louis 1 Mo
x* E F Tuck CMO Springfield Mo
* A N Laret VP St Louis 1 Mo
John S Abbott Gen Fmn Springfield Mo
Lawrence M Allison Diesel Foreman Springfield Mo
F E Beck Loco Fmn Sherman Tex
F E Boultinghouse Gen Fmn Memphis 11 Tenn
C N Cawlfield Diesel Supvr Tulsa Okla
G J Cosait Asst Diesel Supt Springfield Mo
Albert L Crews Diesel Shop Supvr Memphis Tenn
L D Criswell RH Fmn Thayer Mo
Charles H Dingman Elec Fmn Springfield Mo
K I Dyche Div Elect Fmn Amory Mississippi
John Eckley RH Fmn Enid Okla
x Robert W Ege Elec Engr Springfield Mo
x Robert H Francis Gen Rd Fmn of Equip Springfield Mo
x J H Hall Gen Fmn W Tulsa Okla
x Max Herzog Engr of Tests Springfield Mo
H E Hubbard Asst MM Monett Mo
x G M Jessee MM Amory Miss
C Y Knox Gen Fmn Amory Miss
Wayne L Land RH Fmn Kansas City Kansas
x John T Martin Diesel Supvr Tulsa Okla
John McLaggan Supvr Tools Spec Equip Springfield 2 Mo
Michael P Murphy RH Fmn Joplin Mo
x Thos Murray MM Springfield Mo
Victor K Pack Mech Fmn Wichita 12 Kansas
N F Phikpott Diesel Fmn Springfield Mo
Willis C Reddick MM Tulsa Okla
J A Reed MM Kansas City Mo
Edward W Rice Elec Fmn Springfield Mo
H F Richardson Gen Fmn Oklahoma City Okla
James E Rucks Gen Fmn Pensacola Fla
P E Scherrey Loco Fmn Fort Smith Ark
x Ralph H Stracke Elec Foreman Springfield Missouri
B W Swain MM Sherman Tex
x T H Temple Diesel Supt Springfield 2 Mo
H G Threlfall Gen Fmn Tulsa Okla
Lee Wardlaw Elec Fmn St Louis Mo
x E S Wood MM St Louis Mo
B G Worden RH Fmn Fort Smith Ark
48 — 48 ST LOUIS SOUTHWESTERN — 6
* H J McKenzie President St Louis 2 Mo
* W H Hudson VP & Gen Mgr Tyler Tex
x E V Myers Supt MP Pine Bluff Ark
* T E Martin Purch Agent St Louis 2 Mo
C D Allison Elec Shop Fmn Pine Bluff Ark
T W Bellhouse MM Tyler Tex
L O Bluerock Asst Mech Engr Pine Bluff Ark

J M Brown RH Fmn Tyler Tex
W A Brule Jr MM Pine Bluff Ark
C E Bynum Mech Fmn Dallas Tex
L H Cain Gen Fmn Shreveport La
C A Chatfield Div Diesel Supvr Pine Bluff Ark
R M Clark Supvr of Diesel Equip Pine Bluff Ark
Ralph E Cutrell Gen Fmn E St Louis Ill
K E Deasom Machine Fmn Tyler Tex
W C Fiesler Mech Fmn Malden Mo
C O Floyd Mech Fmn Corsicana Tex
S J Fuller Mech Engr Pine Bluff Ark
James S Gardner Night RH Fmn E St Louis Ill
H R Gilmer Machine Fmn Pine Bluff Ark
L H Harris Diesel Loco Fmn Pine Bluff Ark
Edward Leon Hawkins Lead Workman Lewisville Ark
x T H Henry Night Mech Fmn Jonesboro Ark
E M Hercher RH Fmn Pine Bluff Ark
G G Hunter Gen Fmn Illmo Mo
Charles Kalkbrenner Mech Fmn Pine Bluff Ark
Eugene Kennedy Chief Elec Tyler Tex
x G L Kenney Prin Div Chemist Pine Bluff Ark
Arthur E Leath Blacksmith Fmn Pine Bluff Ark
x M E Lee Gen Fmn Waco Tex
H R Leggett Rd Fmn of Engines Pine Bluff Ark
C A Lites Night Mech Fmn Waco Tex
S R Lusk Div Diesel Supvr Tyler Tex
Ralph Miller Rd Fmn of Engs Fernfelt Mo
John M Mullins RH Fmn Tyler Tex
M P Nunnally Engr MP Pine Bluff Ark
C E Platt Gen Loco Fmn Tyler Tex
J C Renfrow Jr Spec Mech Supvr Pine Bluff Ark
F M Roberts Rd Fmn of Engines Pine Bluff Ark
x S J Roberts Mech Fmn Shreveport La
C G Schrader Elec Fmn Pine Bluff Ark
x R A Scott Gen Loco Fmn Pine Bluff Ark
W S Shelby Night Mech Fmn Mt Pleasant Tex
A B Shinall Boiler Shop Fmn Pine Bluff Ark
L E Smith Gen Fmn Texarkana Tex
H E Webb Gen Fmn Commerce Tex
J T Wilson Mech Fmn Camden Ark
C O Yowell RH Fmn Pine Bluff Ark

1 — 1 ST PAUL UNION DEPOT — 1

x Robert C Meihofer RH Fmn St Paul Minn

1 — 2 SAUDI GOVERNMENT RAILROAD — 0

Bernard G Langhoop Asst MM Rt 2 Lockport N Y
J M Terranova Gen Fmn Damman Saudi Arabia

2 — 2 SAVANNAH & ATLANTA — 0

* C E Gay III President Savannah Ga
* J M Sikes Supt MP Savannah Ga

70 — 10 SEABOARD AIR LINE — 3

* John W Smith President Norfolk 10 Va
* C H Sauls VP Oper Norfolk 10 Va
* H S Mercer CMO Norfolk 10 Va
* R W Rogers Gen Purch Agent Norfolk 10 Va
x E P Bledsoe Shop Supt Jacksonville Fla
Harold R Boyette Diesel Supvr Norfolk Va
H W Brewer Ch Clerk & Sec Norfolk Va
· Henry W Jarrett Asst to Chief Mech Officer Norfolk 5 Va

x R L Lynn Asst CMO Norfolk Va
x Robert W Murray Diesel Inspr Norfolk 7 Va

1 — 1 SOUTH AFRICAN RAILWAY — 0
C E Taylor Advisory Engr New York 36 N Y

1 — 1 SOUTH AUSTRALIAN RAILWAY — 0
A A Pryce Chief Mech Engr Adelaide S A Australia

150 — 50 SOUTHERN RY — 25
* H A DeButts President Washington 13 D C
* D W Brosman VP Oper Washington 13 D C
* R E Franklin Asst VP Mech Washington 13 D C
* C R Whitaker Asst VP Washington 13 D C
x A Arnhart Chemist Alexandria Va
D M Barksdale Process Engr System Asst Shop Chattanooga Tenn
x J C Barlow Gen Diesel Supvr Atlanta Ga
R M Barnett Gen Fmn Diesel Loco Spencer N Carolina
Charles W Bennett Gen Fmn System Assembly Shop Chattanooga Tenn
M R Brockman Retired VP Salisbury N C
x S E Butler Gen Fmn Salisbury N C
J R Cress Gen Diesel Supvr Spencer N C
x C L Crymes Supvr Diesel Water Alexandria Va
Charles E Daniel Gen Fmn Hamburg S C
D F DeLong Train Control & Radio Supvr Atlanta 3 Ga
Wm B Dobbs Gen Fmn Assembly Shop Chattanooga Tenn
x O H Duncan Gen Fmn Diesels Knoxville Tenn
x P O Fairchild Gen Fmn Chattanooga Tenn
x C O Garvin Gen Fmn Atlanta Ga
K L Gentry Asst Supt System Assembly Shop Chattanooga Tenn
V D Greene Gen Fmn E St Louis Ill
x R S Hamilton Asst CMO Washington D C
x M H Hammett Mgr Spencer Shop Spencer N C
x William T Harkey Elec Engr Washington D C
x C F Harvey Diesel Engr Washington D C
x R H Herman Engr Shops & Equip Washington 13 D C
x A E Hinson Asst Engr of Tests Alexandria Va
x Paul Jones Met Engr Alexandria Va
James M Lyons Gen Fmn Macon Ga
C J McMichen Gen Fmn Macon Ga
Jack M Miller MM Chicago 17 Ill
x A N Oden Gen Fmn Irondale Ala
H L Ousley Gen Diesel Supvr Salisbury N C
x K L Pollitt Asst Diesel Supt Chattanooga Tenn
A B Rountree Gen Fmn Jacksonville Fla
x H W Sanders Gen Fmn Columbia S C
x Carroll H Shelhorse Asst Diesel Supt Washington 13 D C
N W Sitton Gen Fmn Atlanta Ga
x O H Smart Master Mech Chattanooga Tenn
x L Fred Smith Mech Engr Washington D C
x F E Stubbs Mgr Motor Shop Atlanta Ga
x J C Taylor Diesel Supt Washington 13 D C
x H G Trollinger Asst Engr Mech Dept Washington D C
O P Tucker Jr Gen Diesel Instr Signal Mt Tenn
x J C Waddle Gen Diesel Supvr Knoxville Tenn
A G Waldrupe MM Macon Ga
W W Wallace Gen Fmn Assembly Shop Chattanooga Tenn
x C E Webb Engr of Tests Alexandria Va
Forman D White Gen Fmn Valdosta Ga
J B Yonge Gen Fmn Ludlow Ky

371 — 144 SOUTHERN PACIFIC — 7

* D J Russel President San Francisco 5 Calif
* J W Corbett VP Oper San Francisco 5 Calif
* S M Houston Gen Supt MP San Francisco 5 Calif
* M C Mystrom Gen Purch Agent System San Francisco 5 Calif
L J Adams Rd Fmn of Engines El Paso Tex
H T Anderson MM Bakersfield Calif
Esteban G Angulo RH Fmn Nogales Arizona
P Aprato Sheetmetal Fmn Los Angeles 31 Calif
C D Aull RH Fmn Tucumcari N M
I L Baumann Trav Diesel Supvr San Francisco Calif
x James Bean Engr of Motive Power San Francisco 5 Calif
C M Biffi Deptl Sheetmetal Fmn Los Angeles 31 Calif
J V Bland Rd Fmn of Engines Portland 2 Oregon
C J Bohn Relief Fmn Diesels Roseville Calif
John Boroja Sheet Metal Wkr Fmn Roseville Calif
Lauren S Boyd Dynamometer Car Engr San Francisco 5 Calif
William M Brennan Dist Rd Fmn Albany Calif
A C Brewer Asst Rd Fmn of Engines Portland Oregon
R J Brinegar RH Fmn Klamath Falls Ore
Drisdale Brown Shop Supt Los Angeles 31 Calif
* B M Brown Retired Gen Supt MM Palo Alto Calif
Harold P Brown Machine Fmn Roseville Calif
J D Brown Asst Rd Fmn of Engines Sparks Nev
William O Brown Asst Supt MP Sacramento Calif
J A Burke RH Fmn Klamath Falls Ore
G M Cagley Supt Shops Sacramento Calif
L E Cantrell Gen Fmn El Paso Tex
A S Carlson Machinist Fmn Los Angeles 31 Calif
H E Carter MM Tucson Ariz
E Christian RH Fmn Tracy Calif
H L Covington RH Fmn Carlin Nev
Ray F Cronkhite Roundhouse Fmn Gerber Calif
J R Davidson Supvr Fdry Oprs Sacramento Calif
Earl W Davis RH Fmn Oakland Calif
E E Denyer Mach Fmn Los Angeles 31 Calif
E M Dewey Sheetmetal Fmn Los Angeles 31 Calif
R M Dickson Asst Rd Fmn Engines Dunsmuir Calif
C C Edson Welder Fmn Los Angeles 31 Calif
James K Edwards Asst MM Oakland Calif
S H Ehrenstein Mach Fmn El Paso Tex
Walter F Entelman RH Fmn Concord Calif
Rudolph Ersepke MM Oakland Calif
J E Ewing Fire Inspector Los Angeles 31 Calif
Kenneth W Faulkner RH Fmn Turckee Calif
* L T Fife MM Coast Div San Francisco 24 Calif
x Edward O Fink Rd Fmn of Engs Ogden Utah
G Gabler RH Fmn San Luis Obisop Calif
Malcolm R Gaddis Engr MP Dept San Francisco Calif
Sam S Gillespie Asst MM Ogden Utah
K F Gluesing Elec Fmn Los Angeles 31 Calif
H H Goodloe-RH Fmn El Paso Tex
Lauren N Griffith Asst Mech Engr San Francisco 5 Calif
Allen C Grover Traveling Diesel Supvr San Francisco 5 Calif
x Oscar H Gutsch MM El Paso Tex
H H Hamann Schedule Supvr Los Angeles 31 Calif
John F Hamilton Elec Fmn Roseville Calif
J L Hancock RH Fmn Sacramento Calif
J R Harrigan Machinist Fmn Los Angeles 31 Calif

Lloyd C Harpster RH Fmn Coos Bay Ore
x Roy E Harrison Supvr Diesel Loco Maint San Francisco 5 Calif
Hollis A Henderson Night Gen Fmn Ogden Utah
W C Herman RH Fmn Roseburg Ore
Harold E Hill Relief RH Fmn Klamath Falls Ore
J H Hines Gen Fmn Bayshore Calif
E E Hinchman Supt MP Los Angeles 31 Calif
B B Hoadley RH Fmn Fresno 4 Calif
W H Hodsdon Machinist Fmn Los Angeles 31 Calif
N F Hoffman Dept Blacksmith Fmn Los Angeles 31 Calif
Mike S Howard RH Fmn Hayden Jct Ariz
Howard H Hughes Asst RFE Eugene Ore
George W Hutton Machinist Fmn Los Angeles 31 Calif
W A Jackson Mach Fmn Los Angeles 31 Calif
Walter A Johnson Gen Fmn Loco Dept Sacramento Calif
T F Johnson RH Fmn San Jose Calif
Frank Keiper Spec Rep MP San Francisco 5 Calif
H L Kidwell Machinist Fmn Los Angeles 31 Calif
Elven L Kerran Relief RH Fmn San Jose Calif
James Kitchen Ld Elec Diesel Dept Los Angeles 31 Calif
Donald C Kutsch Machinist Fmn Los Angeles 31 Calif
R R Latimer Machinist Fmn Los Angeles 31 Calif
Jack Lewis Traveling Loco Supvr T & NO Shops Houston Tex
A E Lines Dept Elec Fmn Los Angeles 31 Calif
Laurence E Lonergan MM Roseville Calif
J H Long Supt El Paso Tex
x*F A Longo Gen Welding & Boiler Inspr San Francisco Calif
S G Longo Gen Boiler Fmn Los Angeles 31 Calif
x N L McCracken Asst Gen Supt MP San Francisco Calif
Earl A McCutscheon RH Fmn Bakersfield Calif
W J McHugh Asst Supt MP Los Angeles 31 Calif
R J McKinney Mach Fmn Los Angeles 31 Calif
R D Mahr Gen Fmn Oakland Calif
H P Manning Mech Fmn Los Angeles 31 Calif
W H Meredith Gen Fmn Sacramento Calif
S A Meyer RH Fmn Suisun Calif
F E Molloy Supt MP Sacramento 14 Calif
Thurman Moore RH Fmn Tucumcari N M
LeRoy Morgan Safety Supvr Los Angeles 31 Calif
Harry Nations Rd Fmn of Engines El Paso Tex
Edward Neahr RH Fmn Yuma Ariz
James L Nethery RH Fmn Carlin Nev
D B O'Connell Chief Draftsman Los Angeles 31 Calif
L P Oberkamp MM Dunsmuir Calif
Francis R Olds MM Portland Ore
G E Orr Boilermaker Fmn Los Angeles 31 Calif
Edmund F Peters Asst MM Eugene Ore
E M Pitt RH Fmn Dunsmuir Calif
Eliot Pope, Traveling Diesel Supvr Oakland 1 Calif
N Pratt RH Fmn Dunsmuir Calif
Walter L Preece Traveling Diesel Supvr San Francisco Calif
* William G Reed Retired Supt MP El Paso Tex
M E Reneau Div Elec Fmn Avondale La
Martin E Ries Gen Fmn Eugene Ore
Robert W Riley Gen Fmn West Oakland Calif
J W Ronan Master Mech Bakersfield Calif
E B St Clair Asst Chief Chemist Ogden Utah
Carl M Schultze Rd Fmn Engs Oakland Calif

H R Schuneman Machinist Fmn Los Angeles 31 Calif
F M Scott Sheetmetal Fmn Los Angeles 31 Calif
Glenn E Selfridge RH Fmn (Relief) Citrus Heights Calif
John H Shawver RH Fmn Phoenix Ariz
A L Shoupe Rd Fmn of Engs Klamath Falls Ore
* J F Simpson Retired Sheetmetal Fmn Onalaska Wash
Louie Sinnar Rd Fmn of Engs Eugene Ore
W T Small Sched Supvr Sacramento Calif
x Robert L Smith MM Ogden Utah
D J Stavros Relief RH Fmn Dunsmuir Calif
J M Stout Rd Fmn of Engines Sparks Nev
Lewis H Sultan Diesel Engr San Francisco 5 Calif
R W Sundborg Dist Auto Train Controls Sacramento Calif
H F Swift RH Fmn So Pac RH Tracy Calif
J E Thexton RH Fmn Globe Ariz
Herman D Tueller RH Fmn Roseville Calif
C R Turner RH Fmn Diesels Roseville Calif
Ralph Vogt RH Fmn Tracy Calif
Eugene C Wagner Asst MM Roseville Calif
L H Walters Welder Fmn Los Angeles 31 Calif
O S Weise Elec Fmn Roseville Calif
Joseph Weldon Sheet Metal Wkr Fmn Oakland Calif
G H Wheat Gen RH Fmn San Jose Calif
R J Winston Loco Painter Fmn Los Angeles 31 Calif
R W Wisdom Sheetmetal Fmn San Bernardino Calif
S J Wyckoff RH Fmn Tucumcari N M
Orlando S Young Asst Rd Fmn of Engines Ogden Utah
J Zimmerman RH Fmn San Francisco 24 Calif

13 — 10 SPOKANE PORTLAND & SEATTLE — 1

* J M Budd President St Paul Minn
* L W Albertson VP Portland Ore
* N S Westergard Gen Mgr Portland Ore
x D J Ritchie Gen Supt MP Vancouver Wash
* W T Cowan Purch Agent Portland 7 Ore
Herbert E Croffut Trav Engr Spokane 35 Wash
Lester Z Daniels MM Vancouver Wash
L J Fitzgerald Trav Engr Vancouver Wash
Everett L Kennard Supvr Diesel Maint Oper Vancouver Wash
Joseph J Shefchek Trav Engr Vancouver Wash

2 — 1 STATE RAILWAY OF THAILAND — 0

Chu Hoonchamlong Engr 1c Diesel Locos Bangkok Thailand

9 — 13 TERMINAL RAILROAD ASSOCIATION OF ST LOUIS — 2

* Armstrong Chinn President St Louis 3 Mo
* Elwood Davis VP & Gen Mgr St Louis 3 Mo
* George B Miller Supt MP & E St Louis 3 Mo
x E R Coggins Erecting Fmn Lovejoy Ill
H G Field Gen Diesel Supvr Lovejoy Ill
J A Johnson Mach Gang Leader & Extra Fmn Lovejoy Ill
O J Laubenthal Gen Fmn St Louis 3 Mo
Paul A Laubenthal Elec Fmn St Louis Mo
C J McGuire Gen Fmn Lovejoy Ill
George B Miller Supt MP & E St Louis 3 Mo
Otto C Mundelius Fmn Mech Dept Madison Ill
x H W Musick Elec Fmn Lovejoy Ill
Fred C Whitlock Asst to Supt MP & E Ry St Louis 3 Mo

1 — 1 TEXAS & MEXICAN RY — 1

x T C Savey Master Mechanic Laredo Tex

20 — 23 TEXAS & NEW ORLEANS — 3

* B S Sines Exec VP Houston Tex
* R de Waal Gen Mgr Houston 1 Tex
* Frank E Russell Supt MP & Equip Houston Tex
A J Anderson Night RH Fmn Del Rio Tex
N W Beeson Gen Shop Fmn Houston Tex
C Bosco Diesel Loco Fmn Houston Tex
C C Cernuch RH Fmn Houston 22 Tex
J J Daugherty Master Mech Lafayette La
Malcolm P Ehrhardt Sr RH Fmn Avondale La
A E Felscherv RH Fmn Jacksonville Tex
H E Fletcher Night RH Wrk Fmn Sanderson Tex
F W Gehrer Diesel Mech Fmn San Antonio Tex
W R Glenn Sr Gen Loco Fmn San Antonio Tex
Michael Gogol Diesel Engr Houston 1 Tex
x E I Norman Asst MM Houston Tex
x Ky Pruchnicki Asst Supvr of Diesels Houston 9 Tex
P B Rice MM Houston Tex
H E Rigby Diesel Shop Fmn San Antonio Tex
x A I Sellers Chief Asst Supt MP & E Houston 1 Tex
Dempsey S Thibodeaux Loco Fmn Lafayette La
Joseph F Tronson Day RH Fmn Sanderson Tex
F L Williamson Day RH Fmn Valentine Tex
N W Yates Night Diesel Shop Fmn San Antonio Tex

90 — 43 TEXAS & PACIFIC — 3

* W G Vollmar President Dallas Tex
* L C Porter VP of Oper Dallas Tex
x T E Albright Mech Supt Dallas Tex
* H Crouse Purch Agent Dallas 2 Tex
C L Armstrong Car Fmn El Paso Tex
A L Bell Diesel Elec Marshall Tex
A C Bjork Asst Diesel Fmn Ft Worth Tex
E R Bjork RH Fmn Mineola Tex
H G Burford RH Fmn El Paso Tex
T C Chastain Chief Draftsman Marshall Tex
E L Chelf Car Fmn Baird Tex
Wilbert Combs Gen Car Fmn Marshall Tex
T J Conway Trans Asst Dallas Tex
F H Cowan RH Fmn Mineola Tex
Foy Crockett Asst Car Fmn Big Spring Tex
J C Cutrell Mech Fmn Monahans Tex
M H Davies RH Fmn Texarkana Tex
* L E Dix Retired Mech Supt Ft Worth Tex
D D Dyer Gen Car Fmn Big Spring Tex
R L Eiland Gen Fmn El Paso Tex
G V English Engine Disp Fmn Ft Worth Tex
A J Faulkner Diesel Fmn Big Spring Tex
J W Forrester Diesel Shop Fmn Ft Worth 7 Tex
J O Fraker Supt Diesel & Elec Maint Dallas 2 Tex
R M Hawkins Apprentice Instr Marshall Tex
H D Hollis Mech Engr Dallas Tex
R W Jordan RH Fmn Texarkana Tex
J H Judd Asst MM Marshall Tex
x H L McMullin Engr Tests & Water Supply Ballard Tex
A McNamara Coppersmith Fmn Ft Worth Tex
J J Meneghetti Night Fmn Toyah Tex
* R C Parker Asst VP Oper Dallas 2 Tex
C S Perry Diesel Fmn Ft Worth Tex
A J Pierson Gen Fmn Toyar Tex

O E Prior Car Fmn Big Spring Tex
H Reeves Asst Car Fmn Big Spring Tex
W E Routon Night RH Fmn Dallas Tex
F L Scarborough Jr Gen Fmn Dallas Tex
x Louis E Talbot Chief Chemist Ft Worth Tex
Brice Whitson Jr Mech Draftsman Ft Worth Tex
V E Winel RH Fmn Texarkana Tex
James T Wood Jr Night RH Fmn El Paso Tex
C I Wright Jr Mech Fmn Monahans Tex

5 — 4 TEXAS PACIFIC-MISSOURI PACIFIC TERMINAL — 2
x H L Gore MM Metairie La
x F W Kramer Diesel Shop Fmn New Orleans La
Andrew Lewis Langridge Mach & Relief Fmn Avondale La
Ruben Modern Elec Supvr New Orleans 13 La

6 — 4 TOLEDO PEORIA & WESTERN — 1
* J Russel Coulter President E Peoria 8 Ill
* R M Esslinger Supt E Peoria 8 Ill
* R H Egbert Chief Engr & Mech Officer Peoria Ill
x J E Fox Gen Fmn E Peoria Ill

2 — 4 TOLEDO TERMINAL — 1
* R H McGraw President Cleveland 13 O
* C F Meyers Gen Mgr Sylvania O
* H G Dugan Supt MP Toledo 4 O
x E J Palmer Gen Fmn Shops Toledo 4 O

2 — 2 TORONTO HAMILTON & BUFFALO — 0
* P W Hankinson Gen Mgr Hamilton Province Ont Canada
J W Rowley Master Mech Hamilton Province Ont Canada

1 — 1 TRONA RAILWAY COMPANY — 0
A L Morgan Mech Supt Trona Calif

1 — 2 UNION BELT OF DETROIT — 0
James F Colville Loco Fmn Detroit 28 Mich
J A Jones RH Fmn Highland Park 3 Mich

212 — 53 UNION PACIFIC — 3
* A E Stoddard President Omaha 2 Neb
* E Hicks VP Oper Omaha 2 Neb
* D S Neuhart Gen Supt MP & Mach Omaha 2 Neb
* G T Wickstrom Gen Purch Agent Omaha 2 Neb
Joe Barton Asst EH Fmn Los Angeles 23 Calif
W R Bennett Rd Fmn of Engs Marysville Kansas
William C Bossley EH Fmn Yermo Calif
F D Bruner Gen Elec Fmn Omaha 2 Neb
R E Carroll Gang Fmn OGE M & P Omaha 2 Neb
J G Claus Supvr Oil Gas Elec Mobile Power Omaha 2 Neb
Charles G Cluff Mech Fmn Cache Jct Utah
Roy Cochran Gen Boiler Fmn Omaha 2 Neb
x R F Connor System Wheel Shop Insp Omaha Neb
H L Crane Dist Fmn Ogden Utah
John B Crawford Misc Equip & Tool Fmn Omaha Neb
James F Dunn OGE & MP Fmn Omaha 2 Neb
Lloyd D Edson Elec Fmn Omaha Neb
George J Galda Gen Elec Fmn Los Angeles 23 Calif
Emil W Gehrke Wheel Shop Fmn Omaha Neb
J Geist Gang Fmn Omaha 2 Neb
Augustine J Genovesi Elec Fmn Omaha Neb
Joseph Hailicka Gang Fmn Mach Omaha Neb
* C L Hemple Retired Boiler Inspr Omaha Neb
Earl M Hickox Asst Gen Storekeeper Omaha 2 Neb
Robert L Johnson Asst Supvr Mobile Power Omaha Neb

H H Jones Engr of Air Brakes & Train Control Maint Omaha 2 Neb
James A Kaiser Diesel Supvr Denver Colo
E J Keane Gen Elec Fmn Omaha Neb
Carl W Lowe Gen Elec Fmn Milford Utah
Fred H Lundholm Asst Rd Supvr Diesel Power Omaha 2 Neb
J P McGlynn Diesel Instr Omaha Neb
Merlyn F Miller Asst Supvr Mobile Power Omaha Neb
A C Morck Mech Inspr Omaha Neb
x E E Murphy Elec Engr Omaha Neb
E L Neeley Mech Supt Omaha Neb
William W Peterson Asst Supvr OGEMP Ogden Utah
Fred M Petrie Elec Fmn Kansas City Kansas
James E Pickett MM Portland Ore
W E Pitner OGE Mobile Power Fmn Omaha 2 Neb
Frank Poloncic Asst Supvr OGE MP Omaha Neb
F H Prideaux Jr Elec Fmn Omaha 2 Neb
Richard E Prince Jr Engr Turbine Loco Design Omaha Neb
J S Richardson Dist Fmn Nampa Idaho
Floyd A Riggs Mech Supvr Las Vegas Nev
Frank St Lucas Supvr Diesel Eng Maint Omaha Neb
J H Sinnar Asst MM Los Angeles Calif
Earl Sitton Mech Fmn Ellis Kansas
x A R Snyder Asst Gen Supt MP & M Omaha Neb
Frank J Stehno Wheel Shop Fmn Omaha Neb
William Turner Jr Elec Fmn Ogden Utah
Carroll L Wagner OGE Mobile Power Fmn Omaha Neb
Carl F Westphal Gen Elec Fmn Salt Lake City Utah
William J Williams Mech Fmn Kelso Calif

16 — 6 UNION — 3
* F W Okie President Pittsburgh 30 Pa
* J E Metzler Supt E Pittsburgh Pa
* R L Baker Mech Supt E Pittsburgh Pa
x Joseph J Borish Diesel Supvr E Pittsburgh Pa
x Earl R Miller Diesel Supvr Monroeville Pa
x J A Osten Gen Fmn E Pittsburgh Pa

1 — 2 U S ARMY TRANSPORTATION SCHOOL RR — 1
x Ralph B Craine Supvr Mech Engr St Louis Mo
Peter W Haff Bronxville 8 New York

1 — 1 VICTORIAN RAILWAYS — 1
x S F Keane Diesel Maint Engr Victoria Australia

5 — 9 VIRGINIAN — 3
* F D Beale President Norfolk 10 Va
* D C King Gen Mgr Norfolk 10 Va
* W W Osborne Supt MP Princeton W Va
* F C Holton Purch Agent Norfolk 10 Va
x Claude Edgar Fisher Engr of Tests Roanoke Va
x W A Grigg Asst Supt MP Princeton W Va
R R McDaniel Master Mech Victoria Va
x George T Strong Jr Master Mech Mullens W Va
Edwin H Werner Asst Elec Engr Princeton W Va

40 — 19 WABASH — 8
* A K Atkinson President St Louis 1 Mo
* J F Nellis Gen Mgr Oper St Louis 1 Mo
x* E R Buck Gen Supt MP Decatur Ill
* K L Brenner Purch Agent St Louis 1 Mo
x C L Craig Water Inspector Moberly Mo
W M Dempster Shop Supt Decatur Ill
G C Drake Relief Fmn St Louis Mo

George E Evans Asst Supvr of Diesel Equip Moberly Mo
x R N Foster Asst to Gen Supt MP Decatur Ill
x W O Freischlag Asst Engr to G SMP Decatur Ill
Charles J Graham Asst MM St Thomas Ont Canada
A E Haase Water Inspector Decatur Ill
x F T Lines Asst Gen Supt MP Decatur Ill
x James P MacGregor Supt Diesel Power Decatur Ill
D T McNutt Night RH Fmn St Louis Mo
B J Payne MM Moberly Mo
x John P Rodger Water Engr Decatur Ill
Frank See Elec Fmn Moberly Mo
x Harold L Wingfield Asst Engr Decatur Ill

1 — 1 WASHINGTON TERMINAL — 1

x J W Phillips Gen Fmn Loco Dept Washington D C

46 — 31 WESTERN MARYLAND — 5

* W Arthur Grotz President Baltimore 2 Md
* G M Leilich VP Oper Baltimore 2 Md
* C J Wolfe Supt Motive Power Hagerstown Md
x S K Bonebrake Asst Rd Fmn of Engines Cumberland Md
W L Brown Gen Loco Fmn Dunbar Pa
x W F Bowers Supvr Diesel Loco Maint Hagerstown Md
H M Burley Working RH Fmn Worthington W Va
J R Campbell RH Fmn Cumberland Md
W O Cottingham Supvr Loco Perform Hagerstown Md
D G Drawbaugh Jr Engr of Tests Hagerstown Md
P R Dugan RH Fmn Elkins W Va
C W Dunham Diesel Fmn Elkins W Va
x W P Gilford MM Cumberland Md
* A W Grosskopf Retired Boiler Fmn Elkins W Va
R H Harrison Asst Elec Supvr Hagerstown Md
I L Hostettler RH Fmn Cumberland Md
x H J Koch Asst Mech Engr Hagerstown Md
M L Lantz Asst RH Fmn Hagerstown Md
W G Malcolm RH Fmn Elkins W Va
R B Martin RH Fmn Cumberland Md
P S Mouldan RH Fmn Cumberland Md
Virgin Parnell RH Fmn Dunbar Pa
W L Preaskorn RH Fmn Ridgley W Va
P T Quinn RH Fmn Connellsville Pa
H W Reed MM Hagerstown Md
J L Spangler Gen RH Fmn Ridgeley W Va
T L Staun RH Fmn Dunbar Pa
R H Stocksdale Elec Supvr Hagerstown Md
x J L Triplett Engineering Asst to Supt MP Hagerstown Md
E R Varley Shop Fmn Baltimore Md
M A Weiner Supvr Welding Hagerstown Md

21 — 8 WESTERN PACIFIC — 2

* Frederic B Whitman President San Francisco 5 Calif
* Harry C Munson VP & Gen Mgr San Francisco 5 Calif
x E T Cuyler CMO Sacramento 18 Calif
* J C Marchand Gen Purch Agent San Francisco 5 Calif
* G S Allen President Pacific Ry Club Supt Trans San Francisco Calif
Frank Bennyhoff RH Fmn Quincy Calif
* E E Gleason Retired CMO Sacramento 18 Calif
x W B Wolverton Mech Engr Sacramento 17 Calif

1 — 2 WESTERN RAILWAY OF ALABAMA — 0

G D Brown Mech Engr Atlanta Ga
Geo A Joiner Gen Diesel Supvr Montgomery Ala

1 — 1 YOUNGSTOWN & NORTHERN — 1
x C E Brandfass Supt Youngstown 9 O
0 — 23 ASSOCIATED ORGANIZATIONS — 4
* Allyn C Breed Washington 16 D C
* Frank D Carvin Dir Ill Inst of Tech Chicago 16 Ill
Edward J Cavanaugh Forest Protection Engr RR Fire Protec State of Wis 2899 N 29 Milwaukee 10 Wis
* Arthur Cole Librarian Harvard U Cambridge Mass
* V W Eldridge Mass Sch of Tech Cambridge 30 Mass
* Mrs Varelia H Farmer Supvr Pro Dept Cleve Pub Lib Proc Dept Cata Div Cleveland 14 O
* Curtis Fuller Ed Annual Mkt Data & Dir # 200 E St Louis St Chicago Ill
x Claude D Fulk Supt U S Ry Dept Int Corres Schools Salisbury N C
Linda Hall Library Kansas City 10 Mo
* Harold E Heldreth Ag Rep Nat Safety Coun 425 N Michigan Ave Chicago 11 Ill
* A N Houston MD 912 Union New Orleans 12 La
* G R Hutchinson Whitehall Tech Press Ltd Catherine Place Westminster London SW-1 Eng
* Robert Lewtin Ed Sales Meet 1212 Chestnut St Philadelphia 7 Pa
* Helen M Mason Los Angeles Pub Library Los Angeles 17 Calif
* Miss Helen J Maunu Head Order Div Cleve Pub Library Cleveland 14 O
Henry E Patjens Mfgs Agent 38 Stratford Ave University City Mo
* O S Pepper Mgr Rate Serv Dept Stand Rate & Date Serv Inc. Evanston Ill
* H T Pledge Librarian The Science Library-Science Museum S Kensington London SW 7
x James G Russell Trans Spec U S Dept of Labor Bu of App Rm 302 Wn Pac Bldg Los Angeles 15 Calif
x George W Sabo Trans Rep Bur of App U S Dept of Labor Nashville 3 Tenn
* St Louis Public Library St Louis 3 Mo
The Librarian SAR & H Ref Library Railway Hqs Johannesburg South Africa
C F Weil Retired Sec Treas Allied Ry Sup Assn 349 N Bowling Green Los Angeles 49 Calif
0 — 7 ASSOCIATION OF AMERICAN RAILROADS — 1
* J H Aydelott Ret VP Assn of Am Railroads La Grange Ill
John Driver Jr Lab Engr Assn of Am RRs Chicago 16 Ill
* W T Faricy Pres Assn Am Railroads Washington 6 D C
x V W Hawthorne Ret V Ch Mech Sec Assn Am RRs 2136 N 22nd Ave Hollywood Fla
* J R Jackson Ret Mech Engr Assn of Am RRs P O Box 2232 Williamsburg Va
* Wm M Keller Dir Exec V Chmn Mech Div Assn of Am RRs 69 E Van Buren Chicago 5 Ill
Wm M Martin Mech Engr Assn of Am RRs 3140 S Federal St Chicago 16 Ill
0 — 24 INTERSTATE COMMERCE COMMISSION — 14
Lewis H Ashby Dist Inspr of Loco ICC St Louis 1 Mo
K T Bach Loco Inspr ICC Memphis 11 Tenn
x E R Butler Inspr ICC Chicago 39 Ill
x H W Chandler Asst Reg Mgr Bur Safety & Serv ICC Atlanta 23 Ga
* Hon Owen Clark Member ICC Washington D C
x William T Coniff Safety Inspr ICC Washington 25 D C
x E H Davidson Ret Dir Loco Inspec ICC Washington 25 D C
James E Friend Dist Loco Inspr Bur of Safety & Serv Ft Worth 10 Tex
x Charles H Grossman Loco Inspr ICC Albuquerque N M
x John A Hall Dir Bur Loco Inspec ICC Washington 25 D C
A H Johnson Dist Inspr ICC Albany 6 N Y
x H R Longhurst Asst Dir Bur of Safety & Serv ICC Washington 25 D C
x W Harry Ludlow Inspr ICC Chicago 49 Ill
C M McLaughlin Inspr of Loco ICC Great Falls Montana

Jacob K Mahr Inspr of Loco ICC Worthington O
x L C Otto Asst Reg Mgr ICC St Davis Mo
x R T Roberts Loco Inspr Albany 8 N Y
x Irv L Saucerman Inspr of Loco ICC Portland 5 Ore
x Howard H Shannon Asst Dir ICC Washington D C
x G A Sheehan Inspr Bur of Loco Inspec Omaha 2 Neb
x Harold C Sherman Zone Supvr ICC St Louis 14 Mo
Elmer H Sor Inspr of Locos ICC Denver 2 Col
G L Swetland Inspr ICC Columbus 12 O
S V Wadman US Inspr of Loco ICC St Paul 2 Minn

0 — 6 BOARD OF TRANSPORT COMMISSIONERS FOR CANADA — 4

x H O Bingham Dist Inspr Brd of Trans Com for Can Montreal Que Canada
x H R Cawley Mech Asst Brd of Trans Com for Can Ottawa Canada
W M Downie Dist Inspr Brd of Trans Com Moncton N B Canada
x*R H MacDonald Dir of Oper-Brd of Trans Com for Can Ottawa Ont Canada
W H Rose Diesel Elec Inspr Brd of Trans Com for Can Ottawa Canada
x Thomas H Turnbull Dist Insp Brd Trans Com Winnipeg 1 Canada

ASSOCIATE MEMBERSHIP

All concerned please note that this is not a listing of Companies; but is a listing of the actual individual Associate Members who have taken out individual memberships in the Association for the year 1957 and are identified here as to their Company.

1 **ADAMS & WESTLAKE COMPANY — 0**
Russell S Warren Mgr Relay Div No Michigan St Elkhart Ind
2 **AEROQUIP CORPORATION — 1**
x Robert G Cox Mgr Engineering Serv 300 E Ave Jackson Mich
Richard D Hitt Mgr RR Sales 300 S East Jackson Mich
3 **AIR MAZE CORPORATION — 1**
Bruce W Carkin Sales Engr 25000 Miles Rd Cleveland 28 Ohio
x H E Donovan RR Sales Mgr 6459 Sheridan St Chicago 26 Ill
William A Powers RR Repr 6459 Sheridan Rd Chicago Ill
3 **AIR REDUCTION SALES COMPANY — 2**
H T Johnson Mech Repr 630 S Second St St Louis Mo
x G H Pinckney Supvr RR Serv 220 Bush St San Francisco 4 Calif
x Ray L Rex Supt RR Serv 60 E 42nd St New York 17 N Y
2 **AJAX-CONSOLIDATED COMPANY — 0**
F R Brookmeyer Sales Engr 4615 W 20th St Chicago 50 Ill
W P Miller Sales Engr 4615 W 20th St Chicago Ill
1 **ALCHEM LTD — 1**
x R M Gale Mgr RR Dept Burlington Ont Canada
18 **ALCO PRODUCTS INC — 13**
x John D Coleman Sales Repr Schenectady N Y
x Ralph M Darrin Jr District Mgr 30 Church St New York N Y
John P DeLaney Mgr Marketing-Transp Prod Schenectady N Y
Joseph G Dolan Field Service Engr 30 Church St New York N Y
x P W Geisler Regional Mgr 30 Church St New York N Y
x Stanley E Lodge Dir of Training Programs Schenectady N Y
x R K McCoy Dist Mgr 501 Barr Bldg Washington 6 D C
W R McQuaid Jr Sales Repr 332 S Michigan Ave Chicago 4 Ill
x Thos W Myers Sales & Serv Repr 5000 S Major Ave Chicago Ill
W M Nichols Chief Engr Diesel Deve Nott St Schenectady N Y
x William A Olson Service Mgr Bldg 143 Schenectady N Y
Robert W Pittman Dist Mgr 235 Montgomery St San Francisco Calif
x Lowell O Ray Proj Leader 2210 Harvard St Cleveland 5 Ohio
x Edward C Roberts Ch Tech Serv Engr Schenectady N Y
R Tom Sawyer Repr Ho-Ho-Kus N J
x V E Varno Sales Repr 332 S Michigan Ave Chicago Ill
x G M White Sales Repr 332 S Michigan Ave Chicago Ill
x David B Wood Dev Engr 2210 Harvard Ave Cleveland 5 Ohio
1 **ALLIED ARKANSAS BEARING CO — 0**
M M Tompkins Gen Mgr & Treas 517 Spring St Little Rock Ark.
1 **AMERICAN BOSCH CORP — 1**
x Harold R Sennstrom Vice Pres Springfield 7 Mass
1 **AMERICAN IRON & STEEL INSTITUTE — 0**
M S Riegel Consulting Engr 230 N Michigan Ave Chicago Ill
1 **AMERICAN PAMCOR INC — 0**
S C Dillman Sales Administrator 181 Hillcrest Ave Havertown Pa
1 **ANACONDA WIRE & CABLE CO — 0**
L I. Carter Asst Chief Engr Hastings-on-Hudson 6 N Y
3 **AUTO CITY PLATING CO — 3**
x A F Cassin Gen Mgr 197 S Waterman Detroit 17 Mich
x Harvey Clark Sales Mgr 197 S Waterman Detroit 17 Mich
x R W Preikschat Sales Rep 8 S Mich Ave Chicago 3 Ill

2 **AUTOMATIC STEAM SALES CO — 1**
George M Egart Sales Mgr 4452 W 16th St Chicago Ill
x Frank W Hawkinson Sales Repr 330 N Branch Rd Glenview Ill
1 **BAILEY DIESEL SCHOOL — 0**
C L Watson Student Counselor 1626 S Grand St Louis 4 Mo
1 **BALDWIN-LIMA-HAMILTON — 0**
John F Kirkland Dist Mgr 2929 19th St San Francisco 10 Calif
2 **BARCO MANUFACTURING CO — 0**
W B Bley Representative 439 Colonial Terrace Hackensack N J
Wesley T Jones Mgr RR Sales 500-53 N Hough St Barrington Ill
1 **BEARINGS INC — 1**
x C R Lyons Ry Divisions 3634 Euclid Ave Cleveland 15 Ohio
1 **BETHLEHEM STEEL — 0**
Roy H Kinsell Salesman 25 Broadway New York 4 N Y
1 **JAMES G BIDDLE CO — 0**
E B Curdts Dir of Engr 1316 Arch St Philadelphia 7 Pa
2 **BIG BEN PETROLEUM PRODUCTS CO — 0**
Herman L Patt Chemist 624 S Michigan Chicago 5 Ill
Ben W Sager Representative 624 S Michigan Ave Chicago 5 Ill
1 **BINKS MANUFACTURING CO — 0**
V G Green Mgr Ry Sales 3114 Carroll Ave Chicago 12 Ill
1 **BIRD ARCHER CO LTD — 1**
x Jack E Koyl Mgr Ry Dept 2nd St Cobourg Ont Canada
1 **G S BLAKESLEE & COMPANY — 0**
A L Bashe Sales Mgr 1844 S 52nd Ave Chicago 50 Ill
1 **BRIGGS FILTRATION COMPANY — 1**
x Don Patton Sales Engr 1233 N Shore Ave Chicago Ill
1 **BRODIE SYSTEM — 0**
Edgar W Nielsen Gen Mgr 115 Clifton Place Brooklyn 38 N Y
2 **BUCKEYE STEEL CASTINGS CO — 0**
E H Bonnet Pres & Gen Mgr 2211 Parsons Ave PO Sta G Columbus 7 Ohio
William W Matchneer Vice Pres 2211 Parsons Ave Columbus 7 Ohio
3 **C & H CHEMICAL CO — 0**
E F Cedarholm President 475 N Cleveland Ave St Paul 4 Minn
J E Cedarholm Gen Mgr 475 N Cleveland Ave St Paul 4 Minn
James J Hale Sales Mgr 475 N Cleveland Ave St Paul 3 Minn
1 **CANADIAN BRONZE CO LTD — 1**
x W W Pugh Representative Montreal Canada
3 **CANADIAN GENERAL COMPANY LTD — 1**
L L Bodie Trans Prod Planning 107 Park St N Peterborough Ont Can
G W Painter Mgr Trans Equip Sales Apparatus Dept Peterborough Ont Can
x S L Thomas Supvr Engr Park St Peterborough Ont Canada
1 **— THE CARBONE CORPORATION — 0**
James J Carey Dist Mgr Chicago 4 Ill
1 **CHAMPION TRANSPORTATION SALES INC — 1**
x Earle A Mann Pres 222 W Adams St Chicago 6 Ill
1 **CHANDEYSSON ELECTRIC COMPANY — 1**
x William E Schwartz Gen Mgr 4084 Bingham St Louis 16 Mo
1 **CHEMICAL SUPPLY COMPANY — 1**
x Joe A Sidwa Owner 1160 W 26th St PO Box 7123 Houston Tex
1 **CHICAGO RAILROAD SUPPLY COMPANY — 0**
Herbert C Schroeder Partner 225 N Wabash Ave Chicago 1 Ill
1 **CHROME CRANKSHAFT COMPANY — 1**
x I A Booker Pres 7512 Maie Ave Los Angeles Calif
6 **CHROMIUM CORPORATION OF AMERICA — 4**
x Henderson M Bell III Plant Mgr & VP 1760 Lakeview Rd Cleveland 12 O
Charles H Belvin Asst Sec 100 E 42nd St New York 17 N Y
Howard H Blouch Sales Mgr 1760 Lakeview Rd Cleveland 12 O

x E W Schweiker Plant Supt 1760 Lakeview Rd Cleveland 12 O
x Faye Thomas Mgr of RR Sales 1760 Lakeview Rd Cleveland 12 O
x Wm B Thornton Sales Engr 1513 Marlboro Rd Westchester Pa

2 **CITIES SERVICE OIL COMPANY — 2**
x Tom E Burke Engr Ry Dept 20 N Wacker Drive Chicago 6 Ill
x S F Erickson Serv Engr 20 N Wacker Dr Chicago Ill

1 **CLEVELAND GRAPHITE BRONZE COMPANY — 1**
x E Crankshaw Chief Engr 17000 St Clair Ave Cleveland 10 O

1 **CLEVELAND HONEE MANUFACTURING CO — 0**
Robert C Smykal Sales Mgr 7120 Carnegie Ave Cleveland 3 O

1 **CLYDE ENGINEERING CO PTY LTD — 0**
Keith Stuart Black Gen Mgr Granville New S Wales Australia

1 **COMMERCIAL FILTERS CORPORATION — 1**
x Graham C Thompson Sales Engr Lebanon Ind

1 **CONTINENTAL OIL COMPANY — 1**
x M B Abernathy Sales Engr Fort Worth Tex

1 **CONTINENTAL SUPPLY COMPANY — 0**
Joe J Dailey Rep 332 S Michigan Ave Chicago 4 Ill

1 **DALC BEARINGS INC — 0**
William B Ashland Rep 1974 Broadway New York 23 N Y

1 **DEARBORN CHEMICAL COMPANY — 1**
x E R Glover Tech Dir RR Dept 375 Merchandise Mart Chicago 54 Ill

1 **DEARBORN RAILWAY SPECIALTY COMPANY — 0**
Robert E Prevaux VP & Gen Mgr 13011 Ford Rd Dearborn Mich

2 **DETROIT STEEL CORPORATION — 1**
Donald W Bogart Gen Fmn MP Box 371 Portsmouth O
x Harry R Mitchell Fmn MP Box 371 Portsmouth O

1 **DIESEL INJECTION SALES & SERVICE INC — 0**
H E Wittersheim Pres 808 Union St Norfolk 10 Va

1 **DIESEL POWER — 0**
C W Kinnear RR Editor 186 Glentay Rd Lansdowne Pa

1 **DIESEL PROGRESS — 1**
x Bruce W Wadman Managering Editor 2040 W Wisc Ave Milwaukee 3 Wisc

1 **DIESEL PUBLICATIONS INC — 0**
Brian P Emerson Editor 192 Lexington Ave New York 16 N Y

1 **THE DOW CHEMICAL COMPANY — 0**
Samuel E Cannon Salesman No 10 S Brentwood Blvd St Louis 5 Mo

2 **DRESSER MANUFACTURING DIV — 0**
J A Bader Wn Dist Mgr 41 Fisher Ave Bradford Pa
E R Carey Mgr RR Dept 41 Fisher Ave Bradford Pa

1 **EDGEWATER STEEL COMPANY — 0**
O B Capps Serv Engr PO Box 478 Pittsburgh 30 Pa

9 **ELECTRO-MOTIVE DIVISION GMC — 4**
G W Brownell Chief Installation Engr La Grange Ill
Guthrie Hill Dist Engr 1531 Ann Ave Kirkwood 22 Mo
Herbert G McClean Export Mgr La Grange Ill
x C R Oesterreich Rep Chicago Ill
Victor E Rennix Gen Sales Mgr La Grange Ill
x Roland R Seward Jr Sales Pro Mgr La Grange Ill
x Robt I Traver Engr La Grange Ill
x Walter A Turner Reg Serv Mgr 230 Park Ave New York 17 N Y
F W Walker Jr Reg Mgr 1230 Field Bldg Chicago Ill

5 **ELECTRIC STORAGE BATTERY CO — 0**
H G Campbell Sales Engr 5335 S Western Blvd Chicago 9 Ill
R L Clark Rep 5335 S Western Blvd Chicago 9 Ill
Val Hernandez Serv Engr 5335 S Western Blvd Chicago 9 Ill
R F Wilgus Field Engr Ry Div 5335 S Western Blvd Chicago 9 Ill
C W Wilson Branch Mgr 5335 S Western Ave Chicago 9 Ill

1 ENGINEERING CONTROLS INC — 1
x Wren Malone VP & Gen Mgr 328 Paul Brown Bldg St Louis 1 Mo

1 EQUIPMENT RESEARCH CORP — 0
J A Amos Pres 64 E Jackson Blvd Chicago 4 Ill

5 ESSO STANDARD OIL COMPANY — 0
Frederick C Davern Mgr RR Sales 15 West 51st St New York 19 N Y
Henry F Dreyer Sales Engr 15 W 51 St New York N Y
F H Greene Jr Lub Engr 4682 Nottingham Jacksonville Fla
Herbert S Muller Sales Engr 15 W 51st St New York N Y
Ernest W Rice Lub Engr 15 W 51st St New York 19 N Y

1 EX-CELLO CORPORATION — 0
Dorm Plank RR Engr 1200 Oakman Detroit Mich

3 FAIRBANKS MORSE COMPANY — 1
x Charles A Mapp Dist Mgr RR Div 600 S Mich Ave Chicago 5 Ill
Charles H Morse Jr Mgr Diesel Serv Dept 600 S Mich Ave Chicago 5 Ill
Jack C Radford Wn Dist Mgr RR Div 630 Third St San Francisco 7 Calif

3 FARR COMPANY — 0
F A Doody 5423 W Belmont Ave Chicago Ill
T J Galvin Repr 5423 W Belmont Ave Chicago Ill
R S Farr Pres 2301 E Rosecrans Ave El Segundo Calif

2 FORD MOTOR COMPANY RY — 2
x L J Brasher Supt Hvy Equip Maint 18671 Lancashire Rd Detroit 23 Mich
x Joseph S Marek Gen Fmn Diesel Hvy Equip Apt 8053 EE Bldg Rouge Plant Dearborn Mich

1 JAMES A GALLIGAN COMPANY — 0
James A Galligan Pres 2246 E 73rd St Chicago 49 Ill

3 GARLOCK PACKING COMPANY — 1
James Coquillard RR Repr 600 W Jackson Blvd Chicago 6 Ill
x P D Malley RR Repr 20 S 15th St Philadelphia 2 Pa
N C Schlegel Mgr RR Div 401 Main St Palmyra N Y

1 GARRATT-CALLAHAN COMPANY OF ILLINOIS — 1
x A W Wahlen RR Sales Mgr 59 E Van Buren St Chicago 5 Ill

14 GENERAL ELECTRIC COMPANY — 6
R C Alley Loco & Car Equip Dept 2901 E Lake Rd Erie 1 Pa
Robert M Coultas Mgr Trans Dept 4966 Woodland Ave Cleveland 4 O
x M D Gunselman Engr Loco & Car Dept Erie Pa
x H M Harrington Engr DE Loco Equip 1 River Rd Schenectady 5 N Y
x M D Henshaw Asst Cont Engr 2901 E Lake Rd Erie 1 Pa
John G Hoffman Jr Fuels & Lub Engr 2901 E Lake Rd Erie Pa
David W Hovis Lib Loco & Car Equip Dept 2901 E Lake Rd Erie 1 Pa
x B L Judy Field Engr 2901 E Lake Rd Erie Pa
G R McDonald Sec Engr 2901 E Lake Rd Erie 1 Pa
J U Neill Mgr Parts Div 2901 E Lake Rd Erie 1 Pa
Paul T Schick Field Engr P O Box 1213 Lancaster Pa
x J W Teker Supvr Ry Motor Prod Engr 2901 E Lake Rd Erie 1 Pa
x John K Wentz Supvr Ry Mtr Prd Eng Loco & C E E Lake Rd Erie Pa
R A Williamson Mgr RR Rolling 2901 E Lake Rd Erie 1 Pa

4 GENERAL MOTORS — 2
G N Bennett Dist Engr 951 Southwood Ave Winnipeg 9 Manitoba Canada
x S T Johnson Dist Engr No 15-134 Berry Rd Toronto 14 Ont Canada
x T N Snyder Serv Mgr 1775 Broadway New York 19 N Y
L M Stacey Serv Mgr P O Box 160 London Ont Canada

1 W M GIBBS RAILWAY SUPPLY — 0
E F Leherissey Partner 332 S Mich Ave Chicago 4 Ill

2 GOULD NATIONAL BATTERIES INC — 0
L M Johnson Dist Repr 35 N 6th St Reading Pa
J J Stroud Spec Engr 100 E Ohio St Chicago 11 Ill

4 **GULF OIL CORPORATION — 4**
x James C Bradley Supvr Ry Sales Gulf Bldg Pittsburgh 30 Pa
x Richard L Nix Supvr Prod App 200 N Mich Ave Chicago 1 Ill
x George E Roch Marketer-Direct Sales P O Box 2140 Houston 1 Tex
x M D Thompson Div RR Repr P O Box 2140 Houston Tex

1 **GUSTIN BACON MANUFACTURING COMPANY — 0**
D M Vance Sales Repr Prudential Plaza Suite 2310 Chicago 1 Ill

2 **HANLON & WILSON COMPANY — 0**
John L Derby VP 321 Pennwood Ave Pittsburgh 21 Pa
J R Wilson Pres 321 Pennwood Ave Pittsburgh 21 Pa

1 **HAWKINS TRUCKING COMPANY — 0**
Ed L Hawkins Owner Lewisville Ark

1 **HELWIG COMPANY — 0**
W O Helwig Sec 2544 N 30th St Milwaukee 10 Wisc

1 **HOL-CHORME CORPORATION — 1**
x W D Holcomb VP in Chg of Sales Allegany N Y

1 **HOLLAND COMPANY — 0**
F J Swanson Sales Engr 332 S Mich Ave Chicago 4 Ill

1 **R B HORNBERGER COMPANY — 0**
R B Hornberger Owner 525 Market St San Francisco 5 Calif

2 **HUCK MANUFACTURING COMPANY — 0**
R V Clute Engr Repr 1074 Kipling Rd Jenkintown Pa
Ed F Walsh Reg Engr Repr 2480 Bellevue Ave Detroit 7 Mich

2 **HUNT SPILLER MANUFACTURING COMPANY — 0**
K A Craig Asst Sales Mgr 1452 Stanford St Springfield Mo
Frank A Lampton Sales Mgr South Boston Mass

2 **HYATT BEARING DIV GMC — 1**
x Albin D Edelman Div Engr Ry 4th at Middlesex St Harrison N J
Louis F Steube Sales Engr 332 S Michigan Ave Chicago 4 Ill

1 **INGERSOLL RAND COMPANY — 1**
x Donald E Swibes Sales Engr Chicago Ill

3 **INLAND STEEL COMPANY — 2**
Frank Guetzka Trav Engr 416 Taft St Gary Ind
x W E Lewis Asst RH Fmn 4004 Deal St E Chicago Ind
x B H Simmons Gen RH Fmn 8324 Ingleside Ave Chicago 19 Ill

1 **INTERNATIONAL NICKEL CO INC — 1**
x J W Crossett Metallurgist 67 Wall St New York 5 N Y

2 **JEFFERS JOURNAL LUBRICATOR DIV FULLO CORP — 0**
Edward C Jeffers Repr Fullo Corp 2610 Eastwood Ave Chicago 25 Ill
Martin C Jeffers Repr 2610 Eastwood Ave Chicago 25 Ill

2 **JOHNS-MANVILLE COMPANY — 0**
C E Bryant Mgr RR Sec Jr Trans Sales 22 E 40th St New York 16 N Y
Fred Fix Sales Repr 1530 Guildhall Bldg Cleveland 15 O

1 **KELTY RADIATOR COMPANY — 1**
x James E Kelty Owner 312 11th Ave SE Cedar Rapids Iowa

1 **KOPPERS COMPANY INC — 0**
John E Onnen Dist Mgr 122 S Mich Ave Chicago 3 Ill

1 **LESLIE COMPANY — 0**
John M Wylie Off Sales Mgr Grant Ave Lyndhurst N J

2 **LINDE AIR PRODUCTS — 1**
J W Lacey Repr 230 N Mich Ave Chicago 1 Ill
x Clarence R Strutze Engr Serv 30 E 42nd St New York 17 N Y

3 **THE LIX CORPORATION — 0**
Frank Hall Repr 716 E 85th St Kansas City Mo
Harry W Copas Pres 716 E 85th St Kansas City Mo
Carl S Phillips Serv Engr 716 E 85th St Kansas City Mo

2 **LUBRI-GAS COMPANY — 2**
x Robert L Isgrig Sales Repr RR Div P O Box 48 St Louis 21 Mo

x W H Zimmer Repr Normandy P O Box 48 St Louis 21 Mo

1 MACKSONS COMPANY — 0
J A McPaden Mgr 125 Cedar St New York N Y

5 MAGNAFLUX CORPORATION — 0
George L C Dehn SW Mgr 2823 Manor Way Dallas 19 Tex
A J DeVries Field Engr 7300 W Lawrence Chicago 31 Ill
Laurence B Haller Field Engr 950 57th St Oakland 8 Calif
R S Peterson Field Engr 25 W 43rd St New York N Y
Kermit Skeie Mgr Western Reg 5148 Alcoa Ave Los Angeles 58 Calif

4 MAGNUS CHEMICAL COMPANY — 0
Bernard H Bailey Jr Asst Mech Dir Garwood N J
Walter A Cauthers SW RR Repr S Ave Garwood N J
Roy D King Jr VP Ry Sales S Ave Garwood N J
Donald D McMullen Ry Sales Repr 210 Everett St E Peoria Ill

13 MAGNUS METAL CORPORATION — 0
Ralph D Baker Eastern Sales Mgr 111 Broadway New York 6 N Y
Emmet J Cole Sales Mgr 510 W 6th St Rm 432 Los Angeles 14 Calif
James J Croft Sales & Serv Repr 4153 Clayton Ave St Louis 10 Mo
Harry C Duckworth Plt Mgr Box 416 Topeka Kansas
Ray J Ferree Jr Repr P O Box 283 Atlanta 1 Ga
Louis J Gruber Sales Engr 80 E Jackson Chicago 4 Ill
John J Hickey Serv Engr 1417 Hardy St Box 315 Houston Tex
Charles V Kinsley Sales & Serv 111 Broadway New York 6 N Y
E C Rathmann Sales & Serv Repr 4153 Clayton Ave St Louis 10 Mo
M J Turner VP 80 E Jackson Blvd Chicago 4 Ill
E M Van Winkle Pres 111 Broadway New York 6 N Y
R J Walker Sales & Serv Repr P O Box 416 Topeka Kansas
Edward B Zabriskie Sales & Serv Engr 2945 Blake St Denver 5 Colo

1 MAGNUSON PRODUCTS CORPORATION — 1
x Harold T Mays SE Mgr 50 Court St Brooklyn 1 N Y

1 MARQUETTE METAL PRODUCTS COMPANY — 0
Fredric C Erdman Sales Engr 1145 Galewood Dr Cleveland 10 O

1 MASTER LUBRICANTS COMPANY — 0
Edwin M Higgins VP 98 Lovell Rd Watertown 72 Mass

1 MASTER REPORTING COMPANY INC — 0
Miss B B Colvin Mgr 105 W Adams St Chicago 3 Ill

1 METAL FINISHERS INC — 1
x H B Hoesly Mgr 1725 E 27th Cleveland O

3 W H MINER INC — 1
x C A Johnson Sales Engr Rm 667 209 S LaSalle St Chicago 4 Ill
L A Marquardt Sales Engr 209 S LaSalle St Chicago 4 Ill
H J Schwartenzenberg Sales Engr Rm 667 209 S LaSalle St Chicago 4 Ill

1 MILLER FELPAX CORPORATION — 0
R Hardenrider Chief Engr Winona Minn

1 PAUL V MILES COMPANY — 0
Paul V Miles Owner 1485 Bayshore Blvd San Francisco 24 Calif

1 MODERN SUPPLY COMPANY — 0
Robert E Mann Pres 222 W Adams St Chicago 6 Ill

1 MOFFATT BEARINGS COMPANY — 0
D G Hornbaker VP 1640 Fairmount Ave Philadelphia 30 Pa

1 MONTREAL LOCOMOTIVE WORKS LTD — 0
H Valle Serv Mgr 5781 Notre Dame East Montreal Canada

4 MORGANITE INC — 1
x J C Dryden Sales Repr Jacksonville Fla
W F Fauerbach Mgr Trac Sales 3302-3320 48th Ave Long Island City 1 N Y
Richard H Ihmels Sales Engr 2 Van Rose Dr Hamden 17 Conn
Wm Pinch Jr Sales Engr 343 S Dearborn St Chicago 4 Ill

1 **MOTOR COILS MANUFACTURING COMPANY — 1**
x Ralph C Lauro Pres Pittsburgh 12 Pa
1 **MOTOR OILS REFINING COMPANY — 0**
Robert E Poindexter VP 7601 W 47th St Lyons Ill
1 **MOZEL CHEMICAL PRODUCTS — 1**
x Frank P Boyle Sales & Serv Engr 3916 Geraldine Ave St Louis 15 Mo
1 **NALCO — 1**
x Alex F McNeil Sales Repr Nalco RFD 4 Box 127 Roanoke Va
1 **NATHAN MANUFACTURING CORPORATION — 0**
Joseph Schultz Jr Mech Engr 45-02 Ditmars Blvd Long Island City 5 N Y
12 **NATIONAL ALUMINATE CORPORATION — 6**
C M Bardwell Repr 2291 Fairfax Denver 7 Colo
R G Bielenberg Mgr Ry Serv 6216 W 66th Place Chicago 38 Ill
x F D Dempsey Serv Repr 323 Sherrin Ave Chicago 38 Ill
P Wilson Evans Consultant 6221 W 66th Pl Chicago 38 Ill
James L Gibboney C P 6216 W 66th Pl Chicago 38 Ill
x Ken Hart Serv Repr Chicago Ill
x L S Heason Asst VP 6216 W 66th Pl Chicago 38 Ill
x Lester L Lux Serv Repr 1175 Lone Tree Rd Elm Grove Wisc
x F C McKenna Serv Repr 6216 W 66th Pl Chicago Ill
Elmer M Miller Asst to VP Stop No 35 Duneland Beach Mich City Ind
C E Winchell Sales Repr 8216 W 66th Pl Chicago 38 Ill
x Russell V Zahm Serv Repr 895 San Mateo Drive Menlo Park Calif
2 **NATIONAL BRAKE COMPANY INC — 0**
Emil P Kondra Asst VP 30 Church St New York 7 N Y
C T Stansfield Pres 30 Church St New York 7 N Y
4 **NATIONAL CARBON COMPANY — 1**
E T Anderson Mgr RR Sales 30 E 42nd St New York 17 N Y
V C Kaskey Sales Engr 41 Marietta St NW Atlanta Ga
W C McCosh Div Mgr 230 N Mich Ave Chicago 1 Ill
x Kenneth Matz Tech Repr New York City N Y
3 **NATIONAL ELECTRIC COIL COMPANY — 1**
Blair L Decker Field Engr 391 Wash Highway Buffalo 21 N Y
x J W Miller Dist Sales Mgr 224 S Mich Ave Chicago 4 Ill
Bailey E Price Sales Mgr Columbus 16 O
1 **NATIONAL ELECTRIC PRODUCTS CORPORATION — 0**
G W Merritt Sales Mgr RR Dept 14th & Duss Sts Ambridge Pa
1 **NATIONAL FORGE & ORDNANCE COMPANY — 0**
James Kannen Sales Mgr Irvine Warren County Pa
1 **NATIONAL MALLEABLE & STEEL CASTINGS — 0**
W W Matzke Engr Cleveland O
2 **NATIONAL REFINING COMPANY — 0**
S C Dinsmore VP Ry Sales 122 S Mich Ave Chicago 19 Ill
John E Shiffler Engr Serv 3923 Gatewood Lane E Cincinnati 36 O
1 **NATIONAL WELDING & GRINDING COMPANY — 1**
x John H Hudson Sales Engr 2929 Canton St Dallas Tex
1 **NEMEC COMBUSTION ENGINEERS — 0**
Ray Nemec Partner 245 W Washington Blvd Whittier Calif
1 **NEW YORK AIR BRAKE COMPANY — 0**
C A Swanson Serv Engr 420 Mkt St San Francisco 14 Calif
3 **NIFE INCORPORATED — 0**
John W Dougherty Sales Pro Mgr Lambert Ave Copiague Long Is N Y
A Blake Eilbeck Repr Lambert Ave Copiague Long Is N Y
S H Karlsson President Copiague L I N Y
1 **OAKITE PRODUCTS INC — 0**
O H Clark Spec Ry Repr 65 W Sherwood Dr St Louis 14 Mo
1 **OCTAGON PROCESS INC — 1**
x Joe Weiser Mgr RR Sales Div 15 Bank St Staten Island 1 N Y

1 **OKONITE COMPANY — 1**
x James R Early Sales Engr Roanoke Va
4 **OLIVER IRON MINING DIV U S STEEL CORP — 3**
x Edwin C Anderson Loco Maint Fmn Hibbing Minn
x Arnold Lahti Maint Fmn Virginia Minn
x Walter Nix Maint Fmn Coleraine Minn
Byron C Rowell Mtce Fmn Loco Virginia Minn
2 **OXWELD RAILROAD SERVICE CO — 2**
x*Wm A Hogan Retired Distr Mgr 8215 Draxel Ave Chicago 19 Ill
x*William Jones Ret Serv Sngr 1348 Glenlake Ave Chicago Ill
1 **PAN ELECTRIC COMPANY — 1**
x R B Lamkin Sales Engr 4092 Bingham Ave St Louis 16 Mo
1 **PENNINGTON CHANNEL CHROM CO — 0**
Harry Pennington Repr 319 Dakota St San Antonio 3 Tex
1 **PERRY FILTER SALES CO INC — 0**
Norman H Camp Mgr 4334 Kelnepa Dr Jacksonville 7 Fla
1 **PILOT PACKING COMPANY INC — 0**
H S FitzGibbon Jr VP 122 S Mich Ave Chicago 3 Ill
2 **PRECISION ENGINEERING COMPANY — 0**
Ernest V Berry Pres 1717 E Slauson Ave Los Angeles 58 Calif
Albert Kay Turner Field Serv Mgr Mt Vernon Ill
1 **PRE HEAT WELDING COMPANY — 0**
E L Jones Sales Engr 603 N Fess Ave Bloomington Ind
1 **PRIME MANUFACTURING COMPANY — 0**
Henry C Kunze Repr 1669 S First St Milwaukee 4 Wisc
1 **PULLMAN COMPANY — 0**
G W Bohannon Gen Mgr Merch Mart Plaza Chicago 54 Ill
1 **PUNCH LOK COMPANY — 0**
Robert E Tatham Sales Mgr 321 N Justine St Chicago 7 Ill
1 **RAILROAD INSURANCE ASSOCIATION — 1**
x D A Darr Staff Diesel Engr 55 John St New York 38 N Y
1 **RAILWAY AGE — 1**
x F N Houser Assoc Mech Editor 30 Church St New York 7 N Y
2 **RAILWAY EDUCATIONAL BUREAU — 1**
D C Buell Dir 1809 Capitol Ave Omaha 2 Neb
x Ed Smith Research Editor 1809 Capitol Ave Omaha 2 Neb
3 **RAILWAY LOCOMOTIVES & CARS — 2**
x N E Gillespie Wn Editor 79 W Monroe St Chicago 3 Ill
A G Oehler Elec Editor 30 Church St New York 7 N Y
x H C Wilcox Editor 30 Church St New York 7 N Y
1 **RAILWAY PURCHASES & STORES — 0**
Edward Wray Mgr 9 S Clinton St Chicago 6 Ill
1 **RAILWAY SERVICE & SUPPLY CORP — 0**
Leonard D Grisbaum Oper VP 510 S Harding St Indianapolis 7 Ind
1 **REPUBLIC STEEL CORPORATION — 0**
Howard L Miller Metallurgist Repub Bldg Cleveland 1 O
1 **RICHFIELD OIL CORPORATION — 1**
x O W Wallin Engr Anaheim Calif
1 **ROBERTS-STAGE ELECTRIC COMPANY — 1**
x Martin R Steck Serv Repr 515 S Western Ave Chicago 12 Ill
1 **THE ROSS COMPANY — 0**
Frank E Ross Jr Salesman 3408 Wash St St Louis 3 Mo
1 **RUST OLEUM CORP — 0**
J C Simmons VP in Chg of RR Activity 2425 Oakton St Evanston Ill
1 **SALES MEETING MAGAZINE — 0**
Mrs Toula DePrince Repr 1212 Chestnut St Philadelphia 7 Pa
1 **SCINTILLA DIV BENDIX AVIATION CORP — 1**
x A J Poole Jr Sales & Serv Aviation Corp Sidney N Y

1 SENECA TOOL CORPORATION — 1
x Thomas E Conlon Sales Mgr 75 Murray St New York City 7 N Y

1 SIMMONS-BOARDMAN PUBLISHING CORP — 1
x C L Combes Editor Loco Cyclopedia 30 Church St New York 7 N Y

1 SIMPLEX WIRE & CABLE COMPANY — 0
Ernest A Carlson Mgr of RR Sales 79 Sidney St Cambridge 39 Mass

10 SINCLAIR REFINING COMPANY — 7
x George A Bleyle Lub Engr Ry Sales New York City N Y
R C Getty Lubr Engr 600 Fifth Ave New York 20 N Y
x Clifford W Kewley Lubr Engr 246 North 20th St Kansas City Kansas
x J W Lohrke Lub Engr P O Box 11003 Ft Worth Tex
A E McClintook Lubr Engr 221 Magellan Rd Arcadia Calif
x T M Naughton Wn Mgr 155 N Wacker Dr Chicago Ill
x Wayne M Parks lub Engr Chicago Ill
x Russell D Ray Lubr Engr 155 N Wacker Chicago Ill
x Carl Smeds Engr 155 N Wacker Chicago Ill
J N Vogler Lubr Engr 2627 Gulf Bldg Houston Tex

1 SKF INDUSTRIES INC — 0
F H Williams Mgr Ry Sales Front St & Erie Ave Philadelphia 32 Pa

1 SNAP-ON TOOLS CORP — 1
x Francis M Lourigan RR Div Sales Supvr 2505 Roosevelt Rd Kenosha Wisc

2 SNYDER COMPANY — 0
George H Snyder Jr VP 2108 Mt Holly St Baltimore 16 Md
George H Snyder Pres 2108 Mt Holly St Baltimore 16 Md

2 SOCONY MOBIL OIL COMPANY — 1
x E B Fremon Sales Repr Box 2207 Gardner Sta St Louis 9 Mo
W S Wilson Engr 59 E Van Buren St Chicago 5 Ill

1 SOLVOX MANUFACTURING COMPANY — 1
x Frank C Lipscomb VP 11725 W Fairview Ave Milwaukee 13 Wisc

2 SPAR-TAN ENGINEERING COMPANY — 2
x F W Gartner Sales Engr 496 Bauchet St Los Angeles 12 Calif
x Geo J Moeller Gen Mgr 2445 Enterprise St Los Angeles 21 Calif

2 STACKPOLE CARBON COMPANY — 2
x W F Hartman Sales Engr 30 W Rocket Circle Park Forest Ill
x C A Sankey Sales Engr 1426 Brophy Park Ridge Ill

3 STANDARD OIL COMPANY OF CALIFORNIA — 3
x H R Cuyler Gen Sales Mgr 225 Bush St San Francisco 20 Calif
x Darrell L First RR Repr San Francisco Calif
x E A Parker Ry Repr 1928 43rd N Seattle Wash

11 STANDARD RAILWAY EQUIPMENT MANUFACTURING CO — 2
John E Earp Staff Asst 310 S Mich Ave Chicago 4 Ill
Arthur A Frank Jr Asst VP 310 S Mich Ave Chicago 4 Ill
H L Kent Eastern Dist Mgr 247 Park Ave New York 17 N Y
W R Lindersmith Repr 582 Market St San Francisco Calif
x M B McCracken Serv Engr 310 S Mich Chicago 4 Ill
R M McLean Serv Engr 310 S Mich Ave Chicago 4 Ill
x E Moser Serv Engr 310 S Mich Ave Chicago 4 Ill
W E Olds VP Sales 310 S Mich Ave Chicago 4 Ill
William B Reed Repr 310 S Mich Ave Chicago 4 Ill
R A Williams Pres 310 S Mich Ave Chicago 4 Ill
J E Wilson Serv Engr 310 S Mich Ave Chicago 4 Ill

1 RALPH STARK INC — 0
A E Morrison Repr 43-12 33rd St Long Island City 1 N Y

2 A STUCKI COMPANY — 0
Wm S Hansen Pres 419 Oliver Bldg Pittsburgh 22 Pa
Wm B Thomas Asst Mgr 419 Oliver Bldg Pittsburgh 22 Pa

1 SYMINGTON-GOULD CORPORATION — 0
Donald L Townsend VP 310 S Mich Ave Chicago 4 Ill

1 **TALLEY BROTHERS — 0**
Alfred W Talley Pres 2007 Laura Ave Huntington Park Calif

3 **THOMPSON PRODUCTS INC — 0**
Merele R Cotter Field Engr 60 Clover Dr Pittsburgh 27 Pa
Fred H Ferris Sales Engr 3400 E 70th St Long Beach 5 Calif
A S Al King Field Engr Supvr 2701 Milton Ave Dallas 5 Tex

1 **H B THORESEN & COMPANY — 0**
H B Thoresen RR Sales 80 E Jackson Blvd Chicago 4 Ill

1 **TIMESAVER PRODUCTS — 0**
Louis J Mohapp Mgr 629 W Wash Blvd Chicago 6 Ill

7 **TIMKEN ROLLER BEARING COMPANY — 0**
H R Chaffin Field Engr 2900 Canton St Dallas 26 Tex
C F Crowell Sales Engr Ry Div Canton O
Mark S Downes Gen Sales Mgr Canton 6 O
V F Murray Dist Mgr Ry Div 150 Broadway New York 38 N Y
Glenn E Neal Sales Engr 2100 S Vandeventer St St Louis 10 Mo
Neil B Stark Sales Engr 2100 S Vandeventer Ave St Louis Mo
Leo W Tobin Field Engr 14012 E Mystic St Whittier Calif

3 **TRANSQUIP CORPORATION — 1**
Robert H Gurley Pres 919 N Mich Ave Rm 3006 Chicago 11 Ill
L R Oswald Sales Repr 919 Mich Ave Chicago 11 Ill
x Richard C Underwood VP 919 N Mich Ave Rm 3006 Chicago 11 Ill

7 **TURCO PRODUCTS INC — 4**
x Frank J Beirne Sales Mgr RR 8 Morris St Patterson N J
J Douglas Charters Repr 605 Third St San Francisco 7 Calif
x Dunnar Deedon Sales Repr 3650 47th Ave S Minneapolis Minn
Donald A Keating RR Div Mgr 6135 S Central Ave Los Angeles 1 Calif
x A F McDonald Salesman 1468 W 9th Cleveland O
x W F Nixon Ry Sales 95 Fairmont Ave Philadelphia 23 Pa
Paul V Rebel Jr RR Repr 208 Western Reserve Bldg Cleveland 13 O
Donald F Steiner Proc Engr RR Tech Serv 6135 S Cen Ave Los Ang 1 Calif

1 **UNION ASBESTOS & RUBBER COMPANY — 0**
Oscar J Rudolph Dist Mgr 6712 N Sioux Ave Chicago 30 Ill

2 **UNION OIL COMPANY — 0**
John L Broughten Mkt Development Engr Brea Calif
C C Mugford RR Repr 425 1st St San Francisco Calif

4 **U S STEEL CORPORATION — 3**
x W A Lane Gen Fmn Mech Shops Geneva Utah
x Martin Matekovic Jr Div Supt Trans & Yds P O Box 510 Provo Utah
Arthur I Sabey Instr Loco Engs P O Box 510 Provo Utah
x Burt St Vincent Gen Fmn Mech Provo Utah

4 **VAN DER HORST CORPORATION OF AMERICA — 4**
x F H Blanchard Sales Engr Box 443 Terrell Tex
x John N Collins Sales Repr 1645 E State St Olean N Y
x Frank K Jorstad Dist Sales Engr 2610 S Shields Ave Chicago 16 Ill
x Kenneth Llewellyn Sales Repr 1645 E State St Olean N Y

3 **VAN NORMAN AUTOMOTIVE EQUIP CO — 2**
x S F Greer VP Sales Mgr Springfield 7 Mass
x F P Healy Chief Engr Springfield 7 Mass
H E Mills Div Mgr 24 S Auburndale St Memphis 4 Tenn

1 **VAN SICKLE ASSOCIATES INC — 0**
John B Mitchell Consulting Engr 442 Broadway Denver 3 Colo

1 **VAPOR BLAST MANUFACTURING CO — 1**
x J Irving Kaul Sales Dept 3025 W Atkinson Ave Milwaukee 9 Wisc

3 **VAPOR HEATING CORPORATION — 1**
J E LaRocque Chief Dev Engr 6420 Howard St Chicago 31 Ill
x G C Scott Sr Asst to VP 3812 W 64th Pl Chicago 29 Ill
Roger A Williams Sales Engr 721 Olive St St Louis 1 Mo

3 **WESTINGHOUSE AIR BRAKE COMPANY — 0**
J Alan Campbell Repr 215 Mkt St San Francisco 5 Calif
Kenneth Chrissinger Repr Rm 3400 350 5th Ave New York N Y
C F Hammer Dir of Engr Wilmerding Pa
2 **WHEEL TRUING BRAKE SHOE COMPANY — 0**
John M Graves Sec 628 W Baltimore Ave Detroit 2 Mich
Walter Hallerud Serv Engr 628 W Baltimore Ave Detroit 2 Mich
1 **WHITE MOTOR COMPANY — 0**
A H Candee MP Consultant 1227 King Ave Pittsburgh 6 Pa
2 **WHITING CORPORATION — 1**
Chas A Geupel Mgr Transp Equip Dept Harvey Ill
x Frank P Walsh Dist Mgr 567 N&S Rd University City 5 Mo
1 **H W WILSON COMPANY — 0**
* H W Wilson 950-972 University Ave New York 52 N Y
1 **WILSON ENGINEERING CORP — 0**
R W Garvey VP & Mech Engr 6 No Mich Ave Chicago 2 Ill
1 **WIX CORPORATION — 1**
x A A Wilson Repr Indus Div Gastonia N C
4 **WYANDOTTE CHEMICALS CORP — 0**
Marvin O Crawford Spec Repr to RRs 202 C Garden Rd Towson 4 Md
S M Grandy Supvr Sales Wyandotte Mich
Joseph M Mann Spec Repr RRs 627 Inning Park Blvd Sheffield Lake O
J L Ramsey Mgr RR Sales Wyandotte Mich
1 **XZIT CHEMICAL COMPANY — 0**
Eugene A Rainville Repr 5800 S Hoover St Los Angeles 44 Calif
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