E. C. No. 27

ESTIMATES COMMITTEE

Thirty-Third Report
1955-56

MINISTRY OF RAILWAYS

1. Research & Standardisation.
2. Signalling & Tele-communications.
3. Accidents on Indian Railways.
4. Miscellaneous Matters.

LOK SABHA SECRETARIAT
NEW DELHI
May, 1956

CORRIGENDA

THIRTY-THIRD REPORT OF THE ESTIMATES COMMITTEE ON THE MINISTRY OF RAILWAYS

Contents Page (i), Chapter II, Item C, sub-item (a) read pages '13-14' for page '14'

Contents Page (ii), Chapter V, Item G; read page '48' for pages '47-48'

Contents Page (ii), Chapter V, Item I; read pages '50-51' for page '50'

Contents Page (ii), Chapter V, Item J; read page '51' for pages '50-51'

Contents Page (ii), Chapter V, Item O; insert 'the' between 'to' and 'Soviet'

Introduction, Page (iv), Para 3, line 1; read 'thanks' for 'thank'

Page 4, Para 11 (i) (f), line 2, read 'is' for 'in'

Page 6, Para 14, (v), line 9, read 'anti-corrosive' for 'anti-corrocive'

Page 7, Para 18, line 8, insert 'is' after 'designs'

Page 7, Para 18, col. 3 of the table, read 'M.G. main line on' for 'B.G. electrified section of'

Page 11, Para 32, line 5, read 'that' for 'trat'

Page 28, Para 91, line 1, read 'the' for 'tre'

Page 29, Para 94, Table VIII, last line, read '(E.I.✦ B.N.)' for '(E.I.✦ S V.)'

Page 34, Para 99, Table XII, Col. 1, line 4, read 'N. Eastern' for 'N.Easthern'

Page 41, Para 115, Item (5), line 5, read 'fifth' for 'fiftr'

Page 45, Para 123, line 16, read 'figures' for 'fgures'

Page 45, Para 123, line 16, read 'per' for 'ped'

Page 50, Para 142, line 8, insert 'There should also' before 'be'

Page 52, Para 148, line 4, read 'electric' for 'electirc'

Page 61, Para 167, line 5, insert 'Year' between 'Five' and 'Plan'

Page 61, Para 167, line 14, insert 'for' between 'funds' and 'the'

Page 61, Para 167, line 16, read 'The' for 'Th✦'

Page 63, Sub-heading B(e), line 4, read 'at' for 'a'

Page 63, Sub-heading B(g), line 4, insert 'save' between 'soon' and 'a'

Page 63, Sub-heading C(c), line 1; read 'varnishes' for 'vernishes'

Page 63, Sub-heading C(c) line 2; read 'cashewnut' for 'cashewnit'

Page 65, Col. 7, last line, read '3,50,700' for '3,39,700'
Page 68, Sub-heading A(iv), 1st line of the table, read 'signalling' for 'signallings'
Page 70, Sub-heading C, 2nd line of the table, read 'Construction' for 'Constructions'
Page 72, Para 3, line 6, insert ',' between 'equipment' and 'efficient'
Page 75, Appendix V, line 3, read '(in thousands of rupees)' for '(in thousand rupees)'
Page 76, Appendix VI, line 3, read '(in thousands of rupees)' for '(inhousands of rupees)'
Page 79, Serial No. 6, line 3, read 'locomotive' for 'locomotives'
Page 80, Serial No. 14, lines 2-3; read 'spraying' for 'praying'
Page 83, Serial No. 31, lines 1-2' read 'occurring' for 'occuring'
Page 90, Serial No. 59, line 1, read 'observe' for 'observed'
Page 91, Serial No. 61, read '163' for '165'
Page 92, Serial No. 62, line 3, read 'corresponding' for 'correspondinn'.

'KKD'
30/5/56.

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Shri H. N. Trivedi—*Deputy Secretary*
Shri R. P. Kaushik—*Under Secretary*

*Elected Member with effect from the 7th December, 1955 *vice* Shri R. Venkataraman resigned.

INTRODUCTION

I, the Chairman, Estimates Committee, having been authorised by the Committee to submit the Report on their behalf present this Thirty-third Report on the Ministry of Railways on the subjects:

1. Research & Standardisation;
2. Signalling & Tele-communications;
3. Accidents on Indian Railways; and
4. Miscellaneous Matters.

2. The Committee wish to express their thanks to the Chairman and Members of the Railway Board and other officers of the Ministry of Railways for placing before them the material and information that they wanted in connection with the examination of the estimates. They also wish to thank the representatives of the Federation of Indian Chambers of Commerce and Industry, New Delhi, the All India Manufacturers' Organisation, Bombay, the All India Federation of Transport Users' Associations, Bombay, the National Federation of Indian Railwaymen, New Delhi, and Sarvashri H. N. Kunzru, M.P., Shanti Prasad Jain, L. P. Misra, K. C. Bakhle, I. S. Puri, V. P. Bhandarkar and B. B. Varma for giving their evidence and making valuable suggestions to the Committee.

3. The Committee also wish to express their heartfelt thank to the officers and staff of the Estimates Committee Branch of the Lok Sabha Secretariat for the valuable service rendered by them throughout the deliberations of the Committee.

BALVANTRAY G. MEHTA,
Chairman,
Estimates Committee.

NEW DELHI;
The 18th May, 1956.

I

RESEARCH

A. Introduction

Indian Railways are spread over a network of 34,000 miles, employ about 10 lakhs of staff and carry about 1,200 million passengers and 106 million tons of freight every year, possess over 8,000 locomotives, 22,000 coaches and 2·5 lakhs wagons, both B.G. and M.G. and consume stores worth over 90 crores of rupees every year. In addition, the Railways own and work a number of workshops, both repairing and manufacturing, apart from the sheds and Depots, and require a very large variety of articles for the maintenance of track and buildings and the running of trains. Hence there is great scope for effecting economy and improving efficiency in different spheres of activities of the Railways through research and standardisation. The Pope Committee, the Wedgwood Committee, the Pacific Locomotive Enquiry Committee and the Kunzru Committee all emphasised the importance of research to the Indian Railways. The Kunzru Committee, while endorsing the views of other Committees, observed that a vast field of research lay entirely unexplored and that investigations wisely directed and effectively controlled would provide solutions to Railway problems, which would result in increased efficiency and large economies. The Committee share these views and feel that in order to make the rail travel safe and comfortable and to achieve self-sufficiency in the matter of manufacture and maintenance of rolling stock and other rail equipment, the Indian Railways should devote greater and greater attention to the Research and Standardisation work. As rightly pointed out by Dr. Kunzru in his speech in the Rajya Sabha on the 16th March, 1956, for a going concern like our Railways, the income of which is of the order of Rs. 300 crores, a small sum of Rs. 16 lakhs spent on Research work is totally inadequate, and there is considerable scope for increasing useful Research activities on Indian Railways. The Committee, therefore, agree with the following observations of Dr. Kunzru:

> "Considering the progress that our Railways have to make and considering the fact that they will have to adjust themselves to new problems altogether..... it is time that the Railway Ministry took into consideration the vital and inescapable need for a better research organisation than they have at the present time."

B. Research Organisation on Railways

2. Research began on the Indian Railways in a small way in 1935 as an off-shoot of the Central Standards Office at New Delhi, when two Officers were deputed to ascertain the maximum speed they could attain under Indian conditions. Later, investigations were extended to the determination of permissible loads and speeds of locomotives and rolling stock and the lateral forces exerted by them on track. During World War II, the research work lay dormant due to shortage of technical staff. After the War, a static research station was

started at Shakurbasti near Delhi. A small test track was laid and the nucleus of a small centre and service workshop for static and dynamic testing of structures and rolling stock was founded. Its most noteworthy features were the installation of a Soil Mechanic and Building Research Wing and a Rolling Load Fatigue Testing machine.

3. On 1st September, 1952, the Research Section of the Central Standards Office was re-organised and established under the Research Directorate of the Railway Board. Its Headquarters were subsequently transferred to Lucknow in November, 1952. The staff and equipment of the nucleus building and soil mechanic static Research Station at Shakurbasti was shifted to Lonavala in March, 1953. The administration of the Chemical and Metallurgical Section of the Central Standards Office, which was located at Chittaranjan was also taken over by the Research Directorate.

The Lucknow Centre carries out primarily research on the dynamic effects of vehicles on the track and bridges and riding quality and performance tests on locomotives and rolling stock assemblies and components. To supplement and premeate these activities a documentation and information service has been provided, which will, in addition, publish bulletins and summaries of important researches conducted in India and abroad including the publication of the Railway Board's Quarterly Technical Bulletin.

5. The Lonavala sub-Centre tackles problems on buildings, foundation engineering, soil mechanics and cement concreate as applicable to Railways.

6. The Chittaranjan sub-centre carries out metallurgical inspection of components manufactured at the Locomotive Works and conducts chemical and metallurgical studies on paints, water softeners, lubricants, bronzes, metals and metal processing.

7. Following are the three objectives before the Railway Research Organisation :

(i) Increased safety of rail travel combined with comfort ;

(ii) Self-sufficiency ; and

(iii) Simplicity and reliability of design leading to economy in capital, maintenance and operation costs.

8. A note furnished by the Railway Ministry showing the extent to which the results of the research have been found to be of use in Railway working is given as Appendix I.

9. The Committee were informed by the representative of the Railway Ministry that it was more of applied research than original research that was being done at Lucknow Centre. It was only a small beginning and that it would take sometime to build up the research structure. Three stages were involved in the research work: these could be named as research, testing and standardisation stages. The representative of the Railway Ministry stated that difficulty was being experienced in getting staff for the research centres, as the railway officers selected were apprehensive

of losing their chances of promotion on the Railways. To overcome this difficulty, the Committee suggest that the Research Organisation should consist of men engaged permanently in research work and they should be given reasonable avenues of promotion in the organisation itself. The Committee further suggest that some research could also be done in the bigger railway workshops by having some research laboratories installed in them. The Committee further recommend that Research and Standardisation should not be confined only to technical and scientific aspects of the Railways but also to other matters, such as administration accounting, public relations, commercial side and other miscellaneous activities of the Railways. Experiments should be conducted from time to time in order to bring about simplicity and standardisation in all the Railways with regard to all these matters with a view to increase efficiency and to eliminate delays or waste. Railways should make increasing use of the work done by bigger research institutes (*e.g.* the Forest Research Institute, National Physical Laboratory etc.) and should submit problems to them for advice. This will enable Railways to get experienced and mature advice in these matters and also help in pooling of ideas and avoid any duplication of efforts on the same subjects.

10. Figures below give the expenditure incurred on the Research Organisation during the last three years and anticipated expenditure for 1955-56 :

(Figures in thousands of Rs.)

Particulars	Actual expenditure for			Estimated expenditure for 1955-56
	1952-53	1953-54	1954-55	
I. Pay of officers	115	170	189	194
II. Pay of establishment . .	111	204	267	331
III. Other charges (for details, please see below) . . .	346	661	765	917
TOTAL	572	1035	1221	1442*
Details of other charges :				
(*a*) Contribution to SRPF Gratuity and Special Contribution P. Fund	16	25	24	35
(*b*) Allowances . . .	91	120	212	222
(*c*) Contingencies . . .	239	516	529	660
TOTAL . . .	346	661	765	917*

*August Review figures

The recurring expenditure for the next year (1956-57) is expected to be Rs. 15 lakhs.

C. Programme for expansion of the activities of the existing Research Organisation

11. As stated above, there is a great scope for expanding the activities of the Research Organisation on Railways. The Committee were informed that the following items have been included in the contemplated programme for expansion during the next two or three years.

(i) *Lucknow Centre*

(a) A detailed scheme along with the abstract estimate for the introduction of scale model testing for studies on steam generation and steam distribution is under preparation.

(b) A test track, one each of B.G. and M.G. is to be constructed for carrying out certain tests on locomotives and carriages, which are included in the Priority Research Programme.

(c) Facilities for holding courses in Fuel Technology for officers and senior subordinates of the Mechanical Engineering Branch and for imparting training to Assistant Engineers and Permanent Way Inspectors in P-Way maintenance and new construction techniques are proposed to be provided.

(d) The Metre-gauge Dynamometer Car and the Broad Gauge track recording cars are on order and are expected to be received in about a year's time. On receipt of these, the work in the Research Centre will further increase.

(e) The equipment for the introduction of fatigue and strength test on rubber fittings is on order abroad. Some small machines manufactured in India have been received.

(f) The manufacture of the machine by the Western Railway for tests on different types of loco and carriage bearings in nearing completion. On its receipt this work will start.

(ii) *Lonavala Sub-Centre*

Service trials with prestressed concrete sleepers are contemplated, as sleepers of other types are in short supply.

(iii) *Chittaranjan Sub-Centre*:

(a) *Manufacture of paints, varnishes and bituminous emulsions on semi-pilot plant scale.*—Those are entirely new materials, the paints being based on cashewnut shell and Bhilawan oils and the emulsion from the bitumen is entirely a new formulation likely to help in solving the corrosion problem both in regard to track and the inside panels of steel coaches.

(b) *Studies in Fatigue Strength.*—With the installation of the Universal Fatigue Testing Machine, studies in fatigue strength of materials and components of locomotives and carriages will be started.

12. The Committee feel that this programme of expansion is good as far as it goes; but that it does not go far enough. The Committee recommend that the Railway Ministry should make out a bigger and a more detailed programme of expansion covering the entire Second Five Year Plan period. The Ministry should

also examine the feasibility of setting up one Research Centre on each Railway. The Research problems to be dealt with at these centres should not, however, be on a territorial basis, but on the basis of specialised subjects.

D. Railway Research Advisory Committee

13. A Railway Research Controlling Committee is functioning to advise on the programme of research and to review its progress. This Committee, which was formed in 1952, consists of 14 senior railway officers including the Chairman, Railway Board and Member, Engineering. From the Report of the Indian Railway Enquiry Committee (1947), para 196, it appears that the original intention was to set up an Advisory Committee, which would include a scientist as Director of Research, representatives of the important laboratories and scientific research institutions already set up by the Government, such as the National Physical Laboratory, etc., a scientific adviser and technical railway officers. This does not appear to have been done. As Research is a highly technical subject, the Committee would suggest that Railway Research might form a separate wing under the Council of Scientific and Industrial Research with the Director Scientific and Industrial Research as the Chairman and the Technical officers of the Railways might be associated with it. Alternatively, the Railway Research Controlling Committee might be reconstructed to associate the representatives of the important laboratories and scientific research institutions with the research problems of the Railways. Thus there should be a representative of the Forest Research Institute to advise on questions of wooden sleepers, a representative of the Fuel Research Institute, Dhanbad to advise on questions of fuel economy and so on. The Committee also suggest that some senior retired Railway officials, who have a flair for research work should also be included in this Committee. The advantage of reconstituting the Committee on the above lines will be that it will be ensured that railway research is not duplicated and that all work, which can best be done by national or university laboratories and institutions is framed out. It will also mean that there will be a greater pooling of knowledge, as far as research problems are concerned.

E. Utilization of results of research work done in other countries by Railway Research Organisation in India

14. The Committee were glad to learn that the result of research in other countries were being utilized in many ways in the work done by the Railway Research Organisation on Indian Railways. It may not be possible to trace in all cases tangible connection between what is done elsewhere and further developments made here, as whatever knowledge is acquired in the scientific world soon becomes, so to say, common property of all research workers. A few cases furnished by the Railway Ministry are, however, quoted below, where the relationship between the work done here and that done elsewhere can be definitely established:—

(i) *Weighbars*

The Research Centre utilizes as a standard equipment, what is known as a 'Weighbar' (a bar for weighing forces) for measuring

heavy dynamic forces *e.g.* those exerted by the locomotive on the track. The weighbar was originally developed in the U.S.A. by the Research Centre there.

(ii) *Soil Pressure Cells*

The Soil Pressure Cell is utilised for measuring the earth pressure under track, foundations etc. The Phillips Company had developed a cell using resistance strain gauge for measuring soil pressures. The Railway Research centre has recently developed a cell, which utilizes a magnetic telemetering device, which gives a sensitivity and reliability considerably greater than what could be obtained with a resistance strain gauge.

(iii) *Internal treatment of Locomotive Feed Water*

The Railway Research Centre had studied the system of locomotive water treatment (internal) and plants used on different railway systems in the world, particularly in France. The foreign systems, in their best form, employ complex chemical formulae and intricate automatic dosing gear. The Sub-Centre at Chittaranjan has developed a simple chemical formulation and it has been found that under conditions obtaining in India, equally good results can perhaps be secured with manual dosing. (Further details are given under item F (a) below).

(iv) *Bituminous Emulsions*

It was known that other countries had developed corrosion-resisting compounds. These could be imported into India at high prices. The Chittaranjan Sub-Centre has developed 'bituminous emulsions' for this purpose based on material indigenously available at much cheaper cost and without any loss in effectiveness—these are being tried.

(v) *Products based on Cashew Nut Shell liquid*

Extensive research had been carried out in the U.S.A. in regard to C.N.S. liquid which is produced only in this country. This research work pertains to the fields of quick-setting cement, brake linings, heat and acid resisting paints, insulating varnishes, baking enamels etc. Based on it, air-drying varnishes and enamels have been developed in the Chittaranjan laboratory from this inexpensive bye-product. These are suitable for use as heat and acid resisting coatings for locomotives, acid and alkali resisting paints for carriages, anti-corrocives for steel structures, thermo setting cements and similar products used on the Railways.

(vi) *General*

Mention may be made here of the design of prestressed reinforced concrete sleepers, instruments like accelerometers and studies on strength of concretes made with materials obtained in India, work in connection with which had to be based on the developments and advances made elsewhere; however, the methods of approach and results obtained here are essentially Indian.

F. Some specific Research problems of the Indian Railways

(a) *Internal treatment of Locomotive Feed Water*

15. Considerable trouble was being experienced due to failure of locomotives on bad water sections on Indian Railways. On some sections a good deal of money had been spent providing external water softeners. The Special Committee of the Indian Railways Chemists and Metallurgists on water treatment appointed to study the performance of the existing water softening plants recommended that the future extension of water-treatment on the Indian Railways should, as far as possible, be based on the principle of internal treatment of feed water with chemical complexes based on suitable tennins, preferably of indigenous origin and the work was entrusted to the Metallurgical and Chemical Sub-Centre, Chittaranjan. A Chemical complex has been evolved at Chittaranjan for internal treatment of locomotive feed water, which when added to water, prevents all the mischief which hard waters cause. At present 589 locomotives are receiving this treatment. The number would increase to about 850, if all the engines running on "bad water" sections are brought within the orbit of this treatment. The interval between wash-outs has been increased and a higher engine availability figures have been achieved, as a result of this internal treatment.

16. A statement showing the gross savings on 520 engines, which is based on a formula adopted by the American Rail-Roads Engineering Association and as revised by the Master Boiler Makers' Association is given as Appendix II.

17. The Committee commend the work done by Chittaranjan Sub-Centre in this respect and recommend that the treatment should be extended early to all the engines running on "bad water" sections to achieve economy from the point of view of greater availability of locomotives and reduction of failures *en route*.

(b) *Development of suitable concrete block type sleepers for Railway track*

18. A start has been made on the manufacture of reinforced concrete block sleepers. Methods are being studied to intensify the rate of manufacture and, in collaboration with the Central Standards Office for Railways, the design is being simplified. Trials with the sleepers manufactured at the Lonavala Sub-Centre have started both on the Broad and Metre Gauges. The Central Standards Office have evolved a number of designs of prestressed and ordinary reinforced concrete sleepers. The progress made in trying out these designs as below:—

Description of sleeper	Remarks
R.C. Block Sleepers for M. G. Main line.	48 sleepers cast at Lonavala and laid on Southern Railway M.G. Main line near Poona in 1954.
R.C. Block Sleepers for B.G. Branch line and sidings.	38 sleepers cast at Lonavala and laid in up platform loop of Poona Yard in 1954.
R.C. Block Sleepers for M.G. Main line.	200 sleepers will be cast at Lonavala and will be laid on the B.G. electrified section of the Central Railway.

Description of sleeper	Remarks
R.C. Block sleepers for B.G. Main line.	200 sleepers will be cast at Lonavala and will be laid on the B.G. electrified section of the Central Railway.
Prestressed concrete sleepers for B.G. Main line.	Railway Testing and Research Sub-Centre, Lonavala will be casting a few of these sleepers.
Prestressed concrete sleepers for M.G. Main line. Prestressed concrete sleepers for M.G. Main line (alternative design).	Tenders to this design or to any suitable alternative design are being called.

19. In addition to the above trials, 200 prestressed concrete sleepers each of DOW-MAC and STENT type are on trial on the electrified section on the main line near Bombay since 1947. About 5 per cent. of these sleepers so far have had to be removed from track due to splitting of the sleepers through bolt holes. The edges of the sleepers are being damaged by beater packing. Also 200 prestressed concrete sleepers by Franki Wagons Type were laid on the Lal Golaghat bank of Sealdah Division in 1952.

20. The main impediments in the way of large scale introduction of concrete sleepers have been the difficulties of handling due to heavier weight, the higher cost, non-availability of prestressing wires and suitable fastenings. On these considerations serious attempts are being made to try concrete sleepers in large scale on the Metre Gauge only, since the Metre Gauge sleeper is not so heavy and can be handled without much difficulty.

21. In this connection, the Committee reiterate their recommendation in para 90 of their Twentyfirst Report that in view of the shortage of wooden and steel sleepers the use of cement concrete sleepers should be extended on Indian Railways and that there should not be any insurmountable difficulties in the way, especially when the French Railways are successfully using them.

(c) *Use of light alloy metals in coach and wagon building*

22. With a view to reduce tare weight and to guard against corrosion, the use of aluminium sheets and extrusions has been made as a trial measure on rolling stock as under :—

(a) 50 Broad Gauge Open and 50 covered wagons were built in 1949 with aluminium alloy body panels.

(b) 50 Broad Gauge all metal coaches turned out by the Hindustan Aircraft Factory Ltd., Bangalore during 1953-54, were panelled with aluminium sheets on body sides and ends.

(c) Aluminium roof water tanks are now accepted as a permissible alternative to the galvanised steel sheet item.

(d) Air-conditioned timber bodies coaches under construction by various Railways are now being panelled at

the body sides and ends in aluminium alloy sheets. The use of aluminium alloy is also being extended in this case to water tanks, window frames and upper berth framework and in the case of other fittings wherever feasible.

(e) Aluminium extrusions are extensively used in the all-metal lightweight coaches that are to be produced in the Integral Coach Factory, Perambur, Madras.

(f) 250 Metre-Gauge coaches obtained from Germany were fitted with aluminium glass frames and louvre shutters.

(g) Aluminium has been extensively used in the E.M.U. coaches placed in service in 1951 in the Bombay area, this alloy being used for the louvre shutters and glass window framework, as well as for the interior penalling and ceiling of the coaches. The use of aluminium alloy is also being made fairly extensively in the E.M.U. stock under order from Italy and Japan for the Bombay area, as well as from Germany and Switzerland for the Calcutta area.

(h) All aluminium cabs have been filled on 'YP' class Metre Gauge locomotives with the object of limiting the weight of hind trucks.

23. The main disadvantage, which has been felt against the wholesale extension in the use of aluminium alloy for coach and wagon construction is the initial capital cost of this material as compared with that of steel, as well as greater liability to physical damage. Recent developments in quality of aluminium alloy manufactured in India, however, claim appreciably increased resistance to physical damage on account of the higher tensile strength and hardness now being obtained, in which case, it may be possible to use aluminium sheets and sections of smaller dimensions and gauge thickness than hitherto; this would reduce the price difference between aluminium alloy and steel. These facts are presently under consideration for extension of the use of aluminium to further trials in the construction of rolling stock.

24. The advantages of the use of aluminium alloys are its greater resistance to corrosion, provided certain precautions are taken and reduction in the tare weight of rolling stock.

25. The Committee understand that in the U.S.A. the use of light alloy metals has enabled considerable savings in dead weight and most of the named stream lined trains are composed of vehicles constructed in this way. Also the use of light weight metals and of plastic and composite laminated materials is gradually becoming more general, and designs are being developed in several countries, which give greater carrying capacity for the same axle load. The Committee, therefore, recommend that the Railway Research Organisation should study developments in this respect made in other countries and devise ways and means for extensive use of light alloy metals for construction of coaches and wagons for Indian Railways with a view to minimise the use of steel, which is in short supply, and with a view to increase the existing carrying capacity.

(d) *Universal Fatigue Testing Machine*

26. The Committee understand that the Railways have not so far been able to procure a Universal Fatigue Testing Machine, which will enable the Railways to know the fatigue strength of materials and components of locomotives and carriages as the manufacturers on whom the order was placed have recently intimated their inability to build the machine, which will completely satisfy the specifications originally agreed upon. The Committee recommend that early action should be taken to obtain the machine by suitably modifying the original specifications, if necessary, as its usefulness cannot be overemphasised in view of the possibilities of economies, that are likely to be achieved in retaining serviceable parts and materials of rolling stock, which are otherwise likely to be condemned as scrap. The problem might also be given to some of the National laboratories to devise a suitable machine indigenously.

(e) *Use of waste wood on Railways*

27. The Committee understand that the waste wood in various workshops is being sold as scrap by the Railways. The Committee recommend that the Research Organisation should consider the feasibility of utilizing the waste wood in a better and more useful way on the Railways in the construction of coaches and buildings. If necessary, enquiries should be made from commercial firms, which are making doors, windows and furniture from the waste wood so that a more profitable use may be made of the waste wood.

(f) *Use of Ply-Belting on Railways*

28. The Committee understand that the Railways were not using indigenous ply belting, as it is said to be of 'inferior quality' and instead were importing the same from outside. The Committee feel that the Research Organisation should study the defects in the Indian made ply-belting and advise the manufacturers to remove the same so that the indigenous factories might not have to close down for want of orders.

(g) *Use of Rail cycle trolleys on Railways*

29. The problem of providing suitable cycle trolleys on Railways is being studied by the Research Centre. Complete frames including wheels of four cycle trolleys (2 for the B. G. and 2 for the M.G) were imported from Denmark for trial. In these trolleys, the frame is slung between two cycles, one working on each rail of the track. These cycles work satisfactorily, if two trolley-men pedal the two cycles simultaneously. With this arrangement, however, hardly any saving could be obtained in the number of trolleymen, because while two trolleymen are cycling and looking forward at least one other man would be required to look out in the rear of the trolley and if the two trolleymen on the cycles do not have to pedal continuously, two more trolleymen to relieve them in turn would be required, thus making a total of four. If one trolleyman only pedalled, the trolley wheels tend to get askew and bind on the rails. The design of the brakes on the imported trolleys was not found adequate to our needs. Moreover, the trolley, when loaded in the brakevans not only occupied much space, but the protruding cycle handles were also liable to be damaged.

30. A design has now been prepared where only one cycle will be provided in the Centre of the trolley, thus making it possible to reduce existing number of trolleymen from four to two. By using aluminium alloy in the construction, the design would be light enough for two trolleymen to remove it in operation from the track. The brake system has also been improved. Handles and cycle seat have been made removable, so that for loading purposes the cycle trolley will take no more room than the orthodox push trolley, now in use.

31. The representative of the Railway Ministry informed the Committee that the experiments were still going on and it could not be adopted unless it was ensured that it would not be a liability or create embarassment anywhere. A prototype M.G. trolley weighing only 277 lbs. and capable of being propelled at 12 m.p.h. on the level by one man has been constructed and is under trial. After extensive service trials the orthodox push trolleys will be replaced by new trolleys constructed on the lines of the successful type.

32. As the introduction of Rail Cycle trolleys on the Railways will result in considerable reduction in the physical strain involved in pushing the present push trolley, apart from considerable saving in the number of trolleymen required to operate them, the Committee recommend trat the experimental stage should be finalised quickly and the new type introduced as soon as possible.

(h) *Research in Electrical Engineering*

33. The Committee understand that the Railway Research Centre does not carry out research in Electrical Engineering. The Railway Ministry informed the Committee that a few specific problems were sent to the Research Centre and their solutions were worked out and communicated to the sponsors. One instance of such a specific problem given was that of turbine radiation, which affected the generating energy of the locomotives for head lights. The representative of the Railway Ministry further added that in 1950, there was a spate of sabotages and a reference was made to an Institute of Science for devising some sort of radar device, whereby it could be known, if a rail was missing ahead, but since the sabotages abated later the matter was not pursued further. There were some quotations from foreign countries, but the prices were so high, that it was not considered worthwhile to try them.

34. The Committee feel that there is a vast field of research in Electrical Engineering specially in tele-communication, which is closely connected with electric engineering and in respect of which Indian Railways are lagging behind. They recommend that the Railway Board should pay more attention to the research work in electrical engineering and equip the Research Organisation for that purpose. For instance one or two sets of radar instruments referred to above could be obtained and indigenous research carried on to devise some cheaper instruments on these lines.

(i) *Dust free ventilation in carriages*

35. At present, passengers are suffering great hardships due to the excessive tropical heat in summer, continuous spraying of dust, and coal particles in compartments during the journeys and invasion of

compartments by insects during the monsoons. The Committee, therefore, reiterate their recommendation made in para 28 (ii) of their Seventeenth Report that the Research Centres of the Railways should concentrate on devising some cheap method by which some degree of cooling can be effected in the third class compartments. Efforts should be made to provide dust free ventilation and to overcome the nuisance of insects during monsoons, in Railway carriages. These problems must have been faced and tackled in foreign countries also. Experience gained by them might be tapped with advantage by the Indian Railways.

II

STANDARDISATION

A. Introduction

36. Railways are a highly specialised industry and the need for standardisation for the Railways is perhaps greater than any other industry. This is due to two reasons. Firstly, as the consumption of various items of stores is large, standardisation based on past experience, is conducive to economy and efficiency. Secondly, as the Railways deal with transport of a large number of passengers at high speeds, safe conditions of travel are of paramount importance. All items of stores connected directly or indirectly with the transport of traffic, such as rails, signals, locomotives, carriages, wagons etc. must be properly tested before being utilised from the point of view of safety; and such tests and the experience gained thereby would naturally lead to standardisation. Once an item is standardised it does not mean that that particular design will remain static. That design properly tested and standardised is brought into use on the Railways. In the meantime, experiments are carried on in the Research Centres to improve the design further. After any improvement is effected, it is properly tested and if the altered design proves satisfactory under practical conditions, the new design is adopted as a revised standard. Thus, Research, Testing and Standardisation is a continuous process.

B. Organisation of Central Standards Office for Railways

37. This office was established temporarily in January, 1930 for a period of 5 years to co-ordinate the work of various Railway Standards Committees. Its principal aim was to provide for the progressive standardisation of rolling stock, track, bridges structures and all equipment commonly used on Indian Railways in accordance with changing conditions and as a result of practical experience. In 1935, the Central Standards Office for Railways was placed on a permanent footing and is now responsible for a wider field of design and standardisation.

38. The office was partially reorganised with effect from 1st June, 1954 and further reorganisation has taken place in December, 1954. It now consists of five main Wings, *viz.* Civil Engineering, Signal and Interlocking, Carriage and Wagon, Locomotive and the Architectural Wings. The Electrical Branch is at present a part of the Carriage and Wagon Wing. The Architectural Wing at present functions on a temporary basis.

C. Functions of the Central Standards Office

39. Briefly, the main functions of the Central Standards Office cover the following:—

(a) *Design and Standardisation*

This Office prepares and issues standard designs, specifications,

codes of practices etc., covering all railway equipment and materials. In this work, it is assisted by the various Standards Committees.

(b) *Consulting Engineers*

This Office has since assumed responsibility as technical consultants to the Ministry of Railways and the Indian Railways and has practically replaced the foreign Consulting Engineers.

(c) *Inspection*

The inspection of locomotives at TELCO and Boilers at Texmaco is controlled by the Central Standards Office. The cost of staff of inspection section is Rs. 65,000 per annum.

(d) *Information Services*

The Central Standards Office is the repository of technical literature and drawings relating to Civil, Mechnical, Architectural, Signal and Electrical Engineering. Important information published in technical journals and books is indexed and made available for reference purposes. A technical library is maintained and important books, journals, etc. published from time to time, in this and other countries are added to it.

(e) *Watch on patents*

A close watch is maintained on the applications for grant of patents with a view to safeguarding the interests of Indian Railways. The design staff are encouraged to evolve original and patentable designs of railway equipment, which are patented by the Government of India. So far the number of patents taken is five relating to Railway vehicles and locomotives. This number appears to be very small and indicates that there is considerable scope for accelerating progress in various directions.

(f) *Liaison*

This Office maintains a close liaison with other organisations and Government Departments engaged on allied work in this country. It is also a member of several such foreign bodies.

40. The Central Standards Office has succeeded to a large extent in its object of providing the progressive standardisation of rolling stock, track, bridges, structures and other equipment commonly used on the Railways. With the exception of long span bridge girders, power signalling including automatic signalling, certain special components of mechanical signalling, equipment for electric multiple unit stock, equipment for diesel cars, diesel electric and electric locomotives and departmental carriages, all other items of track, bridges, structures, rolling stock including steam locomotives and other equipment commonly used on the Railways are at present ordered to standard designs and specifications. The Committee recommend that the work of standardising the above mentioned items should be expedited; because the preparation of standard designs and specifications would facilitate indigenous production of those items.

41. The Central Standards Office functions with the aid of a number of Standards Committees as given below:—

(1) Bridge and Structures;

(2) Track;

(3) Building;

(4) Signalling and Interlocking;

(5) Locomotive;

(6) Carriage and Wagon;

(7) Electrical and

(8) Standing Committee on Standards and specifications.

42. The Committee suggest that some of the senior retired Railway officials with requisite technical knowledge should be associated with some of these Standards Committees.

43. The Foreign Consultants were paid a certain amount as retention fee annually. In addition, for each specific job assigned to them, they were paid actual costs including some percentage. Each Railway and the Railway Board used to assign the jobs to the consulting engineers directly. The Central Standards office has now replaced the foreign consultants and is functioning as technical consultant to the Ministry of Railways.

44. The Committee regret to note that the Railway Ministry have not been able to indicate the saving effected by replacement of Foreign Consultants by Central Standards Office. The Committee suggest that the Railway Board should obtain these figures and supply them to the Committee as early as possible to enable the Committee to examine the savings effected.

45. Central Standards Office has been collaborating with the Indian Standards Institution in the preparation of Indian Standards Specifications for various items, which are used on the Railways.

46. For this purpose Central Standards Office represents the Ministry of Railways on the General Council, Engineering Division Council, Building Division Council, and 25 Sectional Committees and 30 sub-Committees of the Indian Standards Institution.

So far 190 Indian Standard specifications have been adopted for use on Indian Railways.

47. Central Standards Office is also a member of the American Association of Rail-Roads, American Railway Engineering Association, International Railway Congress Association and E.C.A.F.E. (Railway Board in the case of the last two). Valuable data and information are received from these organisations in regard to various problems relating to the working of the Railways; this enables the Central Standards office to keep abreast of modern developments in other countries.

48. Central Standards Office collaborates with the Indian Roads Congress Bridge Committee in evolving codes of practice for steel and prestressed concrete bridges and with the National Building Organisation set up by the Ministry of W.H. & S. in evolving most economical methods of building construction.

49. Collaboration has also been maintained with the Chief Inspector of Explosives, Government of India, in the development of designs for special purpose tank wagons for transport of liquids at higher pressure. Liaison with Railway and allied organisations abroad for specific purposes of this Office is also achieved through the Railway Adviser, London and the Indian Technical Mission in the U.S.A. to obtain assistance in adopting and finalising details for use in India.

D. Miscellaneous

(a) *Relaying of track on Indian Railways as compared with Foreign Railways*

50. On Foreign Railways, the process of relaying is becoming increasingly mechanised, mainly on double lines, as a result of which both the time taken in the actual relaying operation and the subsequent consolidation of the track are considerably reduced and normal running speeds are restored fairly soon after the actual relaying. The Committee were informed by the Railway Ministry that in this country, the employment situation and the need for conserving foreign exchange (as all the track relaying and handling equipment is manufactured abroad) does not permit a change over from manual to mechanical methods.

51. Though the rate of relaying in miles per day in India compares favourably with the rates in some of the more industrially advanced countries, the duration of the block and the time taken upto the restitution of normal speed on the relaid track is, however, much longer. The Committee were informed that every endeavour was being made to enlist the aid of light powered tools and non-powered contrivances for the handling and preparing of permanent way materials preparatory to the actual relaying.

52. The Committee recommend that a detailed and scientific analysis should be made by the Railway Ministry about the relative advantages and disadvantages of the mechanised process of relaying versus the present manual process after keeping in view the employment potential in manufacturing the track relaying and handling equipment indigenously, and if it is found, as a result of this analysis, that the advantages are in favour of the mechanised process, the same may be introduced gradually on Indian Railways. The extra traffic that would be carried due to reduction in the duration of blocks and speed-restrictions should be given full consideration, before coming to a decision on this point.

(b) *Electrification of Indian Railways*

53. Where power is available at a reasonable rate and where coal is comparatively expensive and traffic density adequate, electric traction is accepted by the Railway Board as a better means of haulage. Electrification, however, requires heavy capital, a large portion of which is to be spent abroad for purchasing equipment. So far as the economics of electrification versus dieselisation are concerned, it is not possible to make a general statement as various factors—such as volume of traffic; cost of electricity, gradients etc. considerably affect the initial and operating costs for both types of transport. Each section requires examination separately, taking

into account the relative factors. Comparative study made for Igatpari-Bhusaval section in 1952 indicated that while diesel electrification may need less initial capital, its running expenditure including interest and depreciation is higher when compared to electric traction.

54. The Railways' draft Plan envisaged electrification of about 1,600 miles of double line sections, where saturation of capacity based on steam locomotion had been reached. Due to paucity of funds, the total length for electrification has been reduced to 800 miles. Electric traction has several advantages over steam traction. Some of these are:

(i) thermal efficiency of the electric locomotive is 3 to 4 times that of a steam locomotive;

(ii) central power stations can utilise low grade coal with a comparatively high ash content;

(iii) a steam locomotive is hardly available for 15 out of 24 hours on revenue earning work, whereas electric locomotives are available for 95 per cent. of the time. One electric locomotive can do approximately the same work as two to three steam locomotives;

(iv) Electric traction is obviously much cleaner and less arduous to operate.

55. The modern trend in foreign countries is, therefore, to switch over to electric traction to a greater and greater extent. According to the Report of the Indian Railway Delegation to the Soviet Railways, approximately 10 per cent. of the total mileage of Soviet Railways has so far been brought on electric traction and plans are in hand for its further extension. The Committee suggest that the Railway Ministry should formulate their tentative plans for electrification (and dieselisation) during the Third Five Year Plan also, so that the ancillary electrical industries may be gradually developed in the country, thus reducing the need for imports from foreign countries.

III

SIGNALLING AND TELECOMMUNICATIONS

A. Introduction

56. Movement of trains is regulated by signals. The maximum speeds with which the trains can run with safety, depend to a large extent on the signalling equipment. For light traffic moving at comparatively low speeds, ordinary manually operated signals will suffice; but as the density and speeds of traffic increase, more refinements in signalling equipment become necessary. Similarly, transport means continuous movement of rolling stock carrying passengers and goods. In order that best use may be made of the available rolling stock, a proper control over their movement is necessary. Such a control can be exercised effectively, if the disposition of rolling stock, which is in a state of flux, is available continuously. Good communications are, therefore, a *sine-qua-non* for good operation on Railways. As far as Signalling and Telecommunications are concerned, Indian Railways are behind other foreign countries. So far as the technique of signalling is concerned, the automatic signalling and power signalling, existing on the Western, Central and Eastern Railways to meet the requirements of suburban traffic around the Head-Quarters, compares favourably with that of England and Power Signalling, that is about to be installed at Kurla, will be one of the latest types as installed in Great Britain. As regards the extent of signalling, however, there are many sections on main line, which have low standard of interlocking thereby necessitating imposition of speed restriction. Even the main line route over which the Grand Trunk passes has sections with non-interlocked stations. Moreover, most of the branch lines are non-interlocked. Block instruments are also not provided on a large number of sections.

57. In this connection, the following observations of the Indian Railways' Delegation, which recently visited Soviet and other European Railways, are worth recording:

> "Signalling, however, is one aspect of railway working in which the Indian Railways have not kept pace with modern developments. Class III standard signalling, which at present is the highest prescribed standard of mechanical signalling on Indian Railways, cannot make for the same degree of efficiency and secure such expeditious movements, as can be obtained from modern practices. The 'Lock and Block' system, which is almost the normal practice on busy main line sections of European Railways is not extensively provided on all Railways in India. Track circuiting and colour light signals have been adopted to a limited extent. The feasibility of providing Automatic Train Control was examined by a Committee some years ago; no progress in this connection has, however, been made because it

was considered that the introduction of the system in India would be much too expensive. In order to increase the capacity of two particular sections, it was mooted to adopt the C.T.C. In respect of one it has already been decided to go in for doubling instead and the proposal for the other is still under investigation.

In view of the fact that modern signalling methods increase the working capacities, ensure greater safety and make for higher overall efficiency, the Delegation consider that their adoption should be given priority and would submit that the fact that equipment has largely to be imported at present should not influence the immediate policy in this matter."

58. Shri Kripal Singh, Chief Operating Superintendent of the Eastern Railway, who recently submitted a report on the working of the Japanese National Railways and their method for obtaining maximum line capacity over single line sections, emphasised the need of improving and modernising signalling and interlocking and block working with a view to accelerate movements through stations and between them and thus put through more trains on Indian Railways.

59. The Committee generally agree with these views and are of the opinion that there is vast scope for improvement in the working on Indian Railways by introducing modern methods of signalling and interlocking.

B. Indigenous capacity to manufacture Signalling Equipment

60. Regarding the last sentence of the above extract from the Report of the Indian Delegation, the Committee would like to add that the Railway Ministry should take special measures to build up indigenous capacity for manufacturing signalling equipment in the country.

61. The representative of the Railway Ministry informed the Committee that not only the railway signalling equipment workshops were being expanded, but investment in the country for the manufacture of signalling and telecommunication equipment was also being contemplated on receipt of the Report of the Railway Equipment Committee.

62. The Committee were given to understand that the Railway Ministry proposed to develop both the private sector and the existing signalling workshops on Railways for the manufacture of signalling requirements and that a provision of Rs. 1 crore was made in the works programme of 1956-57 for developing signal wrokshops on Railways. This was expected to take about 2 years' time to be fully established. Regarding the tentative proposal to manufacture signalling equipment in the private sector, the representative of the Railway Ministry informed the Committee that this question would be settled on receipt of the recommendations of the Railway Equipment Committee. The representative further added that the Railways had no objection to the private sector manufacturing equipment covered by certain patent rights, if they had the necessary technical efficiency and that there would be no difficulty in getting

the necessary rights for manufacture of patented articles after paying some royalty.

63. The Committee recommend that the Railway Ministry should take up the question of encouraging the manufacture of Railway signalling equipment in the private sector as soon as the report of the Railway Equipment Committee is received, because for want of modern signalling equipment Railways are very much handicapped. The question of enlarging the capacity of existing Railway Signalling equipment workshops should also be pursued vigorously, so that the existing position of helplessness of the Railways in the matter of improved signalling equipment is set right as soon as possible.

C. Means of communications on Indian Railways

(a) *Existing facilities*

64. Indian Railways utilise about 220 thousand miles of overhead lines and about 200 wireless stations for their exclusive use, in connection with the working of the telegraph, telephone, control telephone and signalling circuits. With a view to expedite the traffic, increased use of teleprinters, both on land lines and wireless, is being planned and P. & T. Department is being approached to provide additional channels.

65. The representative of the Railway Ministry admitted that the efficiency of the telegraph and telephone lines utilised by the Railways was not of a high standard and attributed this to the fact that these lines were, at present, owned and maintained by the P. & T. Department. He was of the opinion that the efficiency would improve, if these lines were owned and maintained by the Railways. The Committee suggest that the Railway Ministry should ascertain the prevalent practice in the foreign countries, assess the results achieved there and then pursue the matter with the Communications Ministry and come to some agreement, so that the programme of improvement in the means of communications on the Railways is expeditiously carried out in the larger interests of the country as a whole.

66. The Committee are of the opinion that the present means of communications (telegraph, telephone, teleprinters etc.) on Indian Railways are inadequate and in many cases outmoded. They feel that if proper and adequate means of communications are provided on Railways, there will be great improvement in the operating position and the movement of traffic will be considerably accelerated. The Committee, therefore, suggest that the Railway Ministry should arrange for a proper survey of the existing facilities by a foreign expert who should make suitable recommendations for modernising signalling and telecommunications on Indian Railways. His recommendations should form the basis of a proper and integrated Plan for the expansion of these facilities during the Second Five Year Plan. Proper training in the use of modern equipment as and when installed sroould also be given due attention.

(b) *Expansion of telephonic connections*

67. The Committee understand that due to paucity of funds available for improvement of communications and signalling on

Indian Railways extensive programme for improvement of telecommunications has not been drawn out. However, within the limited funds available, programme for providing control telephones, replacement of manual exchanges with automatic telephone exchanges, use of VMF equipment in the yards etc. to a limited extent is included in the Second Five Year Plan.

68. Further, in most cases, Railways own the exchanges for their internal working, but where large number of telephone connections to the public exchanges are required for Railway officials, it is found economical for the Railways to rent such exchanges from the P. & T. Department and operate them through Railway staff. At present the P. & T. Department have not agreed to provide any tie lines from their exchanges to the Railway exchanges.

69. So far as the question of installing carrier equipment is concerned the Railway Ministry informed the Committee that barring a few thousand miles of lines, all lines used by the Railways were owned by the P. & T. Department and so it was not possible to instal carrier channels for Railway use on lines belonging to the P. & T. Department. On the lines owned by the Railways, carrier equipment was installed, where necessary. The P. & T. Department were approached to provide direct carrier channels between Delhi and Bombay and Delhi and Calcutta, but so far the channels were not made available.

70. The Committee appreciate the difficulties of the Railways in carrying out improvements in the existing telephonic communications and are glad to note that the Railway Ministry propose to discuss the question of provision of tie lines from P. &. T. Exchanges to the Railway Exchanges with the Ministry of Communications at a high level shortly to remove the existing difficulties. The Committee recommend that the question of providing direct carrier channels between Delhi and Bombay and Delhi and Calcutta should also be pursued at the proposed meeting and the plans regarding installation of additional carrier channels should be finalised early.

(c) *Facilities for tele-printing on Indian Railways*

71. About 30 teleprinters are in operation on the Railway main telegraph circuits and Railways have been asked to make increased use of this equipment to clear traffic on long distance circuits. No arrangements exist on Railways regarding simultaneous transmission of messages to various Railway stations, but wherever direct teleprinter service exists, the stock reports and interchange messages are received on teleprinters.

72. The representative of the Railway Ministry, while replying to the question of the Committee as to whether there were any proposals for providing telephonic and teleprinter facilities on inter-Railway Wireless Links, informed the Committee that the matter was under active consideration of the Railway Ministry and a decision would be arrived at within a year. This was also an item for discussion in the high level meeting with the Ministry of Communications.

(d) *Radio Communication in trains*

73. The Committee understand that so far no trains are provided with radio communication between driver, guard and control office

on Indian Railways. The representative of the Railway Ministry informed the Committee that radio communications were provided on some trains in foreign countries. In the U.S.A. most of the trains were provided with radio communication. In India, the representative added, that though no proposals were so far sanctioned, it was proposed to try and introduce the same. In Moghalsarai, it had been tried in a modified form and it was found that it was expensive to keep it in working condition.

74. The Committee recommend that in view of the great advantages of radio communication on trains, the Railways should examine the matter further in the light of the results achieved in foreign countries and introduce this innovation as an experimental measure.

(e) *Centralised Traffic Control*

75. The Committee understand that with 5 miles block section and with standard III signalling the theoretical saturation capacity of single line is about 32-34 trains both ways and that with improved type of modern signalling such as Centralised Traffic Control, it may be possible to increase it upto 25 per cent more under favourable conditions. It will thus be seen that with improved signalling equipment the capacity of single line section can be increased to some extent.

76. So far as the Centralised Traffic Control is concerned, the representative of the Railway Ministry informed the Committee that under this system all the stations in a particular area were shown in a chart so that a person could visualise from one place, all the points and release the signals of all the stations as required. Its first essential was the provision of wooden sleepers. This system was used in U. S. A. for about 1,800 miles of track. It was suitable for long distances and perhaps for that reason the European Railways had not considered its adoption as distance in most countries in Europe were short. So far as the proposal to introduce Centralised Traffic Control system in India was concerned, the representative of the Railway Ministry informed the Committee that Indian Railways hoped to have one experimental section near Katihar, where there was a bottleneck and where wooden sleepers had been laid. The Committee suggest that the proposal should be expedited and if the results are found to be satisfactory, it should be extended to other heavily occupied single line sections.

D. Telecommunication on Japanese National Railways

77. As a matter of interest the Committee give below the details of telecommunication facilities existing on Japanese National Railways as given by Shri Kripal Singh, Chief Operating Superintendent, Eastern Railway in his report on the working of Japanese National Railways:

"Tele-communications

The Japanese National Railway owns and operates its own Telecommunications. The communication system consists of wired telephone, wired telegraph and wireless telephone and telegraph. The greater part of the communication service depends on telephones.

Telegraph.—Telegraph instruments are installed in 51 telephone and telegraph offices and in 1417 stations and yards.

Telephones.—Telephone switch boards are installed in 51 telephone and telegraph offices and 262 stations, all on a 24 hour duty system.

"There are separate telephone circuits for Control working and also for inter-yard working and a number of local telephone exchanges in important stations and offices are installed. In all, the total number of exchanges is 1362 and the total number of telephones 115,323. Recently, Tele-type communication between the principal marshalling yards has also been introduced to expedite goods train movements.

"Principal marshalling yards receive information about the composition of each train by "Tele-type" prior to the arrival of the train in the yard, so that arrangements for sorting of the train and making up fresh trains are expedited. Talk-back speakers are also installed in marshalling yards for exchange of information between yard employees and cabin or control towers or centres.

Wireless.—All the important Operating Divisions are connected with each other and with the Headquarters office over the wireless system. The Head Office is connected over trunk telephone and telegraph lines to each of the 27 operating divisions. The Railway Operating Divisions are also connected over the wireless with their important traffic and junction stations.

"A mobile radio is also used for special purposes, such as, communication between a ferry boat and wharf. Ferry boats are equipped with Radar, and Walky-Talky sets are used for maintenance of power transmission lines. In some areas, where snowfall causes failure of telephone and telegraph communications, a low powered radio net-work is also installed for emergency use. SHF and UHF wireless sets are also in use for communication over straits between two islands in addition to the submarine cables.

"Public address system is widely used at stations for giving information to the travelling public about trains etc. and in big offices and hospitals as also for co-operation between the signal cabin and the shunters."

78. Shri Kripal Singh recommended in his report as under:

."We should be more liberal in giving telephone connections to facilitate railway working. Quick and adequate means of contact and communication are very necessary for increasing the efficiency of railway operation. Where control lines are already over-busy with train working, we should instal additional telephone circuits to obtain information about wagon utilization and movements etc. The number of stock controllers also in each control office should be adequate to exercise a closer and more effective supervision and control over wagon utilisation and wagon movements. At present, sufficient attention is not being paid in control offices to this matter, the main concern being the punctual running of trains and distribution of wagons."

79. The Committee endorse the recommendation of Shri Kripal Singh in this respect and recommend that the Railways should pay more attention to the development of communication facilities with a view to increasing the efficiency of Railway operation.

IV

ACCIDENTS ON INDIAN RAILWAYS

A. Analysis of Accidents on Indian Railways

80. The total number of accidents (exclusive of accidents in Railway workshops, lines under construction etc.) reported on Government Railways for the post-regrouping years is shown below:—

TABLE I

Years	Total number of accidents
1951-52 (Class I Railways)	16,090
1952-53	12,783
1953-54	11,201
1954-55	10,431

81. The Committee are glad to note that there has been a steady decrease in the total number of accidents on Indian Railways during the last four years. During 1954-55, the number of accidents has shown a decrease of 770 as compared with the number of the previous year.

82. Accidents on open lines of Government Railways during the four years under comparison are summarised Railway-wise in the table below:—

TABLE II

Number of accidents (Government Railways) (Open Line)

Railways	1951-52	1952-53	1953-54	1954-55	Train miles in 1954-55 (In thousands)
1	2	3	4	5	6
Central	2,962	1,915	1,628	1,466	37,879
Eastern	3,516 (E.I. B.N.)	2,298	2,078	1,936	43,716
Northern	940 (E.P. + Bikaner + Jodhpur)	1,752	1,862	1,583	33,601

1	2	3	4	5	6
North Eastern . . .	914	836	885	936	20413
Southern .	3,435	3,225	3,080	2,829	37,357
Western	4,323	2,757	1,668	1,681	28,305
TOTAL . .	16,090	12,783	11,201	10,431	2,01,271

83. The Southern, Eastern and Western Railways account for 27, 19 and 16 per cent respectively of the total in 1954-55, while the Northern and Central Railways come next with about 15 and 14 per cent respectively. Number of accidents on the Southern Railway is disproportionately high. A better criterion for comparison would, however, be the number of accidents per million train miles.

84. Train accidents per million train miles occurring on the Zonal Railways during the year 1953-54 are detailed below:—

Railways	No. of accidents	Train miles	No. of accidents per million train miles
Central	1,628	36,155,000	45·0
Eastern .	2,078	42,306,000	49·1
Northern .	1,862	31,984,000	58·2
North Eastern	885	20,488,000	43·2
Southern . .	3,080	36,223,000	85·0
Western	1,668	27,269,000	61·2

85. From the above table it will be seen that the incidence of accidents occurring on the Southern and the Western Railways is disproportionately high.

86. As regards the accidents on the Southern Railway, the Railway Ministry informed the Committee that out of 3,080 accidents during 1953-54, 1697 were due to 'trains running over cattle on the line'. The procedure in force on other Railways for compilation of cattle accidents is that accidents to small animals such as dogs, sheep, cats, goats, pigs and poultry etc. are not included in the accident statistics, but only accidents to big animals such as cows, buffalows, horses etc., are included in the accident statistics. The reason for the exclusion of small animals is that they do not constitute any danger to the travelling public, the rolling stock and permanent way etc., but the Southern Railway had been compiling the cattle accident statistics erroneously for all sorts of animals, big or small, whatever they may have been. It was only in August, 1955, that the General Manager, Southern Railway issued instructions to all departments that in respect of reporting the cattle accidents, the

Southern Railway should also fall in line with other Railways. The excessive number of 1697 accidents due to trains running over cattle on the line as shown by the Southern Railway has led to an increase in the number of accidents on that Railway. If due allowance for the erroneous method of compilation of this particular item of accidents is made, the result would not be unfavourable, when compared with other Railways. The position on the Western Railway, however, appears to be unfavourable in comparison with other Railways. The Committee recommend that the position should be carefully analysed and remedial action taken.

87. The cases of accidents classified under principal causes are shown in table III below:

TABLE III

Causes	1951-52	1952-53	1953-54	1954-55
		(*Class I Railways*)		
1	2	3	4	5
1. Collisions and derailments :				
Trains	1,428	1,295	1,168	1,108
Others	307	185	196	244
2. Failures of engines and rolling stock	7,553	5,935	5,216	4,781
3. Failure of permanent way	217	213	121	191
4. Fires	436	326	255	263
5. Other accidents	6,149	4,829	4,245	3,844
TOTAL	16,090	12,783	11,201	10,431

Number of accidents caused by collisions, derailments and failures of engines and rolling stock accounts for nearly 60 per cent of the total accidents.

88. *Collisions and derailments.*—Collisions and derailments to trains, both passenger trains and other than passenger trains, have shown a steady decrease during the years under review. Other collisions and derailments, which refer to those in traffic yards, loco sheds, etc. during the shunting operations have, however, recorded an increase in 1954-55 over the previous two years. During 1954-55, there were 1,352 accidents under these two heads, as against 1,364 during the previous year. This indicates that there is no appreciable improvement in this respect.

89. Railway-wise details are shown in the following table.

TABLE IV

Collisions and Derailments

Railways	1951-52			1952-53		
	Trains	Others	Total	Trains	Others	Total
Central	127	47	174	155	30	185
Eastern	417	94 (E.I. + B.N.)	511	329	79	408
Northern	188	101 (E.P. + Bikaner + Jodhpur)	289	239	31	270
N. Eastern	336	2 (O.T. + Assam)	338	286	27	313
Southern	177	39	216	200	2	202
Western	183	24	207	86	16	102
TOTAL	1,428	307	1,735	1,295	185	1,480

Railways	1953-54			1954-55		
	Trains	Others	Total	Trains	Others	Total
Central	178	19	197	190	25	215
Eastern	261	57	318	270	58	328
Northern	228	15	243	194	24	218
North Eastern	278	3	281	255	4	259
Southern	135	86	221	98	115	213
Western	88	16	104	101	18	119
TOTAL	1,168	196	1,364	1,108	244	1,352

The figures on Central Railway have shown a steady increase. What is more disconcerting is the fact that the number of collisions and derailments of trains has recorded a steady and sharp increase on the Central Railway. This point requires careful examination and suitable remedial action. Western Railway has also recorded an increase under this head in 1954-55 in comparison with the previous two years.

Failure of Engines and Rolling Stock

90. Accidents caused by failure of engines and rolling stock have shown a steady decrease during the last four years. The number was 4,781 in 1954-55 as against 5,216 during the previous year. The following table shows the monthly figures of engine miles per engine failure during the years 1952-53, 1953-54 and 1954-55 separately for Broad Gauge (Steam) and Metre Gauge (Steam).

TABLE V

Engine miles per engine failure—B.G. (Steam)

Year	April	May	June	July	August	September
1952-53 . .	48,734	52,908	47,635	44,934	52,221	50,384
1953-54 . .	52,095	46,812	35,747	46,345	53,849	55,968
1954-55 . .	58,309	43,058	41,897	60,762	56,380	70,554

Year	October	November	December	January	February	March
1952-53 . .	51,150	51,820	51,947	49,903	53,066	55,325
1953-54 . .	61,471	53,256	57,264	50,472	57,031	61,536
1954-55 . .	64,181	71,239	48,120	55,342	54,192	54,329

Engine miles per engine failure—M.G. (Steam)

Year	April	May	June	July	August	September
1952-53 . .	28,782	22,899	25,389	33,453	32,047	35,006
1953-54 . .	35,605	31,842	29,275	32,860	42,204	47,575
1954-55 . .	42,226	36,446	36,158	45,728	46,216	57,080

Year	October	November	December	January	February	March
1952-53 . .	40,861	32,059	33,018	29,095	37,326	46,113
1953-54 . .	42,044	49,120	42,705	43,228	44,897	44,726
1954-55 . .	49,183	46,327	47,171	52,542	56,317	55,112

91. On tre Metre Gauge, engine miles per engine failure have shown a steady and substantial increase in practically all the months of the year 1954-55. On the Broad Gauge also, a general improvement has been recorded. These figures seem to indicate that engine failure generally increases during the months of May and June. This is perhaps due to the rigours of climate during the summer months.

Other Accidents

92. There has been a decrease of 401 from 4245 to 3844 under 'Other Accidents' during 1954-55 as compared with the previous year. The number of cases of train wrecking and attempted train wrecking

was 85 in 1954-55 as against 80 in 1953-54. The following table shows the break-up of 'Other Accidents' according to causes:—

TABLE VI

'Other Accidents' (Government Railways)

	1951-52	1952-53	1953-54	1954-55
Trains running over cattle	5,282	4,083	3,674	3,303
Train wrecking	6	3	3	1
Attempted train wrecking	134	87	77	84
Level crossing	110	90	98	105
Trains running into other obstructions	71	65	78	97
Miscellaneous	546	501	315	254
TOTAL	6,149	4,829	4,245	3,844

The accidents at level crossings have been on the increase during the last two years and this, *prima facie*, indicates the need of improving the types of level crossings, according to the increased flow of traffic.

93. Railway-wise figures of 'Train-wrecking' and 'Attempted train-wrecking' taken together are indicated in Table VII below:—

TABLE VII

Train Wrecking and Attempted Train Wrecking

Railways	1951-52	1952-53	1953-54	1954-55
Central	3	..	1	5
Eastern	17 (E.I.+B.N.)	7	24	24
Northern	7 (E.P.+Bikaner+Jodhpur)	8	5	1
North Eastern	20 (O.T.+Assam)	20	8	20
Southern	44	42	38	24
Western	49	13	4	11
TOTAL	140	90	80	85

Cases of train wrecking and attempted train wrecking are the highest on the Southern Railway. On the Eastern Railway these cases have increased during recent years.

94. The following table shows the Railway-wise train collisions and derailments rated against the respective train miles run for the four years under review:—

TABLE VIII

Train Collisions and Derailments per million train miles

	1951-52		1952-53	
	Train miles (000)	Ratio	Train miles (000)	Ratio
Central	35,871	3·54	35,578	4·36
Eastern	56,450 (E.I. + S V.)	7·39	42,367	7·77

	1951-52		1952-53	
	Train miles (000)	Ratio	Train miles (000)	Ratio
Northern	13,138 (E.P. + Bikaner + Jodhpur)	14·3	30,082	7·94
N. Eastern	20,200	16·6	20,408	14·0
Southern	36,586	4·84	36,063	5·55
Western	27,304	6·70	26,624	3·23
TOTAL	189,549	7·53	191,122	6·77

	1953-54		1954-55	
	Train miles (000)	Ratio	Train miles (000)	Ratio
Central	36,155	4·92	37,879	5·02
Eastern	42,306	6·17	43,716	6·18
Northern	31,984	7·13	33,601	5·77
North Eastern	20,488	13·6	20,413	12·5
Southern	36,223	3·73	37,357	2·62
Western	27,269	3·23	28,305	3·57
TOTAL	194,423	6·01	201,271	5·51

Per million train miles, the number of collisions and derailments on 'all Railways' decreased from 7.53 in 1951-52 to 5.51 during 1954-55. The North-Eastern Railway, despite a slight decrease still maintains a figure more than double the average. Reasons for this high figure should be analysed in detail and remedial action taken. Other Railways except the Central and Western have recorded decreases in 1954-55 in comparison with the preceding years.

Casualties from reported accidents:

95. The number of casualties classified according to fatalities and injuries due to collisions between and derailment of trains, fires, failure of engines, rolling stock etc. are shown in Table IX below:—

TABLE IX

Number of fatalities and injuries to persons (Open line)

Fatalities

(*Class I Railways*)

Railways	1951-52				1952-53			
	Passengers	Rly. employees	Others	Total	Passengers	Rly. employees	Others	Total
Central	1	1	1	3	1	1	2	4
Eastern	5 (E.I.+B.N.)	3	9	17	5	4	3	12
Northern	..	1 (E.P.+ Bikaner+ Jodhpur).	21	22	46	6	5	57

Railways	1951-52 Passengers	Rly. employees	Others	Total	1952-53 Passengers	Rly. employees	Others	Total
N. Eastern	22	5	11	38	3	3	3	9
Southern	..	2	..	2	..	1	4	5
Western	..	..	..	..	..	1	1	2
TOTAL	28	12	42	82	55	16	18	89

	1953-54				1954-55			
Central	2	1	6	9	127	12	4	143
Eastern	..	9	4	13	..	1	2	3
Northern	17	35	1	53	1	3	22	26
North Eastern	44	10	2	56	3	10	12	25
Southern	63	10	2	75	1	..	5	6
Western	2	1	..	3	13	..	3	16
TOTAL	128	66	15	209	145	86	48	219

Railways	1951-52 Passengers	Rly. employees	Others	Total	1952-53 Passengers	Rly. employees	Others	Total
	Injuries (Class I Railways)							
Central	24	1	15	40	41	14	6	61
Eastern	102(E.I.+B.N.)	69	14	185	148	30	18	196
Northern	22 (E.P.+Bikaner+Jodhpur).	6	28	56	83	40	20	143
N. Eastern	105	43	21	169	57	26	19	102
Southern	2	19	11	32	..	42	20	62
Western	10	12	14	36	23	13	4	40
TOTAL	265	150	103	518	352	165	87	604

	1953-54				1954-55			
Central	43	16	4	63	74	34	11	119
Eastern	9	60	13	82	15	74	10	99
Northern	41	25	13	79	3	19	39	61
N. Eastern	143	14	12	169	125	64	47	236
Southern	117	56	12	185	1	19	11	31
Western	15	5	6	26	82	25	44	151
TOTAL	368	176	60	604	300	235	162	697

96. The number of casualties according to causes mentioned above, taking the fatalities and the injuries together have increased to 916 during 1954-55 from 693 and 813 in 1952-53 and 1953-54 respectively.

The figures relating to fatalities indicate that there were 10 persons more killed in 1954-55 than during the previous year and 130 more than the number in 1952-53. Accident on the Central Railway during September, 1954 was the main cause of heavy fatalities during the year 1954-55.

97. The number of casualties during the four years due to causes other than those mentioned above are shown in Table X. These

causes include falling between trains and platforms, crossing the line at stations, all accidents during shunting operations, accidents whilst working on the permanent way and sidings, whilst passing over the railway at level crossings, suicides etc.

TABLE X

Fatalities

(Class I Railways)

Railways	1951-52 Passengers	Rly. employees	Others	Total	1952-53 Passengers	Rly. employees	Others	Total
Central	79	25	331	435	74	35	462	571
Eastern	73 (E.I.+B.N.)	54	1,587	17,14	33	65	1,204	1,302
Northern	47 (E.P.+Bikaner+Jodhpur).	16	333	396	44	31	771	846
N. Eastern	48	8	496	552	52	13	547	612
Southern	52	17	341	410	43	17	790	850
Western	91	25	383	499	67	25	293	385
TOTAL	390	145	3,471	4,006	313	186	4,067	4,566

Railways	1953-54 Passengers	Rly. employees	Others	Total	1954-55 Passengers	Rly. employees	Others	Total
Central	69	31	416	516	67	20	380	467
Eastern	30	44	1,179	1,253	34	41	1,041	1,116
Northern	66	44	767	877	58	28	860	946
N. Eastern	62	7	523	592	50	5	537	592
Southern	32	16	734	782	37	16	627	680
Western	53	21	284	358	60	15	258	333
TOTAL	312	163	3,903	4,378	306	125	3,703	4,134

Injuries

(Class I Railways)

Railways	1951-52 Passengers	Rly. employees	Others	Total	1952-53 Passengers	Rly. employees	Others	Total
Central	628	1,620	181	2,429	686	2,077	98	2,861
Eastern	638 (E.I.+B.N.)	1,383	1,004	3,025	393	1,362	835	2,590
Northern	219 (E.P.+Bikaner+Jodhpur).	79	143	441	340	332	363	1,035
N. Eastern	301	67	207	575	308	74	204	586
Southern	769	1,869	155	2,793	701	1,461	296	2,458
Western	681	370	214	1,265	544	362	156	1,062
TOTAL	3,236	5,388	1,904	10,528	2,972	5,668	1,952	10,592

Railways	1953-54 Passengers	Rly. employees	Others	Total	1954-55 Passengers	Rly. employees	Others	Total
Central	630	1,945	215	2,790	655	1,275	197	2,127
Eastern	400	1,694	708	2,802	386	1,769	665	2,820
Northern .	348	311	374	1,033	308	266	392	966
North Eastern .	416	74	227	717	283	86	170	539
Southern . .	678	1,236	299	2,213	580	1,208	231	2,019
Western . .	550	523	139	1,212	719	711	149	1,579
Total .	3,022	5,783	1,962	10,767	2,931	5,315	1,804	10,050

The number of persons killed during 1954-55 was less than during the previous two years. The number of persons injured also was less in 1954-55, the figures on the Eastern Railway, however, showing an increase during the year.

Casualties to passengers

98. Casualties to passengers are broadly grouped under accidents due to collisions and derailment of trains, train-wrecking, and 'other causes'. The following table shows the number of casualties to passengers during the years under review according to these groups:—

TABLE XI

Casualties to Passengers

	1951-52 (*Class I Railways*) Killed	Injured		1952-53 Killed	Injured	
		Serious	Minor		Serious	Minor
From train operation	20	21	194	45	34	222
Train wrecking .	..	1	12	3	8	14
Other causes	398	1,408	1,865	320	1,263	1,783
	1953-54			1954-55		
From train operation	97	91	225	144	41	239
Train wrecking	..	..	..	..	..	..
Other causes . .	343	1,317	1,757	307	1,219	1,732

99. The total number of casualties to passengers under 'other causes' has decreased during 1954-55. The casualties due to train-wrecking during 1952-53 refer to North-Eastern Railway. The number of casualties to passengers per million passengers carried during

the four years are shown below:—

TABLE XII

	1951-52 (Class I Rlys.)		1952-53	
	Passengers carried (000)	Ratio	Passengers carried (000)	Ratio
Central	246,034	2·98	232,528	3·45
Eastern	264,185 (E. I. + B.N.)	3·10	203,450	2·85
Northern	92,542 (E.P. + Bikaner + Jodhpur)	3·11	156,561	3·28
N. Easthern	117,109	4·07	119,634	3·51
Southern	234,260	3·51	216,439	3·44
Western	286,355	2·73	257,878	2·46
	1,240,485	3·16	1,186,490	3·11

	1953-54		1954-55	
Central	241,057	3·08	249,940	3·69
Eastern	216,530	2·03	237,697	1·88
Northern	166,381	2·84	166,403	2·54
N. Eastern	111,539	5·96	111,765	4·60
Southern	206,926	4·30	212,228	3·27
Western	25,28	2·39	287,010	3·01
	1,201.811	3·19	1,265,043	2·91

Casualties to Railway employees

100. Casualties to Railway employees on the open line of Government Railways represent about 70 per cent. of the total casualties. A number of accidents occur on Railway premises not connected with the movement of Railway vehicles. The following table shows these casualties as well as "all accidents" including these casualties for the four years under review.

TABLE XIII

Accidents on Railway premises

	Accidents in which Movement of railway vehicles was not concerned			All accidents including those in which movement of vehicles was concerned		
	Killed	Injured		Killed	Injured	
		Serious	Minor		Serious	Minor
1951-52	28	473	17,865	185	869	23,007
1952-53	24	474	17,867	226	913	23,261
1953-54	47	413	15,915	276	800	21,493
1954-55	27	430	16,363	178	785	21,558

Casualties in workshops, lines under construction

101. The total number of casualties in Railway workshops, lines under construction etc. during the four years under review are shown below:—

TABLE XIV

(*Class I Railways*)

	1951-52			1952-53		
	Railway employees	Others	Total	Railway employees	Others	Total
1. Railway workshops:						
Killed	4	1	5	6	0	6
Injured	17,892	25	17,917	20,415	86	20,501
2. New works not opened for traffic :						
Killed	..	..	..	..		..
Injured	1	..	1	1		1
3. Lines under construction :						
Killed	1	2	3	1	..	1
Injured	50	..	50	16	2	18
4. Lines not open to public traffic :						
Killed	..	..	..	1		1
Injured	5	..	5	7		7
5. Steamers or flats working in connection with Railways :						
Killed	1	..	1	..	..	..
Injured	7	..	7	34	..	34
TOTAL: Killed	6	3	9	8	..	8
Injured	17,955	25	17,980	20,473	88	20,561

	1953-54			1954-55		
1. Railway workshops :						
Killed	4	1	5	15	2	17
Injured	19,050	76	19,126	19,115	91	19,206
2. New Works :						
Killed	1		1	2	1	3
Injured	3		3	18	1	19
3. Lines under construction :						
Killed	1		1	..	..	..
Injured	13		13	2	..	2
4. Lines not open to public traffic :						
Killed	..	..	..	..	..	..
Injured	..	..	..	12	1	13
5. Steamers or flats working in connection with Railways :						
Killed	..	..	..	..	..	..
Injured	28	..	28	38	..	38
TOTAL : Killed	6	1	7	17	3	20
Injured	19,094	76	19,170	19,185	93	19,278

102. The total number of casualties in workshops, lines under construction etc., recorded an increase during 1954-55, the number being 20 killed and 19,278 injured during the year as compared with 7 killed and 19,170 injured during the previous year. The above

figures indicate that accidents resulting in injuries to Railway employees in the Railway workshops are very heavy. The Committee suggest that this point should be specially investigated by the Railway Ministry and remedial action taken. Railway-wise details regarding the fatalities and injuries are given below:—

TABLE XV

(*Class I Railways*)

	1951-52		1952-53	
	Killed	Injured	Killed	Injured
Central	..	4,327	..	3,279
Eastern	1 (E.I. + B.N.)	3,107	4	4,607
Northern	3 (E.P. + Bikaner + Jodhpur)	319	2	815
North Eastern	1	170	1	271
Southern	..	1,933	1	2,041
Western	1	7,155	..	7,958
C.L.W.	3	969	..	1,573
I.C.F.	..	..	..	17
G.B.P.	..	..	..	..
TOTAL	9	17,980	8	20,561

	1953-54		1954-55	
Central		3,118	1	2,725
Eastern	3	4,517	10	4,860
Northern	1	2,040	3	2,012
North Eastern	1	400	..	620
Soutern	1	1,950	2	2,306
Western		6,080	2	5,670
C.L.W.	1	1,042	1	966
I.C.F.	..	23	1	94
G.B.P.	..	..	..	25
TOTAL	7	19,170	20	19,278

103. During 1954-55, there were 10 fatalities in the Eastern Railway as against only 3 during the previous year. Number of injuries is generally the highest on the Western Railway. In the Chittaranjan Locomotive Works, there was one case of fatality during 1954-55, and the number of men injured recorded a decrease of 76 in comparison with the previous year. The above figures indicate that the cases of injuries are much more frequent on the Western, Eastern and Central Railways. The point needs further careful examination by the Railway Ministry.

104. Comparative figures of total cost of damages caused to 'Rolling Stock' and 'Permanent Way' for the last four years are given below:

TABLE XVI

	1951-52	1952-53	1953-54	1954-55
Rolling Stock	17,46,842	20,23,036	25,19,260	18,84,389
Permanent Way	8,64,137	18,08,350	15,30,780	9,95,957

A comparative study of accidents on the Railways in India, U.S.A. and United Kingdom made by Accidents Enquiry Reviewing Committee indicates that the results on Indian Railways do not generally

compare unfavourably with those on the Railways in the U.S.A. and United Kingdom and that the conditions on the Indian Railways cannot be said to show any cause for alarm. All the same, the detailed analysis of accidents on Indian Railways given above shows that there is no ground for complacency either. Apart from the cost of damages caused to rolling stock of which there is acute shortage on Indian Railways and the set back to the flow of traffic as a result of accidents, the question involving the safety of passengers must continue to receive constant attention of the Railway Ministry.

B. **Factors responsible for causing accidents and remedial measures**

105. A detailed analysis, made by the Railway Accidents Enquiry Committee, of the accidents that occurred during the period 1st January, 1953 to 10th January, 1954 indicated that train accidents are mainly contributed by failure of station and train staff to follow the rules and by flaw in metal or design of rolling stock. The majority of accidents attributed to flaw in metal of rolling stock is really due to either faulty workmanship in workshop or negligence in running maintenance. The representative of the Railway Ministry also stated that the main cause leading to accidents was the failure of human element. Remedial measures to tackle the problem of staff failing to perform their duties of train operation properly and correctly may be enumerated as under:—

(a) Adequate training and periodical refresher courses,
(b) Adequate supervision and inspections,
(c) Award of adequate and prompt punishment for mistakes,
(d) Provision of adequate facilities for staff,
(e) Elimination of unreasonable conditions of work,
(f) Uprooting of indiscipline among staff, and
(g) Improvement of psychological background among staff.

106. In this connection, the Committee would like to reproduce below the reply given by the representative of the Railway Ministry to their question as to what steps have been taken by the Railway Ministry to reduce the number of accidents on Railways:

"We have had a Committee—a departmental one—previously. They have gone into the whole question. Whatever they have recommended, we are following them up. But it is a case more of human element than anything else, which accounts for most of these accidents. Human element is a thing that cannot just be regulated by mere instructions or rules and regulations. To an extent, you may be able to get it regulated by supervision or guidance; but it is more psychological than anything else. Now, human psychology has to be enlivened to a greater sense of responsibility and how that has to be done is the problem. The environments within which they are working and what they see all round seem to be—to be very frank—not conducive to the building up of that sort of psychology which will make them more alive to their sense of responsibility. Now, therefore, the little progress that we have made in reducing our accidents has

been done by constant chasing and chasing. There are of course training schemes. But it is not the training scheme that is likely to help. How are these accidents happening. I am not talking of minor ones. I am speaking of major accidents involving risk to one's life. The reason for all that is that the whole of human psychology has become casual and the real sense of responsibility is lacking. Unless that is brought about and people made to realise that it is their own matter, things won't improve. There, of course, a healthy environment has to be there. It is just greater sense of discipline. That is the basic thing and everything else comes from this. Unless we can improve substantially the standard of discipline—discipline of mind is also covered by this—we cannot hope to have any very substantial improvement in the matter of accidents. Look at the Japanese Railways. They get a few accidents. Other countries are not immune to this. For instance, America has fairly large number of accidents and so is England with all the modern equipment they have got. The Japanese Railways have got only much less. There must be some reason for it and the reason, as far as I can see, is that they have got a higher sense of discipline. That is what we are lacking."

107. It will thus be seen that the problem of decreasing the number of accidents due to failure of human element is more or less identical with the problem of increasing the general efficiency of Railway employees.

108. The Committee have already discussed the various problems regarding the recruitment, training, discipline etc. of Railway employees in their 24th Report on Staff Matters and they have no doubt that prompt implementation of their recommendations will result in all-round improvement in the efficiency of Railway staff, which in turn will be reflected in the decrease in the number of accidents.

109. While on the subject, the Committee would specially like to refer to the following observations of the Accidents Enquiry Reviewing Committee:

> "We consider that at present, train examination in its various aspects is the weakest link in the "safety chain" on Railways and we recommend that every Railway should carry out a thorough and early probe into the working of each train examination Depot."

110. The Departmental Committee on Railway Accidents had made a number of useful recommendations and the Committee were assured that the same were being followed up by the Railway Ministry. In this connection, the Committee would, however, like to lay special stress on the following recommendations made by that Committee and suggest that the same should be pursued vigorously—

(1) Adequate facilities for training and refresher courses should be provided for the employees of Traffic, Mechanical and Civil Engineering Departments. (This point has

already been referred to by the Committee in detail in their 24th Report).

(2) Night and surprise inspections must be conducted by Officers and Inspectors.

(3) On sections of heavy traffic, high standard of interlocking should be provided and on all sections, where traffic is light, some sort of rudimentary interlocking must be made available. On the main trunk routes no station should be left un-interlocked and the standard of interlocking at all stations on a section should be the same. Further at large stations, track circuiting should be provided.

(4) Complete lock and block should be planned for all double line sections.

(5) Where on single line sections traffic is in excess of three trains each way, token instruments must be provided and where token instruments are installed the last stop signal should be interlocked with the token instrument.

(6) When paper line clear system is in force, a train signal register should be maintained.

(7) No section of the double line should be worked on paper line clear system.

(8) Standards of interlocking should be gradually raised.

(9) Speedometers should be provided on all engines working trains carrying passengers.

(10) Standard of lighting in yards and platforms should be improved.

(11) Continuous night duty by Assistant Station Masters should be avoided.

(12) The area of a yard in which train examination is done as also the sick-line area should be provided with flood lighting.

(13) On the Metre Gauge pit lines should be provided at stations, where intensive train examination is done.

(14) Supersonic crack detectors should be provided in all Railway workshops.

(15) A proper and well-defined technique in welding should be prescribed in all workshops and proper welding equipment should also be provided. Supervision on welding work should be effective and courses of training for welders should be introduced.

(16) Arrangements for annealing should be provided in all workshops and an organisation should be set up to ensure annealing all welds.

(17) Snatch test arrangements for draw-bars should be provided on all workshops and it should be ensured that

every single draw-bar is given snatch test before it is brought into use on rolling stock.

(18) At the time of periodical overhaul each wagon draw-bar should be annealed and given a snatch test.

(19) The deficiency of gauge glass protectors on engines must be removed.

111. The Committee understand that on the Japanese Railways, a certificate is awarded to the yard by the Divisional Superintendent, if there is no accident for three months and a medal is awarded by the President of the Japanese National Railways, if there is no accident for a whole year. The Committee suggest that this procedure should be adopted on the Indian Railways also, in respect of certain important marshalling yards.

C. Government Inspectorate of Railways

112. The Government Inspectors of Railways have three main functions:

(a) To carry out certain external inspections to check safety standards laid down by the Railway Board;

(b) To ensure minimum passenger amenities; and

(c) To conduct enquiries into major accidents.

113. The Government Inspectorate of Railways is at present under the control of the Ministry of Communications. The Committee had, therefore, requested the Ministry of Communications to send a consolidated note on the suggestions and proposals made by the Railway Inspectorate during the last five years on certain specific points. The intention of the Committee was to enquire as to the extent to which these suggestions and proposals were implemented by the Railway Ministry. Unfortunately, however, it took nearly 7 months for the Ministry of Communications to furnish the consolidated note, a copy of which is enclosed as Appendix III, for information. That it should have taken about 7 months to furnish mere factual information creates a suspicion in the mind of the Committee that all is not well with the functioning of the Inspectorate of Railways.

114. The Committee would like the Railway Ministry to communicate to the Committee in due course the action taken on the various suggestions and proposals, as given in Appendix III.

V

MISCELLANEOUS MATTERS

A. Lack of uniformity of procedure on different Railways

115. During the course of their examination, the Committee came across a number of items where there was a lack of uniformity of practice and procedure on the Indian Railways. The Committee recapitulate below some of the items already dealt with by them in their previous Reports:—

(1) Passenger trains curtailed during the War have been restored on the Central and the Southern Railways but not on the others. (Para. 26 of the Seventeenth Report);

(2) The Western Railway is much behind others in respect of the coach-building capacity (Para. 122 of the Twenty-first Report);

(3) There is considerable disparity in the number of adult schools and the percentage of illiterate staff to literate staff from Railway to Railway. (Para. 169 and Appendices II and III of the Twenty-fourth Report);

(4) Cost per head of Railway staff of medical and health services varies widely. (Appendix I of the Twenty-fourth Report);

(5) Percentage of stations where basic amenities have not so far been provided varies from 5% on the South-Eastern Railway to as high as 70% for some items on the Central Railway and 35% in the case of the Northern Railway. (Para. 17 of the Twenty-fiftr Report);

(6) Percentage of provision of foot overbridges at stations (against the requirements) varies from 7% on the Central Railway to 85% on the South-Eastern Railway (Para. 42 of the Twenty-fifth Report);

(7) The quantum of licence fees and rent realised from catering contractors varies from station to station and Railway to Railway (Paras. 117—120 of the Twenty-fifth Report);

(8) A perusal of the pamphlet "Towards better conditions of Travel" and a scrutiny of the expenditure incurred on different items of amenities indicate that the stress laid by the different Railways in the provision of amenities at stations or in the trains varies from Railway to Railway. The progress with regard to the provision of basic amenities at all the stations, as laid down in the directive of the Railway Board issued as early as in August, 1952 has also varied from Railway to Railway. (Para. 128 of the Twenty-fifth Report);

(9) Organisation for handling and processing court cases varies from Railway to Railway. (Para. 83 of the Twenty-sixth Report);

(10) Standards for fixing the strength of ticket-checking staff are different for different Railways. (Para. 110 of the Twenty-sixth Report);

(11) There is no uniform procedure in the matter of placing contractors for stores purchases in the approved list. (Para. 37 of the Twenty-eighth Report);

(12) The average hours of work per week are not common to all the Railway presses. (Para. 112 of the Twenty-eighth Report);

(13) There is at present dual control by the Chief Engineer and the Controller of Stores over "Track" Stores and Sleepers. In some Railways, the Track Supply Officer and Sleeper Controller is under the Controller of Stores and on other Railways, he is under the Chief Engineer. (Para. 143 of the Twenty-eighth Report); and

(14) The form and contents of the domestic statistics differ from Railway to Railway. (Paras. 15 and 16 of the Twenty-ninth Report).

116. Besides the above, some more instances where there is lack of uniformity are given below:—

(1) Some statistics are given in crores and some in millions in the Statistical Tables appended to the book, "Indian Railways" (Popular Edition);

(2) The powers delegated to Officers subordinate to General Manager are not regulated by the Railway Board, but are sanctioned by the General Managers in consultation with the Financial Adviser and Chief Accounts Officer. There is no uniformity in this respect;

(3) The rules regarding free use of retiring rooms on Railway Stations are not uniform;

(4) The number of installed printing machines varies widely from Railway to Railway;

(5) On the Southern and the North-Eastern Railways, the executive and administrative control of the printing presses has so far been exercised by the respective Financial Adviser and Chief Accounts Officer whereas in other Railways the printing presses are under the Controller of Stores;

(6) In certain Railways, the Sanitary Inspectors are under the Engineering Department and not under the Medical Department; and

(7) While compiling the cattle accidents statistics the Southern Railway used to include the running over of small

animals such as dogs, sheep, cats, goats, pigs and poultry etc. till August, 1955, while the other Railways did not.

117. The Committee appreciate that in the past when the Railways were under different managements, some under the Government of India—some under company management, and some under the former princely states—there was bound to be considerable divergence in many respects. But now that all the Railways in the country are owned and managed by the Government of India (excepting for a negligible proportion of light Railways), the Committee wish to emphasise the need for achieving uniformity of procedure on all the Railways to the maximum extent possible.

B. Delays in implementation of recommendations of the various Committees

118. During the course of examination of the estimates of the Ministry of Railways, the Committee have come across a number of cases, where the implementation of the recommendations of various committees appointed from time to time to investigate the specific problems has been inordinately delayed. The Committee give below some instances of this nature:—

(1) The Indian Railway Enquiry Committee (1947) recommended the adoption of welded rails on a sufficiently large scale. The progress in this direction has not been satisfactory (Para. 14 of the Twenty-first Report);

(2) Even though the same Committee had recommended that the Railways should obtain records of the condition of track by the use of test cars or Hallade instrument twice a year and that the annotated records should be in the hands of the permanent way supervising staff expeditiously, not much progress appears to have been made. (Para. 15 of the Twenty-first Report);

(3) Though the Indian Railway Enquiry Committee (1947) had recommended that properly qualified officers should be entrusted with the least possible delay with the duty of working out and giving effect to a comprehensive scheme for introduction of full costing in workshops, the progress made in this direction on Indian Railways has been very slow. (Paras. 130-131 of the Twenty-first Report);

(4) The Railway Stores Enquiry Committee (1950-51) made two important recommendations regarding (a) the classification of stores under two main categories in order to ensure better control over stocks and (b) simplification of the Stores Code by laying down certain broad principles permitting flexibility for local variations and for standardising statistics and other stores records. These two important recommendations have not yet been complied with. (Paras. 146-147 of the Twenty-seventh Report);

(5) The Indian Railway Enquiry Committee had summed up their recommendations in 173 items, of which 20 are conclusions and findings. The Report was submitted on the 6th November, 1948. Final decision had not been taken in respect of 7 of the important recommendations until late in 1955. The Committee were informed in February, 1956 that decision in respect of 4 of them had since been finalised. Action has yet to be taken in respect of 3 of them; and

(6) An Indian Railway Delegation went to the Soviet Railways and other European Railways in 1954. The Committee were informed that out of the 38 recommendations made by the delegation, only 8 had been accepted and action taken thereon upto the 1st October, 1955.

119. In this connection the Committee reproduce below para 8 of their Twenty-second Report on the Ministry of Production (National Instruments Factory, Calcutta):—

"The Committee would observe in this connection that whenever a Committee or Officer is appointed by Government to examine any particular matter and make recommendations thereon, the Report should be examined in detail as soon as it is received. Thereafter, action should be taken to arrive at a decision on the recommendations. Action should then be initiated without delay to implement such of the recommendations, as have been accepted, and a continuous review of the progress of the action should be maintained. A statement showing the recommendations contained in the report, the decisions taken thereon, if any recommendations are not accepted, the reasons therefor and the action taken to implement the accepted items should be drawn up and maintained uptodate from time to time. Except in case, when for sufficient reasons, Government consider that it is inexpedient in the public interest to do so, the Report as well as the decision of Government thereon should be given the widest publicity and copies thereof placed before Parliament".

This recommendation applies *mutatis mutandis* to the Railway Ministry.

120. The Committee consider that there is no point in constituting any Committee—departmental or otherwise—to go into any particular aspect of working or administration and not take any action thereon, once the Report is submitted by that Committee, especially after incurring so much expenditure and labour in collecting the requisite material. A time limit should be fixed by which decision should be taken and action initiated on the recommendation made by the Committee. Further, it should also be ensured that the recommendations of such committees are properly considered and not rejected merely on the plea that the committees so constituted are not expert bodies. It is a waste of public money to appoint committees, print and publish their Reports, but delay action on the recommendations or suggestions made by them for inordinately long periods.

C. Position on the ex-Indian State Railways

121. There appears to be an impression in the minds of the people belonging to the areas served by the former Indian State Railways, that there has not been any appreciable improvement in the operating results and passenger amenities in those areas, after integration. The Committee, therefore, recommend that the Railway Ministry should publish a pamphlet giving statistical data with regard to each aspect of administration, detailing the position before and after integration in respect of the former Indian State Railways. The pamphlet may briefly compare the position at the time of integration with the position as on 1st April, 1956 with regard to staff matters, number of locomotives and coaches, punctuality of trains, availability of wagons for loading etc. This pamphlet should be widely circulated with a view to dispelling any doubts in the minds of the people regarding the step-motherly treatment accorded to areas covered by former Indian State Railways.

D. Results of the studies of the Efficiency Bureau

122. Apart from assessing the administrative workload on each zonal Railway, the Efficiency Bureau made a detailed study of two important problems relating to Railway Operation, namely (1) break-of-gauge transhipment and (2) speed of goods trains.

123. As a result of the Bureau's investigations into the problems of break-of-gauge transhipment a number of specific suggestions were made to the Railways, most of which have since been implemented. Railway Administrations have also undertaken the work in regard to increasing the physical capacity of various transhipment points. As a result of the suggestions made by the Bureau and of the action taken by the Railways, improvement is recorded in the transhipment performances at several transhipment points. Improvement has been recorded at 10 transhipment points on the B.G. and 12 on the M.G. Seven transhipment points on the B.G. and 2 on the M.G. however, do not reflect improvement due to other factors. The total net saving works out to 2,616 and 5,145 wagon hours per day respectively for Broad and Metre Gauge wagons or a saving of 39,785 wagon days per year on the B.G. and 78,247 wagon days per year on the M.G. On. the basis of the average fgures of earnings per wagon ped day i.e. Rs. 23·1 on the B.G. and Rs. 11·3 on the M.G., a net saving of Rs. 9,18,034 on the B.G. and Rs. 8,84,191/- on the M.G. or a total saving of Rs. 18,02,225 has been secured as a result of the improvements.

Regarding the problem of speed of goods trains, as a result of the study made by the Bureau, specific suggestions were communicated to the Railways, in respect of the steps to be taken to bring about an improvement in the speed of goods trains. The figures of average speed during the 1954-55 disclose, while compared with the previous year, an improvement on the Northern and the Eastern Railways (B.G.) and the Central and the Northern Railways (M.G.). It has been found that the average speed had to be slightly sacrificed in order to permit the increased train density, but on the M.G. the drop in speed has tended to exceed the margin that is allowed by the increase in the train density. This problem, however, has to be pursued further by the Bureau.

124. The Committee recommend that the Bureau should further pursue the problem vigorously and suggest remedial measures. The Committee were informed that the Efficiency Bureau had no permanent set of staff and that Officers on Special Duty were brought in for dealing with specific problems as and when they cropped up. In view of the useful work that is being done by the Bureau, the Committee suggest that a permanent organisation should be set up with a view to organising the work on a sound footing. The officers working therein would then have an opportunity of having uptodate knowledge of the latest techniques in other countries. It would also be useful to have certain officers trained in the latest techniques to form a nucleus, of the organisation. Along with this nucleus, the present practice of recruitment of service personnel on the basis of their experience and aptitude might continue.

The Committee also recommend that the reports of the Efficiency Bureau and the action taken thereon should be promptly published.

E. Number of Staff employed on Indian Railways

125. A comparative statistical study of staff on Indian and foreign Railways is given in Appendix IV together with the Railway Board's comments thereon. Column 10 of the statement annexed to the Appendix shows that, after taking into consideration the volume of work involved, the U.S. Class I Railways employ only 5·4 employees per route mile whereas the Indian Railways employ 28 employees per route mile. The Committee do appreciate the reasons for the variations in the figures given by the Railway Ministry. They also agree that it would not be desirable to extend mechanisation merely to reduce the number of men employed on Railways. All the same, the Committee consider that it would be advantageous to depute one or two officers to make an on-the-spot study of the Railways in the U.S.A. and find out the exact reasons for their being able to carry such a heavy load of traffic efficiently with so little staff. Such a study is bound to reveal many features which might prove useful in increasing the efficiency of Railways and enabling them to carry more traffic with the existing limited resources.

F. Children's Railways

126. The Soviet Railways have adopted two important features for dissemination of general technical knowledge about railway working. These are: (1) the House of Technique and (2) Children's Railways.

127. The relevant extracts from the Report of the Indian Railway Delegation to the Soviet and other European Railways dealing with these two items are given below:

> "Besides the widespread organisation for increasing the availability of qualified technical personnel, the Soviet Railways endeavour to disseminate general technical knowledge about Railway working and inform the public about developments that are constantly taking place in the

railway sphere of state activity. This is most significantly arranged through a Museum-*cum*-Institute called the House of Technique, which is headed by an official of the rank of a Chief of a Department in the Ministry. This institution is undoubtedly one of the most remarkable organisations on Soviet Railways. It has on display elaborate working models of the various types of locomotives, coaching and wagon stock, track and signalling devices and other aspects of railway working which have been and are in use on Soviet Railways. The evolution of design, the conditions under which they are required to work and the methods of their operation are illustrated in detail by means of charts, graphs and other descriptive literature in an easily understandable manner. These models are in the charge of qualified and trained instructors and special courses are held by them to instruct staff deputed by the Ministry from time to time. The House of Technique also operates mobile training schools for staff at stations, particularly those situated in the eastern part of the Union. Films on technical Railways subjects are also made and exhibited throughout the system. The Delegation saw two such films, one dealing with signalling and other describing the life of Driver Ivanov, Stalin Prize-winner, who had achieved some notable results in moving heavy freight traffic with steam locomotives under difficult conditions on the Siberian Railway.

"Another illustration of the policy of the Soviet Railways in disseminating knowledge about railway technique, and attract potential recruits is provided by the installation of children's railways in various parts of the Union. Short narrow stretches of line complete with working replicas of all types of railway installations, stations, controls and signalling etc. have been placed in charge of qualified instructors. School children between the ages of seven and seventeen on holiday in the neighbourhood are given short courses of instruction. They drive the locos, act as station staff, conductors and permanent-way men, and organise the entire working of the railway. They are provided also with uniforms. All expenditure in this connection is borne by the Ministry of Communications".

128. The Japanese National Railways have also a similar feature, viz. the Museum of Transportation. This Museum contains very interesting models of equipment used in Railway operations. These models can be operated by means of electric switches or press buttons by any visitor and their working clearly seen and understood. A large number of school children frequently come and watch the working of these models with keen interest.

129. The Committee recommend that the Railway Ministry should also adopt these ideas in a suitable form. A beginning can be made in Delhi by installing Children's Railway, which should be placed in charge of qualified instructors.

G. Delegation of Powers

130. The Committee were informed by the Railway Ministry that for facility in handling the heavy volume of work expected during the Second Five Year Plan, an examination is being made to consider, if any further powers can be delegated by the Railway Board to the General Managers. The Committee hope that this examination will be completed soon and powers will be delegated to the General Managers to the maximum extent possible, particularly in respect of incurring expenditure and dealing with staff matters

131. In this connection, the Committee would like to give below an extract from the Report of the Indian Railway Delegation to the Soviet and other European Railways. While discussing the administration of Railway Units, the Delegation says:

"The impression gained was that in matters of operation and day-to-day working, and within the limits of the budgetary allotments sanctioned for each railway, the General Manager had considerable powers of initiative and control; he was personally responsible to the Minister for the working of his system. A wide measure of devolution of control seemed to prevail and a balance between over-centralisation of power at the Ministry on the one hand and an undue autonomy of the individual system on the other was sought to be attained."

132. As regards the powers delegated to officers subordinate to General Managers, the Committee were surprised to find that these are not regulated by the Railway Board, but were sanctioned with reference to the conditions on each Railway in consultation with the Financial Adviser and Chief Accounts Officer.

133. The Committee feel that there should be uniformity in this matter on different Railways and that the question of delegating powers at lower levels should also be dealt with by the Railway Board. Now that the Ministry have decided to introduce Divisional system on all the Railways, the Committee feel that there is greater scope for further decentralisation of powers at divisional levels. The Committee, therefore, suggest that maximum decentralisation of powers should be effected on all the Railways at divisional levels on a uniform basis. The representative of the Railway Ministry expressed a certain amount of diffidence in delegating more powers at lower levels, due to the fact that the big expansion closely following the partition of the country had resulted in officers of lesser experience being promoted to higher posts. To overcome this difficulty, the Committee suggest that the Railway Board might lay down two schedules of powers for Divisional Superintendents, one schedule applying to the Divisional Superintendents, who had put in particular length of service and another schedule for the rest.

H. Planning on Indian Railways

134. The Committee have already dealt with the question of the amplitude of the Second Five Year Plan of Indian Railways in their Eighteenth Report. The Committee will, therefore, confine themselves here to the method of operating the Plan.

135. The Indian Railway Delegation to the Soviet Railways made a detailed study of planning and development on the Soviet Railways and they have devoted one full Chapter in their Report to this question. The Committee feel that there are a number of useful points, mentioned there which can be incorporated with advantage by the Indian Railways in their Planning. The Committee will refer here to some of these points.

136. In this connection the following observations of the Delegation are of considerable interest:

"Planning on Soviet Railways is an inclusive and all-round activity, a regular function of the Administration at appropriate levels in the exertion of a central direction of specified objectives and methods. The sphere of planning embraces not only the formulation of railway development projects and schemes of expansion, and their respective priorities, but also a sustained endeavour to attain certain levels of efficiency in day-to-day operation, which are prescribed in advance as the pre-requisites for further progress. The initial impulse comes from the top, and every unit of the organisation is equipped to contribute its assigned quota of effort in fulfilling the tasks devolving on it."

137. Not only there is a separate Planning Department at the Headquarters of the Ministry of Communications, but also there is a Planning Section on each of the constituent Railway systems. Finally there is a Planning Cell on each Division, in each shed, workshop and production unit. These planning cells function directly under the seniormost Command Staff in control of the Division or the Unit. The provision of planning cells even at the lowest levels enables all relevant details being planned with precision and promptness. The Committee suggest that the feasibility of introducing this system on Indian Railways should be examined by the Railway Ministry.

138. There are two types of Plans on Soviet Railways, viz., (i) the prospective Plan, which is the overall Five Year Plan and;

(ii) the Operative Plan, which is further divided into annual, quarterly or monthly plans.

139. The Committee suggest that the Second Five Year Plan of Indian Railways should also be divided into annual, quarterly and monthly Plans, so that the targets to be achieved in each month are placed clearly before the Railway men all over the country. The monthly targets laid down for each Railway and the results achieved can with advantage be included in the new Magazine 'Indian Railways' recently started by the Railway Board. The Committee also reiterate their recommendation in para 26 of their Eighteenth Report that the Railways should draw up a long term Plan for general guidance.

140. The Committee would like to point out here one major point of difference between the Soviet Railways and the Indian Railways. Due to the regimentation implicit in the State economic plan in the Soviet Union, the flow of traffic, its volume, direction and rate of flow is known beforehand, and all that the Railways are required

to do is to ensure that they have the necessary organisation, equipment and development potential to play their role in this connection. This precision and accurate forecast of the flow of traffic are not available for the Indian Railways. All the same, the Committee feel that certain specific targets of performance can be laid down beforehand and adhered to on Indian Railways also. These targets and their performance should be reviewed periodcally. Efficiency targets should also be included in the Plan as is done on Soviet Railways.

141. Another important feature of the Plan of Soviet Railways is that the Plan is broken down into operative plan for each Division and further for each Operating and Production Unit. The Annual Plan for each Unit is elaborated into quarterly and Monthly Plans. Each part of the operative plan is prepared like a Budget, but in very great detail serving at once as a target and a regulator. In this connection, the Committee would like to refer to para 109 of their Twenty-fourth Report.

142. It has to be realised that when the Second Plan of the Indian Railways gets into full swing, they will be incurring the expenditure at the rate of about Rs. one crore a day. In order to enable the Railway Board to keep a careful watch over the progress of the Plan, the Committee suggest that the Chairman, Railway Board should have a big chart in his office, which will give him, at a glance, monthly rate of expenditure incurred Railway-wise. ... a similar chart giving physical progress of the works undertaken by the Railways, as also a chart showing the amount of traffic carried by the Indian Railways every month.

I. Fitting of fans in carriages

143. In May, 1949, the Board decided that fans should be provided in Class III coaches as under:—

(1) All new coaches;

(2) In the existing stock under 20 years old on 1-4-1949.

(3) In all Women's compartments of existing stock irrespective of the age of the coach.

Except for Women's compartments, fans are not being fitted in the Class III coaches, which would be overaged by 31-3-1959.

144. The position as on 31-12-1955 is shown below:—

(*a*) Total numbr of coaches containing Class III	12,900
(*b*) Total approximate number of coaches fitted with fans . . .	6,865
(*c*) Approximate number of coaches yet to be fitted with fans. . .	1,080
(*d*) Approximate number of coaches not to be fitted with fans (Except in women's compartments) being over 20 years old as on 1-4-1949 . .	4,955
(*e*) Percentage of coaches not to be fitted with fans (*b*) to the number of coaches required to be fitted with fans (*b* plus *c*) under the Board's policy.	86
(*f*) Percentage of coaches fitted with fans (*b*) to the total number of coaches (*a*)	53·5
*(*g*) Percentage of coaches not to be fitted with fans (*d*) to the total number of coaches (*a*).	38·4

*This percentage will naturally be progressively reduced and should be 'nil' in 1959 if all overage coaches are removed.

In view of the acute shortage of coaching stock on Indian Railways, overage coaches are bound to continue in service for many years to come. Hence the Committee suggest that the policy of providing fans in the old coaches should be liberalised by the Railways.

J. Incentives and Bonuses on the Soviet Railways

145. According to the Report of the Indian Railway Delegation to the Soviet Railways, there is a healthy rivalry between different railway units in fulfilling their respective targets in the Operative Plan. The incentives in this connection are real and act as a powerful stimulant. The percentage of the gross income as planned to be earned on each system is ordinarily earmarked towards the operation of a fund for giving cash prizes to staff individually or collectively who are recognised to have contributed to the fulfilment of the targets. The fund is administered by the General Managers. In addition to the normal contribution to the percentage, a further allotment of 30 per cent. of the excess earned over the planned income is also made to the fund. Nearly 100 million Roubles were spent out of the fund in 1953 on prizes for exceptional and meritorious work. The collective prizes were given to workers in running sheds, loading centres and marshalling yards, and it was emphasised that the interests of the collective bodies of workers coincided with those of the railways.

146. As an incentive for reducing maintenance costs and for increasing mileage of engines between overhauls, the Soviet Railways have also a system of paying special bonuses to their drivers and shed maintenance staff. For this purpose the average maintenance cost of different types of repairs on different classes of engines is calculated for the previous year and if the actual cost of repairs to any engine between two "lifts" comes to less than this figure, 50 percent. of the savings so effected are distributed as bonus among the staff concerned. This bonus is divided between shed maintenance gangs and drivers in the proportion of 35 per cent. and 65 per cent. respectively. It was claimed that this practice had resulted in considerable increase in the mileage of locomotives between two overhauls and in a steady reduction in maintenance costs.

147. The Committee suggest that a system of incentives and bonuses similar to that prevalent on Soviet Railways might be introduced with advantage on Indian Railways also. "Produce more transport, and earn more wages" should be the slogan to be adopted by the Indian Railways during the Second Five Year Plan. The Committee would, in this connection, like to refer to Para. 129 of their Twenty-first Report on the same subject.

K. The Working of the Japanese National Railways

148. Shri Kripal Singh, the present Chief Operating Suprintendent of the Eastern Railway, was asked by the Railway Board to study the Japanese Railway System for obtaining the maximum line capacity over single line sections, especially in suburban areas, through modern signalling and train passing practices and careful controlling. The report submitted by Shri Kripal Singh contains many interesting special features of the Japanese National Railways. The Committee feel that some of these features can, with advantage, be gradually adopted by the Indian Railways. These are mentioned below:

(i) Most of the busy sections have either already been electrified or are being electrified. About 59 p.c. of the total passenger traffic is being carried by electric traction.

The Japanese National Railway owns and runs two Hydro-Electric Power Stations which supply power for electric train operation in Tokyo and its vicinity, surplus electricity during the off-peak hours being sold to private electirc companies. It is claimed that a net saving of about 1,200 million yens is accruing to the J. N. Railway on account of their producing electricity for their electric train operation instead of purchasing it from private sources.

Dieselisation is also progressing ahead and the number of diesel rail cars is increasing every year. In 1953-54 alone, the number increased from 238 to 458. These rail cars are being operated for inter-urban services on most of the Branch lines and a part of the Main line.

(ii) All Railway Stations on the J. N. Railway are electrified, the electric supply being obtained mostly from private electric supply companies. Where no such source of supply is available, the Railways have put up their own generators. (About 95 per cent. of the total population of Japan is provided with electricity in their homes and places of work. The rest 5 per cent. have not been able to have any such supply on account of their living in distant hills and forests).

(iii) There is colour light system of signals with three aspects, four aspects and five aspects of colour lights operating on various sections of the Japanese Railways, the five aspects colour light system being as under:—

Proceed	Green
Reduced speed	Yellow over Green
Caution	Yellow
Alarm	Yellow over Yellow
Stop	Red.

(iv) Cab signals repeat in the driver's cab the position of the signal ahead as the train approaches it within a certain distance.

(v) There is not a single non-interlocked station on the Japanese National Railway.

(vi) On the single line, the highest number of trains run in any section is 62 in the down direction and 65 in the up direction on the Ube—Ino block section on the Ube line.

(vii) The standard unit of time on which the booking of running time is done is 15 seconds except in the case of electric cars in suburban areas, where this unit is 10 seconds and all trains and electric cars must run punctually to this low unit of time. The watches supplied to the drivers and guards show the seconds quite clearly.

(viii) The Japanese National Railway owns and operates its own telecommunications.

(ix) The shortest headway between electric cars is 1 minute 50 seconds on the Tabate-Tamachi Section on which Tokyo is situated.

(x) Japanese National Railway trucks are quite extensively used for the collection and distribution of goods to and from central freight stations.

(xi) Suburban electric trains stop only for 20 seconds at way-side stations. At important stations where there is heavy traffic, they stop for 40 seconds. At Tokyo station which is the heaviest passenger

traffic station in Japan such of these trains as do not terminate there stop only for 60 seconds. On account of the active and disciplined habits and light travelling of the passengers, no difficulty is experienced in entraining and detraining at these stations with these very short stops. There is no pushing or jostling about amongst the passengers.

(xii) Even third class coaches have cushioned seats. All carriages are inter-connected with each other by collapsible doors at the ends.

(xiii) The standard of discipline and sense of responsibility amongst the railway staff of all ranks on the Japanese National Railway are of a very high order.

(xiv) On the average it takes 12 minutes for sorting out a full load over the hump in the Shintsumni Marshalling Yard and the average detention to through loaded cars in this yard is 8·6 hours as against the target of 9 hours.

(xv) Every train carries two portable telephones to communicate with the Train Despatcher in case of an emergency between stations

L. Siding Charges

149. The basis for the levy of siding charges varies considerably from Railway to Railway. This is mainly due to historical reasons. Obviously there is a need to introduce some uniformity in this respect. The Commitee were, however, informed that introducing uniformity in this respect would result in a substantial drop in revenue on some Railways and abnormal increase in the charges on other railways, causing hardship to the parties concerned. While appreciating the difficulties involved, the Committee do feel that uniformity should be introduced gradually according to phased programme. If necessary, the Railway Ministry may refer this problem to the Railway Freight Structure Enquiry Committee to evolve some suitable formula for introducing uniform siding charges on all Indian Railways.

M. Operating ratios of individual Zonal Railways

150. The percentage of working expenses to gross earnings is termed as operating ratio. Appendix V gives the total gross earnings, total working expenses and the operating ratios of individual Railways for the years 1952-53, 1953-54 and 1954-55. From these figures it will be seen that the North Eastern Railway is a losing concern. The operating ratio of the Southern Railway, though less than 100, is still considerably higher than the same for other Railways, excepting North Eastern Rilway. The reasons for the high operating ratios of the North Eastern and Southern Railways require to be very carefully investigated and remedial action taken, so that they may be brought down more or less to the same level as on other Railways.

151. Appendix VI gives a further break-down of the operating ratios on each Indian Railway, gauge-wise. These figures prominently bring out the fact that all the narrow gauge Railways are heavily losing concerns except the Narrow Gauge system on the Central Railway. It is, therefore, necessary, that the process of conversion of Narrow Gauge lines into Metre Gauge or Broad Gauge, as the case may be, should be expedited. Besides, the operating ratio for the Metre Gauge sections is higher than for the Broad Gauge sections on the same Railway.

N. Results of working of coaching and goods services

(a) *Passenger traffic*

152. The cost of hauling a passenger train one mile on the two gauges for the last three years is shown below:—

(In Rupees)

Year	B.G.		M. G.	
	Excluding interest	Including interest	Excluding interest	Including interest
1952-53	9·74	11·3	8·56	9·67
1953-54	9·69	11·1	8·76	9·89
1954-55	9·43	10·9	8·65	9·77

The cost per train mile is about Rs. 1·2 higher on the Broad Gauge than on Metre Gauge.

153. The figures relating to net earnings are as follows:—

(In Rupees)

Year	B. G.		M. G.	
	Excluding interest	Including interest	Excluding interest	Including interest
1952-53	2·13	0·62	1·05	—0·06
1953-54	1·90	0·49	0·22	—0·91
1954-55	2·54	1·08	0·22	—0·90

154. The net earnings per train mile are higher on the B.G. than on the M.G. in spite of a higher cost of working. Including the interest on the total capital expended on the revenue earning mileage, the Metre Gauge Railways record a loss in respect of earnings. This is mainly due to a loss on the North-Eastern Railway, the longest M.G. Railway with a route mileage of 4,757. The net earnings per passenger train mile of the individual M.G. Railways for the year 1954-55 are shown below:—

(In Rupees)

Railway	Excluding interest	Including interest
Central	2·12	1·04
Northern	0·71	—0·10
North-Eastern	—0·96	—2·43
Southern	0·30	—0·65
Western	1·42	0·39

(b) *Goods traffic*

155. The cost of hauling a goods train one mile on the two gauges for the three years is shown below:—

(In Rupees)

Year	B.G.		M. G.	
	Excluding interest	Including interest	Excluding interest	Including interest
1952-53	17·4	20·0	13·0	14·7
1953-54	18·4	21·0	14·4	16·2
1954-55	18·1	20·6	14·8	16·7

156. The cost per train mile on the Broad Gauge is about Rs. 4 higher than the cost on the Metre Gauge. In spite of this higher cost, the net earnings on working a goods train one mile are higher on the Broad Gauge than on the Metre Gauge. These figures are shown below:—

(In Rupees)

Year	B. G.		M. G.	
	Excluding interest	Including interest	Excluding interest	Including interest
1952-53	6·47	3·92	—1·00	—2·67
1953-54	6·09	3·44	—1·94	—3·75
1954-55	6·10	3·59	—0·16	—2·03

157. Even with a higher cost of hauling, the B.G. Railways show a profit as against the M.G. Railways, recording a loss in all the three years. This is due to the quantum of revenue earning traffic in respect of net ton miles being much higher on the Broad Gauge than on the Metre Gauge Railways.

158. The following table shows the route mileage and the net ton miles for the two gauges and their percentages to the respective totals for the year 1954-55.

	B. G.	Percentage	M.G.	Percentage
Route miles	16,058	51	15,321	49
Net ton miles (000)	2,71,92,963	86	44,91,930	14

159. It will be observed from the above that with practically equal route mileage, the Broad Gauge contributes as high as 86% of the total net ton mileage of the two gauges. The Metre Gauge wagon carries only about half the tonnage carried by a Broad Gauge wagon and the average load per train in terms of 4 wheeler wagons is 40 in the M.G. as against about 50 in the B.G. These factors are reflected in the cost of hauling a ton one mile also. The cost is much lower on the Broad Gauge (about half) than on the Metre Gauge.

160. The cost per ton mile and the net load of a goods train in tons on the two gauges during the three years are shown below:—

	Cost per ton mile (pies) Excluding interest		Net or freight weight per train in tons	
	M.G.	B. G.	B. G.	M.G.
1952-53 . .	13·8	7·50	469	203
1953-54 . .	14·3	7·77	482	216
1954-55 . .	14·3	7·35	500	222

161. A Metre Gauge goods train carries less than half the revenue earning tonnage than the Broad Gauge. The route mileage being practically the same, the working expenses specially relating to the maintenance and structural works and the traffic department are not expected to show wide difference between the two gauges. It appears that these factors have resulted in the cost per ton mile on the Metre Gauge being much higher than on the Broad Gauge. Thus the cost of carrying one ton for one mile is nearly double on the Metre Gauge, when compared with the same on the Broad Gauge.

162. The above analysis, brief and sketchy as it is, seems to indicate that the Metre Gauge Railway system in India is costlier to work than the Broad Gauge system. In this connection the Committee would refer to para 32 of their Eighteenth Report and suggest the Railway Ministry should pursue these investigations and submit the results with their observations in due course. A very detailed and careful examination is necessary before laying down a firm policy regarding the future expansion of Railways in India, whether it should be the Metre Gauge system or Broad Gauge system.

In the meantime, in view of the distinct advantages of the B.G. system over the M.G., it would be advisable to prefer B.G. over M.G., other things being equal, wherever there is a choice in new construction or conversion.

O. Report of the Indian Railway Delegation to the Soviet Railways and other European Railways

163. The Committee have gone through this Report carefully and they found it full of valuable information regarding the conditions obtaining in the Foreign Railways. The Committee in this Report as well as in their previous Reports have made a number of recommendations on the basis of observations made by the Indian Railway Delegation. The Committee enumerate below some more features of the Foreign Railways referred to by the Delegation and suggest that the Railway Ministry examine the feasibility of introducing these features on Indian Railways with such modfications as are considered necessary to suit local conditions:—

(i) On the Soviet Railways, leave for staff is planned in advance, so that the maximum number of staff are available on duty during peak periods and the maximum number avail of leave during the slack periods.

(ii) The budget of each Railway in the Soviet Union is supported by full details concerning each department, plant and other Units, the performance in respect of the roles assigned to each in the operative plan and reasons for variations between allocations and actuals in the current year. So far as Programmes of Works are concerned, only those items are included for which full drawings and plans have already been prepared and approved of by competent authorities. Projects, which are still in the stage of investigation and have not been boiled down to the drawing boards are expressly excluded and the practice of appropriations on an approximate basis or on token account does not seem to obtain.

(iii) Each Railway system is permitted to utilise its receipts for purposes of meeting the expenditure as sanctioned in its budget. Funds required in excess of their respective receipts are made available by the Ministry of Communications through credits placed in the Branches of the State Bank.

(iv) For each of the Railway systems and for the Soviet Railways as a whole, a monthly and a quarterly review of the finances is prepared and circulated. The review presents a critical analysis of expenditure and the pattern of income and is not intended to serve as an instrument for the effectiveness of its control.

(v) Owing to the presence of conductors in each coach, there is little or no ticketless travel on the Russian Railways. Passengers found travelling without tickets are required to pay fares with fairly heavy penalties. In case they are unable to pay while travelling on the trains, charges are recovered from their homes with the assistance of police, if necessary. There is no difficulty in identifying a person, because every one carries with him an identity card.

(vi) An essential feature of the policy of the Soviet Railways appears to be not to make wholesale radical changes in their equipment, but to introduce as many latest developments on the old assets as feasible, in order to achieve better results and more efficiency.

(vii) The Soviet Railway Authorities claim that the scheme of training obtaining on their Railways is unique and comprehensive. There are four distinct links in the scheme, each fulfilling a specific purpose and enabling the Railways to recruit qualified staff and arrange for their further training throughout their professional career. The Indian Railway Delegation has described the scheme in great detail. In this connection, the Committee refer to para. 56 of their Twenty-fourth Report, in which they have suggested that a Committee of educationists should be appointed to look into the problem of training both from the point of view of getting men

trained for the various departments as well as for overhauling the entire system of training. It would be worthwhile for that Committee to study the scheme obtaining on the Soviet Railways.

(viii) Westbahnhof (the main terminal station in Vienna), which the Delegation visited is a remarkable example of modern station architecture in Europe. Every Indian Railway should have a few model stations of this type with all modern amenities. The funds for constructing such stations should not, however, be taken from the passenger amenities fund.

(ix) In German Federal Railways at large stations, the Railways provide cinema halls, where they exhibit short informative feature films generally, having educative, social or propaganda value. Only passengers holding current outward or transit rail tickets are permitted to these shows. There is no charge.

P. Goods loading (including coal) on Indian Railways

164. The daily average wagon loading on different Railways during the busy season (November, '55 to March, '56) is given below, for each Railway month by month, as compared with the corresponding period of last year.

Railway	Broad Gauge			Metre Gauge		
	1954	1955	Increase(+) or Decrease(—) %	1954	1955	Increase(+) or Decrease(—) %
			November			
Central	1961	2270	+16	307	327	+7
Western	1116	1298	+16	1736	2090	+20
Southern	1123	1136	+1	2117	2126	+0·4
South-Eastern	2991	2966	—1	nil	nil	..
Eastern	4052	4213	+4	nil	nil	..
Northern	1643	1715	+4	673	824	+22
North-Eastern	nil	nil	..	2415	2631	+9
TOTAL	12889	13558	+5·5	7248	7998	+10·3
			December			
Central	2072	2402	+15·9	339	338	—0.3
Western	1103	1341	+21·6	1758	2267	+29·0
Southern	1052	1160	+10·3	2122	2170	+2·3
South-Eastern	2988	3076	+2·9	nil	nil	..
Eastern	3937	4185	+6·3	nil	nil	..
Northern	2039	1966	—3·6	689	848	+23·1
North-Eastern	nil	nil	..	3044	3409	+12·0
TOTAL	13191	14130	+7·1	7952	9032	+13·6

NOTE: The above figures are inclusive of originating and transhipment at break-of-gauge points, but exclusive of Military traffic at Coaching rates, transhipped or repacked from wagons of the same gauge and loaded receipts from foreign railways.

Railway	Broad Gauge			Metre Gauge		
	1955	1956	Increase(+) or decrease(—) %	1955	1956	Increase(+) or decrease(—) %
			January			
Central	2273	2252	—0·9	338	323	—4·4
Western	1095	1370	+25·1	1920	2304	+20·0
Southern	1081	1209	+11·8	2117	2259	+6·7
South-Eastern	2891	2844	—1·6	..		..
Eastern	3966	4412	+11·2	..	..	..
Northern	2007	2084	+3·8	720	863	+19·9
North-Eastern	..	..	..	3356	3605	+7·4
	13313	14171	+6·4	8451	9354	+10·7
			February			
Central	2379	2511	+5·5	382	350	—8·4
Eastern	4110	4449	+8·2	..	..	
South-Eastern	2994	2919	—2·5	..	..	..
Northern	2028	2351	+15·9	712	865	+21·5
Southern	1144	1238	+8·2	2165	2238	+3·4
Western	1231	1403	+14·0	1919	2424	+26.3
North-Eastern	..	..	..	3479	3738	+7·4
	13886	14871	+7·1	8657	9615	+11·1

NOTE: The above figures are inclusive of originating and transhipment at break-of-gauge points.

			March			
Central	2251	2360	+4·8	273	342	+25·3
Eastern	4045	4387	+8.5	..	..	..
Northern	2097	2373	+13.2	693	864	+24·7
Southern	1154	1272	+10·2	2192	2357	+7·5
South-Eastern	2991	3007	+0·5	..	..	..
Eastern	..	..	..	..	..	..
Western	1112	1357	+22·0	1802	2355	+30·7
North-Eastern	..	..	..	3280	3711	+13·1
	13650	14756	+8·1	8240	9629	+16·9

NOTE: The figures given above for March include originating and transhipment at break-of-gauge points, but exclude wagons repacked.

165. From the figures given above, it will be seen that though there has been a substantial improvement in goods loading during the current season as compared to the corresponding period of last year, particularly on the Metre Gauge, the actual increase in goods loading achieved, falls below the target envisaged, which was about 15 to 20% increase (except in Eastern and South Eastern Railways, where the target was 10% increase in coal and goods loading.) The results achieved by the M.G. portion of the Northern Railway and by the Western Railway, both for Broad Gauge and Metre Gauge are commendable.

166. The figures of outstanding registrations at the end of each month during the period under review are given below:—

Railway	30-11-55	31-12-55	31-1-56	29-2-56	31-3-56
Central (B.G.)	7,718	10,400	10,904	12,022	13,385
(M.G.)	2,886	2,692	4,044	2,993	2,558
Eastern (B.G.)	2,887	2,519	2,414	2,238	1,586
North-Eastern (M.G.)	47,917	50,141	57,801	66,099	49,639
Northern (B.G.)	14,823	14,257	15,084	12,392	6,864
(M.G.)	20,314	21,511	19,885	25,091	11,613
South-Eastern (B.G.)	2,973	7,146	10,735	15,972	23,262
Southern (B.G.)	16,769	28,408	19,066	8,949	14,912
(M.G.)	35,698	55,104	49,014	47,887	53,410
Western (B.G.)	6,241	6,041	5,376	6,158	8,218
(M.G.)	9,326	5,458	19,872	19,608	22,443
TOTAL: (B.G.)	51,411	68,771	63,579	57,731	68,226
(M.G.)	1,16,141	1,34,906	1,50,616	1,61,678	1,39,693

These figures indicate that there has been a considerable drop in the number of outstanding registrations on the Broad Gauge on 31-3-56., compared to the corresponding figures for the last year (from 89,413 on 31-3-55 to 68,226 on 31-3-56) but on Metre Gauge, there has been an increase (from 1,16,223 on 31-3-55 to 1,39,693 on 31-3-56) despite better loading figures achieved. The need for providing additional rail transport still remains as pressing as before.

167. The detailed examination of the working of the Railway Ministry has indicated that, by and large, Indian Railwaymen have been doing their job reasonably well, despite limited resources. There is, however, considerable scope for improvement in different directions and the Committee have offered concrete suggestions in their various Reports, for improving efficiency and achieving better results. The Committee have no doubt that the implementation of these suggestions and the recent drive initiated by the Railway Ministry to improve goods loading, will enable the Railways to achieve better and better results. The Second Plan of the country is a gigantic programme of an all round increased production; and the main brunt of distributing the raw materials and the finished products will have to be borne by the Railways. The country will, therefore, watch the performance of the Railways with interest and

anxiety—with anxiety, because there is a fear that the Railways might prove to be a serious bottleneck in the movement of goods during the Second Plan period. There is justification for this fear, as will be borne out by the following observations of the Planning Commission in their Report on the Second Five Plan:

> "It is felt that with the resources so far allocated for railway development, the railways may not be in a position to carry all this traffic and that the facilities provided by them may fall short of requirements by about 10 per cent in respect of rolling stock and by about 5 per cent in respect of line capacity."

However, the improvement in goods loading effected during the last few months and the assurance of the Planning Commission that there will be periodical reviews of the allocation of funds the Railways give grounds for hope that the Railways might be able to meet the requirements to a reasonable extent. Th Committee close their examination of the estimates of the Ministry of Railways with this message of hope and cheer to all Railwaymen that they may succeed—nay, they must succeed—in delivering the goods of the Nation.

Q. Corrigendum

168. The opportunity is taken to correct an error contained in para 114 of the Seventeenth Report. The figures of track usage given there are not for 100 miles of running track, but for only one mile of running track. (The train miles are exclusive of Electric Multiple Unit trains and all rail cars.)

BALVANTRAY G. MEHTA,
Chairman,
Estimates Committee.

NEW DELHI;
The 18th May, 1956.

APPENDIX I

Extent to which the results of the research have been found to be of use in railway working

It will be difficult to assess in a general way how the results of the work of the Railway Research Organisation have been of use to the Railways, but the following examples will give some idea of their utility.

A. Mechanical Engineering

(a) The riding quality and performance trials on prototype locomotives such as the WP, YL and MAWD have enabled the Central Standards Office to improve their design before bulk orders were placed.

(b) The oscillation trials carried out on coaches such as the Schlieren and the HAL, have indicated the extent to which travelling comfort can be obtained. Similar tests have provided guidance in improving the comfort conditions in air-conditioned coaches.

(c) Studies in fuel consumption of different types of locomotives have given us suitable insight into the combustion conditions prevailing in fire-boxes of locomotives with Indian Coal, thus enabling the C.S.O. to design locomotives capable of using inferior grades of coal. The importance of it will be increasingly felt in the future as it will be necessary to reserve caking coals entirely for metallurgical purposes.

B. Civil Engineering

(a) The 100 lb. D.H. rails of which about 450 miles existed on the ex-Eastern Railway, caused a good deal of concern when a few years ago there was an epidemic of rail fractures among them. It was feared that the rails were fatigued and, therefore, needed renewal. The tests carried out by the Research Organisation showed that this was not so and this renewal was saved: the rails are still giving service in the track.

(b) The use of the Audigage Flaw Detector, which has recently been obtained, can indicate in situ which rails are defective, thereby relieving the anxiety of Maintenance Engineer. This was particularly of great use in testing rails in the track near Hyderabad and on Vijayawada-Madras Section. In the absence of this class of testing, all the rails would have been scrapped.

(c) The investigations carried out by the Research Organisation indicated that the piers of the Godavari Bridge had almost reached the limit of their settlement and that a state of stability would soon be achieved. This enabled the engineers to relax speed restrictions on the bridge and also relieved them of a source of anxiety provided by the continued settlement of piers over 50 years.

(d) On the recent doubling of Budni-Barkhera Section, the freqent slips of cuttings and upheavals of the formation caused a good deal of anxiety to the engineers. The suggestions given by the Research Sub-Centre at Lonavla have been found of great use. Similar assistance is being given on all new constructions, particularly on the Khandwa-Hingoli and Ernakulam-Quilon Sections.

(e) Currently, advice is being sought by all the railways with regard to design of foundations of important buildings, such as new station buildings at New Delhi and at Allahabad, important bridges and overbridges on the Central Railway, multi-storeyed quarters a Calcutta, etc. The work in this connection has been much appre ciated even by institutions and organisations outside the railways. To mention two recent cases, technical advice was given after detailed foundation exploration for the building of the Industrial Finance Corporation at New Delhi and tests were made for the Kandla Port authorities.

(f) To achieve better and stronger concretes for important works on railways, advice is often being sought by the railways, by sending samples of coarse and fine aggregates. Economical mixes are being designed for them. This has saved them a good deal of money by the saving in cement and obtained them a better and more reliable end product.

(g) Out studies of waste materials like coal ash for use as coarse and fine aggregates for improving the quality of bricks prepared from black cotton soil and for its use as a puzzuolana which will conserve the supply of cement will soon a good deal of money to the railways and will also enable them to get rid of a waste material in a profitable way.

(h) The founding of buildings on black cotton soil has long baffled engineers. This is being investigated and tentative solutions have already been obtained and they are being tried out.

C. Metallurgical & Chemical Engineering

(a) Considerable trouble was being experienced particularly due to failures of locomotives on bad water sections in the Indian Railways. On some sections, a good deal of money had been spent for providing external water softeners. The Railway Research Sub-Centre at Chittaranjan has formulated a chemical complex which, when added to water, prevents all the mischief which the hard waters cause. At present, more than 500 locomotives are being benefited by this process and the CMEs of Central, Eastern, Southern and Western Railways have spoken very highly of this formulation. The interval between washouts has been increased and a higher engine availability figure has been achieved.

(b) The Research Sub-Centre at Chittaranjan has given valuable technical advice on metallurgical subjects to the Locomotive Workshops at Chittaranjan and have tested components and parts of locomotives being built by TELCO.

(c) At Chittaranjan new paints and vernishes have been formulated based on cashewnit shell and Bhilawan oils. These are going to be much better than the existing paints, based on the linseed and also cheaper.

(d) The Research Sub-Centre at Chittaranjan has manufactured a bituminous emulsion which will be very useful for preventing corrosion of track rails and coach panels. Although at present foreign emulsions are available at high cost, the secret of the manufacture process was not known to us. A process of manufacture ensuring a high quality product has now been developed. This will enable the bitumen from the new refineries to be converted into emulsions at a much cheaper rate and make the Indian Railways and the country self-sufficient in this respect.

D. Electrical Engineering

On the Electrical side, the activities are now mainly confined to the operation of the electronic equipment installed in the oscillograph cars, carrying out oscillation trials in connection with problems relating to Civil Engineering and Mechanical Engineering and the handling of instrumentation work. A start has just been made in regard to research and development work on Electrical Engineering problems proper and the following schemes are now in hand:

(a) Investigations into the possibility of working D.C. 24 volts fans from 110 volts A.C. diesel-driven generators in brake-vans of trains by use of suitable rectifiers.

(b) Investigations regarding temperature rise and voltage variations on different types of engine headlight turbo-generators.

(c) Development of an evaporative type water cooler-*cum* air conditioner.

On receipt of equipment, problems of Electrical Engineering listed in the Main Research Programme will be started.

APPENDIX II

Statement showing the Gross Saving per month on Internal Treatment

Railway	Division	Section	No. of Engines	Average hardness on section per 10,000 parts	Average mileage per month	Amount of conditioned scale in pounds	Gross savings per index for 1945 at the rate of o/12/o per lb. of scale (Approx.) Rs.	Cost of Chemicals per treatment	Remarks
Central	Sholapur	Dhond-Manmad	20	30	3500	18,000	13,500	900	
	Jhansi	Jhansi-Kanpur Manikupur	46	20	3500	27,600	20,700	1,200	
	Jhansi	Gwalior	24	30	2000	6,000	4,800	200	
Eastern	Sealdah	South Sealdah & Chitpur	67	30	2500	35,000	26,000	3,400	
Southern	Madura	All	141	30	3500	95,000	71,000	5,000	
	Hubli	Gadag-Sholapur	38	30	3000	22,000	16,000	2,100	
	Bangalore	Bangalore-Bangarapet Chickajur-Chittaldrooj	10	20	2500	22,100	1,600	154	
South-Eastern	Kharagpur	Howrah-Kharagpur Docks	74	30	3000	57,000	42,000	2,700	
Western	Abu Road	Ahmedabad-Botad-Khadbrahma	24	30	3000	14,000	10,000	670	
		Mehsana-Abu Road	20	30	3000	11,000	8,500	560	
	Jamnagar	Jetalsar & Jamnagar	56	40	3000	43,000	32,000	3,100	
		TOTAL	520	..	..	3,30,700	2,46,100	19,984	

APPENDIX III

Suggestions and proposals made by the Government Inspectorate for Railways

Suggestions and proposals made by the Railway Inspectorate for the quinquennium 1950-51 to 1954-55 on the following four points *viz*:—

A. Works, bridges, tracks, signalling, interlocking equipment etc.

B. Locomotives, rolling stock—their maintenance.

C. Operation of the railway with reference to safety of the travelling public and the persons operating the railway.

D. Provision and adequacy of facilities for passengers.

At the outset it may be stated that it is felt desirable to break up the above four main items into major heads and to further subdivide the major heads into minor heads. This will, it is hoped, make for a clearer appreciation of the all-embracing and comprehensive nature of the suggestions and recommendations made by the Railway Inspectorate during the period under review.

Only those suggestions and proposals which are of an important nature and which involve appreciable expenditure or improvements to the existing assets or equipment have been detailed under the various minor heads, some of these proposals are of a general nature relating to the whole Railway or section of a Railway. Other suggestions for improvements to assets or system of working, repairs, maintenance etc. which, though essential from the point of view of safety operation, passenger amenities etc. are of a comparatively less important nature and too numerous to be detailed, have been summarised collectively at the end of each section.

A(i) Bridges

Proposals made by the Inspectorate during the period under review for various bridges on Railways are arranged under the following minor heads:—

Suggestions	No. of Cases.
i Complete rebuilding of bridges	27
ii Rebuilding of abutments, piers, wing walls	18
iii Renewal of girders	8
iv Provision or renewal of bed blocks, centralised bearings, stiffeners	48

Suggestions	No. of Cases
v Renewal of longitudinal and cross timbers	67
vi Pressure grouting of weak masonry, bed stones, arches	58
vii Painting of steel work	149
viii Provision of trolly refuges and guard rails	25
ix Provision of additional waterway	5
x Strengthening of bridges by buttresses R. C. C. jackets, additional steel work etc.	8
xi Provision or renewal of foot-path sheets or planks	17
xii Repairs or strengthening of weak corroded steel work by welding additional plates or with concrete	7
xiii Replacing of sleepers to remove infringements of standard dimensions	89
xiv Increase of cushion over arches etc.	15
xv Pitching scour in piers, abutments and guide bunds	21

In addition to the above, proposals of a comparatively less weighty nature were made by the Inspectorate, such as provision of weep holes, lifting and greasing of girder bearings, pulling back of girders, provision of standard fittings, plastering, pointing etc.

A(ii) Level Crossings

During this period the following suggestions and proposals were made for improvements in the standards of level crossings and to minimise the liability of accidents thereon:—

Suggestions	No. of Cases
i Interlocking of gates with signals	7
ii Provision of barrier gates interlocked with signals	4
iii Provision of bell communication	1
iv Taking of road traffic census for upgrading classification	17
v Improvement and easing of road surface and approaches	162
vi Painting of discs and gates	21
vii Rectification and reorientation of gate lamps	77

In addition to the above suggestions, certain recommendations of a routine nature as enumerated below were also made in the case of numerous level crossings:

Provision of wicket gates, conventional road signs, improvements to gate keepers' equipment, provision of flank fencing etc.

A (iii). Permanent Way

The following suggestions and proposals were made in the interest of safety during the period under review:—

Suggestions	No. of Cases
i Renewals of rails and sleepers	145
ii Renewals of points and crossings	36
iii Provision of additional ballast	68
iv Realignment and transitioning of curves	123
v Provision of creep stoppers and pulling back of excessive creep	41
vi Drainage and consolidation of track in banks, cuttings and station yards	10
vii Improvement to the maintenance of permanent way and points and crossings	500

Apart from the above, extensive repairs and improvements in the standard of maintenance were suggested in numerous cases in the interest of safety, such as, adjustment of clearances, adjustment of sleeper spacings, renewal of unserviceable rail fittings, provision of and repairs to ash pits, provision of trolly refuges in long cuttings etc.

A. (iv). Signalling and Inter-locking

Provision of improved standards and replacement of obsolete items of signalling and interlocking installation at various stations on the railways were recommended during the period. The main suggestions and proposals were:—

Suggestions	No. of Cases
i Provision of power signallings	3
ii Provision of multiple aspect double wire signalling	2
iii Improvement of signalling installations	48
iv Provision of track circuits	9
v Provision of Standard III inter-locking	32
vi Provision of Standard I inter-locking	32
vii Provision of Home signals starters, repeating signals, key transmitters, etc.	19
viii Provision of S.M.'s electric control	7
ix Provision of point indicators	7
x Inter-locking of outer signal levers	2
xi Inter-locking of outlying points with signals	2
xii Provision or replacement of signal cabins, ground frames or lever frames.	7
xiii Improvement to the maintenance of signalling installations.	110
xiv Provision of arm and light repeaters in stations and cabins.	10

In addition to the above, numerous suggestions for improvements in the maintenance of signalling, inter-locking and block instru-

ments were made at a number of stations in the interest of safety and for better operation, *e.g.*, inter-locking of block instruments with slip siding keys, replacement of Thecbalds', Roberts' and Webbs' Block instruments with Nealas' token instruments, double wire operation of home and outer signals, provision of signalling diagrams in cabins, provision of weather protection to cabin, overhauling of lever frames and block instruments, inter-cabin slotting arrangements etc.

B. Locomotive and Rolling Stock

The suggestions made for improvements in the standard of maintenance of locomotives, rolling stock and equipment or facilities required for the same at various loco sheds or stations on Railways during the period were:—

Suggestions	No. of Cases.
Locomotives	
i Provision of spark arrestors	2
ii Provision of safety hangers for brake gear	1
iii Other improvements to locomotives, boilers and running gear	13
iv Improvement to the maintenance of locomotives	38
Loco sheds and yards	
v Improvement to sheds and workshops including lighting, reroofing, etc.	21
vi Improvement to loco yards and sidings	2
Breakdown trains and medical vans	
vii Improvements in standards and maintenance	10
viii Additional equipment	15
ix Improved maintenance of first aid boxes in passenger trains, etc.	48
Rolling stock	
x Conversion of outward opening doors to open inwards in coaches	2
xi Improvement to third class coaches	8
xii Employment of extra shed staff for schedule repairs	2
xiii Provision of ash-trays in passenger compartments	2
xiv Provision of fire hazard notices	9
xv Provision of emergency tool boxes in passenger trains	14
xvi Provision of field telephones in passenger trains	2

Apart from the above, numerous suggestions were made such as, improvements in systems of running and schedule repairs, training of train examiners, provision of speedometers or speed recorders, maintenance of engine boilers and upkeep of drivers' spectacle registers etc.

C. Train Operation

Suggestions for works, staff and facilities to ensure higher standard of safety in operation at various stations were made by the Inspectorate as indicated below:—

Suggestions	No. of Cases
i Remodelling of station yards	8
ii Constructions of new crossing stations	8
iii Provision of catch sidings, shunting facilities, additional reception lines or extension thereof	32
iv Employment of additional operating staff	5
v Drivers, guards, gatemen etc., overdue vision test	64

In addition, numerous suggestions for better supervision and operation were made, such as, provision and repairs of hand signal lamps, training of staff in operation duties, revision of station working orders, provision or repairs to fire fighting equipments etc.

D. Passenger Amenities

Suggestions and proposals for provision of adequate facilities and amenities for the convenience of passengers at stations and in passenger trains made by the Inspectorate are briefly summarised below:—

Suggestions	No. of Cases
i Construction of new station buildings	2
ii Provision of third class waiting halls and sheds	27
iii Improvement to existing station buildings, waiting halls and sheds	131
iv Provision of waiting rooms	7
v Improvements to existing waiting rooms	38
vi Provision of platform sheds	42
vii Provision of platforms or raising and resurfacing existing platforms with concrete or flag stones	143
viii Provision of refreshment rooms and stalls	9
ix Provision of parcel godowns to relieve congestion on platforms or waiting halls	5
x Provision of bathrooms and latrines	63
xi Provision of furniture, benches, lights, wash basins etc. in waiting rooms, waiting halls, refreshment rooms, stations etc.	102
xii Provision of stainless steel utensils in refreshment rooms and for service of meals in trains	6
xiii Plantation of trees and improvements to circulating area	36
xiv Provision of booking facilities	34
xv Installation of and improvements to, sanitation, water supply and electric lighting at stations	104
xvi Provision of drinking water taps at stations and on platforms	14
xvii Provision of electric water coolers	9
xviii Provision of foot over-bridges and palisade fencing	14
xix Provision of approach roads or resurfacing of existing roads	16

In addition to the above, minor proposals and suggestions for removal of defects and improvements in passenger amenities at a number of stations were also made, *e.g.*, cleanliness in refreshment rooms, tinning of utensils, provision of proper rate lists, exhibition of time and fare tables etc.

These suggestions and proposals were made either during inspection of Railway lines or as a result of inquiries into serious accidents.

APPENDIX IV

Comparative Statistical study of staff on Indian and Foreign Railways

The Annexure shows some statistics of British, U.S., Canadian, South-African and Australian Railways as compared with those of Indian Railways. These figures have been taken from Vols. I & II of the Report on Indian Railways for 1953-54. A perusal of the figures in col. 10 of the statement will show that the number of employees per route mile is only 5.4, 5.6, & 6.1 on the Railways in U.S., Canada, and Australia (Victoria Railways only) respectively whereas it is 14.7 on South African Railways. The lowest number is on Western Australian Government Railways, *viz.*, 3·3 whilst the highest number is on the British and Indian Railways, where it is 30·1 and 28·0 respectively.

2. Columns 11 to 14 of this statement show the figures of work done in terms of passenger miles and net ton miles per route mile and train miles respectively. It will be observed that the figures of passenger miles per route mile are highest on Indian Railways, *viz.*, 1091 closely followed by those on British Railways, *viz.*, 1083. The figures of U.S. Class I Railways are only 141. Indian Railways also carry the largest number of passengers per train, *viz.*, 331 against 88 and 95 on British and American Railways respectively. As regards goods traffic, the American Railways carry the largest volume of traffic in terms both of route mile and train mile, *viz.*, 2689 and 1233 respectively and the Indian Railways stand 3rd or 4th with averages of 870 and 363 respectively.

3. If the number of staff employed on railways in various countries is judged after taking into consideration the volume of work involved, the performance of American Railways with only 5.4 employees per route mile appears to be the best as compared with that of all other Railways. There are many factors responsible for this, *viz.*, superior organisation and equipment efficient labour, capital resources etc. But there is no reason why the Railway Board should not carry out an investigation to find out as to how the railways in U.S.A. are able to carry such heavy traffic with only 5.4 persons per route mile.

Comments of the Railway Board

There are several factors responsible for the variation in the number of staff per route mile employed on the Indian Railways as compared with the U.S.A. Railways. Chief among these is the extremely high degree of mechanisation and automatisation on the U.S.A. Railways, which has been almost necessitated by the extremely high cost of labour and facilitated by the easy availability of the required labour saving equipment in that country.

2. The Indian Railways have neither yet gone in, nor have they so far planned, for a large-scale mechanisation, because the condi-

tions in this country are entirely different. The cost of manual labour here is not so high and it is easily available. The attention of the 'Planners' and the Government is focussed on the problem of reducing the high incidence of unemployment in this country and the adoption of a large scale mechanisation, merely with a view to reducing manual labour, is likely further to aggravate the problem. Most of, if not all, the equipment that may be necessary for mechanisation and automatisation will, at present, have to be imported at a high cost.

3. It is, therefore, considered that mechanisation on the Indian Railways, for the present, should be adopted only where it is indispensable for developing movement capacities and efficiency of operation which cannot be obtained otherwise and it would not be desirable to extend mechanisation merely to reduce the number of men employed on the Railways.

4. In view of what has been stated above, it would not appear to be necessary at this stage to carry out the investigation as to how the U.S.A. Railways are able to carry such heavy traffic with only 5.4 persons per route mile; such an investigation, no doubt, will essentially require a detailed on-the-spot study on the Railways in U.S.A.

5. It may, however, be stated that periodical checks and job-analysis are, from time to time, carried out on the Indian Railways to ensure that man-power is not wasted and the number of staff provided is, as far as possible, maintained within limits necessitated by the magnitude and nature of the work assigned to them.

ANNEXURE

Statement showing principal statistics of Railways in some Foreign Countries as compared with those of Indian Railways

Names of Railways	Year to which the figures pertain	Route mileage	Operating ratio	Passenger miles (in thousands)	Net Ton miles (in thousands)	Train miles (in thousands)		No. of employees	No. of employees per route mile	Passenger miles (in thousands) per route mile	Net Ton miles (in thousands) per route mile	Passenger miles per train mile	Net Ton miles per train mile
						Coaching	Goods						
1 British Railways	1953	19,222	92·0	20,810,000	22,766,194	237,599	141,567	593,768	30·1	1,083	1,184	88	161
2 U.S. Class I Railways . .	1953	225,232	76·3	31,655,132	605,913,437	333,128	492,409	1,206,000	5·4	141	2,689	95	1233
3 Canadian Pacific Railways .	1953	17,018	93·9	13,21,000	27,455,728	20,641	36,070	95,211	5·6	78	1,613	64	761
4 South African Railways .	1952-53	13,400	70·7			88,680	..	197,417	14·7	..	..		..
5 Australia-Victorian Railways	1953-54	4,660	106·72	1,805,506	1,262,454	11,933	5,757	28,424	6·1	387	279	151	219
6 Northern Australian Govt. Railways .	1953-54	4,111	120·95	1,35,841	537,799	2,201	4,944	13,465	3·3	33	131	62	109
7 Indian Railways	1953-54	34,406	85·04	37,548,570	29,493,450	113,583	81,227	966,185	28·0	1,091	870	331	363

APPENDIX V

Earnings and Expenses of Individual Zonal Railways (All gauges combined)

(in thousand rupees)

Railways	1952-53			1953-54			1954-55		
	Total gross earnings	Total working expenses	% working expenses to gross earnings	Total gross earnings	Total working expenses	% working expenses to gross earnings	Total gross earnings	Total working expenses	% working expenses to gross earnings
Central	57,64,81	42,25,27	73	58,08,17	44,08,54	76	57,02,35	41,20,27	72
Eastern	76,86,20	62,41,75	81	79,68,07	64,47,24	81	76,55,38	59,79,54	78
Northern	42,94,46	35,96,90	84	42,79,73	37,94,92	89	42,84,99	35,16,85	82
North-Eastern	22,49,33	23,98,13	107	21,53,87	25,74,78	120	23,48,36	27,37,40	116
Southern	44,53,28	38,50,06	86	43,65,81	40,77,15	93	43,30,53	38,79,25	90
Western	40,52,90	30,92,20	76	41,77,98	32,86,58	79	43,67,35	32,16,53	74

APPENDIX VI

Earnings and Expenses of Zonal Railways by Gauges

(Inhousands of rupees)

Railways	Gauge	1952-53			1953-54			1954-55		
		Total gross earnings	Total working expenses	%working expenses to gross earnings	Total gross earnigs	Total working expenses	%working expenses to gross earnings	Total gross earnings	Total working expenses	%working expenses to gross earnings
Central	B. G.	54,32,99	39,98,87	74	54,94,40	41,86,93	76	53,31,98	38,20,91	72
	M. G.	2,69,23	1,74,02	65	2,48,16	1,65,28	67	2,58,20	2,12,67	82
	N. G.	62,59	52,38	84	65,61	56,33	86	1,12,17	86,69	77
Eastern	B. G.	75,81,04	60,66,09	80	78,67,52	62,78,72	80	75,54,82	57,92,71	77
	N. G.	1,05,16	1,75,66	167	1,00,55	1,68,52	168	1,00,56	1,86,83	186
Northern	B. G.	37,40,57	30,36,15	81	37,23,81	32,02,78	86	37,16,54	29,52,70	79
	M. G.	5,15,35	5,01,59	97	5,14,33	5,32,19	103	5,29,84	4,95,87	94
	N. G.	38,54	59,16	153	41,59	59,95	144	38,61	68,28	177
North-Eastern	M. G.	22,30,49	23,66,41	106	21,40,05	25,42,14	119	23,37,89	27,04,20	116
	N. G.	18,84	31,72	168	13,82	32,64	236	10,47	33,20	317
Southern	B. G.	22,36,33	17,52,84	78	22,69,01	18,53,13	82	21,92,47	18,09,39	83
	M. G.	22,08,52	20,85,23	94	20,89,51	22,09,56	106	21,32,10	20,57,21	69
	N. G.	8,43	11,99	142	7,29	14,46	198	5,96	12,65	212
Western	B. G.	25,16,37	16,73,32	67	25,40,93	17,56,04	69	26,69,22	17,59,07	66
	M. G.	14,50,13	13,07,84	90	15,40,90	14,07,65	91	15,97,89	13,46,13	84
	N. G.	86,40	1,11,04	129	96,15	1,22,89	128	1,00,24	1,11,33	111

APPENDIX VII

Statement showing the summary of Conclusions/Recommendations of the Estimates Committee relating to the Ministry of Railways—(1) Research and Standardisation, (2) Signalling and Telecommunications, (3) Accidents on Indian Railways and (4) Miscellaneous Matters.

Sl. No.	Ref. to Para No. in the Report	Summary of Conclusions/Recommendations
1	2	3
		(1) *Research and Standardisation*
1	1	In order to make the rail travel safe and comfortable and to achieve self-sufficiency in the matter of manufacture and maintenance of rolling stock and other rail equipment, the Indian Railways should devote greater and greater attention to the Research and Standardisation work. In this connection, the Committee agree with the following observations of Dr. Kunzru in his speech in the Rajya Sabha on the 16th March, 1956:— "Considering the progress that our Railways have to make and considering the fact that they will have to adjust themselves to new problems altogether. . . . . it is time that the Railway Ministry took into consideration the vital and inescapable need for a better research organisation than they have at the present time."
2	9	The Committee were informed that difficulty was being experienced in getting staff for the Research Centres, as the Railway Officers selected were apprehensive of losing their chances of promotion on the Railways. To overcome this difficulty, the Committee suggest that the Research Organisation should consist of men engaged permanently in Research work and they should be given reasonable avenues of promotion in the organisation itself. The Committee further suggest that some research should also be done in the bigger Railway workshops by having some Research laboratories installed in them. The Committee further recommend that Research and Standardisation should not be confined only to technical and scientific aspects of the Railways, but also to other matters, such as administration, accounting, public relations, commercial side and other miscellaneous activities of the Railways.

1	2	3
		Experiments should be conducted from time to time in order to bring about simplicity and standardisation in all the Railways with regard to all these matters with a view to increase efficiency and to eliminate delays or waste. Railways should make increasing use of the work done by bigger research institutes (*e.g.* the Forest Research Institute, National Phsysical Laboratory etc.) and should submit problems to them for advice. This will enable Railways to get experienced and mature advice in these matters and also help in pooling of ideas and avoid any duplication of efforts on the same subjects.
3	11—12	There is great scope for expanding the activities of the Research Organisation on Railways. The Committee feel that the programme for expansion contemplated during the next two or three years is good as far as it goes, but that it does not go far enough. The Committee recommend that the Railway Ministry should make out a bigger and a more detailed programme of expansion covering the entire Second Five Year Plan period. The Ministry should also examine the feasibility of setting up one Research Centre on each Railway. The Research problems to be dealt with at these centres should not, however, be on a territorial basis, but on the basis of specialised subjects.
4	13	As Research is a highly technical subject, the Committee would suggest that Railway Research might form a separate wing under the Council of Scientific and Industrial Research with the Director, Scientific and Industrial Research as the Chairman and the technical officers of the Railways might be associated with it. Alternatively, the Railway Research Controlling Committee might be reconstituted to associate the represent tatives of the important laboratories and scientific research institutions with the research problems of the Railways. Thus, there should be a representative of the Forest Research Institute to advise on questions of wooden sleepers, a representative of the Fuel Research Institute, Dhanbad to advise on questions of fuel economy and so on. The Committee also suggest that some senior retired Railway officials who have a flair for research work should also be included in this Committee. The advantage of reconstituting the Committee thus will be that it will be ensured that Railway Research is not duplicated and that all work, which can best be done by National or University Laboratories and institutions is framed out. It will also mean that there will be a greater pooling of knowledge, as far as Research problems are concerned.
5	14	The Committee were glad to learn that the results of the Research in other countries were being utilised in many ways in the work done by the Railway Research Organisation on Indian Railways.

1	2	3
6	17	The Committee commend the work done by the Chittaranjan Sub-Centre in the matter of internal treatment of locomotives feed water and recommend that the treatment should be extended early to all the engines running on "bad water" sections to achieve economy from the point of view of greater availability of locomotives and reduction of failures *en route*.
7	18—21	The Committee reiterate their recommendation in para 90 of their Twenty-first Report that in view of the shortage of wooden and steel sleepers, the use of cement concrete sleepers should be extended on Indian Railways and that there should not be any insurmountable difficulties in the way, especially when the French Railways are successfully using them.
8	25	The Committee understand that in the U.S.A., the use of light alloy metals has resulted in considerable savings in dead weight and most of the named stream-lined trains are composed of vehicles constructed in this way. Also, the use of light weight metals and of plastic and composite laminated materials is gradually becoming more general and designs are being developed in several countries, which give greater carrying capacity for the same axle load. The Committee, therefore, recommend that the Railway Research Organisation should study the developments in this respect made in other countries and devise ways and means for extensive use of light alloy metals for construction of coaches and wagons for Indian Railways with a view to minimise the use of steel, which is in short supply and with a view to increase the existing carrying capacity.
9	26	The Committee recommend that early action should be taken to obtain the Universal Fatigue Testing Machine by suitably modifying the original specifications, if necessary, as its usefulness cannot be over-emphasised in view of the possibilities of economies, that are likely to be achieved in retaining serviceable parts and materials of rolling stock, which are otherwsie likely to be condemned as scrap. The problem might also be given to some of the National Laboratories to devise a suitable machine indigenously.
10	27	The Committee understand that the waste wood in various workshops is being sold as scrap by the Railways. The Committee recommend that the Research Organisation should consider the feasibility of utilizing the waste wood in a better and more useful way on the Railways in the construction of coaches and buildings. If necessary, enquiries should be made from commercial firms, which are making doors, windows and furniture from the waste wood so that a more profitable use may be made of the waste wood.

1	2	3
11	28	The Committee understand that the Railways are not using indigenous ply belting, as it is said to be of 'inferior quality' and instead are importing the same from outside. The Committee feel that the Research Organisations should study the defects in the Indian made ply-belting and advise the manufacturers to remove the same, so that the indigenous factories might not have to close down for want of orders.
12	29—32	As the introduction of Rail Cycle trolleys on the Railways will result in considerable reduction in the physical strain involved in pushing the present push trolley, apart from considerable saving in the number of trolleymen required to operate them, the Committee recommend that the experimental stage should be finalised quickly and the new type introduced as soon as possible.
13	33—34	The Committee feel that there is a vast field of research in Electrical Engineering specially in Tele-communication, which is closely connected with Electrical Engineering and in respect of which Indian Railways are lagging behind. They recommend that the Railway Board should pay more attention to the research work in Electrical Engineering and equip the Research Organisation for that purpose. For instance, one or two radar instruments could be obtained and indigenous research carried on to devise some cheaper instruments on these lines.
14	35	At present, passengers are suffering great hardships due to the execssive tropical heat in summer, continuous praying of dust and coal particles in compartments during the journeys and invasion of compartments by insects during the monsoons. The Committee, therefore, reiterate their recommendation made in para 28 (ii) of their Seventeenth Report that the Research Centres of the Railways should concentrate on devising some cheap method, by which some degree of cooling can be effected in the third class compartments. Efforts should be made to provide dust free ventilation and to overcome the nuisance of insects during monsoons, in Railway carriages. These problems must have been faced and tackled in foreign countries also. Experience gained by them might be tapped with advantage by the Indian Railways.
15	39	The number of patents taken so far by the Government of India relating to Railway vehicles and locomotives is five, which appears to be very small and indicates that there is considerable scope for accelerating progress in various directions.

1	2	3
16	40	The Committee recommend that the work of standardising the equipment commonly used in the Railways should be expedited because the preparation of standard designs and specifications would facilitate the indigenous production of those items.
17	41—42	The Committee suggest that some of the senior retired Railway officials with requisite technical knowledge should be associated with some of the Standards Committees.
18	44	The Committee regret to note that the Railway Ministry have not been able to indicate the saving effected by replacement of foreign Consultants by the Central Standards Office. The Committee suggest that the Railway Board should obtain these figures and supply them to the Committee as early as possible to enable the Committee to examine the savings effected.
19	52	The Committee recommend that a detailed and scientific analysis should be made by the Railway Ministry about the relative advantages and disadvantages of the mechanised process of relaying versus the present manual process of relaying, after keeping in view the employment potential in manufacturing the track relaying and handling equipment indigenously and if it is found, as a result of this analysis, that the advantages are in favour of the mechanised process, the same may be introduced gradually on Indian Railways. The extra traffic that would be carried due to reduction in the duration of blocks and speed restrictions should be given full consideration before coming to a decision on this point.
20	55	The Committee suggest that the Railway Ministry should formulate their tentative plans for electrification (and dieselisation) during the Third Five Year Plan also so that the ancillary electrical industries may be gradually developed in the country, thus reducing the need for imports from foreign countries.
		(2) *Signalling and Telecommunications*
21	56—59	Good communications are a *sine-quo-non* for good operation on Railways. As far as Signalling and Tele communications are concerned, Indian Railways are behind other foreign countries. There are many sections on the main line, which have low standard of interlocking, thereby necessitating imposition of speed restrictions. Even the main line route over which the Grand Trunk Express passes has sections with non-interlocked stations. Moreover most of the branch

1	2	3
		lines are non-interlocked. Block instruments are also not provided on a large number of sections. The Committee are of the opinion that there is vast scope for improvement in the working of Indian Railways by introducing modern methods of signalling and interlocking.
22	60	The Committee recommend that the Railway Ministry should take special measures to build up indigenous capacity for manufacturing signalling equipment in the country.
23	63	The Committee recommend that the Railway Ministry should take up the question of encouraging the manufacture of Railway signalling equipment in the private sector as soon as the report of the Railway Equipment Committee is received, without any loss of time, because for want of modern signalling equipment, Railways are very much handicapped. The question of enlarging the capacity of existing Railway Signalling equipment workshops should also be pursued rigorously, so that the existing position of helplessness of the Railways in the matter of improved signalling equipment is set right as soon as possible.
	65	The Committee suggest that the Railway Ministry should ascertain the prevalent practice in the foreign countries, with regard to the existing facilities in respect of telegraph and telephone lines utilised by the Railways, assess the results achieved there and then pursue the matter with the Communications Ministry and come to some agreement, so that the programme of improvement in the means of communications on the Railways is expeditiously carried out in the larger interests of the country as a whole.
25	66	The Committee are of the opinion that the present means of communications (telegraph, telephone, teleprinters etc.) on Indian Railways are inadequate and in many cases outmoded. They feel that, if proper and adequate means of communications are provided on Railways there will be great improvement in the operating position and the movement of traffic will be considerably accelerated. The Committee, therefore, suggest that the Railway Ministry should arrange for a proper survey of the existing facilities by a foreign expert, who should make suitable recommendations for modernising signalling and tele-communications on Indian Railways. His recommendations should form the basis of a proper and integrated Plan for the expansion of these facilities during the Second Five Year Plan. Proper training in the use of modern equipment as and when installed should also be given due attention.

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26	70	The Committee appreciate the difficulties of the Railways in carrying out improvements in the existing telephonic communications and are glad to note that the Railway Ministry propose to discuss the question of provision of tie lines from P. and T. Exchanges to the Railway Exchanges with the Ministry of Communications at a high level shortly to remove the existing difficulties. The Committee recommend that the question of providing direct carrier channels between Delhi and Bombay and Delhi and Calcutta should also be pursued at the proposed meeting and the plans regarding installation of additional carrier channels should be finalised early.
27	74	The Committee recommend that in view of the great advantages of radio communication on trains, the Railways should examine the matter further in the light of the results achieved in foreign countries and introduce this innovation as an experimental measure.
28	76	The Committee were informed that a proposal of introducing as an experimental measure the system of Centralised Traffic Control at one section near Katihar, where there was a bottle-neck and where wooden sleepers had been laid, is under consideration by the Indian Railways. The Committee suggest that the proposal should be expedited and if the results are found to be satisfactory, it should be extended to other heavily occupied single line sections.
29	79	The Committee endorse the recommendation of Shri Kripal Singh that telephone connections should be provided more liberally to facilitate Railway working and recommend that the Railways should pay more attention to the development of communication facilities with a view to increasing the efficiency of Railway operation.
		(3) *Accidents on Indian Railways*
30	81	The Committee are glad to note that there has been a steady decrease in the total number of accidents on Indian Railways during the last four years. During 1954-55, the number of accidents has shown a decrease of 770 as compared with the number in the previous year.
31	85-86	The incidence of accidents per million train miles occuring on the Southern and the Western Railways in 1953-54 is disproportionately high. The excessive number of accidents on the Southern Railway is, however, due to the erroneous method of compilation

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		of statistics insofar as it includes as many as 1,697 accidents due to trains running over cattle. If due allowance is made for this particular item, the result would not be unfavourable, when compared with other Railways. The position on the Western Railway however, appears to be unfavourable in comparison with other Railways. The Committee recommend that the position should be carefully analysed and remedial action taken.
32	88-89	During 1954-55 there were 1,352 accidents due to collisions and derailments as against 1,364 during the previous year. This indicates that there is no appreciable improvement in this respect. In fact, the figures on the Central Railway have shown a steady and sharp increase under these two heads. Disconcerting as it is, this point requires careful examination and suitable remedial action. The Western Railway has also recorded an increase under this head in 1954-55 in comparison with the previous two years.
33	90	On the M.G., engine miles per engine failure have shown a substantial increase in practically all the months of the year 1953-54. On the B.G. also a general improvement has been recorded. The figures seem to indicate that engine failure generally increases during the months of May and June, perhaps due to the rigours of climate during these months.
34	92	The accidents at level crossings have been on the increase during the last two years and this *prima facie* indicates the need of improving the types of level crossings, according to the increased flow of traffic.
35	94	Per million train miles, the number of collisions and derailments on all Railways decreased from 7.53 in 1951-52 to 5.51 during 1954-55. The North-Eastern Railway despite a slight decrease maintains a figure more than double the average. Reasons for this high figure should be analysed in detail and remedial action taken.
36	102	The total number of casualties in workshops, lines under construction etc. recorded an increase during 1954-55, the number being 20 killed and 19,278 injured during the year as compared with 7 killed and 19,170 injured during the previous year. The above figures indicate that accidents resulting in injuries to Railway employees in the Railway workshops are very heavy. The Committee suggest that this point should be specially investigated by the Railway Ministry and remedial action taken.

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37	103	Cases of injuries are much more frequent on the Western, the Eastern and the Central Railways. The point needs further careful examination by the Railway Ministry.
38	104-105	A comparative study of the accidents on the Railways in India, the U.S.A. and the U.K. made by the Accidents Enquiry Reviewing Committee indicates that the results on Indian Railways do not generally compare unfavourably with those on the Railways in the U.S.A. and the U.K. and that the conditions on the Indian Railways cannot be said to show any cause for alarm. All the same, the detailed analysis of accidents on Indian Railways shows that there is no ground for complacency either. Apart from the cost of damages caused to rolling stock, of which there is acute shortage on Indian Railways and the set-back to the flow of traffic as a result of accidents, the question involving the safety of passengers must continue to receive constant attention of the Railway Ministry. Train accidents are mainly contributed by failure of station and train staff to follow the rules and by flaw in metal or design of rolling stock.
39	107	The problem of decreasing the number of accidents due to failure of human element is more or less identical with the problem of increasing the general efficiency of Railway employees.
40	108	The Committee have already discussed the various problems regarding the recruitment, training, discipline etc. of Railway employees in their Twenty-fourth Report on "Staff Matters" and they have no doubt that prompt implementation of their recommendations will result in all round improvement in the efficiency of Railway staff which, in turn, will be reflected in the decrease in the number of accidents.
41	110	The Departmental Committee on Railway Accidents had made a number of useful recommendations and the Committee were assured that the same were being followed up by the Railway Ministry. In this connection, the Committee would, however, like to lay special stress on the following recommendations made by that Committee and suggest that the same should be pursued vigorously :— (1) Adequate facilities for training and refresher courses should be provided for the employees of Traffic, Mechanical and Civil Engineering Departments. (This point has already been referred to by the Committee in detail in their Twenty-fourth Report).

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(2) Night and surprise inspections must be conducted by officers and Inspectors.

(3) On sections of heavy traffic, high standard of interlocking should be provided and on all sections, where traffic is light, some sort of rudimentary interlocking must be made available on the main trunk routes; no station should be left un-interlocked and the standard of interlocking at all stations on a section should be the same. Further, at large stations track circuiting should be provided.

(4) Complete lock and block should be planned for all double line sections.

(5) Where, on single line sections, traffic is in excess of three trains each way, token instruments must be provided and where token instruments are installed, the last stop signal should be interlocked with the token instrument.

(6) When paper line clear system is in force, a train signal register should be maintained.

(7) No section of the double line should be worked on paper line clear system.

(8) Standards of interlocking should be gradually raised.

(9) Speedometers should be provided on all engines working trains carrying passengers.

(10) Standard of lighting in yards and platforms should be improved.

(11) Continuous night duty by Assistant Station Masters should be avoided.

(12) The area of a yard in which train examination is done as also the sickline area should be provided with flood lighting.

(13) On the Metre Gauge, pit lines should be provided at stations, where intensive train examination is done.

(14) Supersonic crack detectors should be provided in all Railway workshops.

(15) A proper and well-defined technique in welding should be prescribed in all workshops and proper welding equipment should also be provided. Supervision on welding work should be effective and courses of training for welders should be introduced.

(16) Arrangements for annealing should be provided in all workshops and an organisation should be set up to ensure annealing all welds.

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		(17) Snatch test arrangements for draw-bars should be provided on all workshops and it should be ensured that every single-draw-bar is given snatch test before it is brought into use on Rolling Stock.
		(18) At the time of periodical overhaul each wagon draw-bar should be annealed and given a snatch test.
		(19) The deficiency of gauge glass protectors on engines must be removed.
42	111	The Committee understand that on the Japanese Railways, a certificate is awarded to the yard by the Divisional Superintendent, if there is no accident for three months and a medal is awarded by the President of the Japanese National Railway, if there is no accident for a whole year. The Committee suggest that this procedure be adopted on the Indian Railways also, in respect of certain important marshalling yards.
43	114	The Committee would like the Railway Ministry to communicate to the Committee in due course, the action taken on the various suggestions and proposals made by the Government Inspectorate of Railways, during the last five years.
		(4) *Miscellaneous Matters*
44	115—117	The Committee have noticed that there is lack of uniformity of practice and procedure in respect of a number of points on the Railways. The Committee wish to emphasise the need for achieving uniformity of procedure on all the Railways to the maximum extent possible.
45	118—120	The Committee have come across a number of cases where the implementation of recommendations of the various Committees appointed from time to time to investigate specific problems has been inordinately delayed.
		A time limit should be fixed by which decisions should be taken and action initiated on the recommendations made by the Committees. Further, it should also be ensured that the recommendations of such Committees are properly considered and not rejected merely on the plea that the Committees so constituted are not expert bodies. It is a waste of public money to appoint Committees, print and publish their reports, but delay action on the recommendations or suggestions made by them for inordinately long periods.

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46	121	The Committee recommend that the Railway Ministry should publish a pamphlet giving statistical data with regard to each aspect of administration, detailing the position before and after integration in respect of the former Indian State Railways. The pamphlet may briefly compare the position at the time of integration with the position as on 1-4-1956 with regard to Staff Matters, number of Locomotives, Coaches, punctuality of trains, availability of wagons for loading etc. This pamphlet should be widely circulated with a view to dispelling any doubts in the minds of the people regarding the alleged step-motherly treatment accorded to areas covered by former Indian State Railways.
47	124	The Committee recommend that the Efficiency Bureau should further pursue the problem of speeds of goods trains vigorously and suggest remedial measures. In view of the useful work that is being done by the Bureau, the Committee suggest that a permanent organisation should be set up with a view to organising the work on a sound footing. The officers working therein would then have an opportunity of having an up-to-date knowledge of the latest techniques in other countries. It would be useful to have certain officers trained in the latest techniques to form a nucleus of the Organisation. Along with this nucleus, the present practice of recruitment of Service peronnel on the basis of their experience and aptitude might continue. The Committee also recommend that the Reports of the Efficiency Bureau and the action taken thereon should be promptly published.
48	125	The Committee consider that it would be advantageous to depute one or two officers to make an 'on the spot' study of the Railways in the U.S.A. and find out the exact reasons for their being able to carry a heavy load of traffic efficiently with comparatively less number of staff.
49	129	The Committee recommend that the Railway Ministry should also adopt measures, as is being done in the Soviet and the Japanese National Railways, to disseminate general technical knowledge about the Railway working. A beginning can be made in Delhi by installing Children's Railway, which should be placed in charge of qualified instructors.
50	130-131	The Committee hope that the examination of the question of delegation of further powers to the General Managers will be completed soon and powers will be delegated to the maximum extent possible, particularly in respect of incurring expenditure and dealing with staff matters.

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51	133	The Committee feel that there should be uniformity, in regard to the delegation of powers to officers subordinate to General Managers on different Railways and that the question of delegating powers at lower levels should also be dealt with by the Railway Board. The Committee suggest that maximum decentralisation of powers should be effected on all the Railways at Divisional levels on a uniform basis. The Committee suggest that the Railway Board might lay down two schedules of powers for Divisional Superintendents, one schedule applying to Divisional Superintendents, who had put in particular length of service and another schedule for the rest.
52	137	On Soviet Railways there is a Planning Cell on each Division, in each Shed, Workshop and Production Unit, which functions under the Seniormost Command Staff in control of the Division or the Unit. The Committee suggest that the feasibility of introducing this system on Indian Railways should be examined by the Railway Ministry.
53	139	The Committee suggest that the Second Five Year Plan of the Indian Railways should be divided into annual, quarterly and monthly plans so that the targets to be achieved in each month are placed clearly before the Railwaymen all over the country. The monthly targets laid down for each Railway and the results achieved can, with advantage, be included in the magazine 'Indian Railways' recently started by the Railway Board. The Committee also reiterate their recommendation in Para 26 of their Eighteenth Report that the Railways should draw up a long term plan for general guidance.
54(a)	142	In order to enable the Railway Board to keep a careful watch over the progress of the Plan, the Committee suggest that the Chairman, Railway Board, should have a big chart in his office, which will give him at a glance the monthly rate of expenditure incurred Railway-wise. There should also be a similar chart giving physical progress of the works undertaken by the Railways as also a chart showing the amount of traffic carried every month.
54(b)	144	In view of the acute shortage of coaching stock on Indian Railways, overaged coaches are bound to continue in service for many years to come. Hence, the Committee suggest that the policy of providing fans in the old coaches should be liberalised by the Railways.
55	147	The Committee suggest that a system of incentives and bonuses similar to that prevalent on Soviet Railways

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		might be introduced with advantage on Indian Railways also. "Produce more transport, and earn more wages" should be the slogan to be adopted by the Indian Railways during the Second Five Year Plan. The Committee would, in this connection, like to refer to Para 129 of their Twenty-first Report on the same subject.
56	148	The Committee feel that some of the interesting features of the Japanese National Railways, revealed in the Report submitted by Shri Kripal Singh can, with advantage, be gradually adopted by the Indian Railways.
57	149	The Committee feel that uniformity should gradually be introduced in siding charges, according to a phased programme. If necessary, the Railway Ministry may refer this problem to the Railway Freight Structure Enquiry Committee to evolve a suitable formula for introducing uniform siding charges on all Indian Railways.
58	150	The reasons for the high operating ratio of the North-Eastern and Southern Railways require to be very carefully investigated and remedial action taken so that they may be brought down more or less to the same level as on other Railways.
59	151	The Committee observed that all the Narrow Gauge Railways are heavily losing concerns except the Narrow Gauge system on the Central Railway. It is, therefore, necessary that the process of conversion of Narrow Gauge lines into Metre Gauge or Broad Gauge as the case may be, should be expedited. Besides, the operating ratio for the Metre Gauge sections is higher than for the Broad Gauge sections on the same Railway.
60	162	The analysis of working of coaching and goods services seems to indicate that the Metre Gauge Railway system in India is costlier to work than the Broad Gauge system. In this connection, the Committee would refer to Para 32 of their Eighteenth Report and suggest that the Railway Ministry should pursue these investigations and submit the results with their observations in due course. A very detailed and careful examination is necessary before laying down a firm policy regarding the future expansion of Railways in India, whether it should be the Metre Gauge system or Broad Gauge system. In the meantime, in view of the distinct advantages of the B.G. system over the M.G., it would be advisable

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		to prefer B.G. over M.G., other things being equal, wherever there is a choice, in new construction or conversion.
61	165	The Committee, in this Report, as well as in their previous Reports have made a number of recommendations on the basis of observations made by the Indian Railway Delegation to the Soviet Railways and other European Railways. The Committee enumerate below some more features of the Foreign Railways referred to by the Delegation and suggest that the Railway Ministry examine the feasibility of introducing these features on Indian Railways with such modifications as are considered necessary to suit local conditions:—
		(i) On the Soviet Railways, leave for staff is planned in advance, so that the maximum number of staff are available on duty during peak periods and the maximum number avail of leave during the slack periods.
		(ii) The budget of each Railway in the Soviet Union is supported by full details concerning each department, plant and other Units, the performance in respect of the roles assigned to each in the operative plan and reasons for variations between allocations and actuals in the current year. So far as Programmes of Works are concerned, only those items are included for which full drawings and plans have already been prepared and approved of by competent authorities. Projects, which are still in the stage of investigation and have not been boiled down to the drawing boards are expressly excluded, and the practice of appropriations on an approximate basis or on token account does not seem to obtain.
		(iii) Each Railway system is permitted to utilise its receipts for purposes of meeting the expenditure as sanctioned in its budget. Funds required in excess of their respective receipts are made available by the Ministry of Communications through credits placed in the Branches of the State Bank.
		(iv) For each of the Railway systems and for the Soviet Railways as a whole, a monthly and a quarterly review of the finances is prepared and circulated. The review presents a critical analysis of expenditure and the pattern of income and is not intended to serve as an instrument for the effectiveness of its control.
		(v) Owing to the presence of conductors in each coach, there is little or no ticketless travel on the Russian

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		Railways. Passengers found travelling without tickets are required to pay fares with fairly heavy penalties. In case they are unable to pay while travelling on the trains, charges are recovered from their homes with the assistance of police, if necessary. There is no difficulty in identifying a person, because everyone carries with him an identity card.
		(vi) An essential feature of the policy of the Soviet Railways appears to be not to make wholesale radical changes in their equipment, but to introduce as many latest developments on the old assets as feasible, in order to achieve better results and more efficiency.
		(viii) The Soviet Railway Authorities claim that the scheme of training obtaining on their Railways is unique and comprehensive. There are four distinct links in the scheme, each fulfilling a specific purpose and enabling the Railways to recruit qualified staff and arrange for their further training throughout their professional career. The Indian Railway Delegation has described the scheme in great detail. In this connection, the Committee refer to Para 56 of their Twenty-fourth Report, in which they have suggested that a Committee of Educationists should be appointed to look into the problem of training, both from the point of view of getting men trained for the various departments as well as for overhauling the entire system of training. It would be worthwhile for that Committee to study the scheme obtaining on the Soviet Railways.
		(viii) Westbahnhof (the main terminal station in Vienna), which the Delegation visited is a remarkable example of modern station architecture in Europe. Every Indian Railway should have a few model stations of this type with all modern amenities. The funds for constructing such stations should not, however, be taken from the passenger amenities fund.
		(ix) In German Federal Railways, at large stations, the Railways provide cinema halls, where they exhibit short informative feature films generally, having educative, social or propaganda value. Only passengers holding current outward or transit rail tickets are permitted to these shows. There is no charge.
62	166	While there has been considerable drop in the numbe of outstanding registrations on the Broad Gauge or 31-3-1956, when compared with the correspondinn

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		figures on 31-3-1955, on the Metre Gauge there has been an increase, despite better loading figures achieved. The need for providing additional rail transport still remains as pressing as before.
63	167	The Committee have no doubt that the implementation of the suggestions made by them and the recent drive initiated by the Railway Ministry to improve goods loading, will enable the Railways to achieve better and better results. The Second Plan of the country is a gigantic programme of an all round increased production; and the main brunt of distributing the raw materials and the finished products will have to be borne by the Railways. The country will, therefore, watch the programme of the Railways with interest and anxiety—with anxiety, because there is a fear that the Railways might prove to be a serious bottle-neck in the movement of goods during the Second Plan period. However, the improvement in goods loading effected during the last few months and the assurance of the Planning Commission ,that there will be periodical reviews of the allocation of funds to Railways give grounds for hope that the Railways might be able to meet the requirements to a reasonable extent. The Committee close their examination of the estimates relating to the Ministry of Railways with this message of hope and cheer to all Railwaymen that they may succeed—nay, they must succeed—in delivering the goods of the Nation.

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