

**HUNDRED AND SIXTY-SEVENTH  
REPORT**

**PUBLIC ACCOUNTS COMMITTEE  
(1983-84)**

(SEVENTH LOK SABHA)

**UTILISATION OF LOCOMOTIVES**

**MINISTRY OF RAILWAYS  
(RAILWAY BOARD)**



*Presented in Lok Sabha on*  
*Laid in Rajya Sabha on*

**LOK SABHA SECRETARIAT  
NEW DELHI**

*July, 1983/Sravana, 1905 (Saka)*

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### PART II\*

Minutes of the Public Accounts Committee (1982-83 & 1983-84)

29-11-1982

18-3-1983

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(1983-84)

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3. Shri Ram Kishore—*Senior Financial Committee Officer.*

## INTRODUCTION

1. I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this Hundred and Sixty-Seventh Report of the Public Accounts Committee on Paragraph 4 of the Advance Report of the C&AG of India for the year 1980-81, Union Government (Railways) relating to Utilisation of Locomotives.

2. The Report of the Comptroller & Auditor General of India for the year 1980-81, Union Government (Railways) was laid on the Table of the House on 5 April, 1982.

3. The Committee's examination of the Utilisation of locomotives has revealed that the locomotive holdings of the Railways were quite excessive to the requirements of the traffic handled. In spite of excessive holdings, the Railways were unable to handle the entire traffic available. The surplus is more if one reckons with the inefficient use of locomotives as disclosed by various indices of performance dealt with in the Report. The Committee have pointed out that lack of proper planning and clear enunciation of *inter se* priority of Plan programmes in the light of past experience besides operational inefficiency have contributed to this phenomenon. The Committee have also found that diesel and steam locomotives continue to be deployed in electrified sections on account of non-electrification of short links. The repairs and maintenance facilities lag behind the need with the result that the idle time of locomotives awaiting repairs etc. is very high in the opinion of the Committee, all this requires careful examination in a coordinated manner in the light of the shortcomings pointed out in the Report, in order to ensure that assets of the Railways are optimally utilised. The Committee have emphasised that machinery for planning, monitoring and review as well as follow-up action should be improved to achieve this end.

4. The Committee (1982-83) examined the Audit Paragraph at their sittings held on 29 November, 1982 and 18 March, 1983. The Committee considered and finalised this Report at their sitting held

on 18 July, 1983. Minutes of the sittings of the Committee form Part II\* of the Report.

5. For reference facility and convenience, the observations and recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix II of the Report.

6. The Committee place on record their appreciation of the commendable work done by the Public Accounts Committee (1982-83) in taking evidence and obtaining information for this Report.

7. The Committee would like to express their thanks to the Ministry of Railways (Railway Board) for the cooperation extended by them in giving information to the Committee.

8. The Committee would also like to place on record their appreciation of the assistance rendered to them in the matter by the Office of the Comptroller and Auditor General of India.

NEW DELHI:  
July 27, 1983.

Shravana 5 1905 (S).

SUNIL MAITRA,  
Chairman,  
Public Accounts Committee.

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# REPORT

## CHAPTER I

### LOCOMOTIVE HOLDING

#### *Introductory*

1.1. The Audit Para\* reveals *inter alia* that during the past few years the number of locomotives acquired or held by the Indian Railways has been in excess of their actual requirements, as compared to their traffic projections. The indices of utilisation of locomotives also deteriorated over the years, in that the traffic moved per locomotive has less since 1969-70, except in 1976-77 and 1977-78.

#### *Locomotive holdings vis-a-vis traffic handled*

1.2. According to the Audit Paragraph, the locomotive holding of the Indian Railways as on 31st March, 1981 comprised:—

	Broad Gauge	Metre Gauge	Narrow Gauge	Total
Steam	4361	2763	345	7469
Diesel . . . . .	1866	4700	67	2403
Electric . . . . .	1016	20	..	1036
	7243	3255	412	10908

1.3. A review in audit of the procurement, utilisation and performance of BG locomotives\*\* revealed the following.

1.4. The acquisition of locomotives during a Plan period is planned with reference to the traffic anticipated and the norms of performance of the locomotives. Necessary provision is made in the annual Rolling Stock Programmes depending upon the delivery period.

\*See Appendix I

\*\*"The review is confined to BG locomotives only as the BG system accounted for 77.5 per cent of the passenger traffic and 86.60 per cent of the goods traffic carried by the Railway in 1980-81. (Source of data : Indian Railway Annual Statistical statements)".

1.5. In Paragraph 11 of the Railway Audit Report for 1969-70 it was pointed out that the locomotive holding was far in excess of the requirement for moving the traffic that materialised during 1965-66 to 1968-69. Excess holding of locomotives continued thereafter also.

1.6. The requirement of locomotives, as computed by adopting the norms used by the Railway Board, for the level of traffic (both passenger and goods) moved in 1977-78 (maximum in any year so far) and the number of locomotives on line during the years 1978-79 to 1980-81 were as below:—

Year	Number of locomotives in steam terms		
	on line	require- ment	surplus
1978-79	9809	9300	509
1979-80	9917	9300	617
1980-81	10079	9300	779

However, as the traffic moved in the respective years was much less than in 1977-78, the actual surplus holdings in these years were higher viz. 808, 970 and 1069 respectively.

1.7. The Audit Para further says that the Fifth Plan provision for acquisition of locomotives was stated to be related to the requirement for moving 250—260 million tonnes of traffic, at an average lead of 678 kilometres, by 1978-79. Taking into account the limitations of the capacity of production units (CLW\* and DLW@ and also availability of funds, ordering of 963 locomotives (Electric 299 and diesel 664) was envisaged. Including the throw-forward from the previous ordering, the provision made in the Rolling Stock Programmes for the five years was for 1080 locomotives. However, the actual production of locomotives during the period 1974-75 to 1978-79 (Vth Plan) was 866 (Electric 263 and diesel 603) and 169 in 1979-80 i.e. 1035 in all in 6 years), as against the installed capacity of 212 locomotives (72 electric and 140 diesel) per annum. If full utilisation of the installed capacity or even the targeted production (1102) had been achieved the surplus mentioned above would have been higher.

\*CLW—Chittaranjan Locomotive Works, Chittaranjan.  
 @DLW—Diesel Locomotive Works, Varanasi.

1.8. Statement showing the traction-wise traffic (Gross tonne kilometres) and the number of locomotives on line which is given in Annexure IV to the Audit Para reads as follows:—

Year	Steam		Diesel		Electric	
	G.T.K.M. (P+G)	Locomotives on line	G.T.K.M. (P+G)	Locomotives on line	G.T.K.M. (P+G)	Locomotives on line
1969-70 . . . . .	103·853	5927	101·11	675	57·377	513
1973-74 . . . . .	79·319	5275	121·92	1118	58·840	645
1976-77 . . . . .	72·290	5019	166·29	1370	93·494	696
1977-78 . . . . .	69·484	4888	179·36	1460	98·503	852
1978-79 . . . . .	57·087	4828	185·06	1575	92·561	899
1979-80 . . . . .	50·352	4697	196·90	1671	90·638	929
1980-81 . . . . .	43·372	4532	205·10	1798	92·492	988

[GTKM: Gross tonne kilometre in billions

Locomotives: in numbers

P : Passenger

G : Goods]

1.9. The above statement shows that the number of diesel and electric locomotives on line increased between 1969-70 and 1980-81 by 1123 and 475 respectively *i.e.* by 166 per cent and 93 per cent. The Traffic carried under these tractions, however, increased by 103 per cent and 61 per cent respectively.

1.10. On the other hand, the reduction in stock of steam locomotives on line was 23.5 per cent only between 1969-70 and 1980-81 though the reduction in traffic carried under steam traction was of the order of 58 per cent.

1.11. Thus, the traffic carried under all the three tractions (diesel, electric and steam) was far less than their respective hauling capacities resulting in inadequate utilisation of locomotives.

1.12. The Committee enquired about the traffic anticipations during the Fifth Plan and the Sixth Plan and the actual traffic compared to the projections in the Plan. The Ministry of Railways (Railway Board) have stated in a written note that:—

“The draft 5th Plan published in 1974 envisaged a freight traffic target of 300 million tonnes; but the provision for rolling

stock was made to cater to freight traffic of the level of only 280 million tonnes.

In the wake of energy crisis, increase in prices, and constraint of resources, a re-appraisal of the Plan was undertaken in 1974-75 i.e. soon after the draft Plan was published. The re-appraisal revealed that with a projected outlay of Rs. 2350 crores on Railways (including Rs. 200 crores for MTP), the Railways may not be able to carry more than 250 million tonnes of originating freight traffic.

The final Fifth Plan issued in September, 1976, thus, envisaged a target of 250/260 million tonnes of freight traffic although it reduced the outlay to Rs. 2202 crores.

Against the target of 250 million tonnes for 1978-79 the Railway lifted 239.1 million tonnes in 1976-77 and 237.3 million tonnes in 1977-78 and the demand for rail transport crashed. In later years, however, e.g. during 1978-79 the railways could lift only 223.4 million tonnes, due to general decline in discipline, which affected efficiency of railways as also of railway users, like Ports, Steel Plant, Collieries, Food Corporation etc., leading to loss of productivity and increase in wagon turn-round.

The Sixth Plan document published by the Planning Commission envisages a demand of 309 million tonnes of originating freight traffic with an average load of 710 km in 1984-85. With an allocation of Rs. 5,100 crores, this Ministry has expressed that it may not be possible to carry more than 260/270 million tonnes of freight traffic in 1984-85, if capacity is measured only in terms of availability of rolling stock. The constraints of ground capacity may limit the capability even further, because there is increasing concentration of traffic on the Main Line routes, where development is but slow due to poor allocation of funds under the Plan Head 'Traffic Facilities' which is burdened with expenditure of such Gauge Conversions which do not add to rail transport capacity.

The actual traffic lifted during 1980-81 was 220 million tonnes. Although the final figures of traffic carried for 1981-82 are not yet available, the tentative figures of traffic lifted in 1981-82 are estimated at about 244 million tonnes."

1.13. The Committee desired to know the views of the Ministry of Railways (Railway Board) on a statement in the audit paragraph that the Railways had 1069 surplus locomotives with reference to the traffic actually moved in 1980-81. The Ministry have stated in a written note as follows:—

“The locomotive holdings and the traffic moved by Railways has been as under:—

Period	Total Number of loco holdings			Total traffic moved in million tonnes	Number of loco units used for moving 1 m.t. traffic	
	Steam	Diesel	Elec.			
1976-77 . . . . .	8 345+	1 903+	847+	11 095	239.1	46.4
1977-78 . . . . .	8 215+	2 025+	901+	11 141	237	46.9
1978-79 . . . . .	8 080+	2 126+	945+	11 153	223.4	49.9
1979-80 . . . . .	7 856+	2 243+	984+	10 073	217.8	46.2
1980-81 . . . . .	7 469+	2 403+	1 036+	10 908	220	49.6
1981-82 . . . . .	7 272+	2 517+	1 104+	10 893	245.5	44.3

From the above it will be seen that while the traffic moved subsequent to 1976-77 has been less, yet it cannot be said that the locomotives were surplus to requirement because the number of loco unit required to move traffic of one million tonne does not show any significant increased except for 1978-79 and 1980-81. In this calculation, diesel and electric locos have not been equated in terms of their higher output as compared to steam locos. Such an assessment indeed is difficult. However, from the trend of traffic moved in 1981-82 it can be said that the previous performance could have been improved upon if the law and order and industrial relations situations were better. It will, therefore, be incorrect to assess the surplus of 1069 locos with reference to the traffic moved during 1976-77.”

In a further note submitted, the Ministry of Railways stated as follows:

Year	Loco Holding		Loco required		Surplus	
	Diesel	Electric	Diesel	Electric	Diesel	Electric
1977-78 . . . . .	1468	852	1398	764	70	88
1978-79 . . . . .	1575	889	1465	796	110	93
1979-80 . . . . .	1671	929	1528	801	143	128
1980-81 . . . . .	1795	958	1650	828	118	160
1981-82 . . . . .	1894	1044	1818	1014	81	30
1982-83 . . . . .	1980	1104	1827	1025	153	79
1983-84 . . . . .	2080	1164	1937	1130	143	34
1984-85 . . . . .	2121	1224	2125	1235	( )4	( )11

“The number of surplus locomotives has been assessed adopting certain norms of utilisation given below: From 1977-78 to 1979-80—Norms adopted for diesel is 185,000 NTKMs per loco on line and electric 190,000 NTKMs per loco on line. This is based upon the achievement in 1977-78 of diesel—185747 and electric—189727. Between 1980-81 to 1984-85 the norms adopted are diesel—180,000 and electric 190,000. This is based upon the performance of diesel and electric locomotives achieved in 1981-82 is as under:

Diesel	..	186182
Electric	..	190199

A slightly lower norm for diesel locomotives has been adopted because of their accelerated deployment in replacement of inferior steam services.

1.14 In view of the fact that traffic under electric traction increased by 61 percent only between 1969-70 and 1980-81 against the 103 percent increase in the number of electric locomotives, the Committee enquired how the Railway Board maintained that the electric locomotives are not in surplus. The Ministry of Railways have stated in a written note as follows:—

“While the traffic increased by 61 per cent under electric traction between 1969-70 and 1980-81, electric locos increased by 103 percent. It is true that certain number

of electric locomotives could have been surplus but as electric traction progresses, a large number of services such as slow passenger trains pilots and work trains are also put on electric traction which do not give commensurate gains yet electric locos have to be utilised for more intensive utilisation of electric power."

1.15 The Committee also enquired whether the excessive number of electric locomotives was attributable to non-completion of electrification projects. The Ministry of Railways have stated in a written note that—

"The pace of electrification has been substantially enhanced during the VI Plan. The locomotive production has to match with the final requirements of electrification. As the electrification progresses in stages, it is not possible to put train services on electric traction straightaway for operating reasons e.g. when Delhi—Palwal—Mathura is electrified, this will be done in stages, i.e. Delhi—Palwal and then onwards to Agra and Mathura. In the intermediate stages, it is not possible to operate passenger and goods trains completely with electric power. We have to wait till electrification has progressed at least from one yard to another before a decision is taken to put electric locomotives on freight operation. It is for this reason that the requirement of electric locomotives in the intermediate stages is surplus but then this surplus gets suddenly wiped out as the route is completely electrified."

1.16 During evidence, the Committee enquired whether the growth of goods traffic had been in proportion to the increase in the number of diesel and electric locomotives acquired over the years and what was the extent of surplus locomotives held by the Railways. The representative of the Ministry of Railways stated:

"We have attempted to make an exercise. Compared to the traffic which we have lifted, there is certain surplus in the availability of locos. Had we carried the planned traffic, the surplus would have been of a marginal nature. It is a fact that during the year under discussion, the traffic that was carried was much less than what we had planned for. This contributed to the surplus being in excess of what it would have otherwise been. Regarding the figure of traffic carried, as has already been

pointed out, there was a shortfall of 9 to 10 per cent only during the year under review, compared to the level of 1976-77. So, I might admit that in respect of steam and electric locos, some surplus does exist. This is mainly because the steam locos were not condemned fast enough. With the condemnation of overaged locos, the position has since been corrected. There will be certain premature condemnation of locos so as to rationalise the deployment of locos. There will be still an element of surplus which, over the years we hope to phase out. We will have to keep a good bit of steam engines some of them have residual life left in them. Regarding electric locos, the traffic which we did carry was less than what we planned for. There is one other factor. The availability of locos is ahead of the actual energisation; this is an in-built phase in the planning process.

The other factor is this. There has been some delay in the energisation itself. This makes the surplus more pronounced than what it should be. We have made rough estimate. By the end of the Sixth Plan period, we shall have locomotives more or less equal to what we should have, with a margin of some 30 or 20 locos, provided the rate of energisation is kept up and the constraints in resources do not make us slow down on this process... We have done a rough estimate. In 1982-83, 80 electric locos will be surplus.... In 1983-84 we will energise much better. It should come down to 40, that is by 1984-85. It should more or less even-out. This is the exercise we have arrived at so far."

1.17 The Committee then desired to know why the Railways had not been able to electrify the track commensurate with the manufacture of locomotives, and whether it did not indicate a lack of coordination in Government policies. The Member, Traffic, Railway Board, said:

"I would submit that it is not a question of lack of coordination. It is a fact that we have not been able to electrify as much as we wanted. The question of locomotives also is there. During the Sixth Five Year Plan we had plans to electrify 2,800 kilometres. In 1980-81 we electrified 438 kilometres, in 1981-82 about 237 kilometres, in 1982 about 142 kilometres, in 1983 we have to do about 350 kilometres and in 1984-85 we would be doing—if our



plans materialise—about 1,000 kilometres. That will take us to about 2,200 kilometres only and it will still be short of the target by 600. We are trying to meet the target for electrification.”

1.18 The Committee desired to know which type of locomotive—steam, electric or diesel was most suited to Indian conditions. The representatives of the Ministry of Railways stated:

“Various Committees have gone into it. There was the Raj Committee Report. Before that, there was the Sahay Committee; that was with reference to the energy policy to be followed. On the basis of that, the Government decided that we should go in for greater electrification, accelerate the process of electrification. So, from a level of 130 km. we were wanting to reach 1,000 km. of electrification.

The comparative economics has been gone into. Steam is very poor in energy utilisation the results are the maintenance cost and operating cost are heavier. Between diesel and electric as far as service benefits are concerned, they are almost equal. But electrification is highly capital-intensive, because of the overhead equipment. The speed, haulage capacity and operating cost are the same. In the maintenance cost, the electric locomotives have an advantage over even diesel locomotives. Ultimately, when we take everything into account, electric traction may turn out to be cheaper in the long run. But, because it is so highly capital-intensive our resources would not permit us to do that.... Where is a limit to the resources that can be made available. It is highly capital-intensive. We will have to invest quite a lot in the overhead. But in the case of diesel, once we purchase the locomotive, there is no further investment.

I will give some comparative maintenance cost figures for all three types of locomotives for 1,000 km.

Year	Passenger service			B.G.
	Steam Rs.	Diesel Rs.	Electric Rs.	
1982-83 (estimated)	54.02	23.51	37.85	
	Goods Train			
1982-83 (estimated)	85.39	16.77	18.68	

This shows that steam engine is highly uneconomic.

The Raj Committee have gone into the economics of various traction and they decided on a cut off level. Taking into account the price of oil, they said that upto a particular limit it is economical to have diesel traction and, beyond that, we have to go in for electric traction. So, whatever sections have been proposed for electrification are those which satisfy these criteria....

Very broadly, 25 per cent of the lines specially the quadrilaterals and the diagonals—Delhi-Madras and Bombay-Calcutta. First priority will be given to these sections, in addition to the Visakhapatnam-Kirandul line which has already been electrified and also some outlying lines where we have coal and mineral movement. So, these are areas which are in the process of electrification.”

1.19 In reply to a question, the Committee were informed that the electrified track—5712 kms. constituted nearly 9 per cent of the kilometreage.

1.20 The Committee then desired to know the progress of electrification since 1975-76. The Chairman, Railway Board stated:

“In 1975-76 we have 4,659 kilometres electrified, in 1976-77 we have electrified 4,720 kilometres, in 1977-78 4720 km., in 1978-79 4,723 km., in 1979-80 4,820 km., in 1980-81 3,345 km. and in 1981-82 5,473 km.

In the Sixth Plan, the progress was very much better than in the Fifth Plan.”

1.21 In reply to a question, the Chairman, Railway Board, stated:

“It is a fact that in the Fifth Five Year Plan the money that was given was not spent.”

1.22 In a note, the Ministry of Railways (Railway Board) have given the following break-up of steam locomotives condemned during the last few years:

1979-80 . . . . .	171	(135 BG+29 MG+7 NG)
1980-81 . . . . .	440	(267 BG+170 MG+3 NG)
1981-82 . . . . .	247	(100 BG+146 NG+1 NG)
1982-83 (expected) . . . . .	900	(Orders have been issued for condemnation of 876 locos (BG - 745 and MG - 131).

1.23 In reply to a question, the Ministry of Railways have stated in a written note that "at present there are about 350 surplus steam locomotives in 'Good Repair Stored.' A certain amount of surplus locomotives are necessary over the Railways for seasonal variation in traffic."

1.24 In reply to another question, the Ministry of Railways have stated that:

"The average number of steam locomotives in 'Good Repair Stored' has been as under:

1978-79 . . . . .	341 (BG 168+MG 150+NG 23)
1979-80 . . . . .	394 (BG 223+MG 144+NG 27)
1980-81 . . . . .	474 (BG 270+MG 187+NG 17)

The number of steam locos in 'Good Repair Stored' as on 1-7-1982 was 484 BG and 101 MG—585 which includes the 350 steam locos mentioned earlier."

1.25 The Committee are concerned over the heavy surplus locomotive holdings of the Indian Railways. According to the Audit Paragraph, as against the anticipated requirement of 9300 locomotives in steam terms, the number of locomotives on line was 10079 during 1980-81, resulting in a surplus holding of 779 locomotives. The corresponding surpluses for the preceding two years—1978-79 and 1979-80—were 509 and 617, respectively. However, as the traffic that actually moved in these years was much less than that in 1977-78, the actual surplus holdings in the years 1978-79, 1979-80 and 1980-81 were much higher, viz., 868, 970 and 1069, respectively. Although there was a steep rise in the excess locomotive holdings in these years, the surplus has not arisen suddenly. In paragraph 11 of the Railway Audit Report for 1969-70, it had been pointed out that the locomotive holding was far in excess of the requirement for moving the traffic that materialised during 1965-66 to 1968-69. Excess locomotive holdings have continued ever since.

10.26 The Committee observe that surplus holdings are mainly in two types of locomotives—steam and electric. According to the Ministry of Railways, the main reason for the surplus in steam locomotives was that "steam engines were not condemned fast" and the main reason for surplus in electric locomotives was that track energisation programme had lagged far behind the locomotive procurement programme. The Committee cannot but observe that the Ministry of Railways had not laid down a time-bound programme

for phasing out steam locomotives with the introduction of high power diesel and electric locomotives.

Though the dieselisation and electrification began during the Second Plan period the decision to introduce diesel and electric traction and closing down steam traction appear to be somewhat ad hoc resulting in mixed traction and multiplicity of facilities. The Committee would like the Ministry of Railways to tackle the problem by framing a perspective plan. The shortfall in the track energisation was attributed to constraint of resources. However as admitted by the representative of Ministry of Railways; (Railway Board) in evidence, "in the Fifth Five Year Plan the money that was given was not spent". Although the progress in track energisation in the Sixth Plan has been better than in the Fifth Plan, according to the figures given in evidence; a shortfall of 600 km. will remain in the Sixth Plan. In order to make full use of the huge investment in electric locomotives, the Committee feel that priority has to be assigned to track energisation and its pace accelerated.

1.27 Lack of proper planning on the part of the Railway Board is also evident from the fact that while large tracks had been electrified, some short intermediate links had not been electrified. The result had been that while a number of electric locomotives continue to be surplus, steam and diesel locomotives continue to be deployed on some electrified sections. The Committee would like the Ministry to accord a high priority to the energisation of the short intermediate links, in the interest of optimum utilisation of electric locomotives. The Committee would like to be apprised of the action taken in the matter.

1.28 As against the increase of 103 per cent in traffic under diesel locomotives during the period 1969-70 to 1980-81 the increase in the number of diesel locomotives was 166 per cent. Likewise, as against the increase of 61 per cent in traffic under electric locomotives during the same period, the increase in the number of electric locomotives was 93 per cent. On the other hand, as against the reduction of 23.5 per cent in the stock of steam locomotives during the same period, the reduction in the traffic carried under the steam traction was of the order of 58 per cent. It is apparent from the figures that the increase in the number of diesel and electric locomotives has been far in excess of that justified by increase in traffic. Likewise, the decrease in the number of steam locomotives was far less than that necessitated by decrease in traffic. While the Committee

appreciate that it may not always be possible to match the increases/decreases in the number of locomotives with increase/decreases in traffic, there ought to be some close approximation between the two. For this, a very alert monitoring arrangement to observe the current and past trends of traffic, and a very efficient machinery for drawing up accurate future projections of traffic is needed.

1.29 Non-materialisation of the anticipated traffic seems to have been largely responsible for the surplus locomotive holding. Against the target of 250 million tonnes for 1978-79, the Railways could lift only 223.4 million tonnes. The actual traffic lifted during 1980-81 was even less—220 million tonnes, i.e. 3.4 million tonnes less than that even in 1978-79. The shortfalls were partly on account of the traffic anticipations not materialising and partly on account of Railways' own inadequacies in handling the entire traffic available. The Committee would expect the Ministry of Railways and the Planning Commission to refine their techniques of forecasting traffic under various tractions so as to avoid over-capitalisation of Railways and the Ministry of Railways to gear up their machinery to ensure optimum utilisation of their assets.

## CHAPTER II

### UTILISATION OF DIESEL LOCOMOTIVES

2.1 As briefly stated above, the traffic carried under all the three tractions (diesel, electric and steam) was far less than their respective hauling capacities between 1969-70 and 1980-81, resulting in inadequate utilisation of locomotives. According to the indices of utilisation of locomotives, the traffic moved per locomotive declined as under:—

	Net tonne kilometre per day per BG goods locomotive in use			Gross tonne kilometre per kg of tractive effort		
	Steam	Diesel	Electric	Steam	Diesel	Electric
1969-70 . . . . .	31284	225958	242263	1139	519	4923
1973-74 . . . . .	23810	198571	184109	945	4253	4459
1976-77 . . . . .	21888	229707	297651	904	4729	4216
1977-78 . . . . .	22169	243892	303779	883	4751	4089
1978-79 . . . . .	17415	213119	236513	741	4600	3480
1979-80 . . . . .	13985	2133024	226578	666	4508	3316
1980-81 . . . . .	11781	212502	201472	611	4497	3390

2.2 Effective utilisation of a locomotive depends upon its timely availability for traffic use, materialisation of load and speed. Traffic use comprises; time spent in hauling trains, terminal detentions, idling in sheds, shunting services, etc., but excludes time spent in sheds and shops when not available for use.

2.3 Since the indices of utilisation showed that the traffic moved per locomotive was less in all years (except in 1976-77 and 1977-78 for diesel and electric locos) than in 1969-70, the Committee enquired whether this indicated fall in efficiency. The Ministry have conceded in a written note:—

“Yes, to a large extent the efficiency was affected due to frequent staff agitations, wild-cat strikes.”

*Avialability for traffic use.*

2.4 The number of diesel locomotives available for traffic use during the years 1969-70 to 1980-81 ranged between 81.53 per cent (1976-77) and 88.27 per cent (1969-70) of the number of locomotives on line. After 1976-77 the availability improved to 85.27 per cent in 1978-79, which marginally increased to 85.76 per cent in 1980-81.

2.5 A statement showing analysis of the time spent by passenger and goods locomotives on various services such as train engines, shunting services, etc. and performance in terms of engine kilometres is given in Annexure 2 to Appendix I. As may be seen from the details in this Annexure (Columns 5) the daily availability of locomotives for traffic use (Passenger services) was as low as 11.6 hours during 1979-80 on the Eastern Railway against 18.21 hours on other Railways. Similarly, in respect of locomotives deployed on goods services, the availability was only 14.4 hours on the Eastern Railway in 1979-80 against 18-19 hours on other Railways.

2.6 The Committee enquired whether the Railway Board had laid down targets of utilisation hours for diesel locos. The Ministry of Railways have stated that "Railway Board's target of utilisation for diesel and electric locos is 80 per cent availability i.e. 19.2 hours per day."

2.7 Asked about the reasons for the very low train engine usage hours on the Eastern Railway—Passenger locos, and South Eastern Railway—Goods locos, the Ministry of Railways have stated in a written note that:

"There are several adverse factors, which contribute to low train engine usage hours. Faulty controlling of trains by the control offices, mismanagement by train crew, loco failures, accidents, inefficient working of yards resulting in delayed formation and late start of trains, staff indiscipline are some of the major reasons affecting train engine usage hours. These factors contributed to the low train engine usage hours on South Eastern Railway. There were large scale failures of electric locos. A special officer was therefore deputed to look into their causes. Various steps taken after his investigations have brought about an improvement. WAG engines which were not performing well are being transferred to other Railways which have less graded sections. Steps have also been taken to improve the maintenance of the engines. All these steps have brought about improvement."

2.8 The Audit Para points out that out of the total availability for traffic use, the time spent by a passenger and a goods (diesel) locomotive in hauling trains, in 1980-81 was only 64 per cent and 56 per cent respectively. While for goods locomotives train engine hours constituted 55.9 per cent in 1980-81 (against 62 per cent in 1971-72), shunting engine hours 15.5 per cent, assisting engine hour 2.5 per cent and in sidings and departmental use 3.2 per cent, the balance of 22.9 per cent (residual hours) represented the time taken by a locomotive in travelling between the shed and the station, waiting for traffic, late starting of trains (for which it is booked), idling in sheds, etc. Between 1977-78 and 1980-81, the total goods train engine hours increased from 4154 thousands to 4679 thousands (12.4 per cent) on account of increase in stock but the "residual hours increased from 1695 thousands to 1920 thousands (13.3 per cent). Bulk of the 'residual hours' in 1980-81 i.e. 22.9 per cent of traffic hours or equivalent of 35 out of 1026 locomotives in use, represented utilisation of power on unproductive work. (The cost of a diesel locomotive was Rs. 54.4 lakhs in 1979-80).

2.9 Unproductive locomotive hours arising out of locomotives not being put to use (though available for use) due to terminal detentions, idling in sheds, etc. increased during 1980-81 (compared to 1977-78) on the Northern, the Southern and the South Eastern Railways (vide Annexure 2 to Appendix I.)

2.10. In the Major yards on Southern Railway (Tondaiyarpatt, Arakkaonam, Jola pettai, Cochin Harbour etc.) the average detention in excess of the targets laid down was 37.4 hours in 1979-80, representing equivalent of 2 locomotives per day. A test review by Audit of terminal detentions in Mughalsarai Yard (Northern Railway) in the months of May 1979, August 1979, December 1979 and March 1980 showed that in 62 cases the detention ranged between 10 hours to 17 hours on each occasion.

2.11 Detention to locomotives in yards on account of late start of goods trains arising out of non-availability of loads or path, late arrival of crew, etc. constituted 8.6 per cent of the goods engine hours on the Southern Railway during 1978-80 and 4 per cent and 4.4 per cent during 1979-80 and 1980-81 respectively on the Western Railway.

2.12. The Committee desired to know the reasons for increase in the proportion of residual hours, that is, unproductive hours to train



engine hours. In a note the Ministry of Railways have stated follows:

"This is because of inefficient utilisation of motive power."

2.13 The Committee enquired whether residual hours, i.e. unproductive hours, which in 1980-81 constituted 22.9 per cent of locomotive traffic hours indicated idle investment, and whether financial implications of such high proportion of unproductive work by locomotives had been examined. The Ministry of Railways have in a written note stated as follows:

"Railway Board is fully conscious that unproductive traffic hours i.e. residual hours should be as low as possible. Since the performance in the past had not been satisfactory, unproductive loco hours had gone up. The financial implications have not been worked out directly but figures are available which indicate the cost of productive hours of diesel and electric locos. The cost of traction per 1000 GTKMs in 79-80 was Rs. 64.74 for steam, Rs. 12.55 for diesel and Rs. 13.74 for electric traction."

2.14 In reply to another question the Ministry of Railways have stated as follows:

"The Board's target for utilisation of diesel locos is 80 per cent availability i.e. 19.2 hrs. per day. Being fully aware of the need to keep unproductive engine hours as low as possible, the performance of locomotives is closely monitored not only at the divisional and zonal level but also in the Board. The mobility of the Indian Railways during the first half of 1980-81 was far from satisfactory. Various factors such as extensive power cuts in the eastern sector resulting in drop of productivity in the marshalling yards, loco sheds and workshops; disturbed conditions in Assam, staff unrest and strikers, crippled general operational efficiency had effected all indices including engine utilisation.

Since late 1980's several remedial measures have been taken to improve engine utilisation. Besides intensive monitoring of locos, segregation of special type of wagons to form an express stream, end-to-end running of through goods trains with the same electric or diesel locomotives, and progressive extension of electrification and dieseli-

sation have helped reduce unproductive hours of engines. This is reflected in the fact that unproductive hours of diesel engines on BG which were 23.1 per cent in 1980-81 have been brought down to 21.3 per cent in 1981-82."

2.15 According to the Audit paragraph, while the train engine hours represent the time spent by the locomotives in hauling trains (out of the total time available for traffic use), they also include detentions en route for change of crew, line clear, etc. The actual utilisation net of such detentions etc. is indicated by the indices of engine kilometres per day per engine in use, net tonne kilometres per engine hour and speed. These indices for 1973-74 and during 1976-77 to 1980-81 were as follows:

	1973-74	1976-77	1977-78	1978-79	1979-80	1980-81
Engine kilometres per day per engine in use (EKM)						
Passenger	694	721	748	628	630	610
Goods	307	379	363	417	307	303
Net tonne kilometres per engine hour	10436	11344	11590	11067	11130	11057
Average speed of all goods train kilometres per hour (km/hr)	22.2	23.1	22.3	21.5	21.3	21.3

Thus, the utilisation of locomotives (as measured by EKM) deteriorated after 1976-77 and, in 1980-81, it was even lower than in 1973-74. Further, as may be seen from the details in Annexure 2 to Appendix I, there was deterioration on all Railways, that on Central and Western Railway being particularly sharp. The Railway Board had fixed (February 1979) targets for utilisation of locomotives varying from 328 EKM per day on Eastern Railway to 450 EKM per day on Northern Railway. None of the Railways had achieved the target prescribed except in Eastern Railway where the target itself was low.

2.16 A contributory factor of the deterioration in utilisation was the decline in the average speed of goods trains from 22.3 Kmph. in 1977-78 to 21.3 kmph. in 1980-81. In the case of passenger locomotives, there had been increase in detention and decline in punctuality in 1979-80 and 1980-81 compared to earlier years. The percentage of mail and express trains (mostly hauled by diesel/electric locomotives) arriving right time was 84 in 1977-78, 72 in 1978-79,

65 in 1979-80 and 67 in 1980-81. The decline was more pronounced on the Central (from 97 per cent in 1977-78 to 62 in 1980-81, Eastern (from 89 in 1977-78 to 53 in 1980-81), Northern (from 87 in 1977-78 to 68 in 1980-81) and South Central (from 82 in 1977-78 to 65 in 1980-81) Railways.

2.17 The Committee desired to know the reasons for a fall in the average speed of all goods trains (diesel) which had come down to 21.2 Kms. per hour/in 1980-81 from 22.2 km. per hour in 1973-74. They also ensured whether the investment on doubling and traffic facilities during these years has resulted in some improvement. In a written note, the Ministry of Railways have stated that "Railway Board has been aware of the shortfall in engine kms. with reference to targets. Poor mobility in the past has been responsible for the shortfall which has been improved in 1980-81 and 1981-82 by special steps taken."

2.18 In a further note, the Ministry have stated:

"The Railway Board is closely monitoring the engine kilometres earned on the Railways on a daily basis. The reasons for shortfall in any particular sector are being analysed and immediate remedial action is being taken. With the segregation of roller bearing wagons and extension of end-to-end running there has been a considerable improvement in engine kilometres on diesel and electric traction."

2.19 The Committee then desired to know the reasons for fall in punctuality of Mail and Express trains during 1980-81 on the Central, Eastern, Northern and South Central Railways. In a note, the Ministry of Railways have *inter alia*, stated as follows:

"Zone-wise punctuality of trains is judged only on the basis of 'not losing time' punctuality and not 'Right Time' basis as a Railway on which an inter Railway trains terminates cannot be held fully responsible for its late running on other Railways.

Notwithstanding the above fact and keeping in view the 'Not Losing Time' punctuality of Mail/Express trains, the performance on the Central, Eastern, Northern, and South-Central Railways suffered a slight set-back during the year 1980-81, as compared to that during 1977-78. The main reasons for fall in punctuality are alarm chain pulling, disconnection of hose pipes, miscreant activities,

accidents and public agitations. The incidence of alarm chain pulling on Central, Eastern, Northern and South Central Railways increased considerably during the year 1980-81 as compared to 1977-78, as may be seen from the following figures:

Railways	Total Number of cases of A.C. Pulling during	
	1977-78	1980-81
Central	13,819	32,667
Eastern ;	3,829	6,737
Northern	47,038	45,884
South Central	10,370	46,537

Detention to trains on account of loco failure defects carriage and wagon defects and crossings/precedences also contributed somewhat towards late running of trains on these Railways.

The punctuality performance of passenger carrying trains is being watched closely at all levels and concerted efforts are made to improve the running of trains. The punctuality performance of about 200 Mail/Express trains is being watched daily in Railway Board's Office and cases of avoidable detentions are investigated promptly. Efforts are being made to improve maintenance of rolling stock. General Managers have been asked to pay special attention in the matter of punctual running of trains. Liaison with concerned State Governments is being maintained by various Zonal Railways for arresting the incidences of A.C. Pulling, hose pipe disconnection and other miscreant activities."

2.20 In terms of engine hours, the Railway Board's target for utilisation of diesel locos is 80 per cent availability i.e., 19.2 hours per day. This target was achieved on all the Railways except the Passenger Services on the Eastern Railway and Goods Services on the South Eastern Railway. The position on the Eastern Railway was dismal inasmuch as the engine usage hours were 12.5 in 1976-77, 13.2 in 1977-78, 13.5 in 1978-79, 11.6 in 1979-80 and 11.1 in 1980-81. The

engine usage hours for goods trains on the South Eastern Railway were also very low. According to the Railway Board, the main reasons for low train engine usage hours on the aforesaid two Railways were faulty controlling of trains by the control offices, mismanagement of yards, resulting in delayed formation and late start of trains and staff indiscipline. The Ministry of Railways have informed the Committee that they have taken certain remedial steps which had "brought about improvement in position". That the inefficiency was allowed to persist for so long until recently owing to variety of reasons most of which were not beyond the control of the Railway Administration, shows that the monitoring and review of the position for appropriate actions were not, to say the least, satisfactory. The Committee desire the Ministry of Railways to review the system of controls exercised by the Railway Board at Zonal level and at Divisional level and streamline the procedures so as to improve the efficiency of utilisation. They would like to be informed of the results of such review.

2.21 The Committee are also concerned at the very high percentage of unproductive diesel locomotive hours, technically called "residual hours" arising out of a locomotive not being put to use (though available for use) due to the time taken by it in travelling between the shed and the station, waiting for traffic, late starting of trains, idling in sheds etc. Overall, the "residual hours" constituted 22.9 per cent of traffic hours or an equivalent of 235 out of the 1026 locomotives in use in 1980-81. An idea of the extent of idle investment represented by residual hours can be had from the fact that a diesel locomotive costs Rs. 54.5 lakhs. The Committee are surprised that the Railway Board has admitted with complacency that the main reason for "high residual hours is inefficient utilisation of motive power." in extenuation, the Railway Board have given the reasons for the "far from satisfactory" mobility of Indian Railways during the first half of 1980-81. According to them, various factors such as extensive power cuts in

the eastern sector resulting in drop of productivity in the marshalling yards, loco sheds and workshops, disturbed conditions in Assam, staff unrest and strikes had crippled general operational efficiency and affected all indices including engine utilisation. However, several remedial measures had been taken to improve engine utilisation. As a result, the unproductive hours of diesel engines which were 23.1 per cent in 1980-81 had been brought down to 21.3 per cent in 1981-82. This improvement, according to the Committee is not quite significant. They would like the Railway Board to continue to make efforts to reduce the "residual hours" to the barest minimum.

2.22 The Committee are also concerned to note a sharp deterioration in the net utilisation of diesel locomotives as indicated by three important indices viz., engine kilometres per day (EKM), net tonne kilometres per engine hour (NTKM) and average speed per hour. The Committee observe from the Audit paragraph that the EKM for passenger trains had improved from 694 in 1973-74 to 748 in 1977-78 whereafter it had sharply fallen as low as 610 in 1980-81. Like wise, the EKM for goods trains had improved from 307 in 1973-74 to 363 in 1977-78 whereafter it had sharply fallen (303 in 1980-81). The net tonne kilometre per engine hour (NTKM) had improved from 10436 in 1973-74 to 11590 in 1977-78 whereafter it decreased to 11057 in 1980-81. The average speed of all goods trains in 1980-81 was 21.3 kilometres per hour, as against 22.2 in 1973.

2.23 The Committee further observe that the position regarding EKM had deteriorated in all the zonal Railways and particularly sharply in the Central, Eastern and Western Railways. None of the Railways had achieved the target fixed by the Railway Board except the Eastern Railway where the target itself was very low. As to the remedial measures, the Ministry have stated that the Railway Board is closely monitoring the engine kilometres on the Railways on a daily basis and the reasons for shortfall in any

particular sector are being analysed and immediate action is being taken. With the segregation of roller bearing wagons and extension of end-to-end running there has been a considerable improvement in position. The Committee desire the Ministry to continue their efforts with greater vigour to further improve the position. They would like to be informed of the outcome of the effort made by the Ministry. The Committee would also like the Railway Board to examine why the target of Engine Kilometres on Eastern Railway is as low as 328 compared to 450 on Northern Railway and why the targets vary widely between the Railways.

2.24 An aspect which has particularly disturbed the Committee is steep fall in punctuality of trains (mostly hauled by diesel/electric locomotives). The punctuality in the Central Railway fell from 97 per cent in 1977-78 to 62 per cent in 1980-81, in the Eastern Railways, it fell from 89 per cent in 1977-78 to 53 per cent in 1980-81, in the Northern Railway, it fell from 87 per cent in 1977-78 to 68 per cent in 1980-81 and in the South Central Railway from 82 per cent in 1977-78 to 65 per cent in 1980-81. According to the Ministry, the main reasons for fall in punctuality are alarm, chain pulling, disconnection of hose pipes, miscreant activities, accidents and public agitations. As to the measures to improve the position, the Committee have been informed by the Ministry that the punctuality performance of about 200 Mail/Express trains is being watched daily in Railway Board's office and cases of avoidable detentions are investigated properly. General Managers have been asked to pay special attention to punctual running of trains. Liaison with concerned State Governments is being maintained by various Zonal Railways for arresting the incidents of alarm chain pulling, hose pipe dis-connections and other miscreant activities. The Committee would like to be informed of the outcome of the efforts made by the Ministry to improve the position. They are positive that the train punctuality ought to be brought at least to the level of 1977-78, if not further improved upon.

*Extent of non-availability for traffic use*

2.25 In 1980-81, 85.76 per cent of the locomotives only were on an average available for use. The balance of 14.24 per cent or 256 locomotives per day, was under 'awaiting repairs'. This includes the time spent while waiting for being taken to shops for repairs, in carrying out the repairs, etc.

*Idle time before/after repairs*

2.26 There were delays in sending locomotives (after withdrawal from traffic) to workshops for periodical overhaul (POH) and in putting them back to traffic after POH, resulting in their nonutilisation for several days. A test check showed that, in 1979-80, in Bondamunda shed (South Eastern Railway) there were delays aggregating 143 days involving 11 locomotives, in Mughal-sarai (Northern Railway), 87 days (4 locomotives) and in Howrah-Burdwan (Eastern Railway) 24 days (10 locomotives) in sending the locomotives for POH. Similarly, in putting the locomotives back to traffic after POH, there were delays at these sheds as also the sheds at Itarsi, Waltair and Ratlam resulting in aggregate loss of 330 days (62 locomotives) at Itarsi during the period 1978-79 to 1980-81, 114 days (5 locomotives) at Ratlam during the period March-June 1981, and from 16 to 69 days (4 to 10 locomotives) in the other sheds.

2.27 The Committee, enquired why delays occurred in sending locomotives to workshops for repairs and putting them back to traffic and whether the sheds were responsible for these delays. In a written note, the Ministry of Railways have stated:

"The time taken for a locomotive from the moment it is withdrawn from service at the home shed for periodical overhaul till the time it reaches the workshops, as also the time taken from the moment the locomotive leaves the shop till it is put back into traffic service is closely watched at various levels on the Railways. Time spent by a locomotive from the moment it is withdrawn from traffic services in the shed, together with the transit time to the workshops for repairs and transit time back from the workshop after repairs and the period in the home shed before it is put back again into traffic service is watched individually and on overall basis for the purpose of monitoring. This time for the two major



diesel POH workshops, namely, Parel and Kharagpur have been as follows for the two years:

	1979-80 (Figures in days)	1980-81
Parel . . . . .	4.75	5.77
Kharagpur . . . . .	11.92	6.00

After a locomotive is withdrawn from traffic service it is given the necessary attention before being sent to workshops, which may be at quite far from the home shed. Sometime, locos are held up in the home shed for unavoidable reasons as indicated below:

- (a) if a locomotive has been involved in major failure or accident and is very close for the POH schedules, then to avoid duplication of maintenance effort, clearance is obtained for sending the locomotive for POH earlier.
- (b) At times certain components are interchanged in shed to replace new assemblies which have recently been fitted, or to make available good components in shed to cover any temporary shortage.

On return from shops and after necessary repairs the locomotives are thoroughly checked up before being put into regular traffic service.

It would be seen that in view of the above, the figures for the period prior to repairs and after repairs, including transit time to and from the shops can be consider satisfactory."

*Facilities for repairs etc.*

2.28 According to the Audit paragraph, though distraction was introduced in 1958-59, the creation of facilities for their repair and POH did not always synchronise with the allotment of locomotives to Railways. Thus, on the Northern Railway while the holding of WDM2 locomotives increased from 89 in 1976-77 to 155 in 1979-80, the facilities for maintaining the locomotives, according to the Railway Administration's Annual Report for 1979-80, had not been simultaneously increased adequately.

2.29 Similarly, while the Diesel loco Shed, Ratlam (Western Railway) was commissioned in 1967 for homing 40 locomotives its expansion was undertaken in March 1976 to enable holding of 100 locomotives. Even before the expansion work was completed, the holding increased to 116 (1973-74) and therefore, work on a new diesel locomotive shed (at Vatva) for homing 50 locomotives was taken up and is in progress (74 per cent). Meanwhile the available facilities had been found inadequate for the holding with the result that the average number of locomotives awaiting repairs increased from 18 in 1978-79 to 22 in 1979-80. On the other hand, the facilities created in Kharagpur (South Eastern Railway) were not utilised fully. Against the established capacity for POH of 60 locomotives annually, the actual out—turn in 1979-80 and 1980-81 was 49 and 47 only respectively. To avoid idling of the capacity, the Railway Administration decided to undertake yearly and three-yearly maintenance schedules which are to be carried out in sheds, but were in arrears. However, three-yearly schedules for 13 locomotives only were carried out in 1980-81.

2.30 In reply to a question whether the shed facilities created were adequate to cater to the holdings of locomotives, the Ministry of Railways have stated in a written note as follows:

“Owing to successive years of severe financial stringency a gap has developed between diesel shed homing capacity and the actual holdings. This continues to persist despite this matter receiving due attention and forward planning being carried out. In fact in view of the seriousness of the situation in the mid-Seventies the matter was reviewed in 1977 by a High Level Committee with representation from Mechanical, Planning, Transportation and Finance wings of the Ministry. The Committee recommended that the backlog should be cleared over the next three years keeping in view the production plan, homing shed capacity availability and works already sanctioned upto 1977-78 Works Programme. Further, taking into consideration the anticipated production programme of diesel locomotives, it was decided to plan for additional homing capacity for these three years at the rate of about 300 locomotives per year. The Committee's proposals were accepted, but due to paucity of funds the actual provision of homing capacity has not been able to

match the locomotive holdings. This is despite the fact that adequate works have been sanctioned to match shed facilities with the holding of locomotives.

As on 1-4-1982, for the broad gauge diesel locomotive holdings of 1977 there is a shortfall of homing shed facilities to the extent of 20 per cent. Further, as already mentioned, due to intensive attention given to the need for building up adequate shed facilities, enough works have been sanctioned to cover the shortfall and the Planning Commission is being urged regularly for sanction of funds to enable completion of these works. Efforts are also being made to increase allotments. Thus allotment of funds, which were approximate Rs. 4.2 crores in 1980-81 for diesel sheds, increased to Rs. 7.2 crores in 1981-82 and Rs. 10.1 crores in 1982-83. The case for additional funds for Railways as a whole which would enable additional funds for diesel shed construction has been taken up already at the highest level.

2.31 The Committee desired to know as to what extent the gap between diesel shed and homing capacity and the actual holdings had affected the operations of the Railways and what steps were being taken to make up the deficiency. The Minister of Railways have stated in a written note as follows:

"Inadequate homing capacity has a number of wide-ranging repercussions such as hold-up of locomotives for berthing and repairs, quality of maintenance, reliability of locos in service, follow-up with regard to spares etc. All these in turn have an impact on operation. It would, however, be very difficult to pinpoint the extent to which operations of the Railways have been specifically affected on this account, as a number of other factors also play an important role in the operations of Railways and affect it. Action is being taken for building up diesel shed homing capacity by sanctioning adequate capacity and by pressing for more funds under the Plan Head 'Workshops including Production Units'. Thus currently the sanctioned capacity for BG and MG diesel locos is nearly 3150 as against the holding of 2446 as on 31-3-82 and around 2500 as on 31-12-1982. The year-wise allotment of

funds under the Plan Head 'Workshops, including Production Units' is as under:

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(Rs. in crores)

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1980-81	:	Rs. 49.89
1981-82	:	Rs. 83.87
1982-83	:	Rs. 116.91
1983-84	:	Rs. 120.12

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Thus the funds for diesel shed which were approximately Rs. 4.2 crores in 1980-81 have been increased to Rs. 7.2 crores in 1981-82 and Rs. 10.2 crores during 1982-83."

The Committee desired to know whether the Railways had overtaken the arrears in overdue periodical overhaul of locomotives and the position in this regard on Northern Railway.

The Ministry of Railways have stated, in a note, as follows:—

"Overdue POH on the Indian Railways at the end of 1980-81 was 0.1 per cent and 0.7 per cent for BG and MG steam locomotives and 2.25 per cent and 7.3 per cent for BG and MG diesel locomotives. At present overdues are Nil for steam locos and 1.85 per cent and 1 per cent for BG and MG diesel respectively. Thus, by and large, overdues have been overtaken except for Northern Railway Broad Gauge diesel locomotives.

Northern Railway overdues are high (6.8 per cent) primarily due to 72 WDM-4 class of locos based on this Railway. Unlike the Indian Railways standard WDM-2 class locos which are manufactured at DLW-Varanasi, these locos were procured from the General Motors Corporation of the USA in the sixties. Only 72 of these locomotives exist in the country and Northern Railway could not undertake their POH for want of the special facilities they require.

These facilities have now been set up at Charbagh Workshop and 2 locomotives per month are being POHed. Arrears will be overtaken in about one year."

*Time taken for repairs*

2.32 Instances were noticed of detention to locomotive in sheds 'waiting for materials' for long period as indicated below:—

*Itarsi shed*—Between June 1979 and May 1981, 20 locomotives suffered detentions of 6 to 179 days totalling 737 days i.e. equivalent of 2 locomotives remaining immobilised for a whole year.

*Burdwan shed*—During 1978-79 three locomotives were detained for periods of 1—4 months.

*Mughalsarai shed*—During October 1978- March 1980 one locomotive was out of commission from June 1979, three were detained for 14, 15 and 18 months and 4 more for periods of 1 to 6 months.

*Bondamunda shed*—Between July 1978 and March 1981, 6 locomotives suffered detentions ranging from 101 to 556 days and 50 more from 4 to 92 days.

*Waltair shed*—During 1978-79, 1979-80 and 1980-81, 16 locomotives remained immobilised for over 100 days (maximum upto 306 days) and another 55 for period of 14 to 100 days.

2.33 The Committee asked whether large scale immobilisation of locomotives for want of materials was due to improper planning. the Ministry of Railways have stated in a written note that:—

"It would not be correct to say that there has been large scale immobilisation of locomotives for want of materials due to improper planning. In this regard it is pointed out that diesel locomotive is an extremely sophisticated and complex equipment. Here we have a specially designed prime mover viz. the diesel engine, to suit the special working condition, namely, to operate on a vehicle running at high speeds under various ambient temperatures, altitudes and grades efficiently and reliably. In addition, the system has special transmission equipment as also control system and various equipment for ensuring safety.

The overall maintenance of the diesel locomotives is planned so that target of 'under and awaiting repairs' is 12.5 per cent in general. This target, by and large, has been met despite very difficult circumstances, namely,—

- (1) Number of critical components having to be imported;
- (2) Adequate homing capacity due to paucity of funds;
- (3) Accelerated pace of indigenisation which has affected maintenance in that—
  - (a) there have been problems with regard to reliability.
  - (b) more intensive maintenance having to be done, as for example, in the case of imported traction motors, overhauling is normally carried out every three years whereas in the case of indigenous motors, these are to be attended to every two years.

In view of the fact that diesel locomotive consists of a very large number of components—over 50,000—some locomotives do at times get held up for materials. In fact in the overall targeted ineffective percentage of 12.5, provision exists for locomotives being held up for materials. For BG diesel locomotives as a whole 'on line' 'under or awaiting repairs' percentage during 1976—81 has been as follows:

	No. on line	Under or awaiting repairs	Percentage
1976-77	1370	234	17.1
1977-78	1460	246	16.8
1979-80	1671	237	14.19
1980-81	1798	250	13.9

The above includes locomotives which may have been held up for materials.

With regard to ensuring that locomotives waiting for materials are kept to a minimum, a comprehensive system exists for planning and procurement of materials. Items which are regularly in use are planned for stocking in the various sheds depending on the consumption and a suitable system exists for recouping these when the stock levels reach a minimum quantity. Similarly, for imported items, in view of the longer lead time, the assessment of require-

ment and planning is started two years in advance since the requirements of these have not only to be dealt with at the Ministry of Railways' level but also by the Ministry of Finance and the Ministry of Technical Development. For items which are only required off and on, some are classified as emergency spares and necessary quantities of these are kept available to meet out of course requirements.

Despite the above, some locomotives do get held up for materials. Some of the main reasons have been:

- (a) failure of suppliers;
- (b) unavoidable delays in procurement on account of factors like negotiations for reduction in price.
- (c) delay in supply and shipment of import equipments due to reasons, such as—
  - (i) delays in supply by manufacturers on account of reasons such as strikes;
  - (ii) congestion in ports;
  - (iii) delays in transit etc.
- (d) locomotives involved in accident requiring extensive and specialised repairs to the main chassis and superstructure etc.

However every effort is made to see that whenever locos get held up for materials special steps are taken to make them same available by resorting to:

- (a) out of course purchase action by setting up Special Purchase Committees;
- (b) airlifting of materials;
- (c) getting special parts fabricated/procured in case of accident; damaged locos, etc.

This is done so that availability of locomotive for goods traffic is kept up. As for passenger services, the requirements of locomotive have to be met in any case by withdrawing locomotives from goods fleet. A watch in this regard is kept on day-to-day basis by monitoring goods locomotives availability *vis-a-vis* targets.

Finally, in view of the reason that availability and performance of locomotives is largely dependent on availability of materials, the fact that the availability of diesel locomotives has generally been around the targeted figure indicate that planning exists for provision of materials in the maintenance of diesel locomotives and there has been no large scale immobilisation."

2.34. In another note, the Ministry of Railways have enumerated the following further measures to improve the position:—

- “1. Build up of unit exchange items like, wheels, expressors etc;
2. Arrangements have also been made for import of important major items, such as, traction motors, traction generators, can shafts, lube oil pumps etc. where indigenous supplies have not been forthcoming;
3. On a long term basis to minimise diesel loco hold up for materials it has been decided to set up a Diesel Component Workshops at Patiala for both adequate and timely supply.”

2.35. Asked how the Railway Board claimed that the system for planning of materials was efficient when a large number of locomotives were kept waiting for materials for periods ranging from 1 month to 18 months in almost all the sheds and the Railways were compelled to air-lift imported spares, the Ministry of Railways have stated in a written note as follows:—

“In the overall planning of maintenance of locomotives, some locomotives at times do get held up for materials, since it is not economically justifiable to maintain quantities of spares of each and every item, which would lead to a very heavy locking up of capital. The aim is to ensure targeted availability, taking into account all factors and this has been more or less ensured at all times. The planning of material for locos can therefore be considered satisfactory.

Procurement of imported spares is a long lead procedure involving consolidate vetting, release of foreign exchange, tender approval of various levels, including at times the Ministry of Railways and Finance Ministry, opening Letters of Credit etc. Since requirements have to be



planned more than two years in advance, any factor affecting material needs, delay in supply by the manufacturers' workers, availability of shipping etc. leads to air-lifting becoming inescapable in a few isolated cases."

2.36. Cases were noticed of locomotives sent to sheds for maintenance suffering excessive detentions. At Itarsi shed, time standards for periodical maintenance schedules had not been fixed and the time taken for various schedules was excessive compared to that for similar schedules took 32 hours against 24 hours in Gooty and 16 hours in Ratlam sheds; similarly, the yearly schedule took 23 days against 10 days in Gooty and Ratlam sheds; At Erode shed, 2253 days and 2388 days were lost in 1979-80 and 1980-81 respectively on account of excessive detentions to locomotives and non-observance of targets fixed. At Bondamunda and Waltair, the corresponding loss was 1181 days and 736 days involving 249 and 22 locomotives respectively during 1979-80.

2.37. The Committee enquired whether time standard for maintenance schedules laid down took into account the capacity of the sheds. The Ministry of Railways have stated in a written note as follows:—

"Time standards for various maintenance schedules have been laid down by Railways after necessary work studies taking into account the lay out of shed, pattern of detailed maintenance practices etc. Actual time taken for individual schedule in the shed as a whole would vary because of the following factors:

- (a) If the loco holding is in excess of the capacity extra time is taken for want of adequate berthing capacity.
- (b) Since diesel locomotives operate over very wide area, their arrival at base sheds for schedule repairs cannot be spaced uniformly. Therefore, invariable locos tend to reach the shed in a group and have to queue up for berthing in the repair days. Thus some unavoidable time for waiting takes place.
- (c) Mail and Express locomotives have to be given priority with regard to berthing for maintenance since these locomotives have to be turned out as per the fixed schedules. This holds up other locomotives.

(d) Unavoidable delays due to unforeseen circumstances like abnormal absenteeism untoward accidents in the diesel shed etc.”

2.38. The Committee enquired about reasons for excessive detention of locos at Erode, Bondamunda and Waltair sheds during 1979-80 and 1980-81. In written note, the Ministry of Railways have stated as follows:—

“As regards the detentions to locomotives at Erode, Bondamunda and Waltair sheds, pointed out by Audit, it is stated that apart from the general reasons which result in detention as given above, these sheds were holding, excessive, locomotives in the year 1979-80 and 1980-81 as per details below:

Shed	Homing Capacity	Actual holding	
		1979-80	1980-81
Erode . . . . .	100	117	120
Bondamunda . . . . .	100	109	116
Waltair . . . . .	100	140	144

It is also pointed out that while individual locomotives may have higher detention due to various reasons, a day-to-day watch is kept on the overall performance of diesel sheds in that the actual number of locomotives given for traffic service, i.e. ‘Outage’ as compared to the target, is watched. Thus a close monitoring is done with regard to the actual locos being ineffective as compared to the target. Presently, this is being done as on *hourly basis*.”

2.39 A significant factor that contributes to non-availability of locomotives for traffic use is idle time before/after repairs. In 1980-81, 14.24 per cent of diesel locomotives or 256 locomotives per day were ‘under/awaiting repairs’. The Committee take a serious view of the inordinately long time taken in some cases in sending locomotives (after withdrawal from traffic) to workshops for periodical overhaul (POH) and in putting them back to traffic after POH. A test check by Audit showed that in one shed, there were delays aggregating 143 days involving 11 locomotives and in another delays aggregating 87 days involving 4 locomotives in sending the locomotives for overhaul. Likewise, there was aggregate loss of 330 days involving 62 locomotives in one shed and of 114 days involving 5

locomotives in another shed. In a note furnished to the Committee, the Ministry have stated that after a locomotive is withdrawn from traffic service, it is given the necessary attention before being sent to the workshop, which may be quite far from the home shed. On return from the workshop and after necessary repairs, the locomotive is thoroughly checked up before being put to regular service. In view of this, the Ministry have stated that "the figures for the period prior to repairs and after repairs, including transit time to and from the shops can be considered satisfactory".

The Committee are not convinced by this explanation and are unable to understand why it should take as long as 25 days for sending the locomotives for periodical overhaul. The Committee desire the Railway Board to lay down norms for the time to be taken for sending locomotives for POH and putting them back to service, so that the delays are cut down to the barest minimum.

2.40 The Committee observe that although diesel traction was introduced in 1958-59, the creation of facilities for their repair and periodical overhaul (POH) did not always synchronise with the allotment of locomotives to the Railways. This is again indicative of lack of perspective planning on the part of the Ministry of Railways. With the introduction of diesel locomotives and reduction of steam locomotives there appears to have been no attempt to minimise the multiplicity of maintenance facilities for steam locomotives so as to modify the steam loco workshops and sheds and mobilise the resources for maintenance of diesel locomotives (vide para 4.25 also).

Facilities for periodical overhaul of 72 WDM-4 class locomotives were not created on Northern Railway with the result that these locomotives were not given POH for 16 years and spare parts had to be airlifted when the locomotive failed. The Committee fail to understand the reasons for not providing suitable facilities. The Committee note that the Railways have been able to reduce the number of overdue POH in 1981-82. It would appear that with more efficient utilisation of the existing facilities, the Railways would have attended to the POH of locomotives without letting the locomotives run overdue repair and consequent failures.

As regards shed maintenance, according to the Railway Board the locomotive holding was far in excess of the homing shed capacity with the consequential increase in the average number of locomotives awaiting repairs. As on 1-4-1980, for the broad gauge diesel locomotive holdings of 1977, there was a shortfall of homing shed facilities to the extent of 20 per cent. The inadequate homing

capacity has a variety of wide-ranging repercussions such as hold-up of locomotives for berthing and repairs, quality of maintenance, reliability of loco in service, follow up with regard to spares, etc. All these in turn have an impact on operation. The Committee note that in view of the serious situation in the mid-1970's, the matter was reviewed by a high level committee. The said committee inter alia recommended that the backlog should be cleared over the next three years keeping in view the production plan, homing shed capacity, availability of works already sanctioned. Even though the committee's proposals were accepted, owing to financial constraints the actual provision of homing capacity has not been able to match the locomotive holdings. The Committee need hardly stress that if the Railway Board want to reduce the unnecessary time spent in waiting in sheds, there is no alternative before the Board but to increase the homing capacity of sheds to match the locomotive holdings. The Committee hope that the Railway Board would attend to augmenting of the capacity without any further loss of time. Granting the financial constraints the inter se priority of plan programmes needs to be realistically re-determined in the light of the experience gained so far. This calls for urgent action. The Committee would await the action taken in this regard.

2.41 The long detentions of locomotives in sheds in a number of cases awaiting materials is yet another serious matter. The Committee find that some of the locomotives had remained immobilised for as long as 14 to 18 months for want of materials. In extenuation the Ministry of Railways (Railway Board) have stated that a diesel locomotive is 'an extremely sophisticated and complex equipment' consisting of over 50,000 components. It is not economically justifiable to maintain quantities of spares of each and every item, which would lead to a very heavy locking up of capital. Items which are regularly in use are planned for stocking in sheds. However, for imported spares, in view of a much longer lead, the assessment of requirement and planning is started two years in advance. The overall maintenance of diesel locomotive is so planned that the target of 'under and awaiting repairs' is 12.5 per cent in general. However, from the figures furnished by the Ministry, the Committee find that the target of 12.5 per cent for 'under and awaiting repairs' has not been achieved in any of the years 1976-77 to 1980-81. The percentage has ranged from 13.9 to 17.1 during the years. In any case the Committee feel that such long delays over a year as they have noticed are indefensible. The Committee are of the view that after regulating the production of locomotives to meet the require-

ments of traffic that materialised from time to time the unutilised capacity of the Production Units could have been utilised for the manufacture of spares for diesel locomotives. The Ministry have enumerated certain special steps to minimise diesel loco hold-ups for want of materials. To tackle the problem on a long term basis, it has been decided to set up a Diesel component Workshop at Patiala for both adequate and timely supply. The Committee would urge that steps taken should be such that would reduce the detentions for want of materials to the minimum. . .

2.42 The Committee learnt from the Ministry of Railways that the procedure for processing and clearance of import of spares and the procurement is so elaborate that the planning has to start two years in advance. The Committee recommend that the procedure should be streamlined in consultation with Ministries concerned so that while serving the purpose it would not delay the import of spares to meet emergent situations. They would also like the Railways to periodically review the lists of items planned for stocking with a view to including new items of frequent demand and deleting non-moving old items, depending upon the past trends of demand and consumption.

2.43 The Committee are also concerned over long detentions of locomotives sent to sheds for maintenance. In one of the sheds—Erode—2253 days were lost in 1979-80 and 2388 days in 1980-81 on account of excessive detentions. At another shed, 1181 days were lost in 1979-80 and yet another shed 736 days during the same period. From the facts furnished by the Ministry, the Committee find that the main reason for the excessive detention of locos in all these cases was insufficient homing capacity of sheds. The need for augmenting the capacity is thus clearly established as pointed out by the Committee earlier. . .

2.44 The Committee would like the Ministry to fix time standards for periodical maintenance schedules in all cases where these have not been fixed already.

## CHAPTER III

### UTILISATION OF ELECTRIC LOCOMOTIVES

3.1 According to the Audit paragraph upto 1980-81, 5178 kilometres of railway lines had been electrified as against 4493 kilometres upto 1975-76. The traffic carried under electric traction and the locomotives on line during the last 5 years were as below:

Year	Traffic carried Gross tonne kilometers (Millions)			No. of locomotives on line
	Passenger	Goods	Total	
1976-77 . . . . .	16671	76823	93494	796
1977-78 . . . . .	20656	77847	98503	852
1978-79 . . . . .	21571	70990	92561	890
1979-80 . . . . .	22593	68045	90638	929
1980-81 . . . . .	23323	69169	92492	988

The number of electric locomotives in use for goods services on 31st March, 1981 was 522 as against 368 on 31st March, 1977. During this period, however, the goods traffic in terms of gross tonne kilometers carried by electric traction decreased from 76.8 billions in 1976-77 to 69.2 billions in 1980-81, indicating considerable under-utilisation. The pay load (net tonne kilometres) per engine hour of these locomotives consequently went down from 12,668 in 1976-77 (12028 even in 1969-70) to 11104 in 1980-81.

3.2 The Committee enquired about the reasons for the steady drop in goods traffic under electric traction as compared to 1976-77 and 1977-78 and whether this was attributable to utilisation of more diesel locomotives on electrified sections. The Committee also enquired why this trend was more pronounced on the Eastern Railway. The Ministry of Railways have stated as follows:

“The drop in goods traffic under electric traction was primarily on account of more diesel locomotives being deployed and with extension of electrification more and more electric

locomotives being put on passenger trains. Sometimes other extraneous factors such as heavy power cuts and frequent staff agitations are also responsible for use of diesels on electrified sections. On the Eastern Railway the efficiency was further affected by staff indiscipline."

3.3 The Committee enquired why in spite of the drop in goods traffic more locomotives were being deployed for goods services and how did the Railway Board justify the acquisition/addition of more locomotives resulting in their under-utilisation. The Ministry of Railways have stated that:

"There is no drop in goods traffic during 1980-81 and 1981-82. As already stated poor performance during 1979-80 was responsible for under-utilisation of assets in that year. The traffic picked up in later year due to better mobility."

3.4. The Committee desired to know as to what extent and for what reasons goods traffic had been placed under diesel traction on electrified sections and whether it did not amount to wastage of the available capacity created at enormous cost, resulting in loss to the Railways on this account. In a note, the Ministry of Railways have stated as follows:

"Normally diesels are not run in the electrified territories. However, diesel locomotives are utilised to some extent in the electrified territory for the following reasons:—

- (i) A diesel hauled route meets an electrified route junction stations where facilities cannot be economically created for change of traction.
- (ii) To avoid change of traction at two places within a short run of a diesel power in an electrified territory.
- (iii) To maintain a schedule of passenger services having major run on diesel territory and only a short run in electrified territory.
- (iv) On account of power cuts and power failures and other unavoidable operational reasons.

The direct financial implications of running diesel locos on electrified territory have not been worked out.

Electric locomotives are allotted to the various services with a view to ensuring optimum benefits to overall Railway operation. The Railway Board takes into account the requirements of both passenger and goods traffic before deciding on allotment of locomotives. The ultimate goal is to ensure that all trains running on electrified territory, whether passenger or goods, are run on electric traction."

3.5. During evidence before the Committee the representative of the Ministry of Railways stated *inter-alia*:

"On the electrified track, the use of electric locomotives is very much limited. For instance, on Manmad-Bhusaval track, a few trains have been allowed because we are not able to change the traction and the distance is only about 120 Kms. We have always to change the engine. That is a very small section. The other one is between Asansol and Howrah where a few express trains are running with Diesels. They are also now going with diesel locomotives. Otherwise by and large electric locomotives are used on this track."

3.6 The availability and use in train of locomotives for goods services had declined on all Railways during 1979-80 and 1980-81 compared to 1976-77. The number of hours worked per day which was 19.1 in 1976-77 (18.2 even in 1969-70) declined to 17.5 in 1979-80 and 16.7 in 1980-81. On the Northern Railway, the actual usage during 1979-80 on train was only 8.68 hours out of the available 17.03 hours; on the Western Railway it was only 8.56 hours out of 18.74 hours in 1979-80 and 8.48 hours out of 19.03 hours in 1980-81; on the South Eastern Railway it was 10.6 hours out of 21.2 hours in 1980-81.

3.7. The Committee enquired whether the Railway Board had reviewed the comparative utilisation of electric locomotives on various Railways and what were the reasons for the very low usage hours on train on Northern and Western Railway. The Ministry have stated as follows:

"The utilisation of electric locos railway-wise is looked by the Railway Board on day-to-day basis. Various factors such as faulty controlling of trains, mismanagement by train crew, loco failures, accidents, inefficient working of yards resulting in delayed formation and late start of



trains and staff indisciplines affect train engine usage hours on Northern and Western Railway. Floods and breaches also adversely affect the engine usage during the rainy season on both these railways."

3.8. One of the reasons for the low utilisation was the extent of detentions in yards, waiting in sheds, etc. represented by 'residual engine hours' (unproductive hours) which had increased from 1154 thousands (35 per cent of goods engine hours) in 1975-76 to 1391 thousands (40 per cent) in 1980-81. The speed of goods trains hauled by electric locomotives had also declined from 25.4 km. per hour in 1976-77 (25.8 in 1969-70) to 22.8 only in 1980-81.

3.9. The utilisation of locomotives measured in terms of Engine Kilometres per day, for which a target of 425 km had been laid down by the Railway Board, was lower in 1979-80 and 1980-81 on the Eastern (260 and 266), Northern (358 and 369), South Eastern (397 and 351) and Western (437 and 414) Railways than in earlier years (ranging from 410 km to 655 km in 1976-77).

3.10. In relation to the target, the excessive hours on line in 1979-80 on the Kanpur-Allahabad-Mughalsarai sections of the Northern Railway amounted to 49,980 hours.

3.11 On the South Eastern Railway a test check for March, 1980 and March, 1981 the loads hauled by them were also much below the compared to the prescribed timings; on the sections Jharsuguda Jn.—Bilaspur Jn. and Bilaspur Jn.—Bhilai these (in the aggregate) were as much as 5411 hours and 5766 hours.

3.12. A review in audit of the utilisation of selected locomotives revealed that the loads hauled by them were also much below the loads prescribed by the Railway Administration. On Northern Railway, the maximum load of electric trains (in the months of May 1979, August 1979, December 1979 and March 1980) ranged between 2530 tonnes and 2960 tonnes against 3200 tonnes to 4600 tonnes prescribed. On the Western Railway, 85 per cent of the trains run during April—June 1979 carried load less than 2,000 tonnes against 2346—2765 prescribed for four wheelers and 3660 tonnes for BOX wagons.

3.13. The Committee enquired about the reasons and implications of running under-loaded trains and why this trend was more pronounced on Western Railway. In a written note furnished by the Ministry of Railways (Railway Board), it has been stated that:

“Prior to segregation of roller-bearing wagons to run as block train loads, a large proportion of the loading on the Indian Railways was in piecemeal. This inevitably choked up the marshalling yards where wagons are sorted out and reformed destinationwise. As a consequence, formation of trains got delayed and in order to avoid excessive detention to locomotives, trains were despatched without waiting for completion of load after a full train for certain destination can be formed only after 3 days due to less materialisation of stock. Another reason for under-load running is the limited hauling capacity of certain locomotives or severe gradients on the section. On certain sections where traffic offering is very meagre, trains necessarily have to run under-load as clearance cannot be delayed inordinately for making up full train loads. Under-load running of trains very seriously affects the “net tonne kilometres per engine” which is an important statistical index for gauging the efficiency of any system. The Railways are making all-out efforts to ensure that trains are run with the maximum permissible load, but this to a great extent depends upon the cooperation given by the other sectors and major customers. That is why steel plants, fertilizers and cement factories are being requested to load more and more block rakes and club their piecemeal despatches to form a train load. On the Western Railway salt and cement was being loaded mostly in piecemeal. Now they have also been persuaded to offer bulk of their traffic in rake loads. Indian Railways will like all freight trains to run with full load and for this purpose regular meetings are being held with our principal customers.”

3.14 During evidence, the Committee enquired why the speed of electric trains had gone down. The representative of the Ministry stated that:

“Most of the electric trains are on the section where the capacity got saturated. The average speed is calculated from the time the train leaves a particular terminal to the time it reached the next terminal. In between, there may be stations and the train may be stopped for reasons of signal etc. The intensity of traffic has been increasing on these sections, as a result of which there has been a small decrease in the speed of trains on an average basis. We have not been able to come to the full extent in res-

pect of all the sections concerned. The constraints are line capacity and, in some cases, reliability of locomotives not being up to the mark."

3.15 Asked about the decline in hauling in terms of tonnage in 1980-81, the representative of the Ministry stated:

"It is also due to the decline in the overall efficiency of the Railways as well as due to certain external factors which affected the working of the Railways.... Those were the days when we had first our own indiscipline in the staff to a great extent. In fact, it ultimately culminated in the loco staff running strike in 1980-81. Drivers are on the loco staff. There were a lot of agitations and delay-tactics which affected the working of the Railways to a great extent."

3.16 The Chairman, Railway Board, added:

"You may kindly remember that there was indiscipline among the loco staff in 1980 which ultimately culminated in the s'rike at the end of January, 1981 and went on for one full month in many parts of the country. There are cases in which the standard or the norms were not observed while running the trains and deliberate resort to slow-running was taken. These were some of the methods which were regularly resorted to by the drivers. Ultimately, they did not accept the standard norms which we had discussed about 5 years back. Ultimately after the strike, we have also had asked the Committee to go into it and to come forward with specific improved norms so that it will be attractive for the drives to run the trains faster. The new allowance rules have now taken effect (about a year ago)."

3.17 To a question whether as a result, the efficiency and speed of electric engines had gone up, the Chairman, Railway Board, stated:

"The speed of goods train (electric) which had gone down to 22.8 km in 1980-81 has not gone up very much. It has gone up to 23.1 km in 1981-82. The engine kilometreage for electric engines has gone up from 327 in 1980-81 to 384 in 1981-82."

3.18. To another question whether he was satisfied with the speed and efficiency of electric engines, the Member, Traffic, Railway Board, stated:

"Not at all. The improvement is a continuing process."

3.19. In reply to a question as to what factors were responsible for fall in speed and efficiency of electric locos, the Member, Traffic, Railway Board, stated:

"There are three components which are attributing to the efficiency of electric engines being not as it should be. One is the question of constraints, like over-aged track and over-aged wagons which impose certain impediments in the way of running trains. Gradually, we are trying to remove these impediments.

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There is a constraint of resources. We have 13,500 km. of track which requires rehabilitation or renewal immediately at the beginning of the Sixth Plan. It will require about Rs. 1200 crores. We are geared up to do for about 3500 km. per year. Unfortunately, the amount given to us is Rs. 500 crores. At the end of the Sixth Plan, we will have 18,000 km. of over-aged track. There is a constraint of funds.

Another point which I would like to make is, as you are aware, the number of goods trains, the amount of traffic moved and the number of passenger trains have gone up year after year. For example, this year, we expect to move 227 million tonnes as against 192 million tonnes about 3 years back. Similarly, the number of passenger trains have multiplied. With more and more number of trains put into the circuit, naturally, that affects the speed because more and more number of trains have to cross each other. The average speed of the goods train was 20.8 in the case of electric engines and the overall average speed was 17.4 in 1980-81. In 1981-82 it has gone up to 23.1 in the case of electric engines and the overall speed has gone up to 20.8."

#### *Allotment of locomotives in Railways*

3.20. The locomotives are allotted to the zonal Railways on the basis of the Power Plans submitted by them showing their requirements for various types of traction. The freight traffic carried by electric traction on the Eastern Railway declined from 12520 million net tonne kilometres (65.3 per cent of freight traffic under all tractions) in 1969-70 to 8282 million net tonne kilometres (43.2 per cent of total freight traffic) in 1980-81. However, the number of locomotives added and in use on goods services increased from 101 in 1969-70 to 145 in 1980-81. This indicated that the allotment

had not been made after a realistic appraisal of the traffic requirements.

3.21. The Committee desired to know the basis of allotment of locomotives to various Railways. In reply, the Ministry of Railways have stated as follows:

“More electric locos have been allotted to Eastern and South Eastern Railways as these are the two premier railways for freight movement on the Indian Railways. The allotment of locos is made based on the traffic needs of each Railway.”

3.22. The Ministry of Railways (Railway Board) have further stated:

“The allotment of locomotives is based on the traffic needs of each Railway over the years and not for a particular year. There has been a decline in the traffic carried by electric traction on Eastern Railway mainly on account of more intensive deployment of diesels particularly on the non-electrified routes of the Railways. Allotment of locomotives to Eastern Railway has to be viewed in the context of phasing out of steam services in certain sections and the utilisation of electric locomotives for running of shunting/departmental trains and also for yard work so as to avoid mixed traction.”

3.23. In reply to a further question the Ministry of Railways have stated:

“It is true that the mobility on the Eastern Railway during the first part of 1980-81 was not very satisfactory which to some extent explains the deterioration in the utilisation of electric locomotives. The drop in the utilisation under electric traction has to be viewed in the context of the general staff indiscipline and the acute power crisis in the Eastern Sector resulting in under-utilisation of assets thereby requiring more inputs. The heavily graded sections of Eastern Railway are under electric traction and the general decline in maintenance of the locomotives due to factors such as staff indiscipline resulted in loco failures on the Ghat Section and consequent drop in through put.”

It is also a fact that more electric locomotives had to be allotted to Eastern Railway on account of phasing out of steam services and utilisation of electric locomotives for shunting/departmental trains and for yard works.

While not denying the fact that there was some under-utilisation of electric locomotives, it is also true that whereas the coal offered from the Bihar/Bengal fields served mainly by electric traction remained more or less static, there has been substantial increase in coal loading from the Karanpura fields which are non-electrified diesel routes.”

*Time taken for repairs, POH etc.*

3.24. According to the Audit paragraph due to non-synchronisation of provision of maintenance facilities with introduction of electric locomotives, the Northern Railway had to send them to Kancharapara workshop (Eastern Railway) and Bhusaval workshop (Central Railway) for P.O.H., the time taken for P.O.H. in these workshops during 1979-80 was 70 days and 57 days respectively (against the prescribed 30 days). The number of locomotive days lost as a result was 1057 in respect of 30 locomotives. Similarly, 276 days were lost in respect of 12 locomotives on the Western Railway and 586 days in respect of 19 locomotives on the South Eastern Railway during 1980-81. On the Central Railway the time taken for periodical overhaul of 32 locomotives (reviewed by audit) during the period September 1977 to August 1981 was 32 to 73 days against 30 days prescribed; the detention was over 60 days in 14 cases and 40—60 days in 13 cases.

3.25 Similar hold up of locomotives was also noticed in respect of other repair schedules carried out at Bhusaval, Kanpur, Tananagar and Bhilai sheds. One of the causes of the delays was stated to be non-availability of spares from CLW despite 10 per cent of capital spares being supplied by CLW along with new locomotives.

3.26 The extent of engine failures on various Railways also showed increase from 140 in 1978-79 to 162 in 1979-80 on Northern Railways, from 277 to 294 on Eastern Railway and from 958 to 1045 on South Eastern Railway. The high incidence of failures on the South Eastern Railway was attributed by the Administration to sub-standard spares and stores, inadequate maintenance and 'mismanagement' by crew. Another major factor was the extent of failures of traction motors of the locomotives. The number of such failures on the South Eastern Railway was 247 in 1978-79, 252 in 1979-80 and 246 in 1980-81 and on Western Railway 101 in 1979-80. At the end of 1980-81, 249 traction motors were awaiting repairs on South Eastern Railway and 90 (July 1980) on Northern Railway. Delay in repairs resulted in detention in shops of ten locomotives on Northern Railway in 1979-80 for 15 to 41 days and

one for over 9 months. On the Western Railway, for want of facilities at Ratlam, traction motors had to be sent to CLW for repairs and consequently, five locomotives had to be stabled for periods ranging from 12 days to 140 days in 1979-80.

3.27 The Committee enquired why the rate of failure of traction motors was high on the South Eastern and Western Railways and what were the reasons for such failures and what were the remedial measures proposed to be taken in this behalf. In a written note, the Ministry of Railways have stated as follows:

"The failure rate of traction motors of electric locomotives on South Eastern Railway is comparable to other Railways. However, it may be mentioned that the traction motors on South Eastern Railways are working to the limit of their capacity on account of heavy loading and steep long gradients on that Railway. The failure rate of traction motors on South Eastern Railway has shown slight downward trend, as will be seen from the following figures:

	No. of traction motor (approx.)	Total no. of failures
1979-80 . . . . .	1362	252
1980-81 . . . . .	1520	246
1981-82 . . . . .	1776	239

On the Western Railway, the failure rate of traction motors on electric locos has not been abnormal.

The failures are generally attributed to inadequate insulation scheme, defects in workmanship during manufacture, generally poor quality of indigenous materials used and arduous loading conditions. Necessary remedial measures are being implemented to reduce the incidences of failures.

The following action has been taken/proposed to be taken to reduce the failure of TAO-659 traction motors which was currently under production:

- (i) Midpoint earthing of traction motors on the locomotives to reduce voltage stress across the motors.
- (ii) Provision of a glass-mica-silicon separator all along the length of the coils between two pairs of conductors.

- (iii) Provision of a nomex slot liner.
- (iv) Provision of Kapton covered conductors in lieu of glass braided conductors and improvement to the ground insulation.
- (v) Improved maintenance practices in electric loco sheds."

In regard to the repair facilities for the traction motors, the Ministry of Railways have added:

"These have been set up at Tatanagar on South Eastern Railway and at Kanpur on Northern Railway. In addition, a central repair workshop has been established at Nasik on Central Railway to meet the requirements of all the Railways. It is felt that with full commissioning of this facility at Nasik, the backlog of various Railways is being cleared fast."

#### *Utilisation of electrified track*

3.28 Although 578 kilometres of railway lines had been electrified by March 1981, there is mixed traction practically on all routes of the railway network at present (November 1981) resulting in duplicate facilities such as steam sheds for steam locomotives and diesel shed for diesel locomotives and shunters, etc. Also, there were delays in taking up electrification short links necessitating running of diesel trains for operational reasons. Some instances are given in Annexure 4 to Appendix I. Two of these are:

- (a) On Bhusaval-Igatpuri and Bhusaval-Manmad sections which were energised by 31st March 1969, 1,318 trains in 1979 and 784 in 1980 were run with diesel power.
- (b) The entire section between Madras and Vijaywada had been electrified by December, 1980. According to the records of the Administration, on an average 5.90 locomotives were available as spares. (The 'spares' are engines not actually worked during 24 hours on any one day from mid-night to mid-night) during the period January 1981. Nevertheless, a total of about 44,67,58 (in thousands) GTKMs were done with diesel traction during the same period (January 1981 to May 1981) due to shortage of crew. Diesel traction being costlier than electric traction, this involved extra expenditure of Rs. 11.5 lakhs on fuel costs."

3.29 The Committee enquired about steps taken to eliminate mixed traction on electrified routes especially in the light of ins-



tances of running of diesel locos on electrified sections *viz.* Agatpuri-Vijayawada section (South Central Railway) involving additional expenditure, brought out in the Audit Para. The Ministry of Railways have stated in a written note as follows:

“The Railways are fully conscious of the need to move traffic over the electrified routes by electric traction only. A clear directive has been given to the Zonal Railways that only electric engines should haul traffic over the electrified routes. The seriousness with which the Railways have implemented this policy decision is reflected in the fact that the New Delhi-Calcutta Rajdhani Express which for years was running on diesel traction on the electrified route has now been switched over to electric traction after a suitable locomotive has been developed for the superfast train.

While every effort is made to ensure that traffic on electrified routes is cleared only by electric traction, there are certain exigencies on account of which diesels have to be pressed into service in the electrified territory. For instance on the Igatpuri-Manmad-Bhusawal section diesels have had to be deployed occasionally when electric locomotives were not available and to prevent detention to loads. Also when the run of a particular train was only for a short distance on the electrified route, it was considered operationally convenient to work the train with diesel traction on its entire turn. For example, traffic from Bhusawal to Sholapur has a very short run on the electrified route and when electric powers were not readily available it was decided to run them out with diesel. Similarly diesel locomotives returning to their homing shed at Bhusawal for their periodical overhaul from Sholapur Division have necessarily to move over the electrified route.

The Madras-Vijayawada section which was completely electrified in December 1980 had initial teething trouble including shortage of trained electric crews on account of which some diesel locomotives were deployed on the section. Moreover, a large proportion of the traffic on the North and South route is for destinations reached *via* Gudur—Renigunta, and it was occasionally found expedient to work trains for these destinations with the same diesel instead of changing engines both at Vijayawada and Gudur.”

....

3.30 In a further note, the Ministry of Railways have added:

“While in principle Railways have accepted the need to ensure that only electric engines haul traffic on the electrified routes, the first conscious effort to eliminate mixed traction in electrified territory was made towards the end of 1980. In November 1980 instructions were issued for purification of traction and the performance of electric locomotives with particular emphasis on this aspect monitored at Board’s level on a day-to-day basis. The improvements effected as a result of this drive are evident from the fact that the electric NTKMs on Eastern Railway which was 7425 million in 1980-81 has increased to 10680 million NTKMs in 1981-82 with fewer locos in use.”

3.31. Asked to comment on two instances of delay in electrification of short links pointed out in the Audit Paragraph and whether there were other instances and why these works were not taken up earlier so as to avoid detentions to locos and trains on account of change of traction, the Ministry of Railways have stated:

“Electrification of Ahmedabad-Sabarmati and Ahmedabad-Asarva was originally included in the sanctioned estimate for electrification of Virar-Sabarmati section. Later on it was decided on the request of General Manager, Western Railway not to electrify these two small sections because with the establishment of the proposed marshalling yard at Vatva the goods trains hauled by electric locomotives after electrification would be terminated at Vatva and electrically hauled passenger and mail trains would be terminated at Ahmedabad. With the setting up of a marshalling yard at Vatva the leads would advantageously be taken right upto Vatva from where they would be worked by pilot movement to the terminal at Asarva and Sabarmati. With the sanctioning of the Godra-Anand as part of Godra-Ratlam electrification scheme, additional traffic movement justified electrification of these short links.

There are no other instances of such a nature involving electrification of short links on other sections.”

3.32 The important index of utilisation of a locomotive viz. net tonne kilometres per day per locomotive (NTKM) indicates that compared to diesel locomotives the deterioration in the utilisation of electric locomotives has been far more pronounced. The NTKM per BG electric goods locomotive fell from 303779 in 1977-78 to 201472

in 1980-81 (fall of nearly 33 per cent) whereas NTKM of diesel goods locomotives fell from 243892 to 212502 (a fall of nearly 12.5 per cent). There was a steady downward trend in the goods traffic on electric traction right from 1976-77 with a marginal improvement in 1980-81. In terms of gross tonne kilometres, the goods traffic decreased from 76.8 billions with a deployment of 368 locomotives in 1976-77 to 69.2 billions with a deployment of 522 locomotives. The fall in freight traffic was very steep in the eastern region where it fell from 12.52 billion net tonne kilometres in 1969-70 to 8.29 billion net tonne kilometres in 1980-81.

3.33 The average speed of an electric locomotive had also continuously gone down from 25.8 km per hour in 1969-70 to 22.8 km per hour in 1980-81. The Ministry have ascribed the fall in the utilisation of electric locomotives to general fall in efficiency, heavy power cuts and frequent staff agitations. On the Eastern Railway the efficiency was further affected by staff indiscipline which culminated in 'go-slow' tactics and loco staff running strike in 1980-81. However, the Ministry have claimed that Government have since taken remedial measures as a result of which there had been improvement in position. The engine kilometreage per day had gone up from 327 in 1980-81 to 384 in 1981-82 and the speed had also gone up from 22.8 km per hour to 23.1 km per hour in 1981-82. The Committee feel that though there has been a slight improvement in position, a lot still remains to be done. They would expect further improvement in this regard. . . .

3.34 The Committee find that while the availability and use of electric locomotives for goods services had declined on all Railways during 1979-80 and 1980-81 compared to 1976-77, the position was particularly bad on two Railways—Northern and Western. On the Northern Railway, the actual usage during 1979-80 on train was only 8.68 hours out of the available 17.3 hours, and on the Western Railway it was only 8.56 hours out of 18.74 hours in 1979-80 and 8.48 hours out of 19.3 hours in 1980-81. Except the floods and breaches that affected adversely the electric engine usage during the rainy season on these two Railways, the reasons given by the Ministry are the same as for the low utilization of diesel engine usage on Eastern and South Eastern Railways. The Committee are not, therefore, satisfied with such a general explanation. The Committee would like the Railway Board to study the problem in depth, identify precisely the causes responsible for such low usage of electric engines on the two Railways and take corrective measures without delay. The Committee would like to have a further report in the matter.

3.35 Earlier in this Report, the Committee have expressed their concern over the 'residual engine hours' (unproductive hours) represented by detentions in yards, waiting in sheds, etc. in the case of diesel engines. The position in the case of electric engines is worse inasmuch as 'residual engine hours' was as high as 40 per cent compared to 22.9 per cent in the case of diesel engines in 1980-81. Another disturbing feature of utilization of electric locomotives is that the loads hauled by these locomotives were much below the loads prescribed by the Railway Administration. On Northern Railway, the maximum load of electric trains ranged between 2530 tonnes and 2960 tonnes against 3200 tonnes to 4600 tonnes prescribed. On the Western Railway, 85 per cent of the trains running during April-June 1979 carried loads less than 2,000 tonnes against 2346 to 3660 tonnes prescribed. The main reason given by the Ministry for under-loaded trains was that to avoid the chocking-up of marshalling yards, trains were despatched without waiting for completion of load. As to the remedial measures, the Ministry have stated that they are requesting the bulk customers—steel plants, fertilizer and cement factories—to load more and more block rakes and club their piecemeal despatches to form a train load. On the Western Railway, salt and cement manufacturers are being persuaded to offer bulk of the traffic in rake loads. The Railways are holding regular meetings with their principal customers. It is needless for the Committee to emphasise that any train with less than full load gives less revenue to the Railways than they would otherwise get. It is therefore imperative for the Railways to make every effort to run full load trains, if necessary, by adopting a system of incentives to bulk consumers. The Committee would like to be informed of the outcome of the efforts made/proposed to be made by the Railways in this regard.

3.36 The Committee are unhappy over the manner in which the Railway Board had allotted electric locomotives to the zonal Railways. The freight traffic carried by electric traction on the Eastern Railway declined from 12520 million net tonne kilometres in 1969-70 to 8282 million net tonne kilometres in 1980-81. However, the number of locomotives added to goods services increased from 101 in 1969-70 to 145 in 1980-81, resulting in gross under-utilisation of locomotives. In a note furnished to the Committee, the Ministry have stated that the allotment of locos is made on the basis of the traffic needs of each Railway. More electric locomotives had been allotted to the Eastern and South-Eastern Railways, as these were the two premier Railways for freight traffic and account for 60 per cent of the freight movement on the Indian Railways. The Ministry have

further stated that there had been a decline in the traffic carried by electric traction on the Eastern Railway "mainly on account of more intensive deployment of diesel locomotives, particularly on the non-electrified routes." The Committee are not convinced by this explanation. It is apparent to them from the facts of the case that the Railway Board had failed to make a realistic appraisal of not only the traffic requirements of zonal Railways before making allotment of electric locomotives but also of the traffic to be carried by the electric and diesel tractions in the Eastern Railway. The Committee would, therefore, like the Railway Board to review the position and make sure that the present electric locomotive allotment to the various Railways is in accordance with their requirements and optimum utilisation is achieved.

3.37 Earlier in this Report, the Committee have dwelt at length on the heavy loss of locomotive days on account of inadequate repair/periodical overhaul facilities for diesel locomotives. They find that the position is no better in the case of electric locomotives. For instance, the time taken for periodical overhaul in Kanchrapara Workshop was 70 days and in Bhusaval 57 days, as against the prescribed period of 30 days, resulting in heavy loss of locomotive days. The Northern Railway had to send electric locomotives all the way to Kanchrapara and Bhusaval workshops for periodical overhaul. The Committee would like the Railway Board to go into the matter in depth, identify the deficiencies and take necessary corrective steps with a view to reduce the loss of locomotive days on account of detentions for repairs/periodical overhauls to the barest minimum.

3.38 An aspect to which the Committee would draw particular attention is the extent of failures of traction motors of locomotives. The number of such failures on the South-Eastern Railway was 252 and that on the Western Railway 101 in 1979-80. As many as 259 traction motors were awaiting repairs on the South-Eastern Railway and 90 on the Northern Railway in July 1980. According to the Ministry the failures were generally due to inadequate "insulation schemes", defects in workmanship during manufacture, generally poor quality of indigenous material used and arduous loading conditions. The Ministry have assured the Committee that necessary remedial measures are being implemented to reduce the incidents of failures. Repair facilities for traction motors have been set up at Tatanagar and Kanpur. In addition, a Central repair workshop has been established at Nasik to meet the requirements of all the

Railways. The Ministry have expressed the hope that with the commissioning of this workshop the backlog of various Railways will be cleared fast. The Committee would like to be apprised of the results of the efforts made by the Railways to improve the position.

3.39 The Committee have already commented upon the delay in the energisation of short intermediate links. The result was that while there was surplus electric locomotive holding, steam and diesel locomotives continued to run on the electric track. The Committee observe that although 5178 km of railway lines had been electrified by March 1981, there was mixed traction practically on all the routes of the railway network, resulting in duplicate facilities such as steam sheds and diesel sheds in addition to electric sheds on electrified sections. On two electrified sections along—Bhusaval-Igatpuri and Bhusaval-Manmad section—1318 trains in 1979 and 784 trains in 1980 were run with diesel power. The Committee have been informed that in November 1980 a clear directive was issued by the Railway Board to all the zonal Railways that only electric engines should haul traffic over the electrified routes. The impementation was monitored at Board's level on a day-to-day basis. As a result, electric NTKMs on the Eastern Railway which were 1325 millions in 1980-81 had increased to 10680 million NTKMs in 1981-82, with fewer locomotives in use. The Committee are happy to learn this. They would like the Ministry to continue with the process of improvement till optimum utilisation of the electric locomotives is achieved, having regard to the economics of electric traction vis-a-vis other tractions in the overall interest of the country.

## CHAPTER V

### UTILISATION OF STEAM LOCOMOTIVES

4.1 According to the Audit Paragraph, the BG steam locomotive holdings (Production discontinued from 1971) at the end of 1969-70 and 1980-81 and the traffic carried by them in these years were as below:

	1969-70	1979-80	1980-81
(a) Holdings (on line)	5127	4697	4532
(b) Traffic carried (GTKM billions)	103.853	50.352	43.372

4.2 The stock of steam locomotives on 31-3-1981 included 10 overaged locomotives. Even by the year 1978 another 1952 WP and WG locomotives only would be due for condemnation on age basis leaving in service 1575 such locomotives, besides locomotives of other classes. The holdings of B.G. steam locomotive (4868) on 1st April, 1978 comprised 28 different classes of engines. Even after condemnation of 446 locomotives (being overage), during the period 1978-83, 16 classes of locomotives would still be left with the Railways. The various classes of locomotives are distributed on all Railways.

4.3 The Railways had shown 562 to 657 BG steam locomotives as spare during the years 1977-78 to 1980-81. These were not however taken off the line and kept as 'good repair stored' but were available for traffic use, the actual number kept off the line being therefore much less. The retention of a large number of locomotives for traffic use, though not justified by the requirements of traffic, meant more expenditure in terms of maintenance, operating costs including crew and other staff, unnecessary fuel consumption, etc.

4.4 During the years 1978-79 and 1979-80, 11,408 million and 6,995 million tonne kilometres of through goods traffic (on main lines, excluding sectional transshipment and shunting trains) was moved by steam traction, the fuel cost of moving this quantum of traffic being Rs. 19.39 crores and Rs. 11.89 crores in 1978-79 and

1979-80 respectively. If this traffic could have been diverted to diesel traction by rationalisation of operation between the different modes of traction, Rs. 13.74 crores in 1978-79 and Rs. 8.55 crores in 1979-80 could have been saved on fuel cost alone. If the other operating costs and repairs and maintenance are included the saving would have been much higher.

4.5. Asked whether it was not possible to take off the line more number of steam locomotives commensurate with the reduction in steam traction and keep them in 'good repair stored', the Ministry of Railways have stated in a written note that:

"The Good Repairs Stored position is an indicator of the surplus locos over a particular period on account of seasonal variations in the operational requirements. The position of steam locos holdings is kept constantly under review and maximum possible number of locomotives are kept under Good Repairs Stored. As on 1-7-82, 484 BG and 101 MG (585 total) locos had been kept under Good Repairs Stored.

4.6. The Committee desired to know the policy of the Railway Board in planning out the steam locomotives, particularly WPs and WGs—numbering more than, 3,000 which still have 20—30 years. In a written note the Ministry of Railways have stated as follows:

"Presently Railways are holding 738 WP locomotives and 2421 WG locomotives (Total 3159). Out of these, 568 WGs and 259 WPs (Total 827) have a codal life of more than 20 years. Condemnation of steam locomotives is being done in a phased manner and also taking into account the operating requirements. While WPs are likely to be relegated to inferior passenger services, WGs will be ultimately utilised for mostly shunting purposes. WPs and WGs are the latest type of locomotives on the Indian Railways and these will be the last to be worked of in time to come."

4.7. The Committee asked whether the Railway Board had taken action to close any steam loco-sheds and rationalise the arrangement so that multiplicity of facilities for different classes of locos could be avoided. The Ministry of Railways have stated that:

"With the rationalisation of traffic streams and reduction in the number of steam locomotives, the Railways have been



able to close down 77 steam locomotives sheds upto 31-3-1982. The detailed position is indicated below:

Period	Number of steam loco sheds closed down		
	Home g sheds	outstation sheds	Total
Up to 31-3-1980 . . . . .	22	12	34
1980-81 . . . . .	11	6	17
1981-82 . . . . .	24	5	26
	57	23	77

During this year 321 BG and 141 MG locos have been condemned eliminating 5 classes of engines on BG & 8 classes on MG."

4.8. The Committee enquired whether the reduction in steam locomotives had affected the staff position and how many were rendered surplus from year to year. The Ministry of Railways have stated that:

"As a result of closure of steam sheds, about 3600 posts have been rendered surplus in 1981-82. The surplus staff have been absorbed in suitable alternate vacancies."

4.9. The Committee enquired about the number of staff likely to be rendered surplus during the years 1982-83 and 1983-84 keeping in view the policy of phasing out the steam locomotives. In a written note the Ministry of Railways have stated as under:

"During 1981-82, 26 steam loco sheds were closed down rendering about 3,600 men surplus, who were given alternative employment. This review was based on the condemnation of 440 steam locos during 1980-81. With condemnation of approximately 900 steam locos, it is expected that about 7,300 men will be rendered surplus. However, the actual figures can only be obtained from the zonal Railways after the close of the financial year. During 1983-84 another 300 locos may have to be condemned and about 2400 men rendered surplus."

4.10. The Committee enquired when it would be possible to eliminate steam locos completely on Broad Gauge and the Metre Gauge. In a written note the Ministry of Railways have stated:

“Elimination of steam locomotives on Broad Gauge and Metre Gauge will depend on the production of diesel and electric locomotives which in turn is linked up with the availability of funds from the Planning Commission. Based on the codal life the last steam loco on B.G. will be phased out in 2012-13 and M.G. steam loco in 2012-13.”

4.11. The Committee enquired whether any exercise had been carried out to rationalise holdings of steam locos with a view to economise repair and maintenance facilities, staff and spares and stores and could holding of steam locos be not concentrated in a few loco traffic density areas. The Ministry of Railways have stated that:

“To economise on repairs and maintenance facilities staff, spares and stores rationalisation of steam locomotives is under constant watch. During this year 321 Broad Gauge and 141 Metre Gauge locomotives have been condemned. With this condemnation, 5 classes of Broad Gauge locomotives and 8 classes of Metre Gauge locomotives have been completely eliminated from the Indian Railways. Steam locomotives are being utilised now mostly for inferior services like shunting, branch line trains and short distance goods trains. The policy is to close down steam traction in areas which are far away from the coalfields. Southern Railway which was holding 291 Broad Gauge locos on 31-3-81 has now 148 Broad Gauge locos as on 13-8-82 and these are expected to be eliminated by the end of this year.”

4.12. A review of utilisation of steam locomotives revealed the following:

- (i) The number of locomotives under or awaiting repairs increased from 673 (13.4 per cent) in 1976-77 to 745 (16.4 per cent) in 1980-81 though 487 numbers (mostly overaged) had been taken off the line.

(ii) Detentions to locomotives in yards and sheds were on the increase in relation to the hours spent on train engines vide details given below:

	Passenger service		Goods service	
	1975-76	1980-81	1975-76	1980-81
Train engine hours . . . . .	3191	2792	2913	1310
Other hours (terminal detentions, idling, etc.)	1111	1177	2186	1293
Percentage of other hours . . . . .	35.6	42.2	75.0	98.7

(iii) With the reduction in steam locomotives, heavier types of locomotives (including WG locos) are employed for shunting purposes. The shunting kilometres per 100 train kilometres increased from 35.0 in 1975-76 to 38.1 in 1980-81. On the Southern Railway this index had risen from 37.8 in 1977-78 to 46.5 in 1979-80. The increase in percentage of shunting kilometres is attributable to slackness in shunting.

#### *Sheds and Workshops*

4.13. Locomotives under awaiting repairs on South Eastern Railway increased from 101 (16.8 per cent of the number of line) in 1977-78 to 135 (23.6 per cent) in 1979-80.

4.14. Engine failures increased between 1978-79 and 1979-80 from 50 to 119 in four sheds of Northern Railway and from 355 to 557 on South Eastern Railway; a substantial number (39 per cent in 1979-80) of the failures was attributed by the Railway Administration to bad workmanship in sheds.

4.15. The time fixed for P.O.H. in workshops is 18 days for a locomotive. It was noticed that the time taken by sheds and workshops for carrying out the various schedules was excessive in relation to the targets fixed. The time taken in excess of the target in Charbagh and Amritsar workshops during 1980-81 was 337 days (134 locomotives) and 101 days (30 locomotives) respectively.

4.16 The average time taken for periodical overhaul of steam locomotives was 21.1 days in 1980-81. The Committee enquired whether this period was not excessive compared to the target of 18

days. The Committee also enquired why inspite of reduction in load on workshops, it was not possible to adhere to the targets. The Ministry of Railways have stated in a written note as follows:

“Over the last 4-5 years the average working days for POH of steam locos have been between 19 & 20. The figure was slightly excessive during 80-81 but has been brought down in 81-82 to 19.85.

Although there has been a reduction in steam loco workload there has also been a corresponding reduction in manpower and facilities being utilised for maintaining steam locos. The workshop capacity rendered surplus as a reduction of steam POH has been diverted for other activities, such as POH of diesel electric & electric low POH, manufacture of cranes, jacks, etc. This is reflected in the manpower ratio for steam loco POH which has remained constant inspite of fall in out-turn.”

4.17 According to the Audit paragraph, the detentions in shops were attributed to non-availability of materials, gas and spare parts, heavy absenteeism, etc. Locomotives had been also detained after P.O.H. at Amritsar and Charbagh workshops for as many as 129 (30 locomotives) and 1829 (134 locomotives) days respectively in 1980-81.

4.18 Further, on the Northern Railway the excess time taken for maintenance schedules of B.G. locomotives in 5 sheds during 1979 and 1980 was 3654 locomotive days (148 locomotives). Including the transit time from sheds to shops and back, the total number of locomotives days lost worked out to 12893.

4.19. On the South Eastern Railway, the extra time taken over the targets allowed at Kharagpur shed was 37 to 160 days in respect of 8 locomotives in 1980-81 and 33 to 93 days in respect of 9 locomotives in 1980-81. In all, 778 and 506 engine days (8 and 9 locomotives) were lost in 1979-80 and 1980-81 respectively on account of such excessive detentions which were stated to be partly due to non-availability of materials.

4.20 Asked to explain the system of monitoring the utilisation of locomotives at Railway Board level, Zonal level and Divisional level, the Ministry of Railways have stated as follows:

“At the Divisional level the loco utilisation is monitored in the Control Office which functions round the clock. The

emphasis is to reduce the detentions to locos in yards by planning train departures and the Control office prepares the position each by which is checked by the Divisional officers. There are charts for delays and loco utilisation which give the break-up of locos detention in yards, while on run, etc. The divisional figures are conveyed to zonal railway headquarters where at the level of COPS utilisation of locos is being watched. The zonal railways give a feed back daily to Railway Board and this is discussed in the operating meetings held by Member (Traffic) and the utilisation of locos is watched."

4.21 Asked what indices were utilised for measuring utilisation of locomotives, the Ministry of Railways have stated that:

"The indices for loco utilisation that are watched are engine kilometres per locomotive per day 'in use'. The overall Kilometrage of the total number of locomotives on Indian Railways is also watched, i.e. for steam, Diesel and Electric locos."

4.22 During evidence, the Committee referred to the indices of utilisation of locomotives which showed that the net tonne kilometre per day per steam BG goods locomotive decreased sharply from 31,284 in 1969-70 to 11,781 in 1980-81. The Committee desired to know the reasons for the fall in utilisation of locomotives. The Chairman, Railway Board, stated:

"The point you have raised is pertinent and certainly it does not speak well of our performance. There has been as you can see over the years and especially in the particular year you have mentioned, growing indiscipline which culminated as I just mentioned in the strike of 1981 January February. After the strike we have taken very strong measures and tried to inculcate again and bring back that sense of discipline which prevailed 4-5 years ago. We are not proud of these figures and we do not expect that we will certainly improve or at least try to regain the high levels which we have achieved earlier."

**4.23. Presently the Railways are holding 738 WP locomotives and 4221 WG steam locomotives (total 4959). Out of this, 568 WGT and 259 WPs (total 827) have a codal life of more than 20 years. Because of the very high operational cost of steam locomotives, it is proposed to completely phase them out. However, because of financial**

constraints involved in acquiring diesel and electric locomotives energisation of tract, condemnation of steam locomotives is being done in a phased manner. Based on the codal life the last steam loco on BG and MG will be phased out in 2012-13.

4.24. The Committee observe that during the year 1979-80, 6995 million tonne kilometres of through goods traffic was moved by steam traction, the fuel cost on moving this quantum of traffic could have been diverted to diesel traction by rationalisation operation between the different modes of tractions, Rs. 8.55 crores in 1979-80 could have been saved on fuel cost alone. If the other operating costs and repairs and maintenance are included the saving would have been much higher. According to Railway Board, the cost of maintenance per 1000 GTKM of steam locomotive for goods services was Rs. 85.39 while that of diesel locomotive was only Rs.16.77. As already pointed out by the Committee, there is under-utilisation of both diesel and electric locomotives available at present. In view of all these, the Committee would like the Railway Board to consider whether the pace of condemnation of highly un-economic steam engines cannot be accelerated if no improvement could be effected as suggested later in this Report.

4.25. The Committee also observe that on 1-4-78 there were 28 different classes of steam engines in operation on the Indian Railways. Even after condemnation of 446 locomotives during the period 1978-83, 16 classes of locomotives would still be left with the Railway. The Committee would like the Railway Board to examine the feasibility of redistributing the various classes of locomotives so as to minimize the multiplicity of maintenance facilities in each Zonal Railways. Of the three tractions, the position of utilisation of locomotives is the worst in the case of steam locomotives. The net tonne kilometre per day per steam BG goods locomotives had come down from 31284 in 1969-70 to 11781 in 1980-81. Detention to locomotives in yards and sheds were on the increase in relation to the hours spent on train engines and its percentage was as high as 98.7 in 1980-81. The Committee recommend that Government should come out with a clear policy on the future of steam traction and take appropriate action to make use of the existing assets optimally.

4.26 As discussed earlier in this Report, the monitoring and review mechanism to ensure optimum utilisation of locomotives (steam, diesel or electric) does not seem to work satisfactorily. The Railway Board have however, clarified that the monitoring is done

at three levels—Divisional, Zonal and Board levels. At the Divisional level, the loco utilisation is monitored in the Control Office which functions round the clock. The Divisional figures are conveyed to Zonal Railway Headquarters where the utilisation is watched at the level of Chief Operating Superintendent. The Zonal Railways give a feedback daily to Railway Board and this is discussed in the operating meetings held by the Member (Traffic) and the utilisation of locos is watched. The Committee are constrained to observe that in spite of daily monitoring at three levels the position of utilisation of locomotives leaves much to be desired. The Committee would like the Railway Board to examine how far the existing monitoring system needs to be streamlined to fully subserve the purpose.

## CHAPTER V

### FUEL CONSUMPTION

5.1. A Fuel Control Organisation under an Additional Chief Mechanical Engineer exists on each zonal Railway to keep a watch on fuel consumption.

#### *Diesel oil*

5.2. On the Eastern Railway, 'trip rations' of diesel oil had not been fixed at all and the instructions issued by the Railway Board in this regard in November 1967, April 1968 and August 1977 had not been implemented.

5.3. Similarly, on the Northern Railway 'trip rations' had not been fixed in respect of various sections served by WDM2 locomotives homed in Tughlakabad shed.

5.4. The 'trip rations' fixed in 1972 for the BG sections of the Western Railway are still operative and have not been revised despite changed operational conditions, such as removal of speed restrictions etc.

5.5. The Railway Board had issued instructions to the Railways in October 1973 and June 1978 that consumption of lubricating oil should not normally exceed 1.5 per cent of the diesel oil consumed for WDM2 and WDM1 locomotives and 1.1 per cent for WDM4 locomotives. The actual consumption by the Railways was as follows:

	Percentage of lube oil to diesel oil consumed by WDM2 locomotives		
	1978-79	1979-80	1980-81
Itanagar . . . . .	2.00	1.79	1.80
Tughlakabad . . . . .	0.96	2.18	2.19
Erode . . . . .	1.60	1.48	1.68
Bondamunda . . . . .	1.92	2.50	2.40
Waltair . . . . .	1.86	1.85	1.99
Ratlam . . . . .		2.67	2.31



5.6. In respect of WDM4 locomotives homed at Mughalsarai the figures were 1.31 per cent and 1.39 per cent in 1978-79 and 1979-80 (against the target norm of 1.1 per cent).

5.7. The cost of excess consumption in the five sheds at Itarsi, Tughlakabad, Bondamunda, Waltair and Ratlam worked out to Rs. 1.91 crores and Rs. 1.12 crores during 1979-80 and 1980-81 respectively, but the matter does not seem to have been investigated.

5.8. The Committee enquired whether the Railway Board was keeping a watch on fuel consumption and how did they ensure that the instructions were implemented without delay.

5.9. The Ministry of Railways have stated *inter alia* as follows:

"The Railway Board instructions pointed out by Audit pertain to trip-rations. As per the existing orders trip-rations have to be reviewed|revised whenever there is introduction of a new train or change in the timings|stoppages etc. of the existing trains with the change of time-table. Trip-rations need not be reviewed after every six months for services where there has been no change with the change of time-table. Eastern and Northern Railways have already reviewed trip rations and on Western Railway it is under review.

Railway Board is keeping a close watch on fuel consumption. Monthly Fuel Economy Reports are received from the Zonal Railways and these are studied|examined in the Board's Office with reference to the performance of last month and corresponding month of the previous year. The reasons for variation in consumption rates of each service (gauge-wise) are analysed and Railways which show heavy consumption are advised to take appropriate action to rectify the factors contributing to increasing the consumption rates and Railway's compliance is ensured."

5.10. The Committee asked why the consumption of lube oil was consistently higher than the norms prescribed by Railways and what remedial measures were proposed to be taken. In reply, the Ministry of Railways have stated *inter alia* as follows:

"The need for economy in the consumption of lubricating oil and watch on consumption in diesel locomotives has been an item receiving attention since the inception of regu-

lar main line diesel working the Indian Railways. While targets for various types of engines have been fixed for the consumption of lube oil as percentage of fuel oil, it is pointed out that in actual practice the consumption of lube oil varies and is affected by several factors, such as—

- (i) Operating conditions—usage of locomotives, grades and curve encountered, type of service such as through goods, proportion of light running, banking duty, pattern of oad hauled and so on.
- (ii) Quality of lube oil—i.e. detergent dispersant properties, TBNE levels, generation of lube oil viz., whether second or third etc.
- (iii) Availability and performance of spare parts directly involved, such as piston rings, cylinder liners, pistons etc.
- (iv) Sulphur content of High Speed Diesel Oil.

To achieve control on lube oil consumption, the same is tackled from various aspects as indicated below:

- (a) *Design aspects:* This is basically followed up by Research, Designs & Standards Organisation. Thus trials have been carried out with various types of ring combinations with a view to improving oil control.

Again in this regard, a different design of conformable oil scrapper ring has been introduced which is spring loaded in place of conventional oil scrapper rings.

- (b) *Quality of lube oil:* There has been constant endeavour to improve the quality of lubricating oil to keep the best of latest technological development with close collaboration with various public sector undertakings and their Research and Development wings. Despite the fact that there was a temporary set-back due to end of agreement between M/s. Indian Oil Corporation and their foreign collaborator which led to TBNE values of oils supplied reducing further trials with superior quality of lubricating oils developed by M/s. Indian Oil Corporation have enabled relatively high TBNE oils with better detergent dispersant properties being cleared recently for general

use. Trials with even more superior types of oils are continuing both in collaboration with M|s. Indian Oil Corporation and M|s. Hindustan Petroleum.

- (c) *Sulphur content of High Speed Diesel:* Whenever the sulphur content of HSD diesel is more than 0.5 per cent it has detrimental effect on diesel engines leading to greater wear and tear and consequently affects lube oil consumption. While the Indian Standards Specification lays down a maximum of 1 per cent limit for the sulphur content, this has been relaxed on a number of occasions to 1.2 per cent in view of the need for maximising availability on a national level. The effect of this has been to increase the wear and tear on diesel engines. This is being combated not only by taking up the matter with the Ministry of Petroleum, but by efforts to develop superior brands of lubricating oils.
- (d) *Maintenance aspects:* Maintenance aspects which require specific watch with regard to lube oil consumption have been identified. Diesel sheds not only watch overall lube oil consumption but watch individual loco-wise consumption to ensure pinpointing causes for early remedial steps.
- (e) *Other aspects:* These cover various aspects for preventing leakages on lube oil covering storage of oil, eliminating outstation issues etc.

The important steps taken in this regard have been—action taken for bulk lube oil storage facilities. In this, lube oil is brought in special sealed tankers instead of in barrels, thus reducing chances of wastage, pilferage etc. In brief, some of the reasons for higher lube oil consumption have been:

- (i) With a view to increasing traffic on a priority basis, utilisation of diesel locomotives by more intensive use, diesel locomotive working has been changed to conform to integrated operation.
- (ii) Problems due to shortage of important components, particularly piston rings. This has been aggravated by certain imported rings supplied from vendors approved by the original makers not coming up to the performance expectations.

- (iii) Quality of lubricating oil not keeping up with needs particularly in view of increased sulphur contents permitted.
- (iv) Inadequate holding capacity for diesel locomotives due to paucity of funds.

However, every effort is being made to see that lube oil consumption, which is of vital importance, is watched and all steps taken to bring this consumption level as close to the target as possible. Some of these important steps have been—

- (i) ensuring that critical spares such as piston rings, gaskets are available. In this regard whenever necessary, even airlifting of piston rings is being resorted to. Again special measures have been taken to see that capacity for manufacture and reclamation of cylinder liners is built up at Diesel Locomotive Works Golden Rock Shops and for additional future requirements at Diesel Component Works at Patiala.
- (ii) ensuring that important spares of even new foreign suppliers undergo performance tests even if cleared by original makers.
- (iii) to see that vigorous watch at the shed level both with regard to overall as well as loco-wise consumption is kept.
- (iv) various aspects affecting lube oil consumption being discussed in the meetings of Diesel Maintenance Group, which enables various Diesel Shed Field Officers to compare the performance of their sheds. Research, Designs & Standards Organisation, which is closely associated with this also studies various design aspects, which could result in reduction of lube oil consumption.
- (v) All-out action for elimination of out-station topping up points and scheme for obtaining lube oil on diesel sheds in bulk in special tankers instead of barrels is taken.
- (vi) Close collaboration with major public sector undertakings and their Research and Development wings for development of superior lubricating oils.

The above steps have resulted in considerable improvements and

some sheds have already come close to the targets. The trend of consumption in some of the important sheds are indicated below:

	1978-79	1979-80	1980-81	1981-82
Itarsi . . . . .	2.00	1.79	1.8	1.71
Tughlakabad . . . . .	2.00	2.18	2.18	1.90
Erode . . . . .	1.60	1.48	1.69	1.44

#### *Shed consumption of Diesel oil*

5.11 The Central Railway Administration had not fixed the (norm) scale of consumption of diesel oil for the various schedules carried out in Itarsi shed. A test check showed that the consumption of diesel oil in 1979-80 and 1980-81 ranged from 174.5 to as much as 244.8 litres for a trip schedule.

5.12 The norms on the Northern Railway varied from 17280 litres per month in Mughalsarai shed to 77045 litres per month in Tughlakabad shed. The actual consumption during July 1979 to December 1979 at Tughlakabad however exceeded even the target by 77,250 litres, the reasons for which had not been investigated by the shed authorities.

5.13 At Erode also, no yardstick had been fixed; however, the shed consumption increased from 11.30 lakh litres in 1979-80 to 13.56 lakh litres in 1980-81 though the number of locomotives homed had increased marginally by two only.

5.14 At Waltair, the shed consumption (15.85 lakh litres) exceeded the target by 3.05 lakh litres during 1980-81 i.e. by 23.9 per cent, but the excess had not been investigated.

5.15 The Committee asked whether the Railway Board considered laying down uniform norms of consumption of diesel oil during the various maintenance schedules in sheds. The Ministry of Railways have stated in a written note as follows:

“Consumption of High Speed Diesel in sheds takes place—

- (a) on the locomotives during the course of movement under power, running of engine during the running tests, load box tests, taking out diesel oil for testing including draining to remove contaminated oil etc.
- (b) HSD used for various cleaning purposes.

It would not be feasible for Railway Board to lay down norms of consumption of diesel oil in different sheds, for the above purpose due to variation in the lay outs of sheds

types of locomotives being homed, different shed practices including difference in system of cleaning etc. Moreover, during the schedules arising out of preventive maintenance inspection, need arises for carrying out additional repairs. Such repairs are followed with additional tests including load box tests, which affect shed consumption. However, Railways have generally fixed 'ration' for HSD used for cleaning and also for consumption rates for diesel locomotives in their usual sheds. Railways are being advised to fix similar targets for shed consumption after necessary studies in cases where the same may not have been done."

### Coal

5.16 The rate of consumption of coal has been increasing as indicated below:

Year	Coal (Kgs.) consumed per 1000 GTKM(BG)	
	Passenger	Goods
1969-70	58.3	58.9
1973-74	62.2	63.5
1977-78	62.2	65.7
1978-79	67.1	74.1
1979-80	69.8	83.0
1980-81	75.2	91.0

5.17 Steep increase in the rate of consumption in 1978-79 and 1979-80 was explained by the Railway Administration as being due to drop in average load per train, in speed, in the proportion of fast trains to slow trains, in engine use (due to excessive detention) and in the quality of coal and increase in engine failures.

5.18 The average gross load of goods trains had decreased from 1037 tonnes in 1975-76 to 850 tonnes in 1980-81 (i.e. by 18.0 per cent); however the rate of coal consumption had increased by 38.9 per cent during the same period.

5.19 The quantity of coal consumed on shunting services was the same, viz. 2.85 million tonnes, in both the years 1978-79 and 1979-80 though the hours spent by steam locomotives on shunting work had decreased, from 5.7 million hours in 1978-79 to 5.6 million hours in 1979-80.

5.20 The increase in consumption was attributed to use of heavier types of locomotives for shunting services, such as WG (which are standard locomotives for main line services). These locomotives have a larger fire grate area (46 sft.) than the standard shunting locomotives (WS-30 sft.). The question of reducing the fire grate

area in these engines used for shunting (by carrying out suitable modifications) so as to minimise coal consumption does not seem to have been considered by the Railways.

5.21 The Committee asked the reasons for the step increase in rate of coal consumption from 74.1 Kgs. per 1000 GTKM in 1978-79 to 91.0 Kgs. in 1980-81 and whether the Railway Board was satisfied that the increase was due to relegation of steam locos to inferior services only. The Ministry of Railways have stated in a written note as follows:

“Coal consumption rates pertain to Goods and Prop. of Mixed Services on BG. It is correct that with more and more dieselisation/electrification, steam locos are being relegated to inferior services resulting in increased coal consumption rates. The other important factor which has contributed to the excess coal consumption on the Railways is the supply of inferior quality of coal”.

5.22 Asked whether the WG locos were being utilised for shunting purposes and what/action had been taken by Railway Board to minimise coal consumption when those locos were used for shunting purposes, the Ministry of Railways have stated in a written note that:

“With the relegation of steam locos to the inferior services, WG locos are being utilised on Shunting Services. Wherever these engines are earmarked for doing light shunting, the fire grate area of these engines has been reduced to economise on coal consumption. Out of the total 783 WG locos deployed on Shunting Services 366 locos have reduced fire grate area on the Zonal Railways”.

5.23. Fuel constitutes an important element of the operating cost of a locomotive. It is therefore imperative that its consumption is properly regulated in accordance with well set 'norms'. With this end in view, 'trip rations' are required to be fixed and there were repeated instructions of the Railway Board to this effect. However, the Committee find on the Eastern Railway, trip rations had not been fixed at all and on the Northern Railway 'trip rations' were not fixed in respect of various sections. On the Western Railway, 'trip rations' fixed in 1972 had not been revised, despite changed operational conditions. While the Committee note that steps are being taken in this regard on these Zonal Railways, they cannot help expressing regret that the Railway Board's repeated instructions should have been disregarded in the Zonal Railways till Audit pointed out the lapse. This

indicates that the existing arrangements in the Railway Board to see that the instructions issued by it are implemented by the Zonal Railways are totally unsatisfactory. The Committee desire that such lapses should not be allowed to persist in future. ∴ ..

5.24 According to the instructions issued by the Railway Board, consumption of lubricating oil should not normally exceed 1.5 per cent of the diesel oil consumption for WDM 2 and WDM 1 locomotives and 1.1 per cent for WDM 4 locomotives. The Committee however observe that the consumption of lubricating oil in quite a number of sheds was fairly in excess of the limits laid down by the Railway Board. The Committee note the various steps taken by the Railways to bring the lubricating oil consumption close to the targets fixed by the Railway Board and as a result the consumption of lubricating oil as a percentage of diesel oil at Itarsi, Tuglakabad and Erode sheds has been considerably brought down. At Erode, it is already within the prescribed limit but at Itarsi and Tuglakabad it is still in excess of the prescribed limit. The Committee trust that the Railway Board will continue to make efforts to bring the lubricating oil consumption in all the sheds within the prescribed limit.

5.25. The Committee note that 'scales' (norms) of consumption of diesel oil for various schedules had not been fixed in some sheds while at other sheds consumption exceeded the target. In a note furnished to the Committee, the Ministry have stated that Railways have generally fixed 'ration' for HSD used for cleaning and also for consumption rates for diesel locos in their sheds. Railways are being advised to fix similar targets for shed consumption after necessary studies in cases where the same have not already been done. It is not clear how the Railway Board did not initiate action in this regard until Audit pointed it out. However the Committee desire that early action should be taken to complete the studies and to fix the targets and the Committee informed of it.

5.26. The Committee observe that while the average gross load of goods trains had decreased from 1037 tonnes in 1975-76 to 850 tonnes in 1979-80 (i.e. by 18 per cent), the rate of coal consumption has increased by 39 per cent during the same period. According to the Ministry, the main reason for increase in coal consumption is that with more and more dieselisation/electrification, steam locomotives are being relegated to inferior services and are being utilised for shunting. As to the action taken by the Ministry to minimise the coal consumption, the Railway Board have stated that wherever the WG locomotives are earmarked for doing light shunting, the fire grate area of these



**engines has been reduced to economise on coal consumption. Out of the total 783 WG locos deployed on shunting services, 266 locomotives have reduced fire grate area. The Committee would like the Ministry to examine whether it is not possible to reduce the fire grate area in the remaining 513 WG locos. They will also like the Railway Board to examine whether the increased coal consumption on the Railways is also not partly due to pilferage.**

## **CHAPTER VI**

### **RESEARCH & DEVELOPMENT**

6.1 The Committee desired to know what was the thermal efficiency by using steam locomotive vis-a-vis diesel locomotive. The Chairman, Railway Board, stated during evidence:

“When it comes to the question of basic utilisation of energy source, normally in the case of steam engine thermal efficiency varies from 6 to 7 per cent whereas in the case of diesel engine, it will go upto 25 to 30 per cent”.

6.2 Asked whether it was on ground of thermal efficiency that the Railways were trying to replace steam locomotives by diesel locomotives, the Chairman, Railway Board added:

“.....It is one of the considerations”.

6.3 The Committee then enquired whether there was any effort in the R & D to find out whether steam locomotives could be more efficient, the Chairman, Railway Board, replied in the affirmative and added:

“We have tried to improve the efficiency (of steam locomotives) by changing certain design features”.

6.4 To a further question as to the speed to which the two types of engines could go, the witness stated:

“With steam locomotives, we can go upto 100 kms/hr and with diesel locomotives, we can go upto 120-130 kms/hr.”

6.5 The Committee then enquired whether steam locomotives with greater thermal efficiency were in operation in any part of the world, the Chairman, Railway Board, stated:

“We are presently able to get the maximum output of the 1500 hp from steam locomotives. The rate of firing would go upto nearly 2 tonnes per hour which is quite difficult for the fireman on a sustained long run. Beyond that, we have not gone in for any other experiment for improvement of the steam locomotive”.

In reply to another question, he added:

“We have heard that the United States and some other countries are experimenting on the use of coal to have more thermal efficiency, but we have not done much research on that”.

In reply to a further question, he added:

“.....Some experiments were conducted by us. For instance we tried to go in for oil-spraying on top of the coal and we tried to get higher energy. But the ultimate utility depended on the boilers which are so large that they were not of optimum size. Therefore we stopped. At present there is no experiment on this on our hands. Incidentally I may say that it has been our policy of late to use basically coal for generation and distribution of electricity and this may come to our help for the electrification of the trains”.

6.6 The Committee then drew the attention of the witness to a Railway journal—International Railway (July 1982 issue). According to this Journal, in Argentina coal was being used for steam locomotives and the thermal efficiency there was around 12 per cent more. In the U.S.A, prototypes had been manufactured with a thermal efficiency of 18 per cent and a very low grade coal could be used there; and the speed limit of 100 kilometres per hour had been crossed upto 130 kilometres per hour.

6.7 The Committee desired to know why the Indian Railways did not conduct research in efficient steam locomotives. The Chairman, Railway Board stated:

“Your point is well taken. We will follow up on these developments, and try to get some more details and work on them”.

6.8 The Committee note that the thermal efficiency of a steam locomotive is around 6 to 7 per cent, which is nearly one-fourth of the thermal efficiency of a diesel locomotive. The operating cost of a steam locomotive is nearly four times that of a diesel locomotive, and the maximum speed which a steam engine can attain is considerably less than that of a diesel locomotive. Therefore, there seems hardly any alternative for the Railways but to phase out steam engines. However, the Committee learn that through research, Argentina has been able to raise the thermal efficiency of a

steam engine to about 12 per cent, with a low grade of coal and in the United States prototypes of steam engines are reported to have been developed with a thermal efficiency of 18 per cent, and a speed of 130 kilometres per hour. In view of this, the Committee would like the Railway Board to examine the feasibility of carrying out research to see if the thermal efficiency, operating cost and speed of a steam locomotive can be improved to an extent that would justify the retention and greater use of the existing steam locomotives.

### CONCLUSION

6.9 The Committee's examination of the utilisation of locomotives has revealed that the locomotive holdings of the Railways were quite excessive to the requirements of the traffic handled. However, the fact remains that the Railways are unable to handle the entire traffic available. Thus, partly on account of the Plan projections of traffic not materialising and partly on account of Railways' own inadequacies to handle the entire traffic available, there is surplus of locomotives. This surplus is more if one reckons with the inefficient use of locomotives, as disclosed by various indices of performance dealt with in this Report. Lack of proper planning and clear enunciation of inter se priority of Plan programmes in the light of past experience besides operational inefficiency has contributed to this phenomenon. For instance, diesel and steam locomotives continue to be deployed in electrified sections on account of non-electrification of short links and non-elimination of change of traction. Repairs and maintenance facilities lag behind the need with the result the idle time of locomotives awaiting repairs etc. is very high. All this requires careful examination in a coordinated manner in the light of the shortcomings pointed out by the Committee, in order to ensure that assets of the Railways are optimally utilized in a manner that is in the overall interest of the economy. The machinery for planning, monitoring and review as well as follow-up action should be improved to achieve this end. The Committee hope that the Ministry of Railways would earnestly address themselves to this task without delay.

NEW DELHI;  
*July 27, 1983*  
 Sravana 5, 1905 (S)

SUNIL MAITRA,  
*Chairman,*  
*Public Accounts Committee.*

## APPENDIX I

(See Para 1.1 of Report)

*Paragraph 4 of Advance Report of the C & AG for 1980-81  
Union Government (Railways)*

### 4. Utilisation of locomotives

#### *Introduction*

4.1 The locomotive holding of the Indian Railways as on 31st March 1981 comprised:

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	Broad Gauge	Metre Gauge	Narrow Gauge	Total
Steam . . . . .	1361	2763	345	7469
Diesel . . . . .	1866	470	67	2403
Electric . . . . .	1016	20	..	1036
	7243	3253	412	10908

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4.2 A review in audit of the procurement, utilisation and performance of B. G. locomotives\* revealed the following.

4.3 The acquisition of locomotives during a Plan period is planned with reference to the traffic anticipated and the norms of performance of the locomotives. Necessary provision is made in the annual Rolling Stock Programmes depending upon the delivery period.

4.4 In Paragraph 11 of the Railway Audit Report for 1969-70 it was pointed out that the locomotive holdings were far in excess of the requirement for moving the traffic that materialised during 1965-66 to 1968-69. Excess holding of locomotives continued thereafter also.

4.5 The requirement of locomotives, as computed by adopting the norms used by the Railway Board, for the level of traffic (both passenger and goods) moved in 1977-78 (maximum in any year so

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\*The review is confined to B.G. locomotives only as the B.G. system accounted for 77.5 per cent of the passenger traffic and 86.60 per cent of the goods traffic carried by the Railways in 1980-81.

Sources of data: Indian Railways Annual Statistical statements. A detailed note on the subject was sent to the Ministry of Railways (Railway Board) on 24th November, 1981; its reply is awaited (February 1982).

far) and the number of locomotives on line during the years 1978-79 to 1980-81 were as below:—

Year	Number of locomotives in steam terms		
	on line	repairment	surplus
1978-79 . . . . .	9809	9300	509
1979-80 . . . . .	9917	9300	617
1980-81 . . . . .	10079	9300	779

However, as the traffic moved in the respective years was much less than in 1977-78, the actual surplus holdings in these years were higher *viz.*, 868, 970, and 1069 respectively.

4.6 The Fifth Plan provision for acquisition of locomotives was stated to be related to the requirement for moving 250—260 million tonnes of traffic, at an average lead of 678 kilometres, by 1978-79. Taking into account the limitations of the capacity of the Production units (CLW\* and DLW\*\* and also availability of funds, ordering of 1963 locomotives (electric 299 and diesel 664) was envisaged. Including the throw-forward from the previous ordering, the provision made in the Rolling Stock Programmes for the five years was for 1080 locomotives. However, the actual production of locomotives during the period 1974-75 to 1978-79 (Vth plan) was 866 (electric 263 and diesel 603) and 169 in 1979-80 i.e. 1035 in all (in 6 years), as against the installed capacity of 212 locomotives (72 electric and 140 diesel) per annum. If full utilisation of the installed capacity or even the targeted production (1102) had been achieved the surplus mentioned in paragraph 4.5 above would have been higher.

4.7 A statement showing the traction-wise traffic (Gross tonne kilometres) and the number of locomotives on line is given in Annexure—I.

4.8 As may be seen from the statement given in Annexure 1, the number of diesel and electric locomotives on line increased between 1969-70 and 1980-81 by 1123 and 475 respectively, i.e., by 166 per cent and 93 per cent. The traffic carried under these traction, however, increased by 103 per cent and 61 per cent only, respectively. On the other hand, the reduction in stock of steam locomotives on line was 23.5 per cent only between 1969-70 and 1980-81 though the reduction in traffic carried under steam traction was of the order of 58 per cent. Thus, the traffic carried under all the three tractions (diesel, electric and steam) was far less than their respective hauling capacities resulting in inadequate utilisation of locomotives.

\*CLW—Chittranjan Locomotive Works—Chittranjan;

\*\*DLW—Diesel Locomotive Works—Varanasi

4.9 The indices of utilisation of locomotives showed deterioration over the years in that the traffic moved per locomotive declined, as under:

	Net tonne kilometre per day per B.G. goods locomotives in use			Gross tonne kilometre per kg. of tractive effort		
	Steam	Diesel	Electric	Steam	Diesel	Electric
1969-70 . . . . .	31284	225958	242263	1139	5193	4923
1973-74 . . . . .	23810	198571	184109	945	4253	4459
1976-77 . . . . .	21888	229707	297651	904	4729	4216
1977-78 . . . . .	22169	243892	303779	883	4751	4089
1978-79 . . . . .	17415	213119	236513	741	4600	3480
1979-80 . . . . .	13986	213024	226578	666	4508	3316
1980-81 . . . . .	11781	212502	201573	611	1457	3390

The traffic moved per kilometres was less in all the years (except in 1976-77 and 1977-78 for diesel and electric locos) than in 1969-70.

#### *Utilisation of diesel locomotives*

##### *Availability for traffic use*

4.10 Effective utilisation of a locomotive depends upon its timely availability for traffic use, materialisation of load and speed. (Traffic use comprises time spent in hauling trains, terminal detentions, idling in sheds, shunting services, etc., but excludes time spent in sheds and shops when not available for use).

4.11 The number of diesel locomotives available for traffic use during the years 1969-70 to 1980-81 ranged between 81.53 per cent (1976-77) and 88.72 per cent (1969-70) of the number of locomotives on line. After 1976-77 the availability improved to 85.27 per cent in 1978-79, which marginally increased to 85.76 per cent in 1980-81 . .

4.12 A statement showing analysis of the time spent by passenger and goods locomotives on various services such as train engines, shunting services, etc., and performance in terms of engine kilometres is given in Annexure 2. As may be seen from the details in Annexure 2 (column 5) the daily availability of locomotives for traffic use (passenger services) was as low as 11.6 hours during 1979-80 on the Eastern Railway against 18—21 hours on other Railways. Similarly, in respect of locomotives deployed on goods services, the availability was only 14.4 hours on the Eastern Railway in 1979-80 against 18-19 hours on other Railways.

4.18 Out of the total availability for traffic use, the time spent by a passenger and a goods (diesel) locomotive in hauling trains, in 1980-81, was only 64 per cent and 56 per cent respectively. While for goods locomotives train engine hours constituted 55.9 per cent in 1980-81 (against 62 per cent in 1971-72), shunting engine hours 15.5 per cent, assisting engine hours 2.5 per cent and in sidings and departmental use 3.2 per cent, the balance of 22.9 per cent (residual hours) represented the time taken by a locomotive in travelling between the shed and the station, waiting for traffic, late starting of trains (for which it is booked), idling in sheds, etc. Between 1977-78 and 1980-81, the total goods train engine hours increased from 4154 thousands to 4679 thousands (12.4 per cent) on account of increase in stock but the 'residual hours' increased from 1695 thousands to 1920 thousands (13.3 per cent). Bulk of the 'residual hours' in 1980-81, i.e. 22.9 per cent of traffic hours or equivalent of 235 out of 1026 locomotives in use, represented utilisation of power on unproductive work. (The cost of a diesel locomotive was Rs. 54.4 lakhs in 1979-80).

4.14 As may be seen from the details in Annexure 2, such unproductive locomotive hours arising out of locomotives not being put to use (though available for use) due to terminal detentions, idling in sheds, etc. increased during 1980-81 (compared to 1977-78) on the Northern, the Southern and the South Eastern Railways.

In the major yards on Southern Railway (Tondaiyarpeta, Arakonam, Jolarpettai, Cochin Harbour, etc.) the average detention in excess of the targets laid down was 37.4 hours in 1979-80, representing equivalent of 2 locomotives per day. A test review by Audit of terminal detentions in Mughalsarai Yard (Northern Railway) in the months of May 1979, August 1979, December 1979 and March 1980 showed that in 62 cases the detention ranged between 10 hours to 17 hours on each occasion.

4.15 Detentions to locomotives in yards on account of late start of goods trains arising out of non-availability of loads or path, late arrival of crew, etc. constituted 8.6 per cent of the goods engine hours on the Southern Railway during 1979-80 and 4 per cent and 4.4 per cent during 1979-80 and 1980-81 respectively on the Western Railway.

4.16 While the train engine hours represent the time spent by the locomotives in hauling trains (out of the total time available for traffic use), they also include detentions en route for change of crew, line clear, etc. The actual utilisation net of such detentions



etc. is indicated by the indices of engine kilometres per day per engine in use, net tonne kilometres per engine hour and speed. These indices for 1973-74 and during 1976-77 to 1980-81 were as follows:

	1973-74	1976-77	1977-78	1978-79	1979-80	1980-81
Engine kilometres per day per engine in use (EKM)						
Passenger . . . . .	694	721	748	628	630	610
Goods . . . . .	307	379	363	317	307	303
Net tonne kilometres per engine hour . . . . .	10436	11344	11590	11067	11130	11057
Average speed of all goods trains kilometer per hour (km/h) . . . . .	22.2	23.1	22.3	21.5	21.3	21.23

Thus, the utilisation of locomotives (as measured by EKM) deteriorated after 1976-77 and, in 1980-81, it was even lower than in 1973-74. Further, as may be seen from the details in Annexure 2, there was deterioration on all Railways, that on Central and Western Railways being particularly sharp. The Railway Board had fixed (February 1979) targets for utilisation of locomotives varying from 328 EKM per day on Eastern Railway to 450 EKM per day on Northern Railway. None of the Railways had achieved the target prescribed except the Eastern Railway where the target itself was low.

4.17 A contributory factor of the deterioration in utilisation was the decline in the average speed of goods trains from 22.3 kmph in 1977-78 to 21.3 kmph in 1980-81. In the case of passenger locomotives, there had been increase in detentions and decline in punctuality in 1979-80 and 1980-81 compared to earlier years. The percentage of mail and express trains (mostly hauled by diesel/electric locomotives) arriving right time was 84 in 1977-78, 72 in 1978-79, 65 in 1979-80 and 67 in 1980-81. The decline was more pronounced on the Central (from 97 per cent in 1977-78 to 62 in 1980-81) Eastern (from 89 in 1977-78 to 53 in 1980-81) Northern (from 87 in 1977-78 to 68 in 1980-81) and South Central (from 82 in 1977-78 to 65 in 1980-81) Railways.

*Extent of non-availability for traffic use*

4.18 As was mentioned in paragraph 4.11 above, in 1980-81 85.76 per cent of the locomotives only were on an average available for use. The balance of 14.24 per cent or 256 locomotives per day, was under/awaiting repairs. This includes the time spent while waiting for being taken to shops for repairs, in carrying out the repairs, etc. The position of repairs, etc. is discussed in the following paragraphs.

*Idle time before/after repairs*

4.19 There were delays in sending locomotives (after withdrawal from traffic) to workshops for periodical overhaul (P.O.H.) and in putting them back to traffic after P.O.H. resulting in their non-utilisation for several days. A test check showed that, in 1979-80, in Bondamunda shed (South Eastern Railway) there were delays aggregating 143 days involving 11 locomotives, in Mughal-sarai (Northern Railway) 87 days (4 locomotives) and in Howrah-Burdwan (Eastern Railway) 24 days (10 locomotives) in sending the locomotives for P.O.H. Similarly, in putting the locomotives back to traffic after P.O.H. there were delays at these sheds as also the sheds at Itarsi, Waltair and Ratlam resulting in aggregate loss of 330 days (62 locomotives) at Itarsi during the period 1978-79 to 1980-81, 114 days (5 locomotives) at Ratlam during the period March—June 1981, and from 16 to 69 days (4 to 10 locomotives) in the other sheds.

*Facilities for repairs, etc.*

4.20 Though diesel traction was introduced in 1958-59, the creation of facilities for their repair and P.O.H. did not always synchronise with the allotment of locomotives to Railways. Thus, on the Northern Railway, while the holding of WDM2 locomotives increased from 89 in 1976-77 to 155 in 1979-80, the facilities for maintaining the locomotives, according to the Railway Administration's Annual Report for 1979-80, had not been simultaneously increased adequately.

4.21 Similarly, while the Diesel loco shed, Ratlam (Western Railway) was commissioned in 1967 for homing 40 locomotives, its expansion was undertaken in March 1976 to enable holding of 100 locomotives. Even before the expansion work was completed, the holding increased to 116 (1973-74) and, therefore, work on a new diesel locomotive shed (at Vatva) for homing 50 locomotives was taken up and is in progress (74 per cent). Meanwhile the

available facilities had been found inadequate for the holding with the result that the average number of locomotives awaiting repairs increased from 18 in 1978-79 to 22 in 1979-80.

On the other hand, the facilities created in Kharagpur (South Eastern Railway) were not utilised fully. Against the established capacity for P.O.H. of 60 locomotives annually, the actual outturn in 1979-80 and 1980-81 was 49 and 47 only respectively. To avoid idling of the capacity, the Railway Administration decided to undertake yearly and three-yearly maintenance schedules which are to be carried out in sheds, but were in arrears. However, three-yearly schedules for 13 locomotives only were carried out in 1980-81.

*Time taken for repairs*

4.22 (a) Instances were noticed of detentions to locomotives in sheds 'waiting for materials' for long periods as indicated below:

*Itarsi shed*—Between June 1979, and May 1981, 20 locomotives suffered detentions of 6 to 179 days totalling 737 days i.e. equivalent of 2 locomotives remaining immobilised for a whole year.

*Burdwan shed*—During 1978-79 three locomotives were detained for periods of 1-4 months.

*Mughalsarai shed*—During October 1978-March 1980 one locomotive was out of commission from June 1979, there were detained for 14, 15 and 18 months, and 4 more for periods of 1 to 6 months.

*Bondamunda shed*—Between July 1978 and March 1981, 6 locomotives suffered detentions ranging from 101 to 556 days and 50 more from 4 to 92 days.

*Waltair shed*—During 1978-79, 1979-80 and 1980-81, 16 locomotives remained immobilised for over 100 days (maximum upto 306 days) and another 55 for periods of 14 to 100 days.

(b) Cases were noticed of locomotives sent to sheds for maintenance suffering excessive detentions. At Itarsi shed, time standards for periodical maintenance schedules had not been fixed and the time taken for various schedules was excessive compared to that for similar schedules in other sheds, e.g. the quarterly schedules took 32 hours as against 24 hours in Gooty and 16 hours in Ratlam sheds; similarly, the yearly schedule took 23 days against 10 days in Gooty and Ratlam sheds. At Erode shed, 2253 days and 2388 days were lost in 1979-80 and 1980-81 respectively on account of excessive detentions to locomotives and non-observance of tar-

gets fixed. At Bondamunda and Waltair, the corresponding loss was 1181 days and 736 days involving 249 and 22 locomotives respectively during 1979-80.

(c) A review of the time taken for periodical overhaul in workshops showed that the actual time taken was far above the target of 26 days. In Parel Workshop (Central Railway) the loss of locomotive days on account of such excessive detentions was 307 in respect of 67 locomotives during 1978-79 and 1979-80; the corresponding loss in Charbagh Workshop (Northern Railway) was 1622 days involving 25 WDM2 locomotives during the period May 1976 to September 1979 and 464 days for 11 WDM4 locomotives during 1979-80. In Kharagpur workshop, 544 days (54 locomotives) were lost in 1978-79, 461 days (40 locomotives) in 1979-80 and 509 days (45 locomotives) in 1980-81.

(d) A review by Audit of maintenance of locomotives in 8 sheds (Itarsi, Howrah-Burdwan, Mughalsarai, Tughlakabad, Erode, Bondamunda, Waltair and Ratlam) and 3 workshops (Parel, Charbagh and Kharagpur) showed that (i) the percentage of ineffective locomotives (*i.e.* not fit for use), (ii) the number of engine failures on account of mechanical defects, mismanagement by crew, etc. and (iii) delays in carrying out the maintenance schedules had increased. The percentage of ineffective locomotives had increased in 1979-80 in the sheds at Bondamunda, Mughalsarai and Erode; the number of failures had increased in the sheds at Itarsi, Bondamunda, Mughalsarai, Tughlakabad and Erode, *vide* details given in Annexure 3. At Ratlam shed, 45—50 per cent of the engine failures were attributable to defective components and spares.

(e) One of the reasons for the high incidence of engine failures was non-observance of maintenance schedules such as trip schedules, monthly, quarterly and yearly schedules and P.O.H. On the Central Railway, the schedules of 42 locomotives were found to be overdue by 1—6 days during April, 1979 and May, 1979. On the Northern Railway, out of 72 locomotives in Mughalsarai shed only 11 had been given P.O.H. upto 1979-80 and that too after a lapse of 16 years. On the Southern Railway, the percentage of locomotives overdue for P.O.H. increased from 6.42 in 1977-78 to 9.69 in 1978-79. The incidence of failures was found to be higher in the locomotives running overdue P.O.H.

(f) Cases were also noticed of engines failing within a short interval after P.O.H. due to bad workmanship, use of defective parts, etc. Of the 86 engine failures analysed by Audit during 1978-79 to 1980-81 in Tughlakabad (41), Waltair (22), Bondamunda (17)

and Ratlam (6) sheds, 13 failures had occurred within one month of P.O.H., another 16 in 2 months, 12 in 3 months and 7 within 6 months. An average of 5 days per locomotive was taken by the South Eastern Railway to repair the failed locomotives and to put them back to traffic.

4.23 Thus, the utilisation of locomotives as measured by Engine kilometres per day, speed, etc., had deteriorated in 1979-80 and 1980-81 as compared to the performance in earlier years; excessive idling of locomotives had occurred on account of delays in sending them for repairs and putting them back to traffic after repairs, 'waiting for materials', etc.

#### *Utilisation of electric Locomotives*

4.24 Upto 1980-81, 5178 kilometres of railway lines had been electrified, as against 4493 kilometres upto 1975-76. The traffic carried under electric traction and the locomotives on line during the last 5 years were as below:

Year	Traffic carried Gross tonne kilometres (millions)			number of loco- motives on line
	Passenger	Goods	Total	
1976-77	16671	76823	93494	796
1977-78	20636	77847	98503	852
1978-79	21571	70990	92561	890
1979-80	22593	68045	90638	929
1980-81	23323	69169	92492	988

The number of electric locomotives in use for goods services on 31st March, 1981 was 522 as against 368 on 31st March 1977. During this period, however, the goods traffic in terms of gross tonne kilometres carried by electric traction decreased from 76.8 billion in 1976-77 to 69.2 billion in 1980-81, indicating considerable under-utilisation. The pay load (net tonne kilometres) per engine hour of these locomotives consequently went down from 12.668 in 1976-77 (12028 even in 1969-70) to 11104 in 1980-81.

4.25 The availability and use in train of locomotives for goods services had declined on all Railways during 1979-80 and 1980-81 compared to 1976-77. The number of hours worked per day which was 19.1 in 1976-77 (18.2 even in 1969-70) declined to 17.5 in 1979-80 and 16.7 in 1980-81. On the Northern Railway, the actual usage

during 1979-80 on train was only 8.68 hours out of the available 17.03 hours; on the Western Railway it was only 8.56 hours out of 18.74 hours in 1979-80 and 8.48 hours out of 19.03 hours in 1980-81; on the South Eastern Railway it was 10.6 hours out of 21.2 hours in 1980-81.

4.26 One of the reasons for the low utilisation was the extent of detentions in yards, waiting in sheds, etc. represented by 'residual engine hours' (unproductive hours) which had increased from 1154 thousands (35 per cent of goods engine hours) in 1975-76 to 1391 thousands (40 per cent) in 1980-81. The speed of goods trains hauled by electric locomotives had also declined from 25.4 km per hour in 1976-77 (25.8 in 1969-70) to 22.8 only in 1980-81.

4.27 The utilisation of locomotives measures in terms of Engine kilometres per day, for which a target of 425 km had been laid down by the Railway Board, was lower in 1979-80 and 1980-81 on the Eastern (260 and 266), Northern (358 and 369) South Eastern (397 and 351) and Western (437 and 414) Railways than in earlier years (ranging from 410 km to 655 km in 1976-77).

In relation to the target, the excessive hours on line in 1979-80 on the Kanpur—Allahabad—Mughalsarai sections of the Northern Railway amounted to 49,980 hours.

On the South Eastern Railway a test check for March 1980 and March 1981 showed that the detention en route were excessive compared to the prescribed timings; on the sections Jharsuguda Jn.—Bilaspur Jn. and Bilaspur Jn.—Bhilai these (in the aggregate) were as much as 5411 hours and 5766 hours.

4.28 A review in audit of the utilisation of selected locomotives revealed that the loads hauled by them were also much below the loads prescribed by the Railway Administration. On Northern Railway, the maximum load of electric trains (in the months of May 1979, August 1979, December 1979 and March 1980) ranged between 2530 tonnes and 2960 tonnes against 3200 tonnes to 4600 tonnes prescribed. On the Western Railway, 85 per cent of the trains run during April—June 1979 carried loads less than 2,000 tonnes against 2346—2765 prescribed for four-wheelers and 3660 tonnes for BOX wagons.

#### *D.C. Locomotives on Central Railway*

4.29 In paragraph 9 of the Report of the Comptroller and Auditor General of India for the year 1975-76—Union Government

(Railways), it was mentioned that on account of design defects 57 WCG2 locomotives produced in CLW, essentially for banking purposes, could not be used as bankers. The utilisation of these locomotives showed further deterioration during 1978-79 and 1979-80. The daily availability for traffic use was 13.0 hours in 1979-80 against 14.4 in 1975-76, 17.1 in 1976-77, 14.4 in 1977-78 and 13.4 in 1978-79. The traffic moved per locomotive in use was 79419 net tonne kilometres in 1978-79 and 81457 in 1979-80 against 84216 in 1975-76. The engine kilometres per day per locomotive in use also decreased from 426 in 1977-78 to 227 in 1979-80 and 218 in 1980-81.

#### *Allotment of locomotives to Railways*

4.30 The locomotives are allotted to the zonal Railways on the basis of the Power Plans submitted by them showing their requirements for various types of traction. The freight traffic carried by electric traction on the Eastern Railway declined from 12520 million net tonne kilometres (65.3 per cent of foreign traffic under all tractions) in 1969-70 to 8282 million net tonne kilometres (43.2 per cent of total freight traffic) in 1980-81. However, the number of locomotives added and in use on goods services increased from 101 in 1969-70 to 145 in 1980-81. It would appear that the allotment had not been made after a realistic appraisal of the traffic requirements.

#### *Time taken for repairs. P.O.H., etc.*

4.31 Due to non-synchronisation of provision of maintenance facilities with introduction of electric locomotives, the Northern Railway had to send them to Kancharapara workshop (Eastern Railway) and Bhusaval workshop (Central Railway) for P.O.H., the time taken for P.O.H. in these workshops during 1979-80 was 70 days and 57 days respectively (against the prescribed 30 days). The number of locomotive days lost as a result was 1057 in respect of 30 locomotives. Similarly, 276 days were lost in respect of 12 locomotives on the Western Railway and 586 days in respect of 19 locomotives on the South Eastern Railway during 1980-81. On the Central Railway the time taken for periodical overhaul of 32 locomotives (reviewed by Audit) during the period September 1977 to August 1981 was 32 to 73 days against 30 days prescribed; the detention was over 60 days in 14 cases, and 40—60 days in 13 cases.

4.32 Similar hold up of locomotives was also noticed in respect of other repair schedules carried out at Bhusaval, Kanpur, Tatanagar and Bhilai sheds. One of the causes of the delays was stated to be non-availability of spares from CLW despite 10 per cent of capital spares being supplied by CLW along with new locomotives.

4.33 The extent of engine failures on various Railways also showed increase from 140 in 1978-79 to 162 in 1979-80 on Northern Railway, from 277 to 294 on Eastern Railway and from 958 to 1045 on South Eastern Railway. The high incidence of failure on the South Eastern Railway was attributed by the Administration to sub-standard spares and stores, inadequate maintenance and 'mismanagement' by crew.

4.34 Another major factor was the extent of failures of traction motors of the locomotives. The number of such failures on the South Eastern Railway was 247 in 1978-79, 252 in 1979-80 and 246 in 1980-81 and on Western Railway 101 in 1979-80. At the end of 1980-81, 249 traction motors were awaiting repairs on South Eastern Railway and 90 (July 1980) on Northern Railway. Delay in repairs resulted in detention in shops of ten locomotives on Northern Railway in 1979-80 for 15 to 41 days and one for over 9 months. On the Western Railway, for want of facilities of Ratlam, traction motors had to be sent to CLW for repairs and consequently, five locomotives had to be stabled for periods ranging from 12 days to 140 days in 1979-80.

4.35 During 1979-80, there were 18 cases of failure of locomotives on Western Railway on account of leakage of water through roof causing detentions to trains for 29 hours in mid-sections. The roofs of 96 locomotives had consequently to be modified between August 1979 and July 1980 involving detentions in sheds for 6 days per locomotive on an average.

#### *Vijayawada loco shed*

4.36 The planning and setting up of the electric loco shed at Vijayawada (South Central Railway) are reviewed below.

The shed was designed to cater to the repair and maintenance of 100 WAM4 type locomotives, manufactured by the CLW. Forty-seven such locomotives had been received at the shed by December 1980, when the Railway Board decided to transfer 50 WAG1 locomotives, after carrying out certain modifications, to the South Central Railway of which 12 had been received upto May 1981. In order to cater to the requirements of these locomotives the shed at Vijayawada is proposed to be modified at a cost of Rs. 1.48 crores, sanction (of the Railway Board) for which however was accorded only in August 1981. Meanwhile, the facilities already created (cost Rs. 240 lakhs) for WAM4 locos are being utilised only to a limited extent, there being only 47 such locomotives. As for WAG1 locomotives, adequate facilities for repair, maintenance and



POH being **not** available, it had not been possible to adhere to the targets of **overhauling schedules** fully. As against the time limits of **6 hours, 8 hours and 12 hours** prescribed for monthly, bi-monthly and four-monthly schedules respectively, the average time for which **the locomotives remained** in the shed for overhaul was very high during the six months upto May 1981, being 20 hours to 93 hours for monthly, 14 hours to 96 hours for bi-monthly and 57 to 173 hours for four-monthly schedules.

*Utilisation of electrified track*

4.37 Although 5178 kilometres of railway lines had been electrified by March 1981, there is mixed traction practically on all routes of the railway network at present (November 1981) resulting in duplicate facilities such as steam sheds for steam locomotives and diesel sheds for diesel locomotives and shunters, etc. Also, there were delays in taking up electrification of short links necessitating running of diesel trains for operational reasons. Some instances are given in Annexure 4.

*Utilisation of steam locomotives*

4.38 (i) The BG steam locomotive holdings (production discontinued from 1971) at the end of 1969-70 and 1980-81 and the traffic carried by them in these years were as below:

	1969-70	1979-80	1980-81
(a) Holdings (on H.R.C) . . . . .	5927	4697	4532
(b) Traffic carried (GTKM billens) . . . . .	163,833	59,352	43,372

(ii) The stock of steam locomotives on 31-3-1981 included 10 overaged locomotives. Even by the year 1998 another 1592 WP and WG locomotives only would be due for condemnation on age basis leaving in service 1575 such locomotives, besides locomotives of other classes.

The holdings of B.G. steam locomotives (4846) on 1st April 1978 comprised 28 different classes of engines. Even after condemnation of 446 locomotives (being overage), during the period 1978-83, 16 classes of locomotives would still be left with the Railways. The various classes of locomotives are distributed on all Railways. The feasibility of redistributing the various classes of locomotives so as to minimise multiplicity of maintenance facilities does not seem to have been considered.

(iii) The Railways had shown 562 to 657 BG steam locomotives as spare during the years 1977-78 to 1980-81. These were not however taken off the line and kept as 'good repair stored' but were available for traffic use, the actual number kept off the line being therefore much less. The retention of a large number of locomotives for traffic use, though not justified by the requirements of traffic, meant more expenditure in terms of maintenance operating costs including crew and other staff, unnecessary fuel consumption, etc.

(iv) During the years 1978-79 and 1979-80, 11,408 million and 6,995 million tonne kilometres of through goods traffic (on main lines, excluding sectional, transshipment and shunting trains) was moved by steam traction, the fuel cost on moving the quantum of traffic being Rs. 19.39 crores and Rs. 11.89 crores in 1978-79 and 1979-80 respectively. If this traffic could have been diverted to diesel traction by rationalisation of operation between the different modes of traction, Rs. 13.74 crores in 1978-79 and Rs. 8.55 crores in 1979-80 could have been saved on fuel cost alone. If the other operating costs and repairs and maintenance are included the saving would have been much higher.

4.39 A review of utilisation of steam locomotives revealed the following:

(i) The number of locomotives under or awaiting repairs increased from 673 (13.4 per cent) in 1976-77 to 745 (16.4 per cent) in 1980-81 though 487 numbers (mostly overaged) had been taken off the line.

(ii) Detentions to locomotives in yards and sheds were on the increase in relation to the hours spent on train engines *vide* details given below:

	Passenger service		Goods service	
	1975-76	1980-81	1975-76	1980-81
Train engine hours				
Other hours (terminal detentions, idling, etc.)	3191	2792	2913	1310
	1141	1177	2186	1293
Percentage of other hours	35.8	42.2	75.0	98.7

(iii) With the reduction in steam locomotives, heavier types of locomotives (including WG locos) are employed for shunting purposes. The shunting kilometres per 100 train kilometres increased

from 35.0 in 1975-76 to 38.1 in 1980-81. On the Southern Railway this index had risen from 37.8 in 1977-78 to 46.5 in 1979-80. The increase in percentage of shunting kilometres is attributable to slackness in shunting.

### *Sheds and workshops*

4.40 (a) Locomotives under/awaiting repairs on South Eastern Railway increased from 101 (16.8 per cent of the number on line) in 1977-78 to 135 (23.6 per cent) in 1979-80.

(b) Engine failures increased between 1978-79 and 1979-80 from 50 to 119 in four sheds of Northern Railway and from 355 to 557 on South Eastern Railway; a substantial number (39 per cent in 1979-80) of the failures was attributed by the Railway Administration to bad workmanship in sheds.

(c) The time fixed for P.O.H. in workshops is 18 days for a locomotive. It was noticed that the time taken by sheds and workshops for carrying out the various schedules was excessive in relation to the targets fixed. The time taken in excess of the target in Charbagh and Amritsar workshops during 1980-81 was 337 days (134 locomotives) and 101 days (30 locomotives) respectively.

(d) The detentions in shops were attributed to non-availability of materials, gas and spare parts, heavy absenteeism, etc. Locomotives had been also detained after P.O.H. at Amritsar and Charbagh workshops for as many as 129 (30 locomotives) and 1829 (134 locomotives) days respectively in 1980-81.

(e) Further, on the Northern Railway the excess time taken for maintenance schedules of B.G. locomotives in 5 sheds during 1979 and 1980 was 3654 locomotive days (148 locomotives). Including the transit time from sheds to shops and back, the total number of locomotive days lost worked out to 12893.

(f) On the South Eastern Railway, the extra time taken over the targets allowed at Kharagpur shed was 37 to 160 days in respect of 8 locomotives in 1979-80 and 33 to 93 days in respect of 9 locomotives in 1980-81. In all, 778 and 506 engine days (8 and 9 locomotives) were lost in 1979-80 and 1980-81 respectively on account of such excessive detentions which were stated to be partly due to non-availability of materials.

*Fuel consumption*

4.41 A Fuel Control Organisation under an Additional Chief Mechanical Engineer exists on each zonal Railway to keep a watch on fuel consumption. The fuel consumption by the Railways for locomotive purposes, the cost and the traffic carried under different types of traction from 1969-70 onwards are given in Annexure 5. It may be observed that, while the traffic carried by steam traction decreased by 45 per cent, the quantity of coal consumed decreased by 25 per cent only during the period from 1969-70 to 1979-80.

4.42 The following features were noticed during test check of fuel consumption by locomotives.

*Diesel oil*

4.43 (a) (i) On the Eastern Railway, 'trip rations' of diesel oil had not been fixed at all and the instructions issued by the Railway Board in this regard in November 1967, April 1968 and August 1977 had not been implemented.

(ii) Similarly, on the Northern Railway, 'trip rations' had not been fixed in respect of various sections served by WDM2 locomotives homed in Tughlakabad shed.

(iii) The 'trip rations' fixed in 1972 for the BG sections of the Western Railway are still operative and have not been revised despite changed operational conditions, such as removal of speed restrictions, etc.

(b) (i) On the following Railways the consumption of diesel oil exceeded the 'trip rations' (as revealed during a review by Audit of the trip cards of individual locomotives relating to 1979-80 and 1980-81).

	Diesel oil (litres) per 1000 GTKM			
	Trip rations		actual Consumption	
	Passenger	Goods	Passenger	Goods
Central Railway (Itarsi)	4.5	3.5 to	5.4 to 8.9	3.5 5.5
Northern Railway (Mughals rai)	4.96	2.9	4.98 to	2.9 to
	5.04	3.22	5.60	5.14

The excess consumption in one month—December, 1979 was 0.42 lakhs litres (cost Rs. 0.67 lakh) in respect of 28 locomotives.

*Southern Railway (Erode)*

The excess consumption in March 1980 and March 1981 amounted to 0.82 lakh litres and 1 lakh litres respectively (cost Rs. 2.33 lakhs).

*South Eastern Railway (Bondamunda)*

The excess consumption during February 1981 to June 1981 (5 months) was 0.57 lakh litres (cost Rs. 0.79 lakh).

(ii) While the Central Railway Administration attributed the excess consumption to running of passenger trains with low average loads and on non-planned link trains, no reasons were forthcoming for the excess consumption on Northern and South Eastern Railways.

(c) Drivers are required to switch off the engines whenever the detention is expected to exceed 30 minutes. A test check of the detentions suffered by (selected) locomotives revealed that if the instructions had been implemented the Railway Administrations could have saved substantial quantity of diesel oil. Thus, on Central Railway, 10 locomotives reviewed by Audit suffered detentions exceeding one hour aggregating 732 hours in August 1979, involving Rs. 0.24 lakh on diesel oil consumption for such detentions; on Northern Railway 28 locomotives reviewed suffered detentions on 2609 occasions for an aggregate of 6308 hours during May 1979, August 1979, December 1979 and March 1980 involving Rs. 2.3 lakhs on diesel oil and lube oil; on South Eastern Railway there were 49 cases of detentions in excess of one hour during a period of 4 days covered by check in June 1981, aggregating 804 hours and involving diesel oil consumption valued at Rs. 0.23 lakh.

(d) The Railway Board had issued instructions to the Railway in October 1973 and June 1978 that consumption of lubricating oil should not normally exceed 1.5 per cent of the diesel oil consumed for WDM2 and WDM1 locomotives and 1.1 per cent for

WDM4 locomotives. The actual consumption by the Railways was as follows:—

	Percentage of lube oil to diesel oil consumed by WDM2 locomotives		
	1978-79	1979-80	1980-81
Itarsi . . . . .	2.00	1.79	1.80
Tughlakabad . . . . .	0.95	2.18	2.19
Erode . . . . .	1.60	1.43	1.68
Bondamunda . . . . .	1.92	2.50	2.40
Waltair . . . . .	1.86	1.85	1.99
Ratlam . . . . .	..	2.37	2.31

In respect of WDM4 locomotives homed at Mughalsarai the figures were 1.31 per cent and 1.39 per cent in 1978-79 and 1979-80 (against the target norm of 1.1 per cent).

The cost of excess consumption in the five sheds at Itarsi, Tughlakabad, Bondamunda, Waltair and Ratlam worked out to Rs. 191 crores and Rs. 1.12 crores during 1979-80 and 1980-81 respectively, but the matter does not seem to have been investigated.

#### Shed consumption of Diesel oil

(e) The Central Railway Administration had not fixed the (norm) scale of consumption of diesel oil for the various schedules carried out in Itarsi shed. A test check showed that the consumption of diesel oil in 1979-80 and 1980-81 ranged from 174.5 to as much as 244.8 litres for a trip schedule.

The norms on the Northern Railway varied from 17280 litres per month in Mughalsarai shed to 77045 litres per month in Tughlakabad shed. The actual consumption during July 1979 to December 1979 at Tughlakabad however exceeded even the target by 77,250 litres, the reasons for which had not been investigated by the shed authorities.

At Erode also, no yardstick had been fixed; however, the shed consumption increased from 11.30 lakh litres in 1979-80 to 13.56 lakh litres in 1980-81, though the number of locomotives homed had increased marginally by two only.

At Waltair, the shed consumption (15.85 lakh litres) exceeded the target by 3.05 lakh litres during 1980-81 i.e. by 23.9 per cent, but the excess had not been investigated.

### Coal

4.44 (a) (i) The rate of consumption of coal has been increasing as indicated below:—

Year	Coal (Kgs.) Consumed per 1000 G.T.M.(B.G)	
	Passenger	
1969-70 . . . . .	58.3	58.9
1973-74 . . . . .	62.2	65.5
1977-78 . . . . .	62.2	65.7
1978-79 . . . . .	67.1	74.1
1979-80 . . . . .	69.8	83.0
1980-81 . . . . .	75.2	91.0

(ii) Steep increase in the rate of consumption in 1978-79 and 1979-80 was explained by the Railway Administration as being due to drop in average load per train, in speed, in the proportion of fast trains to slow trains, in engine use (due to excessive detention) and in the quality of coal and increase in engine failures.

(iii) The average gross load of goods trains had decreased from 1037 tonnes in 1975-76 to 850 tonnes in 1980-81 (i.e. by 18.0 per cent); however the rate of coal consumption had increased by 38.9 per cent during the same period.

(iv) The quantity of coal consumed on shunting services was the same, viz. 2.85 million tonnes, in both the years 1978-79 and 1979-80 though the hours spent by steam locomotives on shunting work had decreased, from 5.7 million hours in 1978-79 to 5.6 million hours in 1979-80.

The increase in consumption was attributed to use of heavier types of locomotives for shunting services, such as WG (which are standard locomotives for main line services). These locomotives have a larger fire grate area (46 sft.) than the standard shunting locomotives (WS-30 sft.). The question of reducing the fire grate area in these engines used for shunting (by carrying out suitable modifications) so as to minimise coal consumption does not seem to have been considered by the Railways.

### Excessive consumption at sheds

(b) (i) An allowance of 5 quintals of coal is added to the trip ration for shed movement of engines, keeping the engines in steam, etc. A review of the position at Mughalsarai, Kanpur and Allahabad for the period November 1979 to April 1981 showed that the quantity consumed was 3308 tonnes in excess of the allowances fixed. This excess consumption was attributed (December 1980) by the Senior Divisional Mechanical Engineer to pilferage.

(ii) Similar excess consumption valued at Rs. 5.95 lakhs due to pilferage was noticed in respect of lic-over of locomotives at Palwal station of Central Railway during 1979-80.

#### 4.45 *Summing up*

##### (1) General

The locomotive holding of the Railways on 31st March 1981 was excessive in relation to the requirements of traffic, the surplus being 779 locomotives in terms of steam locomotives.

##### (2) Diesel and electric locomotives

(a) Both in the case of diesel and electric traction, the number of locomotives placed on line between 1969-70 and 1980-81 was far more than justified by the increase in traffic. While the number of diesel locomotives increased by 166 per cent (from 675 to 1798) the traffic under diesel traction increased by 103 per cent only. Similarly while the number of electric locomotives increased by 93 per cent (from 513 to 988) the traffic under electric traction increased by 61 per cent only.

(b) The extent of utilisation of locomotives as measured by their availability for traffic, number of hours worked, net tonne kilometres per engine hour, speed, engine kilometres per engine day etc., showed that the performance levels of both diesel and electric locomotives in 1979-80 and 1980-81 were lower than in 1977-78 or even 1969-70. The deterioration was mainly on account of excessive en route and terminal detentions, waiting for traffic, idling in sheds, etc.

(c) The time taken for maintenance and periodical overhaul was excessive resulting in locomotives remaining out of commission for periods ranging from 1 month to 18 months in the case of diesel locomotives and from 1 month to 70 days in the case of electric



locomotives. Further, the creation of facilities for maintenance had not synchronised with the introduction|addition of locomotives resulting in inadequate maintenance. The maintenance and repair schedules had also not been observed resulting in increased failures of engines.

(d) A large number of diesel locomotives had been detained in sheds and workshops for 'want of materials' for periods ranging from 1 month to 18 months. Similarly, on account of frequent failure of traction motors and non-availability of replacements, several electric locomotives had suffered detentions on the Northern, South Eastern and Western Railways for periods ranging from 1 month to 9 months in some cases.

(e) Diesel and steam locomotives continued to be deployed in electrified sections on account of non-electrification of short links and non-elimination of change of traction resulting in additional operating costs.

### (3) Steam Locomotives

(a) The number of steam locomotives taken off the line was not in keeping with the reduction in traffic under steam traction, resulting in more expenditure on operation and repairs and maintenance of steam locomotives.

(b) Though there was reduction in the number of overaged locomotives, the utilisation of locomotives as indicated by the hours of availability had deteriorated.

(c) The indices of utilisation of steam locomotives used for shunting purposes also showed deterioration in 1980-81 compared to earlier years.

### (4) Fuel consumption

(a) The fuel consumption of diesel locomotives was excessive compared to the norms fixed, mainly on account of non-observance of instructions issued by the Railway Board. On several Railways, particularly Eastern and Northern, 'trip rations' for diesel oil consumption had not been laid down: where laid down the consumption was found to be excessive in relation to the 'trip rations' but the excesses had not been investigated.

(b) Norms for shed consumption of diesel oil for maintenance of locomotives had not been laid down on the Central and Southern Railways; where such norms had been laid down on the Northern and South Eastern Railways, they had not been observed resulting in excessive consumption.

(c) The coal consumption by goods locomotives per 1000 GTKM had increased from 58.9 Kgs. in 1969-70 to 91.0 Kgs. in 1980-81. In aggregate terms, while the traffic under steam traction decreased by 51 per cent between 1969-70 and 1980-81 the coal consumption decreased by 27 per cent only. The major causes were excessive detentions in sheds and yards, drop in average load per train and in speed, increase in engine failures, etc.

## ANNEXURE I

(Ref : para 4.7)

Year	Steam		Diesel		Electric	
	G.T.X.M. (P G)	locomotive on line	G.T.X.M. (P G)	locomotive on line	G.T.X.M. (P G)	locomotive on line
1969-70	103.853	5927	101.11	675	57.377	513
1973-74	79.319	5275	121.92	1118	58.840	645
1976-77	72.290	5091	166.29	1370	93.494	796
1977-78	60.484	4888	179.46	1460	98.5033	852
1978-79	57.087	4828	185.06	1575	92.561	899
1979-80	59.352	4697	196.90	1671	90.638	929
1980-81	43.372	4532	205.10	1798	92.492	988

GTKM : Goods tonne kilometre in billions

Locomotives : in numbers

P : Passenger

G : Goods



## ANNEXURE--3

(Ref. : Para 4.22(d))

Year	Number of locos homed	Shed in-effective percentage	Number of engine failures	kilometres per engine failures (lakhs)
(1)	(2)	(3)	(4)	(5)
<b>Itarsi</b>				
1976-77 . . . . .	118	26.7	100	0.61
1977-78 . . . . .	120	24.1	96	0.69
1978-79 . . . . .	120	26.4	109	0.73
1979-80 . . . . .	122	13.7	121	0.82
1980-81 . . . . .	120	13.3	93	0.93
<b>Howrah and Burdwan</b>				
1976-77 . . . . .	61	10.3	29	0.89
1977-78 . . . . .	64	10.2	21	1.18
<b>1978-79 . . . . .</b>	<b>66</b>	<b>11.1</b>	<b>19</b>	<b>1.12</b>
1979-80 . . . . .	67	10.5	21	1.11
1980-81 . . . . .	91	12.3	21	0.85
<b>Bondamunda</b>				
1976-77 . . . . .	63	13.4	48	1.08
1977-78 . . . . .	76	12.4	128	0.37
1978-79 . . . . .	87	13.0	105	0.47
1979-80 . . . . .	93	13.9	158	0.31
1980-81 . . . . .	100	14.6	219	0.21
<b>Waltair</b>				
1976-77 . . . . .	123	21.9	316	0.58
1977-78 . . . . .	137	22.6	600	0.25
1978-79 . . . . .	133	21.0	516	0.28
1979-80 . . . . .	132	16.7	500	0.28
1980-81 . . . . .	130	14.7	432	0.31

(1)	(2)	(3)	(4)	(5)
<b>Ratlam</b>				
1976-77 . . . . .	138	21.0	175	0.88
1977-78 . . . . .	137	20.5	160	0.98
1978-79 . . . . .	144	11.9	183	0.82
1979-80 . . . . .	149	12.8	155	1.02
1980-81 . . . . .	150	12.0	152	1.16
<b>Mughalsarai</b>				
1976-77 . . . . .	72	14.6	58	1.75
1977-78 . . . . .	72	13.0	66	1.36
1978-79 . . . . .	72	14.0	82	1.15
1979-80 . . . . .	72	16.9	120	0.85
1980-81 . . . . .	70	15.6	68	1.17
<b>Tughlakabad</b>				
1976-77 . . . . .	105	9.4	97	1.14
1977-78 . . . . .	110	11.5	114	1.26
1978-79 . . . . .	110	11.6	98	1.45
1979-80 . . . . .	110	10.8	110	1.33
1980-81 . . . . .	110	11.6	98	1.45
<b>Erode</b>				
1976-77 . . . . .	89	13.4	155	1.42
1977-78 . . . . .	98	13.5	95	1.93
1978-79 . . . . .	111	14.5	86	1.68
1979-80 . . . . .	113	14.7	190	1.44
1980-81 . . . . .	120	13.0	80	2.00

## ANNEXURE 4

(Ref. : Para 4.37)

(i) Railway lines in the coal and steel belts of Chandrapura Complex connect 4 major coal washeries and lie between the main electrified sections on the Eastern and the South Eastern Railways electrified in II and III plan periods. Their electrification is expected to eliminate the existing constraints in the movement of wagons caused due to change of traction within short distances of the destination. Yet, electrification of these lines at a cost of Rs. 14.55 crores was taken up in 1980-81 only.

(ii) While the Bombay-Ahmedabad section was energised in stages from March 1973 to November 1975, the electrification of Ahmedabad-Sabarmati and Ahmedabad-Asarva sections, though originally included in the Virar-Sabarmati Electrification Project, was not carried out. Meanwhile, the point loads between Sabarmati and Bombay Vadodara side have to be detained in the busy Ahmedabad yard for change of power, thereby affecting the movement of traffic. On an average 3.5 trains per day in each direction (to and from Sabarmati) are so detained involving 2 hours 13 minutes per train as against 55 minutes prior to electrification. Similarly, block loads for Sabarmati from/to Ratlam side are worked with diesel power involving haulage of diesel trains on electrified sections.

(iii) On Bhusaval-Igatpuri and Bhusaval-Manmad sections which were energised by 31st March 1969, 1318 trains in 1979 and 784 in 1980 were run with diesel power.

(iv) The entire section between Madras and Vijayawada had been electrified by December 1980. According to the records of the Administration, on an average 5.90 locomotives were available as spares. (The 'spares' are engines not actually worked during 24 hours on any one day from mid-night to mid-night) during the period January 1981. Nevertheless, a total of about 44,67,58 (in thousands) GTKMs were done with diesel traction during the same period (January 1981 to May 1981) due to shortage of crew. Diesel traction being costlier than electric traction, this involved extra expenditure of Rs. 11.5 lakhs on fuel costs.

## ANNEXURE—5

(Refer Para 44.1)

(All Gauges)

Year	Quantity of coal million tonnes	Cost Rs. Crores	Traffic (GTKM million)
<i>Steam Traction</i>			
1969-70	15.22	102.55	191834
1973-74	12.69	92.31	143836
1976-77	12.18	136.90	140907
1977-78	12.29	136.35	135914
1978-79	11.63	134.19	116442
1979-80	11.39	169.32	106156
1980-81	11.09	187.51	94806
<i>Diesel Traction</i>			
Year	Qty. of HSD oil kilolitre	Cost Rs. Crores	Traffic (GTKM million)
1969-70	536301	45.12	127963
1973-74	681006	57.45	157626
1976-77	846654	106.40	213040
1977-78	945660	118.49	228536
1978-79	952621	120.46	235632
1979-80	980742	140.00	248932
1980-81	1093252	214.44	259697
<i>Electric Traction</i>			
Year	Units KWH million	Cost Rs. Crores	Traffic carried (GTKM million)
1969-70	1013.5	10.48	63020
1973-74	977.2	14.22	64621
1976-77	1447.0	33.09	102551
1977-78	1543.0	36.24	108429
1978-79	1513.0	41.32	102225
1979-80	1574.0	49.90	99965
1980-81	1640.3	60.45	1020003



## APPENDIX II

### *Statement of conclusions and recommendations*

Sl. No.	Para No.(s)	Ministry [ Deptt. Concerned	Conclusions and Recommendation
1	2	3	3
1.25 & 1.26		Railways	<p>The Committee are concerned over the heavy surplus locomotive holdings of the Indian Railways. According to the Audit Paragraph, as against the anticipated requirement of 9300 locomotives in steam terms, the number of locomotives on line was 10079 during 1980-81, resulting in a surplus holding of 779 locomotives. The corresponding surpluses for the preceding two years—1978-79 and 1979-80—were 509 and 617, respectively. However, as the traffic that actually moved in these years was much less than that in 1977-78, the actual surplus holdings in the years 1978-79, 1979-80 and 1980-81 were much higher, viz., 868, 907 and 1069, respectively. Although there was a steep rise in the excess locomotive holdings in these years, the surplus has not arisen suddenly. In paragraph 11 of the Railway Audit Report for 1969-70, it had been pointed out that the locomotive holding was far in excess of the requirement for moving the traffic that materialised during 1965-66 to 1968-69. Excess locomotive holdings have continued ever since.</p>

The Committee observe that surplus holdings are mainly in two types of locomotives-steam and electric. According to the Ministry of Railways, the main reason for the surplus in steam locomotives was that "steam engines were not condemned fast" and the main reason for surplus in electric locomotives was that track energisation programme had lagged far behind the locomotive procurement programme. The Committee cannot but observe that the Ministry of Railways had not laid down a time bound programme for phasing out steam locomotives with the introduction of high power diesel and electric locomotives.

Though the dieselisation and electrification began during the Second Plan period the decision to introduce diesel and electric traction and closing down steam traction appear to be somewhat ad hoc resulting in mixed traction and multiplicity of facilities. The Committee would like the Ministry of Railways to tackle the problem by framing a perspective Plan. The shortfall in the track energisation was attributed to constraint of resources. However, as admitted by the representative of Ministry of Railways (Railway Board) in evidence, "in the Fifth Five Year Plan the money that was given was not spent". Although the progress in track energisation in the Sixth Plan has been better than in the Fifth Plan, according to the figures given in evidence, a shortfall of 600 km. will remain in the Sixth Plan. In order to make full use of the huge investment in electric locomotives, the Committee feel that priority has to be assigned to track energisation and its pace accelerated.

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1	2	3	4
2	1-27	Railways	<p>Lack of proper planning on the part of the Railway Board is also evident from the fact that while large tracks had been electrified, some short intermediate links had not been electrified. The result had been that while a number of electric locomotives continue to be surplus, steam and diesel locomotives continue to be deployed on some electrified sections. The Committee would like the Ministry to accord a high priority to the energisation of the short intermediate links, in the interest of optimum utilisation of electric locomotives. The Committee would like to be apprised of the action taken in the matter.</p>
3	1-28	Do.	<p>As against the increase of 103 per cent in traffic under diesel locomotives during the period 1969-70 to 1980-81 the increase in the number of diesel locomotives was 166 per cent. Likewise, as against the increase of 61 per cent in traffic under electric locomotives during the same period, the increase in the number of electric locomotives was 93 per cent. On the other hand, as against the reduction of 23.5 per cent in the stock of steam locomotives during the same period, the reduction in the traffic carried under the steam/traction was of the order of 58 per cent. It is apparent from the figures that the increase in the number of diesel and electric locomotives has been far in excess of that justified by increase in traffic. Likewise, the decrease in the number of steam locomotives was far less than that necessitated by decrease in traffic. While the Committee appreciate that it may not always be possible to match the increases/decreases</p>

in the number of locomotives with increases/decreases in traffic, there ought to be some close approximation between the two. For this, a very alert monitoring arrangement to observe the current and past trends of traffic, and a very efficient machinery for drawing up accurate future projections of traffic is needed.

4 1·29 Railways/Planning  
Commission

Non-materialisation of the anticipated traffic seems to have been largely responsible for the surplus locomotive holding. Against the target of 250 million tonnes for 1978-79, the Railways could lift only 223.4 million tonnes. The actual traffic lifted during 1980-81 was even less—220 million tonnes, i.e. 3.4 million tonnes less than that even in 1978-79. The shortfalls were partly on account of the traffic anticipations not materialising and partly on account of Railways' own inadequacies in not handling the entire traffic available. The Committee would expect the Ministry of Railways and the Planning Commission to refine their techniques of forecasting traffic under various tractions so as to avoid over-capitalisation of Railways and the Ministry of Railways to gear up their machinery to ensure optimum utilisation of their assets.

5 2·20 Railways . . . . .

In terms of engine hours, the Railway Board's target for utilisation of diesel locos is 80 per cent availability i.e. 19.2 hours per day. This target was achieved on all the Railways except the Passenger Services on the Eastern Railway and Goods Services on the South Eastern Railway. The position on the Eastern Railway was dismal inasmuch

as the engine usage hours were 12.5 in 1976-77, 13.2 in 1977-78, 13.5 in 1978-79, 11.6 in 1979-80 and 11.1 in 1980-81. The engine usage hours for goods trains on the South Eastern Railway were also very low. According to the Railway Board, the main reasons for low train engine usage hours on the aforesaid two Railways were faulty controlling of trains by the control offices, mismanagement by train crew, loco failures, accidents, inefficient working of yards, resulting in delayed formation and late start of trains and staff indiscipline. The Ministry of Railways have informed the Committee that they have taken certain remedial steps which had "brought about improvement in position." That the inefficiency was allowed to persist for so long until recently owing to variety of reasons most of which were not beyond the control of the Railway Administration, shows that the monitoring and review of the position for appropriate action were not, to say the least, satisfactory. The Committee desire the Ministry of Railways to review the system of controls exercised by the Railway Board at Zonal level and at Divisional level and streamline the procedures so as to improve the efficiency of utilisation. They would like to be informed of the results of such review.

6 2-21 Railways . . . . .

The Committee are also concerned at the very high percentage of unproductive diesel locomotive hours, technically called "residual hours" arising out of a locomotive not being put to use (though available for use) due to the time taken by it in travelling between the

shed and the station, waiting for traffic, late starting of trains, idling in sheds etc. Overall, the "residual hours" constituted 22.9 per cent of traffic hours or an equivalent of 255 out of the 1026 locomotives in use in 1980-81. An idea of the extent of idle investment represented by residual hours can be had from the fact that a diesel locomotive costs Rs. 54.5 lakhs. The Committee are surprised that the Railway Board has admitted with complacency that the main reason for "high residual hours is inefficient utilisation of motive power". In extenuation, the Railway Board have given the reasons for the "far from satisfactory" mobility of Indian Railways during the first half of 1980-81. According to them, various factors such as extensive power cuts in the eastern sector resulting in drop of productivity in the marshalling yards, loco sheds and workshops, disturbed conditions in Assam, staff unrest and strikes had crippled general operational efficiency and affected all indices including engine utilisation. However, several remedial measures had been taken to improve engine utilisation. As a result, the unproductive hours of diesel engines which were 23.1 per cent in 1980-81 had been brought down to 21.3 per cent in 1981-82. This improvement, according to the Committee is not quite significant. They would like the Railway Board to continue to make efforts to reduce the "residual hours" to the barest minimum.

111

7 2.22 & Railways  
2.23

The Committee are also concerned to note a sharp deterioration in the net utilisation of diesel locomotives as indicated by three important indices viz, engine kilometres per day (EKM), net tonne

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kilometres per engine hour (NTKM) and average speed per hour. The Committee observe from the Audit paragraph that the EKM for passenger trains had improved from 694 in 1973-74 to 748 in 1977-78 whereafter it had sharply fallen as low as 610 in 1980-81. Likewise, the EKM for goods trains had improved from 307 in 1973-74 to 363 in 1977-78 whereafter it had sharply fallen (303 in 1980-81). The net tonne kilometre per engine hour (NTKM) had improved from 10436 in 1973-74 to 11590 in 1977-78 whereafter it decreased to 11057 in 1980-81. The average speed of all goods trains in 1980-81 was 21.3 kilometres per hour, as against 22.2 in 1973.

The Committee further observe that the position regarding **EKM had deteriorated in all the zonal Railways and particularly sharply in the Central, Eastern and Western Railways. None of the Railways had achieved the target fixed by the Railway Board except the Eastern Railway where the target itself was very low.** As to the remedial measures, the Ministry have stated that the Railway Board is closely monitoring the engine kilometres on the Railways on a daily basis and the reasons for shortfall in any particular sector are being analysed and immediate action is being taken. With the segregation of roller bearing wagons and extension of end-to-end running there has been a considerable improvement in position. The Committee desire the Ministry to continue their efforts with greater vigour to further improve the position. They would like to informed of the outcome

of the effort made by the Ministry. The Committee would also like the Railway Board to examine why the target of Engine Kilometres on Eastern Railway is as low as 328 compared to 450 on Northern Railway and why the targets vary widely between the Railways.

An aspect which has particularly disturbed the Committee is steep fall in punctuality of trains (mostly hauled by diesel/electric locomotives). The punctuality in the Central Railway fell from 97 per cent in 1977-78 to 62 per cent in 1980-81, in the Eastern Railway, it fell from 89 per cent in 1977-78 to 53 per cent in 1980-81, in the Northern Railway, it fell from 87 per cent in 1977-78 to 68 per cent in 1980-81 and in the South Central Railway from 82 per cent in 1977-78 to 65 per cent in 1980-81. According to the Ministry, the main reasons for fall in punctuality are alarm chain pulling, disconnection of hose pipes, miscreant activities, accidents and public agitations. As to the measures to improve the position, the Committee have been informed by the Ministry that the punctuality performance of about 200 Mail/Express trains is being watched daily in Railway Boards office and cases of avoidable detentions are investigated properly. General Managers have been asked to pay special attention to punctual running of trains. Liaison with concerned State Governments is being maintained by various Zonal Railways for arresting the incidents of alarm chain pulling, hose-pipe dis-connections and other miscreant activities. The Committee would like to be informed of the outcome of the efforts made by the Ministry to improve the position. They are positive that the train punctuality ought to be brought at least to the level of 1977-78, if not further improved upon.

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9 2.39 Railways

A significant factor that contributes to non-availability of locomotives for traffic use is the idle time before/after repairs. In 1980-81, 14.24 per cent of diesel locomotives or 256 locomotives per day were 'under/awaiting repairs'. The Committee take a serious view of the inordinately long time taken in some cases in sending locomotives (after withdrawal from traffic) to workshops for periodical overhaul (POH) and in putting them back to traffic after POH. A test check by Audit showed that in one shed, there were delays aggregating 143 days involving 11 locomotives and in another delay aggregating 87 days involving 4 locomotives in sending the locomotives for overhaul. Likewise, there was aggregate loss of 330 days involving 62 locomotives in one shed and of 114 days involving 5 locomotives in another shed. In a note furnished to the Committee, the Ministry have stated that after a locomotive is withdrawn from traffic service, it is given the necessary attention before being sent to the workshop, which may be quite far from the home shed. On return from the workshop and after necessary repairs, the locomotive is thoroughly checked up before being put to regular service. In view of this, the Ministry have stated that "the figures for the period prior to repairs and after repairs, including transit time to and from the shops can be considered satisfactory". The Committee are not convinced by this explanation and are unable to understand why it should take as long as 25 days for sending the locomotives for periodical overhaul. The Committee desire the Railway Board to

lay down norms for the time to be taken for sending locomotives for POH and putting them back to service so that the delays are cut down to the barest minimum.

10 2.40 Railways . . . . .

The Committee observe that although diesel traction was introduced in 1958-59, the creation of facilities for their repair and periodical overhaul (POH) did not always synchronise with the allotment of locomotives to the Railways. This is again indicative of lack of perspective planning on the part of the Ministry of Railways. With the introduction of diesel locomotives and reduction of steam locomotives there appears to have been no attempt to minimise the multiplicity of maintenance facilities for steam locomotives so as to modify the steam loco workshops and sheds and mobilise the resources for maintenance of diesel locomotives (*vide* para 4.25 also).

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Facilities for periodical overhaul of 72 WDM-4 class locomotives were not created on Northern Railway with the result that these locomotives were not given POH for 16 years and spare parts had to be airlifted when the locomotive failed. The Committee fail to understand the reasons for not providing suitable facilities. The Committee note that the Railways have been able to reduce the number of overdue POH in 1981-82. It would appear that with more efficient utilisation of the existing facilities the Railways could have attended to the POH of locomotives without letting the locomotives run overdue repair and consequent failures.

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As regards shed maintenance, according to the Railway Board the locomotive holding was far in excess of the homing shed capacity locomotive holding for repair and overhaul of most of the sheds was far in excess of their homing capacity with the consequential increase in the average number of locomotives awaiting repairs. As on 1-4-1980, for the broad gauge diesel locomotive holdings of 1977, there was a shortfall of homing shed facilities to the extent of 20 per cent. The inadequate homing capacity has a variety of wide-ranging repercussions such as hold-up of locomotives for berthing and repairs, quality of maintenance, reliability of locos in service, follow-up with regard to spares, etc. All these in turn have an impact on operation. The Committee note that in view of the serious situation in the mid-1970's, the matter was reviewed by a high level committee. The said committee *inter alia* recommended that the backlog should be cleared over the next three years keeping in view the production plan, homing shed capacity, availability of works already sanctioned. Even though the Committee's proposals were accepted, owing to financial constraints the actual provision of homing capacity has not been able to match the locomotive holdings. The Committee need hardly stress that if the Railway Board want to reduce the unnecessary time spent in waiting in sheds, there is no alternative before the Board but to increase the homing capacity of sheds to match the locomotive holdings. The Committee hope that the Railway Board would attend to augmenting of the capacity

without any further loss of time. Granting the financial constraints the *inter se* priority of plan programmes needs to be realistically re-determined in the light of the experience gained so far. This calls for urgent action. The Committee would await the action taken in this regard.

11 2.41 Railways

The long detentions of locomotives in sheds in a number of cases awaiting materials is yet another serious matter. The Committee find that some of the locomotives had remained immobilised for as long as 14 to 18 months for want of materials. In extenuation the Ministry of Railways (Railway Board) have stated that a diesel locomotive is 'an extremely sophisticated and complex equipment' consisting of over 50,000 components. It is not economically justifiable to maintain quantities of spares of each and every item, which would lead to a very heavy locking up of capital. Items which are regularly in use are planned for stocking in sheds. However, for imported spares, in view of a much longer lead, the assessment of requirement and planning is started two years in advance. The overall maintenance of diesel locomotive is so planned that the target of 'under and awaiting repairs' is 12.5 per cent in general. However, from the figures furnished by the Ministry, the Committee find that the target of 12.5 per cent for 'under and awaiting repairs' has not been achieved in any of the years 1976-77 to 1980-81. The percentage has ranged from 13.9 to 17.1 during the years. In any case the Committee feel that such long delays over a year as they have noticed are indefensible. The Committee are of

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the view that after regulating the production of locomotives to meet the requirements of traffic that materialised from time to time the unutilised capacity of the Production Units could have been utilised for the manufacture of spares for diesel locomotives. The Ministry have enumerated certain special steps to minimise diesel loco hold-ups for want of materials. To tackle the problem on a long term basis, it has been decided to set up a Diesel component Workshop at Patiala for both adequate and timely supply. The Committee would urge that steps taken should be such that would reduce the detentions for want of materials to the minimum.

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2.42

Railways . . . . .

The Committee learn from the Ministry of Railways that the procedure for processing and clearance of import of spares and the procurement is so elaborate that the planning has to start two years in advance. The Committee recommend that the procedure should be streamlined in consultation with the Ministries concerned so that while serving the purpose it would not delay the import of spares to meet emergent situations. They would also like the Railways to periodically review the lists of items planned for stocking with a view to including new items of frequent demand and deleting non-moving old items, depending upon the past trends of demand and consumption.

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2.43

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The Committee are also concerned over long detentions of locomotives sent to sheds for maintenance. In one of the sheds—Erode—

2253 days were lost in 1979-80 and 2388 days in 1980-81 on account of excessive detentions. At another shed, 1181 days were lost in 1979-80 and at yet another shed 736 days during the same period. From the fact furnished by the Ministry, the Committee find that the main reason for the excessive detention of locos in all these cases was insufficient homing capacity of sheds. The need for augmenting the capacity is thus clearly established as pointed out by the Committee earlier.

14 2.44 -do- . . . . The Committee would like the Ministry to fix time standards for periodical maintenance schedules in all cases where these have not been fixed already.

15 3.32 -do- . . . . The important index of utilisation of a locomotive viz. net tonne kilometres per day per locomotive (NTKM) indicates that compared to diesel locomotives the deterioration in the utilisation of electric locomotives has been far more pronounced. The NTKM per BG electric goods locomotive fell from 303779 in 1977-78 to 201472 in 1980-81 (fall of nearly 33 per cent) whereas NTKM of diesel goods locomotives fell from 243892 to 212502 (a fall of nearly 12.5 per cent). There was a steady downward trend in the goods traffic on electric traction right from 1976-77 with a marginal improvement in 1980-81. In terms of gross tonne kilometres, the goods traffic decreased from 76.8 billions with a deployment of 368 locomotives in 1976-77 to 69.2 billions with a deployment of 522 locomotives.

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The fall in freight traffic was very steep in the eastern region where it fell from 12.52 billion net tonne kilometres in 1969-70 to 8.29 billion net tonne kilometres in 1980-81.

16 3-33 Railways

The average speed of an electric locomotives had also continuously gone down from 25.8 km per hour in 1969-70 to 22.8 km per hour in 1980-81. The Ministry have ascribed the fall in the utilisation of electric locomotives to general fall in efficiency, heavy power cuts and frequent staff agitations. On the Eastern Railway the efficiency was further affected by staff indiscipline which culminated in 'go-slow' tactics and loco staff running strike in 1980-81. However, the Ministry have claimed that Government have since taken remedial measures as a result of which there had been improvement in position. The engine kilometreage per day had gone up from 327 in 1980-81 to 384 in 1981-82 and the speed had also gone up from 22.8 km per hour to 23.1 km per hour in 1981-82. The Committee feel that though there has been a slight improvement in position, a lot still remains to be done. They would expect further improvement in this regard.

17 3-34 -do-

The Committee find that while the availability and use of electric locomotives for goods services had declined on all Railways during 1979-80 and 1980-81 compared to 1976-77, the position was particularly bad on two Railways—Northern and Western. On the Northern Railway, the actual usage during 1979-80 on train was only

8.68 hours out of the available 17.3 hours, and on the Western Railway it was only 8.56 hours out of 18.74 hours in 1979-80 and 8.48 hours out of 19.3 hours in 1980-81. Except the floods and breaches that affected adversely the electric engine usage during the rainy season on these two Railways, the reasons given by the Ministry are the same as for the low utilization of diesel engine usage on Eastern and South Eastern Railways. The Committee are not, therefore, satisfied with such a general explanation. The Committee would like the Railway Board to study the problem in depth, identify precisely the causes responsible for such low usage of electric engines on the two Railways and take corrective measures without delay. The Committee would like to have a further report in the matter.

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18 3:35 -do- . . . .

Earlier in this Report, the Committee have expressed their concern over the 'residual engine hours' (unproductive hours) represented by detentions in yards, waiting in sheds, etc. in the case of diesel engines. The position in the case of electric engines is worse inasmuch as 'residual engine hours' was as high as 40 per cent compared to 22.9 per cent in the case of diesel engines in 1980-81. Another disturbing feature of utilization of electric locomotives is that the loads hauled by these locomotives were much below the loads prescribed by the Railway Administration. On Northern Railway, the maximum load of electric trains ranged between 2530 tonnes and 2960 tonnes against 3200 tonnes to 4600 tonnes prescribed. On the Western Railway, 85 per cent of the trains



running during April-June 1979 carried loads less than 2,000 tonnes against 2346 to 3660 tonnes prescribed. The main reason given by the Ministry for under-loaded trains was that to avoid the chocking-up of marshalling yards, trains were despatched without waiting for completion of load. As to the remedial measures, the Ministry have stated that they are requesting the bulk customers—steel plants, fertilizer and cement factories—to load more and more block rakes and club their piecemeal despatches to form a train load. On the Western Railway, salt and cement manufacturers are being persuaded to offer bulk of the traffic in rake loads. The Railways are holding regular meetings with their principal customers. It is needless for the Committee to emphasise that any train with less than full load gives less revenue to the Railways than they would otherwise get. It is therefore imperative for the Railways to make every effort to run full load trains, if necessary, by adopting a system of incentives to bulk consumers. The Committee would like to be informed of the outcome of the efforts made/proposed to be made by the Railways in this regard.

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The Committee are unhappy over the manner in which the Railway Board had allotted electric locomotives to the zonal Railways. The freight traffic carried by electric traction on the Eastern Railway declined from 12520 million net tonne kilometres in 1969-70 to 8282 million net tonne kilometres in 1980-81. However, the

number of locomotives added to goods services increased from 101 in 1969-70 to 145 in 1980-81, resulting in gross under-utilisation of locomotives. In a note furnished to the Committee, the Ministry have stated that the allotment of locos is made on the basis of the traffic needs of each Railway. More electric locomotives had been allotted to the Eastern and South-Eastern Railways as these were the two premier Railways for freight traffic and account for 60 per cent of the freight movement on the Indian Railways. The Ministry have further stated that there had been a decline in the traffic carried by electric traction on the Eastern Railway "mainly on account of more intensive deployment of diesel locomotives, particularly on the non-electrified routes." The Committee are not convinced by this explanation. It is apparent to them from the facts of the case that the Railway Board had failed to make a realistic appraisal of not only the traffic requirements of zonal Railways before making allotment of electric locomotives but also of the traffic to be carried by the electric and diesel tractions in the Eastern Railway. The Committee would, therefore, like the Railway Board to review the position and make sure that the present electric locomotive allotment to the various Railways is in accordance with their requirements and optimum utilisation is achieved.

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20 3:37 Railways . . . . .

Earlier in this Report, the Committee have dwelt at length on the heavy loss of locomotive days on account of inadequate repair/periodical overhaul facilities for diesel locomotives. They find that the position is no better in the case of electric locomotives. For instance, the time taken for periodical overhaul in Kanchrapara Workshop was 70 days

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and in Bhusaval 57 days, as against the prescribed period of 30 days, resulting in heavy loss of locomotive days. The Northern Railway had to send electric locomotives all the way to Kanchrapara and Bhusaval workshops for periodical overhaul. The Committee would like the Railway Board to go into the matter in depth, identify the deficiencies and take necessary corrective steps with a view to reduce the loss of locomotive days on account of detentions for repairs/periodical overhauls to the barest minimum.

21 3.38

Railways . . . . .

An aspect to which the Committee would draw particular attention is the extent of failures of traction motors of locomotives. The number of such failures on the South-Eastern Railway was 252 and that on the Western Railway 101 in 1979-80. As many as 259 traction motors were awaiting repairs on the South-Eastern Railway and 90 on the Northern Railway in July 1980. According to the Ministry, the failures were generally due to inadequate "insulation schemes", defects in workmanship during the manufacture, generally poor quality of indigenous material used and arduous loading conditions. The Ministry have assured the Committee that necessary remedial measures are being implemented to reduce the incidents of failures. Repair facilities for traction motors have been set up at Tatanagar and Kanpur. In addition, a Central repair workshop has been established at Nasik to meet the requirements of all the Railways. The Ministry have expressed the hope that with the commissioning of this workshop the backlog of various Railways will be cleared fast. The Committee would like

to be apprised of the results of the efforts made by the Railways to improve the position.

22 3-39 Railways

The Committee have already commented upon the delay in the energisation of sort intermediate links. The result was that while there was surplus electric locomotive holding, steam and diesel locomotives continued to run on the electric track. The Committee observe that although 5178 km of railway lines had been electrified by March 1981, there was mixed traction practically on all the routes of the railway network, resulting in duplicate facilities such as steam sheds and diesel sheds in addition to electric sheds on electrified sections. On two electrified sections alone—Bhusaval-Igatpuri and Bhusaval-Manmad sections—1318 trains in 1979 and 784 trains in 1980 were run with diesel power. The Committee have been informed that in November 1980 a clear directive was issued by the Railway Board to all the zonal Railways that only electric engines should haul traffic over the electrified routes. The implementation was monitored at Board's level on a day-to-day basis. As a result, electric NTKMs on the Eastern Railway which were 7425 millions in 1980-81 had increased to 10680 million NTKMs in 1981-82, with fewer locomotives in use. The Committee are happy to learn this. They would like the Ministry to continue with the process of improvement till optimum utilisation of the electric locomotives is achieved, having regard to the economics of electric traction *vis-a-vis* other tractions in the overall interest of the country.

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23	4.23 & 4.24	Railway	<p>Presently the Railways are holding 738 WP steam locomotives and 4221 WG steam locomotives (total 4959). Out of this, 568 WGs and 259 WPs (total 827) have a codal life of more than 20 years. Because of the very hgih operational cost of steam locomotives, it is propped to completely phase them out. However, because of financial constraints involved in acquiring diesel and electric locomotives and energisation of tract, condemnation of steam locomotives is being done in a phased manner. Based on the coal life the last steam loco on BG and MG will be phased out in 2012-13.</p>

The Committee observe that during the year 1979-80, 6995 million tonne kilometres of through goods traffic was moved by steam traction, the fuel cost on moving this quantum of traffic being 11.89 crores. If this traffic could have been diverted to diesel traction by rationalisation operation between the different modes of tractions, Rs. 8.55 crores in 1979-80 could have been saved on fuel cost alone. If the other operating costs and repairs and maintenance are included the saving would have been much higher. According to Railway Board, the cost of maintenance per 1000 GTKM of steam locomotive for goods services was Rs. 85.39 while that of diesel locomotive was only Rs. 16.77. As already pointed out by the Committee, there is under-utilisation of both diesel and electric locomotives available at present. In view of all these, the Committee would like the Railway Board to consider whether the pace of condemnation of highly uneconomic steam engi-

nes cannot be accelerated if no improvement could be effected as suggested later in this Report.

24 4.25 Railways

The Committee also observe that on 1-4-78 there were 28 different classes of steam engines in operation on the Indian Railways. Even after condemnation of 446 locomotives during the period 1978—83, 16 classes of locomotives would still be left with the Railway. The Committee would like the Railway Board to examine the feasibility of redistributing the various classes of locomotives so as to minimize the multiplicity of maintenance facilities in each Zonal Railways. Of the three tractions, the position of utilisation of locomotives is the worst in the case of steam locomotives. The net tonne kilometre per day per steam BG goods locomotives had come down from 31284 in 1969-70 to 11781 in 1980-81. Detention to locomotives in yards and sheds were on the increase in relation to the hours spent on train engines and its percentage was as high as 98.7 in 1980-81. The Committee recommend that Government should come out with a clear policy on the future of steam traction and take appropriate action to make use of the existing asset optimally.

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25 4.26 Railways

As discussed earlier in this Report the monitoring and review mechanism to ensure optimum utilisation of locomotives (steam, diesel or electric) does not seem to work satisfactorily. The Railway Board have however, clarified that the monitoring is done at three levels—Divisional, Zonal and Board levels. At the Divisional level, the

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loco utilisation is monitored in the Control Office which functions round the clock. The Divisional figures are conveyed to Zonal Railway Headquarters where the utilisation is watched at the level of Chief Operating Superintendent. The Zonal Railways give a feedback daily to Railway Board and this is discussed in the operating meetings held by the Member (Traffic) and the utilisation of locos is watched. The Committee are constrained to observe that in spite of daily monitoring at three levels the position of utilisation of locomotives leaves much to be desired. The Committee would like the Railway Board to examine how far the existing monitoring system needs to be streamlined to fully subserve the purpose.

26 5.23 Railways

Fuel constitutes an important element on the operating cost of a locomotive. It is therefore imperative that its consumption is properly regulated in accordance with well set 'norms'. With this end in view, 'trip rations' are required to be fixed and there were repeated instructions of the Railway Board to this effect. However, the Committee find on the Eastern Railway, trip rations had not been fixed at all and on the Northern Railway 'Trip rations' were not fixed in respect of various sections. On the Western Railway, 'trip rations' fixed in 1972 had not been revised, despite changed operational conditions. While the Committee note that steps are being taken in this regard on these Zonal Railways, they cannot help expressing regret that the Railway Board's repeated instructions should have been disregarded in the

Zonal Railways till Audit pointed out the lapse. This indicates that the existing arrangements in the Railway Board to see that the instructions issued by it are implemented by the Zonal Railways are totally unsatisfactory. The Committee desire that such lapses should not be allowed to persist in future.

27 5.24 Railways

According to the instructions issued by the Railway Board, consumption of lubricating oil should not normally exceed 1.5 per cent of the diesel oil consumption for WDM2 and WDM1 locomotives and 1.1 per cent for WDM4 locomotives. The Committee however observe that the consumption of lubricating oil in quite a number of sheds was fairly in excess of the limits laid down by the Railways Board. The Committee note the various steps taken by the Railways to bring the lubricating oil consumption close to the targets fixed by the Railway Board and as a result the consumption of lubricating oil as a percentage of diesel oil at Itarsi, Tuglakabad and Erode sheds has been considerably brought down. At Erode, it is already within the prescribed limit but at Itarsi and Tuglakabad it is still in excess of the prescribed limit. The Committee trust that the Railway Board will continue to make efforts to bring the lubricating oil consumption in all the sheds within the prescribed limit.

28 5.25 Railways

The Committee note that 'scales' (norms) of consumption of diesel oil for various schedules had not been fixed in some sheds while at other sheds consumption exceeded the target. In a note furnished to the Committee, the Ministry have stated that Railways have generally



fixed 'ration' for HSD used for cleaning and also for consumption rates for diesel locos in their sheds. Railways are being advised to fix similar targets for shed consumption after necessary studies in cases where the same have not already been done. It is not clear how the Railway Board did not initiate action in this regard until Audit pointed it out. However the Committee desire that early action should be taken to complete the studies and to fix the targets and the Committee informed of it.

29 5-26 Railways

The Committee observe that while the average gross load of goods trains had decreased from 1307 tonnes in 1975-76 to 850 tonnes in 1979-80 (i.e. by 18 per cent), the rate of coal consumption has increased by 39 per cent during the same period. According to the Ministry, the main reason for increase in coal consumption is that with more and more dieselisation/electrification, steam locomotives are being relegated to inferior services and are being utilised for shunting. As to the action taken by the Ministry to minimise the coal consumption, the Railway Board have stated that wherever the WG locomotives are earmarked for doing light shunting, the fire grate area of these engines has been reduced to economise on coal consumption. Out of the total 783 WG locos deployed on shunting services, 266 locomotives have reduced fire grate area. The Committee would like the Ministry to examine whether it is not possible to reduce the fire grate area in the remaining 513 WG locos. They would also

like the Railway Board to examine whether the increased coal consumption on the Railways is also not partly due to pilferage.

The Committee note that the thermal efficiency of a steam locomotive is around 6 to 7 per cent, which is nearly one-fourth of the thermal efficiency of a diesel locomotive. The operating cost of a steam locomotive is nearly four times that of a diesel locomotive, and the maximum speed which a steam engine can attain is considerably less than that of a diesel locomotive. Therefore, there seems hardly any alternative for the Railways but to phase out steam engines. However, the Committee learn that through research, Argentina has been able to raise the thermal efficiency of a steam engine to about 12 per cent, with a low grade of coal and in the United States prototypes of steam engines are reported to have been developed with a thermal efficiency of 18 per cent, and a speed of 130 kilometres per hour. In view of this, the Committee would like the Railway Board to examine the feasibility of carrying out research to see if the thermal efficiency, operating cost and speed of a steam locomotive can be improved to an extent that would justify the relation and greater use of the existing steam locomotives.

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#### CONCLUSION

The Committee's examination of the utilisation of locomotives has revealed that the locomotive holdings of the Railways were quite excessive to the requirements of the traffic handled. However, the fact remains that the Railways are unable to handle the entire traffic available. Thus, partly on account of the Plan projections of traffic

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note materialising and partly on account of Railways own inadequacies to handle the entire traffic available, there is surplus of locomotives. This surplus is more if one reckons with the inefficient use of locomotives, as disclosed by various indices of performance dealt with in this Report. Lack of proper planning and clear enunciation of *inter se* priority of Plan programmes in the light of past experience besides operational inefficiency has contributed to this phenomenon. For instance, diesel and steam locomotives continue to be deployed in electrified sections on account of non-electrification of short links and non-elimination of change of traction. Repair and maintenance facilities lag behind the need with the result the idle time of locomotives awaiting repairs etc. is very high. All this requires careful examination in a coordinated manner in the light of the shortcomings pointed out by the Committee, in order to ensure that assets of the Railways are optimally utilized in a manner that is in the overall interest of the economy. The machinery for planning, monitoring and review as well as follow-up action should be improved to achieve this end. The Committee hope that the Ministry of Railways would earnestly address themselves to this task without delay.

