Chapter 4 – Mechanical – Zonal Hqrs/Workshops/ Production units

The Mechanical Department is headed by Member (Mechanical) at Railway Board and by Chief Mechanical Engineer at the Zonal level. The department is responsible for the supply and maintenance of adequate numbers of safe and reliable rolling stock for ensuring passenger comfort and safety. For manufacturing and periodic overhauling of rolling stock, six production units and 45 workshops were established in the different Railway Zones. Various 'running sheds', sick lines and train examination stations were conveniently established on the lines, where different types of rolling stock were examined and kept in readiness for immediate use.

The total expenditure of the Mechanical Department during the year 2009-10 was ₹19,754.55 crore. During the year, apart from regular audit of vouchers and tenders etc., 536 offices of Mechanical Department were inspected.

This chapter includes major audit findings dealing with issues of planning and procurement of rolling stock, maintenance and periodic overhauling, workshop modernization, issues of design/ up-gradation of locos/ coaches/wagons. Issues regarding non-adherence/non-implementation of rules contained in Mechanical Code (Workshop), Track Manuals and other rules/orders issued by Railway Board are also covered.

4.1 North Western Railway: Excessive delays in maintenance of locomotives

Failure of the Railway Administration to carry out the maintenance schedules of diesel locomotives within the prescribed time led to excess detention and consequential loss of earning capacity to the tune of ₹ 92.89 crore

Locomotives were a valuable revenue-earning asset of the Railways, being responsible for haulage of train services. To ensure maximum availability and optimum utilization of the loco fleet, scheduled preventive maintenance was carried out at specified intervals. Any excess time taken, directly affects the availability of locomotives for rail services.

The maintenance of Diesel locos (Broad Gauge) of North Western Railway was carried out by the Diesel Sheds located at Abu Road (ABR) and Bhagat Ki Kothi (BGKT). Review of records of scheduled maintenance carried out by these sheds during the period 2008-09 to 2009-10 (November 2008 to October 2009) revealed that the ABR Diesel shed carried out 2260 maintenance schedules, out of which 2240 maintenance schedules (99 per cent) were not carried out within the prescribed time. The excess time taken in all the schedules resulted in loss of earning capacity of `43.74 crore. Similarly, BGKT Diesel Shed carried out 3022 maintenance schedules, out of which 2676 maintenance schedules (89 per cent) were not carried out within the prescribed time. The excess time taken in all the schedules resulted in loss of earning capacity of `49.15 crore.

When the matter was brought to the notice of Railway Board (September 2010), they admitted (December 2010) that there was scope of improvement in detention of locos through avoidance of bunching of locos, over utilization of locos etc. However, they contended that extra time was taken when locomotives required additional repairs and major sub-assemblies were required to be arranged from Diesel Locomotives Works (DLW) and Diesel Maintenance Works (DMW). They further stated that the outage of locomotives was a better indicator of the shed's performance as regards the maintenance of locomotives was increased.

The reply was not acceptable for the reason that better outage as claimed by the Railways evidently was achieved at the cost of less than prescribed maintenance schedules. Over utilization of the locos resulted in major repairs entailing large detentions owing to lack of availability of critical components which should have been provided for.

Had the Railway Administration properly planned and carried out the diesel loco maintenance schedules within the prescribed time, the loss of

`92.89 crore (`43.74 crore + `49.15 crore) on account of detention to locomotives could have been avoided.

4.2 North Western Railway: Loss due to non stocking of critical spares

Non stocking of critical spares resulted in derating/ detention of locomotives causing under utilization of loco capacity and consequential loss of ₹ 85.81 crore

During the review of field performance of ABB/ Napier turbo charges fitted on 3100 H.P. diesel engines, Research, Design and Standards Organization (RDSO) had decided in favour of fitment of high capacity high efficiency turbo super chargers (TSCs) in WDM2 locos. This was to increase engine horse power of locos from 2600 bhp to 3100 bhp for making them capable of hauling a trailing load of 4400 tonnes on a mean gradient of 1 in 200 as against 3250 tonnes for WDM2 loco. Further, as per provisions of Indian Railway Maintenance Manual for Diesel Locos, the system of preventive maintenance envisaged a schedule for maintenance attention at regular intervals and replacement of components before they actually failed in service due to ageing, wear and tear etc. to obtain maximum life possible. The system also aimed at synchronization of attention to all related components so that the manpower and engine-days lost on account of the examination were kept to the minimum. The loco sheds homing up to 100 locos were required to keep four TSCs and one Diesel engine power pack complete with generator as exchange spares.

The diesel sheds at Abu Road and Bhagat-Ki-Kothi homing around 100 locos each were supposed to keep all the required TSCs and other essential machines as spares. Review in Audit of these two diesel sheds revealed that WDM3A/ WDG3A locomotives were derated to WDM2 due to failure of the TSCs which could not be replaced due to their non-availability as exchange spares in the respective Diesel sheds. Audit observed that during the 2006-07 to 2009-10 (October 2010), 50 locos were de-rated for a period of 15 days and 725 days. Further, due to derating of the locos, Railway Administration had to provide one additional locomotive (double headed) to haul loaded BCN rakes, which under normal circumstances would have been hauled by a single WDG3A/ WDM3A locomotive. The excess fuel consumed on provision of extra loco worked out to `.8.63 crore and the consequential loss on provision of one extra locomotive for 8,019 days worked out to `73.52 crore. Similarly, locomotives, having residual life of 18 years, that were received for repair due to damaged Crankshaft/ engine block were detained for periods of 32 days to

121 days due to non availability of the required spares. During the period 2006-07 to 2009-10, 13 locomotives were detained for a total of 383 days resulting in loss of earning capacity of `3.66 crore.

Due to non availability of TSCs, Crankshaft and Power Pack and derating/ detention to locos for unduly long periods, Railway Administration had to suffer a loss of `.85.81 crore [`.8.63 crore (+)` 73.52 crore (+)`3.66 crore] which could have been avoided had these critical spares been stocked.

When the matter was brought to the notice of Railway Administration (March 2010), they stated (June 2010) that power pack did not play any role in derating of locomotives and 720 type TSCs were already available with the sheds. They further stated that the double heading operation of a locomotive was done by the Traffic Department according to their requirements and all the 50 derated locos were used in freight/ passenger services having lesser load and as such, there was no loss on this account. It was also stated that the WDM2 locomotives could not be converted to WDG3A locomotives.

The remarks were not acceptable. Derating of locos happened due to failure of high capacity TSCs. As regards stocking of 720 type TSCs in the sheds, the facts were that high capacity, high efficiency TSCs required to keep the locos in rated condition were not available in the sheds in the first place causing derating of locos and sufficient number of freight trains could not move for want of locos, as also confirmed by the Railway Administration. This resulted in suboptimal utilization of loco capacity causing avoidable use of tow locos for hauling heavier loads which otherwise would have been hauled by a single rated loco. Further, the Traffic Department was dependent upon the Mechanical Department for locos and accordingly planned the operation of freight/ passenger services as per the availability of suitable locomotives. The argument of conversion of WDM2 locos to WDG3A locos was misplaced as the point of contention was that after fitment of high horse power TSCs the engine horse power would increase from 2600 bhp to 3100 bhp and the engine would be capable of hauling heavier loads.

Thus, failure of the Railway Administration to stock important critical spares resulted in derating/ detention to locos for unduly long period causing loss of `85.81 crore.

The matter was brought to the notice of Railway Board (October 2010); their reply had not received (January 2011).

4.3 South Western Railway: Idling of diesel locomotives for want of Wheel Discs

Detention of WDG-4 locomotives in the shed exclusively for want of wheel discs for replacement resulted in loss of locomotive earnings to the extent of ₹20.47 crore

Locomotives management was critical to efficient operation of freight and passenger transportation. Optimal utilization of the locomotives to meet the ever increasing demands of passenger and freight services depended upon effective maintenance of this core asset.

Electro Motive Division (EMD) shed, Hubli was set up exclusively for the maintenance of WDG-4 locomotives. Primary maintenance, repairs and replacement of defective parts of these locomotives were undertaken in this shed. Change of wheel discs was one of the major activities undertaken in the shed. Wheel discs of WDG-4 locomotives were different from other locomotives. Initially, requirement of wheel discs was met through imports alone. Subsequently, the Administration started obtaining the wheel discs from Durgapur Steel Plant (DSP) as well. The requirement of wheel discs was put to Diesel Locomotive Works (DLW), Varanasi and Railway Board through Non Stock Indents. Railway Board solely controlled the procurement process.

A review of the records of EMD shed for the period April 2007 to October 2009 revealed that there were heavy detentions to locomotives arriving at the shed for wheel change due to paucity of wheel discs. Even after allowing a reasonable time of 15 days for wheel change operation and other allied activities, the time taken was much more and had resulted in a total detention of 2060 days to 38 locomotives causing loss of `20.47.

When the matter was taken up with the Railway Administration (April 2010), they stated (June 2010) that the introduction of WDG-4 locomotives in the ghat section increased the requirement of wheel discs. Wheels supplied by DSP were no match for imported ones. Further, the wheel demand projections were made taking into account the increase in the loco holdings. Since wheel discs were very highly capital intensive, stocking of the item in anticipation of their working in ghat section would have resulted in holding high inventory.

When the matter was taken up with Railway Board (August 2010), they reiterated the above and stated that wheel requirement closely matched the indents placed and supply received. There was no lapse on the part of the administration in planning the procurement of wheels. EMD Shed met the outage targets and there had never been a natural shortage of locomotives for traffic, despite shortage of wheel discs.

Their reply was not acceptable for the reason that adequate provision for working of the ghat section should have been planned keeping in view higher wear and tear of the wheel discs and the inferior quality of wheels supplied by DSP. While the shed had been meeting the outage targets, the detention of the locomotives for unduly long periods for want of wheel discs could have been avoided through better inventory planning.

4.4 West Central Railway: Non recovery of empty haulage and stabling charges of tank wagons sent for POH without degassing

Failure of the administration to levy empty haulage as well as stabling charges on tank wagons received for periodical overhauling without degassing besides non-recovery of ₹ 0.81 crore resulted in loss of earning potential of ₹18.71 crore on account of avoidable detention of 49791 days

Maintenance manual for Liquefied Petroleum Gas tank wagons (GT) provided that no person shall be allowed to enter the tank barrel for internal examination/repairs till it was ensured that the barrel was free from Liquefied Petroleum Gas (LPG) fumes and necessary facilities of light and fresh air were provided. The manual further provided that it was the duty of the oil companies to send barrels free from LPG (after proper degassing) for Periodical overhauling (POH).

Kota Workshop was nominated for POH of gas tank wagons. Consequent upon an accident in January 2002 involving Gas tank wagon, it was recommended that the practice of ascertaining the degassing certificate and physically checking the wagons for presence of LPG with the help of explosive meter from sampling valve in the open area should be continued. In compliance with the above provisions and directions, 1885 GT wagons were received for POH during the period 2005-06 to 2009-10 (up to September 2009),. Of these 221 wagons (8 and 4 wheeler) were sent back to oil companies as they were either not accompanied by a de-gassing certificate or were found with gas contents. These wagons were, therefore, returned to Bajwa (Vadodara) of Western Railway for de-gassing. However, the empty haulage charges and stabling charges of ` 0.81 crore for the avoidable movement/stabling of these wagons in the Railway premises were not recovered.

Audit also noticed that, the wagons received for POH without proper de-gassing remained out of traffic service for a total period of 49791 wagon days resulting in loss of earning potential of ` 18.71 crore during the period 2005-06 to 2009-10.

When the matter was taken up with the Railway Board (September 2010), they admitted (April 2010) the receipt of wagons without degassing certificate or without proper de-gassing They, however, stated that the assessment of loss of earnings was not correct as the eight wheel wagons were fully owned by the oil companies and four wheel wagons were jointly owned by Railway and oil companies. They also stated that oil companies were responsible only for payment of empty haulage of only 14 wagons for which Divisional Authorities had been instructed to recover the amount. As per their reply the remaining wagons were returned for want of degassing certificate for which Railway officials of the originating yards were responsible as they had not ensured the receipt of proper certificate. They added that instructions had been issued to all concerned to ensure that tank wagons were received with degassing certificate and checked for the same.

The contention of the Railway Board that the assessment of loss of earnings was not correct as the eight wheel wagons were fully owned by the oil companies on account of the fact that the wagons procured under 'Own Your Wagon Scheme' or 'Wagon Investment Scheme' were required to be merged and operated in the general pool of Indian Railways. Since these wagons were returned by the Workshop for completion of de-gassing or for want of requisite certificate and involved avoidable empty movement as well as unnecessary detention, they remained out of traffic service and caused loss of potential earnings on account of failure of the Railway to ensure that the wagons were properly degassed before dispatch for POH.

4.5 Northeast Frontier Railway: Avoidable loss due to replenishment of missing fittings on inward tank rakes

Due to non-compliance with Railway Board's instructions regarding release of inward tank rakes at unloading terminals Railway Administration suffered an avoidable loss of ₹.3.35 crore on account of replenishment of missing fittings during the period April 2006 to December 2009

BTPN wagons/ rakes were critical railway assets for freight earnings for transportation of POL products over Indian Railways. In view of the potential of high volume of petroleum and other liquid (POL) traffic to be offered by M/s. Numaligarh Refinery Limited (NRL), Railway Board decided (August 1997) to develop a centralized tank wagon maintenance facility at New Jalpaiguri (NJP) as a mother depot to cater to the maintenance needs of all the loading points of Northeast Frontier Railway. Accordingly, the infrastructural facilities were developed in 2001 at NJP to provide maintenance attention to BTPN rakes prior to release for loading at NRL.

Railway Board had issued instructions (April 2004/ June 2005 and July 2008) to the Commercial and Operating staff stipulating that release memo from the

consignees should not be accepted if the tank wagon rakes were handed over by the Oil Industry/ Consumers with deficiencies. Audit, however, noticed that during the period April 2006 to December 2009, an expenditure of `3.35 crore was booked on replenishment of missing fittings on inward tank rakes received from the consignee points.

When the matter was brought to the notice of Railway Board (September 2010), they admitted (February 2011) that in view of the existing cost implications, RDSO had been advised to find an alternative scheme for sealing of discharge outlets. However, they contended that the items were consumable in nature and were required to be replaced to ensure safe running of trains.

The reply was not acceptable. The oil companies were required to return empty wagons with complete fittings. Railway Board also from time to time had issued instructions to the Zonal Railways not to accept defective wagons from the oil companies and in case these were received with deficient fittings the cost of the same was to be borne by the oil companies. Moreover, consumable stores were meant for replacing those items which became unserviceable during normal operations and not for those which were found missing from the wagons due to mishandling or theft.

Had the Railway Administration taken due cognizance of the serious concern expressed by Railway Board regarding the occurrence and implications of frequent incidents of missing fittings, expenditure of `3.35 crore incurred on replenishment of missing fittings on inward tank rakes could have been avoided.

4.6 Northeast Frontier Railway: Avoidable loss due to inadequate infrastructure and inefficient maintenance facility in C&W yard

Railway Administration suffered loss of ₹.3.33 crore due to avoidable detention of BTPN rakes in C&W yard and unnecessary empty haulage of unfit tank wagons during the period January 2006 to December 2009

Keeping in view the high volume of POL traffic to be offered by M/s. Numaligarh Refinery Limited (NRL), Railway Board in August 1997 decided to develop the centralized tank wagon maintenance facilities at New Jalpaiguri (NJP) as a mother depot to cater to the maintenance needs of all the BTPN rakes. The facilities were to be developed in such a way that the examination as well as repairing could be done within three hours. As per policy decision the rakes were to be examined at NJP before loading and there was no further examination after loading.

Accordingly, the infrastructural facilities were developed in a centralized manner on nominated lines in C&W yard at NJP in 2001. The expenditure on creation of these facilities was to be shared by NRL and Railway Administration. M/s. NRL was required to bear the expenditure on steam cleaning activities including shallow pit, gantry and track. As per the joint procedure issued (January 2001), the rakes were to be intensively examined and Brake Power Certificate (BPC) issued for running of 4500 kms. (revised to 7500 kms. in February 2009) for rakes exclusively used in closed circuit and for running of 3500 kms for other BTPN rakes so that the rakes on their arrival at Numaligarh refinery gantries could be directly loaded without any further C&W attention.

Scrutiny of records of Carriage and Wagon (C&W) yard at NJP, however, revealed that the Railway Administration created all other maintenance facilities except gantry which was a pre-requisite for complete examination. Due to inadequate maintenance infrastructure at NJP, supplementary maintenance had to be provided by the Railway's mechanical staff posted at NRL loading point. The mechanical staff in C&W yard at NJP was consuming 4 hours 02 minutes to 07 hours 51 minutes per day for each rake in addition to 02 hours 03 minutes to 02 hours 08 minutes taken in further maintenance attention at NRL gantries as against the projected time of 03 hours for the same.

Consequently, 2,259 BTPN rakes suffered detention for 491 wagon days during April 2006 to December 2009, leading to loss of earning capacity of `2.00 crore. Further, due to inefficient maintenance by the mechanical staff in C&W yard at NJP, even unfit wagons were being embedded in the BTPN rakes dispatched to NRL under BPC. These anomalies resulted in rejection of 590 unfit wagons of 455 rakes during the period from January 2006 to November 2009 that were unnecessarily hauled empty for 14.10 lakh kms. to various destinations over Indian Railways resulting in avoidable empty haulage of wagons amounting to `1.33 crore.

Thus, due to avoidable detention of BTPN rakes in C&W yard at NJP and NRL loading point and unnecessary empty haulage of unfit tank wagons, Railway Administration suffered a loss of `3.33 crore during the period from January 2006 to December 2009.

When the matter was taken up with the Railway Administration (February 2010); they stated (June 2010) that the provision of gantry was a pre-requisite

at the loading point and not for the BTPN rake maintenance in the yard. For provision of Gantry, there was also space limitation in the yard. Regarding supplementary maintenance at NRL, it was stated that the deployment of C&W maintenance staff at loading point was a vital part of the system and different types of examination/ work had to be carried out at loading/ unloading point irrespective of whether gantry facility was available or not. They further stated that BPC was issued only for fit running wagons while their loadability could be examined at the point of loading. In order to maintain the integrity of the rake, wagons fit for run but unfit for loading were carried with the other loaded wagons under special circumstances.

The contention of the Railway Administration was not tenable. The provision of Gantry at NJP was made as per contract awarded for construction of the BTPN yard at NJP and accordingly a portion of gantry was constructed. But in August 2001, DME/ NJP decided to drop the proposed construction of gantry and dismantle the portion of gantry already constructed. This clearly indicated that there was no space limitation in the yard. As regards supplementary maintenance at NRL and unfit rake for loading, Joint Mechanical and Operating Circular No.1/2001, clearly indicated that the maintenance facilities for BTPN rakes were developed in a centralized manner at NJP so that rakes on arrival at Numaligarh refinery could be directly loaded without any further C&W attention. The Railway Board had clearly anticipated such an arrangement even earlier (1989).

The matter was brought to the notice of Railway Board (October 2010); their reply had not received (January 2011).

4.7 North Central Railway: Improper management of hazardous waste

Improper management of waste and failure of compliance with provisions of environmental regulations resulted in accumulation of more than 1600 MT of hazardous waste over period of 18 years in the work shop premises endangering human environment, besides the closure of the workshop for about 3 months entailing significant production loss of 14000 finished springs valuing ₹ 2.28 crore

Providing rail service at the least pollution of the environment was the stated objective of Railways from the beginning. In terms of various environment Rules such as Environment (Protection) Act 1986 and in terms of Environment Hazards Wastes (Management and Handling Rules) 1989 etc. the generator of hazardous wastes shall be responsible for the proper collection, reception, treatment, storage and disposal of them without causing any adverse effects to the environment. Further such parties should obtain authorization from Pollution Control Boards for carrying out such operations.

Rail Spring Karkhana-Sithouli, Gwalior started manufacturing coil springs for Indian Railways in 1989. During the manufacturing of springs a lot of end grinding sludge (about120MT per Annum was produced which contained

hazardous elements such as hexavalent chromium, nickel and chromium. The wastes were allowed to accumulate over the years (1600 MT by November 2007) in the Workshop premises. In 2002, at the behest of Madhya Pradesh Pollution Control Board (MPPCB) Railway Administration sent samples of sludge to authorized testing laboratories for ascertaining whether these contained any hazardous elements or not. The test results (August 2002) confirmed the presence of hazardous substances mentioned above in the sludge. However, no concrete action was initiated by the workshop for the disposal of the waste. As such MPPCB, while granting their authorization (May 2004) for the continued production of springs, stipulated that the accumulated hazardous sludge along with other hazardous items like waste oil and containers should be disposed of within 30 days. No definite action plan for the disposal of the waste was submitted to MPPCB despite further notices, warnings and show cause notice issued from time to time. As a result, MPPCB notified (July 2007) the closure of the workshop and the workshop was closed on 20.08.2007. Subsequently, the workshop submitted a time bound action plan for arrangement of disposal of the waste based on which MPPCB gave their permission to restart production (November 2007). The accumulated hazardous waste was finally disposed of by January 2008.

Due to the enforced closure of the workshop (20.08.2007 to 14.11.2007) there was a production loss of 14000 finished springs valuing `2.28 crore vis-à-vis annual production target fixed by Railway Board for the year 2007-08.

The matter was taken up (September 2010) with the Railway Board; in reply (December 2010), they stated that MPPCB had been giving regular authorization for continued production of springs till 2002. It was only in 2002, MPPCB asked the workshop to get the sludge tested and based on the positive result, they recommended disposal of waste in May 2004. And due to procedural delays the disposal of the hazardous waste was prolonged. Taking into account the target proposed by the workshop, the production loss was only 9000 springs but this was offset since the staffs was, utilized for coiling work and maintenance of machines and plants etc during the period when the workshop remained closed.

The reply was not acceptable. It was observed that the environment statement submitted to MPPCB by workshop till 2002 claimed that the sludge generated was not hazardous without any tests having been conducted in any laboratory. Thus, the statement in this respect was misleading. Further, the accumulation

of sludge in the premises was also not reported to MPPCB. Railways, as a public utility had a duty to discharge its environmental responsibilities in accordance with the relevant statutory regulations and the continued accumulation of the hazardous wastes over prolonged periods was in violation of Railway's own corporate objectives. Further, the enforced closure of the workshop resulted in shortfall of 14000 springs vis-à-vis annual target during the year 2007-08.

Thus improper management of waste and failure of compliance with environmental regulations resulted in accumulation of more than 1600 MT of hazardous waste over a period of 18 years in the work shop premises endangering human environment. Further, the closure of the workshop for about 3 months entailed a production loss of 14000 finished springs valuing `2.28 crore.

4.8 North Eastern Railway: Non-commissioning of a machine

Poor planning and lack of effective coordinated efforts had resulted in non commissioning of a machine valuing ₹2.96 crore for more than two years depriving Railways the net saving of ₹1.17 crore expected from its commissioning

In order to augment the maintenance facilities at the new Coaching Depot at Lucknow, a proposal for sanction for an Under Floor Wheel Lathe on additional account was sent to Railway Board by the Zonal Railway Administration. The proposal did not include the cost of required essential facilities for its installation such as covered shed, track and electrical works. Railway Board sanctioned the procurement of the machine in May 2005. Under Floor Wheel Lathe was used for turning defective wheels without removing them from the coaches. This would reduce the ineffective time of coaches which in turn resulted in increase in earnings. The procurement of the machine was justified on the expected net annual saving of ` 0.61 crore.

Subsequently the lathe machine was procured through COFMOW at a cost of `2.96 crore without creating the required facility for its installation. The Machine was received in Coaching Depot in May 2008. However the required facilities were got sanctioned from Railway Board belatedly in December 2008 as a material modification. Thereafter, the contract valuing ` 0.82 crore for carrying out the work was awarded in January 2010. The work was still in progress (July 2010). As such the machine procured remained idle for want of non-commissioning resulting in non- realization of saving of ` 1.17 crore till March 2010. The loss would further mount.

When the matter was taken up with Railway Administration (February 2010), they stated (July 2010) that efforts were made to get the work sanctioned

before the arrival of machine, but the same could not materialize. Further there were some delays in awarding the contract. The reply was not acceptable because Railway Administration failed to include the facilities in the initial sanction and thereafter took more than three years in obtaining sanction for material modification. With better planning and effective co-ordination the delay could have been avoided.

Thus poor planning and lack of effective co-ordination efforts had resulted in non-commissioning of a machine valuing `2.96 crore for more than two years since its receipt depriving Railways the net saving of ` 1.17 crore expected from its commissioning.

The matter was brought to the notice of Railway Board (October 2010); their reply had not been received (January 2011).