Chapter 2 ⇨ Prevention and Control of Pollution

Audit Objective 1

To verify whether the workshops, sheds and PUs complied with the existing laws, rules and regulations relating to prevention and control of air, water and noise pollution

Pollution refers to introduction of contaminants into a natural environment that causes instability, disorder, harm or discomfort to the ecosystem. The growing concerns on the adverse impact of pollution in the environment resulted in legislative enactments[6] at the national level to protect the environment. Workshops, sheds and production units in Indian Railways (IR) conduct various maintenance and production activities. Pollution issues arise mainly while performing various activities including Smith[7], Foundry[8], Furnace, Welding etc. The initiatives of workshops, sheds and PUs in controlling pollution have significant impact in tackling environmental challenges of the country.

2.1 Statutory Compliance

2.1.1 Consent to Establish and Operation

As per section 21 of the Air (Prevention and Control of Pollution) Act, 1981, no person shall except with the previous consent of the State Pollution Control Board (SPCB), establish or operate any industrial plant in an air pollution control area. Sections 24, 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974 provide that no person shall knowingly cause or permit flow of any poisonous, toxic or polluting matter into any stream, well, sewer and land without treating it.

Scrutiny of records relating to Consent to Establish (CTE) and Consent for Operation (CFO) obtained by the selected units from the State Pollution Control Boards revealed the following position:

[6] Environment (Protection) Act, 1986, The Air (Prevention and control of Pollution) Act, 1981, The Water (Prevention and control of Pollution) Act, 1974, The Water (Prevention and control of Pollution) Cess Act, 1977 and the Noise Pollution (Regulation and Controls) Rules, 2000

[7] Working on metal such as shaping of metallic objects by heating or hammering

[8] Casting of metallic objects

I. Consent to Establish under Air and Water Act was not obtained in 40 workshops and 82 sheds (88 *per cent*). The three ZRs (CR, ER and NER) were of the view that CTE was not obtained as the workshops were established prior to enactment of the Act. Contention of the ZRs was, however, not in line with the provisions of Section 21 of the Air (Prevention and Control of Pollution) Act 1981 and Sections 25 and 26 of Water Act which stipulates that the industries that started functioning prior to the commencement of the Acts, must obtain CTE within three months of the commencement of the Act;

II. Consent for Operation under Air and Water Act was not obtained in 26 workshops and 68 sheds (68 *per cent*) across all ZRs. In respect of remaining 23 workshops and 21 sheds where consent was obtained, periodical renewal of Consent for Operation under Air Act and Water Act was not obtained in 11 workshops & four sheds and 11 workshops & five sheds respectively.

III. WBPCB had not granted CFO to Liluah Workshop (ER) in spite of expiry of earlier consent in December 2011 as the workshop did not obtain CTE for commissioning new infrastructure and machinery. Environmental clearance for the new activities/expansion/modernization had also not been obtained from MoEF under Environment Impact Assessment (EIA) notification 2006 as amended from time to time.

IV. Out of six PUs, though CFO was obtained by all units, CTE under Air and Water Act was obtained only by two PUs[9]. CFO obtained by DLW/Varanasi was not renewed (under Air Act) beyond 2010 due to failure in making provision for acoustic enclosure of DG Sets. CFO under Water Act was also not renewed beyond 2011 by CLW/Chittaranjan due to non compliance with the WBPCBs directives for rectification of Sewage Treatment Plant (STP). On this being pointed out by Audit (September 2013), CLW authority obtained CFO in April 2014 with retrospective effect with the same stipulations which implied that the STP plant was not rectified till grant of CFO in April 2014. Further, there was no provision in Air (Prevention and Control of Pollution) Act 1981 for obtaining CFO with retrospective effect.

RB in their reply (November 2013) stated that CFO and CTE was not taken for Sheds/Depots as they are not covered under Factory Act. Contention of RB was, however, not acceptable as Section 21 of the Air (Prevention and Control of Pollution) Act 1981 stipulates that any industrial plant in an air

[9] ICF, Perambur/Chennai (SR) and CLW Chittaranjan (RPU)

pollution area requires previous consent from the concerned SPCB. Moreover, it was seen in audit that out of test checked units, 23 workshops/21 sheds obtained CFO and nine workshops/seven sheds obtained CTE from the concerned Pollution Control Boards.

Thus, the statutory provisions in obtaining CFO were not adhered by 26 workshops & 68 sheds and 40 workshops & 82 sheds in obtaining CTE. There were also lapses in renewal of CFO and CTE in respect of 68 *per cent* and 88 *per cent* of the workshops and sheds test checked.

2.1.2 Environmental Statement

Rule 14 of The Environment (Protection) Rules 1986 provides that every organisation carrying on an industry, operation or process requiring consent under Water (Prevention and Control of Pollution) Act, 1974 or under Air (Prevention and Control of Pollution) Act, 1981 or both should submit to the concerned Pollution Control Boards an Environmental Statement in Form V[10] every financial year on or before the 30th September.

Accordingly, 23 workshops and 21 sheds which obtained Consent for Operation (CFO) under Air and Water Act[11] were required to submit Environmental statements of which only three workshops and three sheds[12] (14 *per cent*) submitted the statement to the concerned SPCBs during the review period. All PUs submitted the Environmental Statement in Form V to the concerned Pollution Control Boards.

Reply of RB for non-submission of the Environmental Statement was not received. (June 2014).

2.1.3 Compliance of Consent and Renewal Conditions

SPCB lay down certain instructions and conditions at the time of granting CFO and its periodical renewal of authorization under Air and Water Act as mentioned in the ***Appendix IV***. Review of the extent of compliance of the conditions by the selected units for the period 2007-12 revealed the following:

[10] The statement discloses water and raw material consumption, pollutants discharged to the environment and quantum of solid wastes and hazardous wastes generated by the units.
[11] Air Act and Water Act refers to Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974
[12] Workshops (WRS/RYP/SR, WS/GOC,SR and RSK/STLI/NCR) and sheds (Diesel loco shed /BGKT/NWR , DLS/GY/SCR, Diesel loco shed /New Katni/WCR)

I. Out of 23 workshops and 21 sheds in nine ZRs[13] where CFO was obtained, conditions of SPCB at the time of renewal were complied in only eleven workshops and nine sheds;

II. Non-compliance with the instructions/prescribed standards of SPCB was also observed in PUs as mentioned below:

a. Sewage Treatment Plant (STP) for treatment of waste water was not renovated and prior permission for installation of new machines as instructed by SPCB in May 2010 was not obtained (CLW/Chittaranjan);

b. Acoustic barrier was not provided and emission levels were not monitored (DLW/Varanasi); and

c. RWF/Yelahanka/SWR did not comply with the standards specified by the SPCB regarding avoidance of fugitive emission, operation of Arc Furnace, storage of furnace slag etc. An agreement was executed (June 2012) with a firm for conducting feasibility study for providing secondary fume extraction system. The report was submitted in March 2013 and an amount of ₹ 0.11 crore was paid to the firm. But the fume extraction system has not been installed (June 2014). Regarding disposal of slag, RWF authority approached the University of Agricultural Science, Bangalore and the final decision in this regard is yet (June 2014) to be taken.

Reply of RB on the Audit findings was not received (June 2014).

Thus, the workshops, sheds and PUs failed in complying with the guidelines/instructions of renewal of consent in 45 *per cent* of the units test checked. Non-compliance of the statutory obligations by the ZRs indicated weakness in the existing system of monitoring both at the Zonal and RB level.

2.2 Monitoring Pollution

2.2.1 Air Pollution Control Equipment

In terms of Section 22 (5) of Air (Prevention and Control of Pollution)Act 1981, every person to whom consent has been granted shall, inter-alia provide for control equipment of such specifications as the State Pollution Control Board

[13] NCR, CR, ER, ECOR, SCR, SR, SWR, WCR and WR

may approve in this behalf. It was also stipulated that the control equipment shall be kept at all times in good condition.

Examination of records in selected units revealed the following issues:

I. Air pollution control equipment were not provided in 30 workshops and 65 sheds (69 *per cent*) as detailed in ***Appendix V.***

II. In the remaining 19 workshops and 24 sheds, pollution control equipment were provided. Incinerator installed at Diesel Loco Shed/ Kharagpur (SER) for controlling air pollution remained idle since July 2010 due to non-availability of facility for checking emissions.

III. The position of six PUs are as follows:

- At DMW/Patiala, RWF/Yelahanka and ICF/Perambur all the air pollution control devices/equipment provided were found to be in working order;

  At RCF, Kapurthala, all stacks, Chimneys and Fume extractors[14] were in working condition except two stacks and three filters of one dust collector;

- At DLW (Loco Frame Shop)/ Varanasi, two out of five fume extractors[15] were not in working condition; and

- Fume Extractor installed in 2004 at a cost of ₹0.46 crore at CLW[16]/ Chittaranjan was not in working condition since November 2010.

The Reply of RB for not providing pollution control equipment in 30 workshops and 65 sheds is awaited (June 2014).

2.2.2 Air Quality Monitoring

As per the National Ambient Air Quality Standard (24 hours average), the concentration of Particulate Matter (PM^{10}) for industrial and residential area is 100 micro gm per cubic metre and the prescribed limit for oxides of Sulphur and Nitrogen is 80 micro gm per cubic metre.

The records relating to the adverse impact on the quality of air due to non-provision of pollution control equipment was examined for the period 2011-12 in

[14] 27 Fume Extractors, 6 Dust Collectors and 76 stack/Chimneys provided in RCF.
[15] Welding Fume Extractor is a pollution control machine used to clean welding fumes generated in the workshops, sheds and PUs which contain fluoride, and metals or oxides of metals. In addition, hazardous gases namely carbon monoxide, oxides of nitrogen, or ozone may also be present during welding. There is also a risk of asphyxiation when shielding gases such as argon are used, particularly in an enclosed or confined space.
[16] Melting shop with Electric Arc Furnace

23 workshops and 21 sheds that obtained consent for operation under Air and Water Act. Scrutiny revealed the following:

I. Only seven workshops and six sheds over seven ZRs[17] had conducted the ambient air quality check as per periodicity prescribed by the SPCB;

II. In three workshops and three sheds over five ZRs[18], the shortfall in conducting ambient air check as prescribed by the SPCB ranged from 25 to 99 *per cent.* Out of these six workshops and sheds, in one workshop and one shed, (CRWS/Bhopal/WCR and DLS/BNDM/SER) air pollution control equipment were not provided;

III. In four workshops and four sheds [19] air quality check was not conducted. Audit also observed that in two workshops and two sheds[20] pollution control equipment had not been provided;

IV. In the remaining eight workshops and nine sheds, air quality check was not carried out as the number of air quality check to be conducted was not prescribed by the SPCB at the time of granting consent for operation and/or at the time of renewal. Of them, in five workshops and five sheds [21], air pollution control equipment were also not provided;

V. Air quality as stipulated in the consent for operation was monitored in all PUs[22]. All parameters of air quality were within the tolerance limit except at DLW/Varanasi, where two out of five fume extractors[23] were not in working condition as mentioned in sub-para 2.2.1 (iii) and Particulate Matter exceeded the tolerance limits by 150 to 375 *per cent* during 2009-12.

In the absence of adequate provision of pollution control devices and monitoring, the required quality of air could not be examined. Adverse impact on quality of air due to non-provision of pollution control equipment was not monitored by the concerned authorities at the Zonal and RB level.

[17] CR, NR, NWR, SCR, SER, SWR and WCR

[18] CR, SER, SR, NCR and WCR

[19] CRW/BBS (ECoR), Kancharapara Workshop (ER), WRS/Raipur (SECR), DLS/ERS (SR), CW/PER (SR), EMD Loco Shed/UBL (SWR), DLS/KJM (SWR) and ELS/ET (WCR)

[20] CRW/BBS/ECoR, Kanchapara WS (ER), DLS/ERS/SR, DLS/ET (WCR)

[21] C&W Workshop, Liluah, Jamalpur Workshop, Bardhaman Diesel Shed (ER), Mechanical Workshop, Gorakhpur, Mechanical Workshop, Izzatnagar, Locoshed, IZN (NER), Diesel Loco Shed, Ludhiana, Ferozpur Division (NR), NG Diesel Loco shed/Motibagh at Nagpur (SECR), Central Workshop / Mysore (SWR), Diesel Loco Shed Vatva (WR).

22 In CLW, as data was not available in shop Nos.8,16,23 and 25, it could not be stated whether the air quality was within the permissible limits in these shops.

[23] Welding Fume Extractor is a pollution control machine used to clean welding fumes generated in the workshops, sheds and PUs which contain fluoride, and metals or oxides of metals. In addition, hazardous gases namely carbon monoxide, oxides of nitrogen, or ozone may also be present during welding. There is also a risk of asphyxiation when shielding gases such as argon are used, particularly in an enclosed or confined space.

RB stated (November 2013) that the quality of air in all diesel sheds were being regularly monitored by the concerned SPCBs. However the fact remained that the ambient air quality check was not conducted in 12 workshops and 13 sheds.

2.2.3 Controlling Noise Pollution from DG Sets

Central Pollution Control Board (CPCB) prescribed 'Systems and procedures for compliance with noise limits for diesel generator sets'. As per these standards, users shall make efforts to bring down noise levels of Diesel Generator (DG) sets, within the ambient noise requirement by adopting adequate control measures such as provision of standard acoustic enclosures, suitable exhaust muffler and stack with minimum prescribed height[24] above the building. For installation of DG sets, 'No Objection Certificate' (NOC) is required to be obtained from Regional Inspectorial Organisation of the concerned State Electricity Board.

Scrutiny of records in selected units revealed that DG sets were provided in 30 workshops and 60 sheds and in six PUs. Assessment of the adequacy of measures taken by the selected units to control the noise level from DG sets revealed the following:

I. In seven workshops and seventeen sheds over eight ZRs[25], the prescribed stack height of DG sets was not maintained;

II. Sound level monitoring of DG sets was not done in 30 workshops and 52 sheds (91 *per cent*). In the balance eight sheds[26] over four ZRs (NCR, NWR, SCR and WCR), monitoring of sound level was done.

III. Acoustic enclosures for noise reduction in DG sets were provided only in 22 workshops and 37 sheds.

IV. Only three workshops and five sheds[27] had obtained "No Objection Certificate (NOC)" from Regional Inspectorial Organisation for operation of DG sets.;

[24] Central Pollution Control Board prescribed minimum stack height for different range of generators. For generator of 50KVA capacity, prescribed height is the height of the building plus 1.5m. The additional height above the building will be increased by 0.5m for every 50KVA increase in capacity of DG Set.
[25] CR, ECR, NCR, NER, SCR, SECR, SER and WR.
[26] DEMU shed (AGC), ELS (JHS), DLS shed (BGKT), DS (Abu Road), DLS (GY), DLS (Itarsi),DLS (New Katni Jn), Coaching Depot (Habibgunj).
[27] JHS/WS, RSK/STLI (NCR), CD/LJN (NER), DLS/Ludhiana (NR), DLS/BGKT (NWR), WRS/RYP, DLS/GY (SCR), WS/GOC (SR).

V. All the six PUs did not obtain 'NOC' from Regional Inspectorial Organisation for operation of DG sets. The noise levels exceeded the tolerance limits[28] at DLW/Varanasi[29] and CLW/Chittaranjan. The height of all 76 stack/chimney at RCF/ Kapurthala ranged from 13 to 20 meters which was less than 30 meters prescribed by CPCB.

Reply of RB for not providing adequate noise control measures is awaited (June 2014).

Thus, the ZRs failed to adhere to the standards prescribed for controlling noise pollution from DG sets. There was lack of established system in the workshops and sheds for monitoring noise level prescribed by the SPCBs.

2.2.4 Noise level Monitoring

Schedule to rules 3(1) & 4(1) of Noise Pollution (Regulation and Controls) Rules 2000 prescribed that noise level in industrial area should not exceed 75 dB during day time and 70 dB during night time. The main sources of noise pollution at workshops and sheds are Diesel Generator (DG) sets heavy machineries etc. While granting CFO, SPCBs generally specify the frequency at which noise level check is to be conducted during a particular period.

Scrutiny of records to assess the extent of compliance with the prescribed standards for the period 2011-12 in selected units revealed the following:

I. While granting CFO under Air Act, SPCBs prescribed the frequency of noise level checks in respect of six workshops and eight sheds over four ZRs[30]. In three workshops and three sheds over three ZRs[31], noise quality checks were not conducted as per prescribed frequency. The resultant shortfall ranged between 92 and 100 *per cent;*

II. During the entire review period 2007-12, noise level checks were conducted at 1105 locations in 13 workshops and 14 sheds over 10 ZRs[32]. The noise level was within the prescribed limits only in one workshop and four sheds. In the remaining 12 workshops and 10 sheds, the noise level exceeded the limits in 387 locations.

[28] The noise limit for DG Sets up to 1000KVA is 75dB(A) as per Environment (Protection) Rules,1986
[29] in 17 out of 20 noise level tests
[30] SCR, SR, SWR and WCR
[31] DLS/KZJ(SCR),EWS/AJJ,DLS/ERS,C&W/PER,W&C/GOC(SR),ELS/Itarsi (WCR)
[32] CR, ER, NCR, NFR, NR, SCR, SER, SR, SWR, WCR and WR

III. SPCB did not specify the frequency of noise level checks in 17 workshops and 13 sheds. Consequently, while six workshops and six sheds carried out noise level checks, eleven workshops and seven sheds did not carry out the checks;

IV. Audit observed that there was no established system of monitoring compliance of instructions/stipulations of SPCBs either at the RB level or at the ZRs level; and

V. Audit scrutiny of records revealed that noise level was checked as per the frequency prescribed by the SPCBs and the noise level was observed within the permissible limit in all PUs. Eco- friendly noiseless generator was available in all PUs except RCF/Kapurtala.

RB stated (November 2013) that all diesel sheds were being regularly monitored by the concerned SPCBs/CPCB for quality level of noise. Contention of RB is not acceptable as there was not only shortfall with reference to prescribed frequency of checks, but noise quality checks were also not conducted in eleven workshops and seven sheds.

2.2.5 Water Pollution

Water pollution occurs when pollutants are discharged directly or indirectly into water bodies without any treatment or removal of harmful compounds. Section 24 of the Water (Prevention and Control of Pollution) Act, 1974 provides that no person shall knowingly cause or permit flow of any poisonous, noxious or polluting matter into any stream. Section 25 provides that no person shall, without the previous consent of the SPCB establish any industry, operation or process which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land.

As per special condition attached to CFO under Water (Prevention and Control of Pollution) Act, 1974, since the activities in workshops and sheds generate effluents such as waste oil, chemicals, sludge, waste grease etc., which pollute the environment, provision of Effluent Treatment Plant (ETP) is, therefore, necessary for treatment of effluents before discharging into sewers/water bodies. The sludge from the ETP should be dried in sludge drying bed and the drained liquid should be taken to equalisation tank. The dried sludge should be disposed off through agencies authorized by the Pollution Control Boards.

Review of the status of installation of Effluent Treatment Plants and disposal of ETP sludge in selected units revealed the following:

I. Though the instructions of RB (June 2009) exist for installation of ETP at all major stations of IR, the same does not exist specifically for workshops, sheds and PUs;

II. Out of selected workshops and sheds, ETP was not available in 83 workshops and sheds[33] (60 *per cent*). In two sheds[34] ETP was not required as no effluents were generated in these sheds;

III. In the remaining 20 workshops and 33 sheds where ETP was provided, the sources of effluents were not connected to the ETP in six workshops and two sheds[35]. During 2011-12, only seven workshops and eight sheds over nine ZRs[36] conducted analysis of sample of sewage or trade effluent before and after treatment;

IV. All the six PUs were provided with ETP. Analysis of the liquid waste discharged through ETP was being carried out in all PUs. However, at CLW/Chittaranjan only paint shop was connected to the ETP and the effluents generated in other shops[37] were being disposed off untreated.

V. In DLS/TNP (SR), oil skimmer was not in working condition. The effluent generated from the loco cleaning bay mixed with oil was being discharged into the pond located nearby without treatment. Effluent treatment facility sanctioned in 2005-06 at a cost of ₹ 23.34 lakh was not provided till September 2012. The delay was attributed to time taken in finalization of tender.

VI. While granting CFO to Bardhaman Diesel Shed (ER), West Bengal Pollution Control Board stipulated provision of alternate power source for running the ETP during power failure. Audit observed that the provision of alternate power source was not made in the shed for running ETP during power failure which would have resulted in discharge of untreated liquid effluents to the municipal drainage system during power failure.

[33] 26 workshops and 57 sheds
[34] MEMU Car Shed/Ambala(NR) and Wagon Depot/Ambala(NR)
[35] Parel Workshop, Matunga Workshop, Bhusawal Wagon Depot (CR), CWS/LGD (SCR), Mechanical Workshop/KGP (SER), CRW/BPL (WCR), Loco, Carriage and Wagon Workshop, Dahod and Coaching Depot/ Bandra Terminus (WR).
[36] ER, NER, NR, NWR, SCR, SECR, SER, WR, NCR
[37] Heavy Machine Shop, Electric Loco Bogie, Traction Motor Manufacturing, Melting and Sand Plant Shop.

VII. In Diesel shed /Andal (ER), ETP was commissioned in March 2012 after a period of five years since issue of purchase order in March 2007.

VIII. Deficiencies were also observed in treatment and disposal of ETP sludge. Some instances are mentioned below:

a. In Matunga Workshop (CR), the sludge drying bed was not being used and sludge was disposed off along with the garbage directly;

b. In CW/PER, S&T/PTJ and WS/GOC, ETP sludge was not being tested through the agencies/laboratories authorised by SPCB and it was kept in covered sheds as hazardous waste;

c. At Jamalpur Workshop/ER, sludge was dumped in the ETP complex and not disposed off since 2006. Similarly, at DLS/ERS, sludge was accumulated in an open space within the workshop premises;


surrounding area in DLS, Vatva (WR)

d. In Loco Shed Vatva (WR) oil sludge from ETP was discharged in the open ground; and

e. At ICF/Perambur, ETP 2.57 MT of sludge was not disposed off within the prescribed period of ninety days (April 2014).

RB stated (November 2013) that no water pollution/hazardous effluents are generated in four signal workshops[38] and therefore, Water (Prevention and Control of Pollution) Act 1974 does not apply to these workshops. RB further stated that the S&T Workshops at CR, ER, NR and NER had been advised to take cognizance of statutory body recommendation and to take appropriate action on priority to comply with applicable statutory obligations. The reply of RB was only for some signal workshops which do not cause water pollution and generate hazardous effluents. The reply did not address the issues highlighted by audit in respect of other workshops and sheds.

In the absence of any specific instructions of the RB, ZRs did not initiate necessary measures to provide ETP in 60 *per cent* (26 workshops and 57 sheds out of selected units) of the workshops and sheds test checked. The performance of ETP to assess the quality of discharge was also not monitored in 13 workshops and 25 sheds. ETP sludge was improperly disposed off in an open area without proper treatment.

[38] S&T WS/Pandu (NEFR), Signal WS/Kharagpur(SER), Signal WS/Ajmer(NWR) and Signal WS/Sabarmati (WR)

2.3 ISO Certification

Workshops and sheds obtain ISO 14001 and ISO 18001 certification to demonstrate their commitment to environment, health and safety. While ISO 14001 establishes standards, guidelines, and policies governing environmental management by certified organizations, the ISO 18001 Occupational Health and Safety System (OHSAS) aim at providing a framework for a safe and healthy working environment. Obtaining ISO 14001 and 18001 certification is recognition of observance of due procedures relating to environment and OHSAS. In the Chief Mechanical Engineer's conferences (January/February 2000), ZRs were advised to seek help from appropriate consultants on the measures to be undertaken to meet the requirements of the SPCBs as well as the stipulations of ISO 14001. Surveillance Audit is conducted at the time of renewal of validity of ISO certification.

Scrutiny of records relating to issue of ISO certifications, renewal of certification and surveillance audit in selected units revealed the following issues:-

I. ISO 14001 accredition was obtained only by 12 workshops and 19 sheds (22 *per cent*) over 12 ZRs[39] and surveillance audit was conducted in ten workshops and 14 sheds (17 *per cent*). ISO surveillance audit team, however, suggested corrective actions for four workshops and eight sheds. Of them, two workshops and six sheds[40] have fully complied with the suggestions. Surveillance audit was not conducted in two workshops and five sheds[41]. Two workshops and seven sheds did not renew the validity of accreditation.

II. All PUs were accredited with ISO 14001 and the corrective action suggested by the surveillance audit teams was complied with.

III. Out of 12 workshops and 19 sheds that obtained ISO 14001 accredition, ISO 18001 accreditation was obtained by six workshops and nine sheds (11 *per cent*) across eight ZRs[42]. Diesel Shed/Abu Road (NWR) has obtained ISO 18001 accreditation only.

IV. Surveillance audit for ISO 18001 was conducted in six workshops and six sheds. In two workshops and three sheds, corrective action was suggested.

[39] CR, ECR, ER, NCR, NFR, NR, SCR, SER, SR, SWR, WCR and WR
[40] WS/Jagadhari, WD/Ambala (NR), DLS/Kharagpur (SER), CRW/Bhopal, DLS/Itarsi, DLS/New katni Jn. ELS/Itarsi (WCR), DLS/Ratlam (WR)
[41] Matunga workshop, DLS/Kalyan (CR) DLS/Ludhiana (NR) DLS/BNDM (SER), CWS/MYS (SWR) Electric loco shed/Vadodara (WR), RSK/STLI (NCR)
[42] CR, ECR, NCR, NFR, NR,SR, WCR and WR

Of them, one workshop and two sheds[43] had fully complied with the suggestions/instructions. Surveillance audit was not conducted by ISO accredited agencies in four sheds[44]. The validity of the accredition was renewed by six workshops and seven sheds and not renewed by DLS/Abu Road (NWR), DLS/ELS/Itarsi (WCR), ELS/Itarsi; and

V. All PUs were accredited[45] with ISO 18001 and surveillance audit was conducted periodically and corrective actions suggested by the ISO audit team were carried out.

The progress of obtaining ISO certification was not significant as only 31 and 16 workshops/sheds obtained ISO 14001 and ISO 18001 respectively. The implementation of corrective action suggested by surveillance audit team was partially complied by Pune DLS/CR in case of ISO 14001 and ISO 18001. In two workshops and one shed[46], implementation of ISO 14001 was partial and in respect of one workshop[47] ISO 18001 implementation was partial.

[43] WS/Jagadhari (NR), ELS/Itarsi (WCR) and DLS/Ratlam(WR)
[44] DLS/Abu Road (NWR), DLS/Itarsi (WCR), ELS/Vadodhara (WR), RSK/STLI (NCR)
[45] Renewal of accreditation was valid up to March 2013(ICF) and up to May 2013(RWF/Yelahanka)
[46] Mechanical WS Dibrugarh/NEFR, C&W Perumbur , ELS/ED (SR)
[47] Bridge WS/Jalandhar Cantt./NR