भारत सरकार **GOVERNMENT OF INDIA**
रेल मंत्रालय **MINISTRY OF RAILWAYS**
(रेलवे बोर्ड **RAILWAY BOARD)**

No. 2016/Elect(TRS)/225//Misc. **New Delhi, dated : 23.01.2017**

General Manager (Elect),

Central Railway, Mumbai
East Central Railway, Hajipur
Northern Railway, New Delhi
North Eastern Railway, Gorakhpur
North Western Railway, Jaipur
South Central Railway, Secunderabad
South East Central Railway, Bilaspur
Western Railway, Mumbai
Chittaranjan Locomotive Works, Chittaranjan

Eastern Railway, Kolkata
East Coast Railway, Bhubaneswar
North Central Railway, Allahabad
Northeast Frontier Railway, Guwahati
Southern Railway, Chennai
South Eastern Railway, Kolkata
South Western Railway, Hubli
West Central Railway, Jabalpur

Director General (Elect), RDSO, Lucknow

Sub : Minutes of performance review meeting held at IRIEEN/Nasik Road, Central Railway on 30.12.2016
Ref : Rly. Board's letter of even no. dated 14.12.16 & 19.12.16

Minutes of performance review meeting held at IRIEEN/Nasik Road, Central Railway on 30.12.16 is enclosed for information and necessary actions.

DA : as above.

(A.K. Goswami)
Dir. Elect. Engg. (RS)
Railway Board
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Minutes of Performance Review Meeting held on 30th Dec'2016

Inaugural Session

Adviser L/RS welcomed all participants from Zonal Railways, RDSO, CLW & Railway Board. He highlighted that agenda of the meeting is Safety & Reliability of Electric Locomotives keeping in view the recent incidences of accidents leading to loss of life and property.

He also mentioned that there are high expectations from the department as we have already embarked upon Mission Electrification and De-carbonization wherein around 25,000 km of route is to be electrified over next 5 years. This would require a substantial step up in production of locomotives from CLW and DLW. On a very pessimistic scale if the electrification progress @ 4000-5000 km per year over next 5 years, we need around 450-500 locomotives per annum and therefore CLW, Dankuni & DLW have to have a share of 300 locomotives at CLW, 50 to 100 locomotives at Dankuni and 50 at DLW.

Right powering of freight trains, to upgrade the speeds of freight trains from an average of 25 kmph to 50 kmph over next 5 years on initially identified 3 groups also requires additional 650 locomotives. Madhepura factory will be ready and first locomotive is expected to be rolled out by Feb,2018. Since the maintenance of locomotive has been included in the contract for Madhepura, the performance of locomotive will really set a benchmark which will bring a paradigm shift and our own loco performance will be compared with Madhepura. It is, therefore, necessary that the reliability of locomotives is to be improved by CLW and RDSO.

It is also well known that the loco shed's infrastructure is highly stressed as we are short of locos homing capacity by nearly 25%. Loco Sheds have to gear up to home at least 250 locomotives in future. This means that next 3 to 5 years will be highly challenging for production units and sheds to meet the new expectations of high reliability and improved safety.

Increased incidences of SPAD is a serious concern, CELEs have to ensure close interaction with the Loco Pilots and their families to reverse this trend. Counseling by Loco Inspectors and rolling stock (operation) officers has to be continued with focus on alertness and crew utilization. Since the production of 3-Phase locomotives has been stepped up, sheds which are not homing 3-Phase locomotives have to gear up to train their maintenance staff and create infrastructure for testing 3-Phase locos. Whatever 3-Phase locos were produced over past two decades, will be produced over next 3 to 4 years, which is a huge challenge.

CLW has already organized training courses on 3-phase locos for maintenance staff and supervisors, this needs to be continued. In addition ELS Vadodara, ELS Lalaguda, ELS Ghaziabad and IRIEEN have to organize similar training modules for supervisors and allocated slots to various zonal railways. This exercise needs to be completed within next one month such that training can start from Mar, 2017.

Address by Member Traction

Thanked Director/IRIEEN for providing venue and logistic supports for the meeting.

He expressed that reliability of electric locomotives is not satisfactory. He advised all the participants to take an urgent call for improvement in electric loco reliability and performance.

He desired that quality of loco manufactured at CLW needs to be improved so that failures of newly built locomotives could be arrested. He advised all the Railways to gear up for homing 3-Phase electric locomotives in all the sheds.

Business session:

- **Safety**
  - Power point presentations made by Railway Board and participating Railways during the meeting.
  - There is increasing trend of Signal Passing at Danger (SPAD) during the current year as compared to last year.
  - During FY 2016-'17 there have been five accidents (upto 27.12.16) under 'Reported to Railway Board' category as compared to two during the same period of previous year and there have been 19 SPAD cases under 'Railway category' as compared to 14 during same period in the previous year.
  - On Electric Loco, it is observed that number of SPAD cases were quite high on CR (32%), NCR (21%), NR (11%), SECR(11%) and WR (11%) during 2016-'17. There is need to analyze these cases and take appropriate action to reduce such cases.
  - During special safety drive to check efficacy and preparedness of Railway Systems (started from 14.11.16), 903 footplate inspection at officers level and 9350 by LI (Total 10253 footplate inspections) have been done so far. Counseling of 67311 running staff has also been conducted during the period.
  - 8346 locos have been super checked at Electric loco sheds and trip sheds at officers and supervisors level.

- With the increase in SPAD cases, special drive for the following has been initiated vide Board's dated 23.12.16:
  - ➢ Mobile phone should not be used by Loco Pilots during run.
  - ➢ CUG call details analysis.
  - ➢ Not to use walkie-talkies to get information about its signal aspect.
  - ➢ Avoiding pairing of newly promoted crew.
  - ➢ Calling out of signal aspect loudly by ALP & LP with Hand Gesture.
  - ➢ Counsel running staff to reduce speed of train in case signal aspect is restrictive and not to presume aspect of next signal.
  - ➢ Proper rest of crew in running room.
- Results of WAG_9 brake hanger monitoring drive discussed and Railways have advised to replace the identified unmodified brake hangers with modified ones at the earliest. RDSO has recently issued modification sheet no. 455 dated 23.12.16 for modified design of brake hanger levers in order to improve factor of safety and ensure interchangeability of brake hangers of different makes. The same may be implemented.
- Railways were advised to check balance 106 WAG_9 locos for identification of for unmodified brake hangers.
- A comprehensive analysis on accident cases (period from year 1996 to 2000) on Mumbai Division of CR on Loco Pilot account presented by CEE/Central Railway was quite enriching and appreciated by all the participants.
- From the presentation following issues observed which may affect safety:
  - o LPs Working over hours.
  - o LPs losing concentration/focus.
  - o LPs not taking adequate rest at home/in running room.
  - o Indulging in Bad habits like gambling, debt etc.
  - o Commuting from far away distances to HQ.
  - o Tendency of hiding critical illness due to fear of getting medically de-categorised (undetected Visual/Hearing disability, under medication causing drowsiness, not using NV/DV glasses).
  - o Distraction in Driving Cab due to:
    - ✓ Maximum number of persons
    - ✓ Cross-talks
    - ✓ Noise proofing
    - ✓ Mobile to be kept off

- ✓ LP to Guard/SM VHF frequency
- Ineffective Asstt. Loco Pilot due to
  - ✓ Feeble Voice
  - ✓ Caution Order Copy not available
  - ✓ Not Looking Back, Not taking Safety round at stops/after Neutral Section etc.

- Apart from the above, factors like Psychometric (aptitude) tests in service, Micro-sleep, effects of ageing etc also discussed.
- The presentation is available on '*elocos*' website (Mail Box) for similar analysis on SPAD cases by all the Railways.
- It was suggested that after availing long hour rest, LPs may preferably be booked in day time & spend some time in lobby so that he can mentally prepare himself for train operation.
- It was suggested that provision of Air conditioning, water closet, soundproofing of loco cab will enhance alertness of crew.
- Speed while passing signal at Caution aspect should not exceed by 40/30 Kmph for Coaching/Freight trains.
- Continuous night duty for Running Staff should be limited to 2 nights.

➢ **3-Phase loco reliability:**

- Failures of three-phase locos have reduced from 327 to 307 during FY 2016-'17 (up to 30.11.16) but it is still quite high.
- For passenger locomotive, Failure Rate Percentage Per Month (FRPCPM) of ELS/GZB (11.4), and TKD (8.3), is higher than IRav FRPCPM (7.5) during 2016-'17.
- Problems being reported by Railways during commissioning of new IGBT based locomotives may be resolved by CLW & RDSO.
- More reliable sources for supply of safety items like brake gears, TBU and PBU are to be developed to improve the reliability and safety of three phase locomotives. Sources having technical tie-up with companies having adequate global experience in this field should be encouraged.
- MTR expressed concern over poor reliability of 3-Phase locos and advised that there is need to make all out effort for reversing the deteriorating trend of 3-phase loco failures especially on locos having IGBT propulsion system.
- All Railways should create facility for homing three phase locos as only three phase locomotives are being manufactured at CLW. Facilities may be created based on RDSO's guidelines issued vide RDSO's TC-134 &135.

- Spheri Block in three phase Loco plays an important role in riding quality of the Locomotive and its condition is to be monitored and checked regularly. Micro-processor based test set up should be installed at electric loco sheds to monitor the condition of these spheri blocks.
- Specification and guidelines for WAG_9 / WAP_5 / WAP_7 Locos damper issued by RDSO has lot of variations. It is desired that these should be stream lined for three phase locomotive.
- A presentation on actions being taken by RDSO on make wise critical equipment failures for improvement in reliability of 3-phase locos along with action, made by Director(Elect)/RDSO.
  - **M/s ABB make IGBT traction converter :**
    - RDSO informed that software issues i.e. Time-out initialization, wrong logic of coolant level, Mapping of display of DDS message, harmonic filter contactor stuck ON/OFF etc have already been addressed. The software version 37 has been put in regular use in new locomotives ex-CLW for extensive field trial and is under trial in five locomotives. RDSO may monitor the performance and advice firm to cut-in the same in all locos based on field performance.
    - For addressing the issues like Harmonic Filter Over current, Time out release shut down due to non availability of timely signal from converter to VCU (within 150 ms) for DC link voltage discharge, modified software 37 has been put in five locomotives in Nov'16.
    - RDSO further informed that failure of Duagon card is mainly due to Firmware malfunctioning. To arrest these failures, modified firmware has been downloaded in all the locos. Firm has recently provided modified Duagon card (D709) with optical connection in place of hardwired electrical connection, provided in existing duagon card (D429). With the above actions, no failure of firmware of Duagon card has been reported over last six months.
    - Higher failure rate of PEBB modules is due to particle impurity in the IGBT conduction area and thermal paste missing from the screw holes. To arrest these failures, defective lot of IGBTs (23 locos) identified and replaced and failures reduced from 25 cases in 2014-'15 to 12 cases in 2015-'16. Firm has started using Hitachi make IGBT devices in place of ABB make. Failures in current year are under investigation by M/s Hitachi and ABB (failed samples sent to OEM).
  - **M/s BHEL make IGBT traction converter:**
    - For the problems, namely failures of IGBT modules and DCU there are no firm commitment from BHEL. RDSO may follow up with BHEL.

- In order to resolve the issues of software malfunctioning, RDSO has given clearance for regular cut-in of the latest software version 371 in all locos after trial in 10 locomotives. The same may be implemented in all locos.
- In addition to the above there are increased incidences of failures due to the following:
  - Harmonic contactor 8.1 stuck on. There are transient cases of stuck on of contactor 8.2 and 8.41.
  - OHE voltage out of limit.
  - Splashing of the coolant : Leakage observed in cooling circuit with threaded joints and therefore modified flange coupling was tried in few locos. Additional connection in between conservator and pipe line was provided to solve problem of overflow of coolant and air trap in pipe line. Performance of revised arrangement done in five locos found satisfactory. BHEL was advised to use this arrangement on regular basis.

- **M/s CGL make Auxiliary Converters:**
  - KUC 153 A02 Power supply: RDSO informed that the firm has resolved the issue by regulating the 24 V supply in the power supply card. The modified card needs to be supplied early for the field trial.
  - As an alternative, firm has modified the KUA 921 Power supply card being used in VCU with satisfactory performance. Already 10 locomotives are working for last 1-2 months. The trial needs to be completed early and detailed report submitted by the firm to RDSO along with the modification in the wiring.

- **<u>Other issues</u>**
  - Gatiman Express is running at 160 kmph between Nizamuddin and Agra. Only three WAP_5 locomotives of ELS/GZB are fit for Gatiman Express. NR should plan at least 10 locomotives and equip them with TPWS, H-type coupler and modified cattle guards.
  - CLW may ensure all coaching locos are turned out with hotel load converters to ensure smooth transition of Rajdhani and Shatabdi services with HOG scheme.
  - RDSO has already issued instructions for Annual Maintenance Contract (AMC) for SIV, MPFDCS, VCD & GTO based propulsion system. It was advised to expedite the process entering into AMC with OEMs to improve reliability of these equipments.

- CLW may provide technically advanced and modern Driver seat in locomotives to improve comfort level of Loco Pilots. It may be provided initially in at least 100 locomotives and feedback be taken from Railways.
- Training of maintenance staff in three phase electric locomotives should be organized by CLW, WR at Vadodara shed, SCR in Lalaguda shed, NR at GZB and IRIEEN and training modules circulated to all Railways by end of Jan'2017.
- Haulage capacity of the locomotive reduces by 15-20% in wet weather as adhesion of wet rail is 15-20% lower than that of dry rail. RDSO has recently issued revised load tables for haulage capacity of electric locomotive incorporating loss of adhesion in wet whether condition with different degree of curves and gradient. RDSO's revised Load tables may be incorporated in the WTT by Zonal Railways.
- Right powering needs to be ensured to avoid excessive wear of wheels & rails due to wheel slip, rail burnt & Equipment failures due to excess stress/forces on locomotives.
- OHE conversion from 1500V DC to 25kV AC has been completed in Mumbai suburban section of Western & Central Railway. It was advised to make provision of metalised carbon strip on top priority in place of steel strip in all the pantograph of locos & EMUs working in 25 kV AC section.

The Meeting ended with thanks to the Chair.

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List of participants

Sn.	Name (S/Shri)	Designation	Organization
1.	Ashwani Kumar Kapoor	MTR	Railway Board
2.	Sudheer Kumar	Adv.L(RS)	
3.	Sudhir Garg	ED(EEM)	
4.	A.K. Goswami	DEE(RS)	
5.	Rajive Agarwal	CEE	CR
6.	M. Meshram	Director	IRIEEN
7.	O.P. Kesari	EDSE/Co-ord.	RDSO
8.	Anup Kumar	ED/TI/RDSO	
9.	Nasim Uddin	ED(PS & EMU)	
10.	Suresh Kumar	Dir. Elect	
11.	B.B. Singh	CEE	CLW
12.	Dayal Dogra	CEE	NR
13.	Deepankar DE	CEE/RS	WR
14.	M.G. Dhamangaonkar	CELE	CR
15.	A.K. Chattopadhyay	CELE	ER
16.	A. Mohapatra	CELE	EcoR
17.	A.M. Choudhary	CELE	SR
18.	R.K. Tiwari	CELE	SER
19.	S.C. Chaudhari	Dy. CEE(EM)	CR
20.	Abhimanyu Seth	Dy. CEE(Loco)	WR
21.	Anant Sadashiva	Sr. DEE(TRS)/TATA	SER
22.	Chetan Gulwani	DEE(TRS)/WAT	ECoR

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