



भारतीय रेल (रेल मंत्रालय)  
डीजल रेल इंजन कारखाना  
वाराणसी - 221004 भारत

INDIAN RAILWAYS (MINISTRY OF RAILWAYS)  
DIESEL LOCOMOTIVE WORKS  
VARANASI - 221004, INDIA



274

पत्र सं. 2016/MCO/13/13

कार्यालय: मु.यां.इंजी./सामग्री  
दिनांक - 10.02.2016.

मुख्य चल शक्ति इंजीनियर/डीजल  
एवं भंडार नियंत्रक  
समस्त क्षेत्रीय रेलवे  
ई.डी./एम.पी., आर.डी.एस.ओ.

Chief Motive Power Engineer/Dsl  
& Controller of Stores  
All Zonal Railways  
ED/MP, RDSO

विषय: Minutes of HHP-BIM Meeting 17-18 held at DLW  
on 20<sup>th</sup> & 21<sup>st</sup> November 2015.

वर्ष 2017-18 के लिए एच.एच.पी.-बी.आई.एम. मीटिंग का रेलवे बोर्ड द्वारा अनुमोदित कार्यवृत्त (मिनिट्स), डी.रे.का. के वेबसाइट ([dlw.indianrailways.gov.in](http://dlw.indianrailways.gov.in)) पर डीजल पोर्टल में आपके सूचनार्थ एवं आवश्यक कार्यवाही हेतु अपलोड किया गया है।

HHP-BIM minutes for the year 2017-18 approved by Railway Board has been uploaded on diesel portal of DLW website ([dlw.indianrailways.gov.in](http://dlw.indianrailways.gov.in)) for your kind information and necessary action please.

उप-मु.यां.इंजी./अतिरिक्त पुर्जा  
Dy CME/Spares

प्रतिलिपि: EDME/Traction/Rly Bd  
CME, COS, FA & CAO, CQAM, CDE, CME/P, CME/Plan  
CMM/Eng, CMM/Loco, CMM/HQ DLW के सादर सूचनार्थ ।

## Minutes of BIM 2017-18 held at DLW on 20 & 21 Nov.2015

Present:- S/Shri

Railway Board		DLW/Varanasi		RDSO		Zonal Railways (CMPEs)	
1	P.K.Agarwal, AM/ME	1	A.K.Singh, CME	1	C.M.Rao, ED/MP	1	A.K.Singh/NER
2	Vivek Kumar, EDME/Tr	2	V.R.Mishra, COS	2	S.Panwar, Director/MP	2	R.C.Meena, NWR
		3	J.N.Pandey, FA&CAO	3	Vivek Bajpayee, Dir./MP	3	Rajnish Arora, SER
		4	P.Ananth, CME/M	4	Abhijeet Singh, Dir./MP	4	D.K.Tete, SR
		5	K.B.Sahay, CME/P	5	S.P.Govil, Director/MP	5	U.F.Kuzur, ECR
		6	A.K.Singh, CDE	6	Vaibhav Sohane, JD/MP	6	P.Ravi Kumar, SCR
		7	A.K.Sharma, CQAM	7	Anurag Mishra, JD/MP	7	Rakesh Behl, CR
		8	S.K.Jain, CMM/Eng.	8	Neeraj Kumar, AD/MP	8	S.R.Ghoshal, ER
		9	M.K.Agarwal, CMM/Loco			9	A.K.Mishra, NCR
		10	S.K.Katiyar, CME/Plant			10	A.K.Rana, NR
		11	P.Hari Prasad, FA&CAO/TOT & other DLW Officers			11	Shyamadhar Ram, SWR
						12	Uday Borwanker, WR
						13	N.K.Barnawal, SECR
						14	Nitin Dhimole, CMM/SECR
							& other Zonal Railway Officers.

### COS/DLW

- COS Welcomed all BIM participants and expressed that fruitful discussion would take place during the meeting.
- He highlighted that there is problem in procurement of some items due to single vendor and requested all concerned to work together for developing more vendors especially indigenous.

### CME/DLW

- Informed all participants that DLW purchases Assembly items and not all part components. DLW can, therefore, only assist Railways by releasing items which DLW procures.
- For items controlled by RDSO, there is need to develop more active vendors especially indigenous vendors.
- DLW is making commitment to resolve the problems of Zonal Railways and is making continuous efforts towards the same.
- All CMPEs were asked to submit indents well in time as this affects and delays the procurement cycle.

### EDME/Traction

- 133 new BIM items have been newly introduced for which procurement action should be initiated. Non-acceptance of Debits (raised by DLW) by the Zonal Railways is an extremely serious matter and all Railways should pay special attention towards this issue.
  - DLW was requested to supply items for commissioning Simulators to 5 loco sheds.
  - RDSO to start portal of innovations and monitor the same.
  - New policy for homing HHP locos will be ;
    - Mega homing sheds 300 + locomotives.
    - Other sheds 250 + locomotives .
- CMPEs to accordingly coordinate with CME/Plg. and propose in Works programme.

- In addition to GOC Workshop/SR, DMW is nominated as the shop for POH of all HHP locos. GOC & DMW should plan for procurement of spares.
- Before undertaking any modifications in safety items, undergear etc., ZRs / Sheds should consult RDSO / DLW.
- Railways should strictly adhere submission of indents in time else DLW will defer the same.
- DLW to provide assistance to GOC for repairing HHP power packs.
- ALCO MG TBDA – DLW should finalise the tenders at the earliest.
- Supply of Initial spares to newer sheds to be expedited.
- All Turbo chargers and Power pack failures to be investigated thoroughly and action taken.
- RDSO & DLW to expedite Developmental Projects.
- Almost 100 bogies of Fab-II type yet to be upgraded. Must be expedited with the help of firms.

### **Additional Member/ME**

- Complimented DLW on its performance, but also added that it should try to reach higher levels to match the increasing aspirations of Zonal Railways.
- DLW to consider one year procurement based on actual and additional 2 years based on anticipated demand especially for uncommon items so that there is continuous availability of material.
- Warranty claims to be settled faster and replacement made immediately without waiting for investigation. There are still large no. of disputes which needs to be resolved.
- Thrust should be given to shift from imported to indigenous items.
- Zonal Railways are having lot of HHP power packs to be repaired for which action plan is to be prepared.
- DLW should fully load Dankuni for Under-frame and Crank case.
- Ease of doing business to be ensured.
- Specifications to lay down measurable parameters.
- He highlighted the role of 3 TC members and explained the role of Technical Member.

### **GM/DLW**

- GM/DLW attended the inaugural session of Meeting.
- He welcomed all participants and said that DLW is striving to meet growing demands and aspiration of Zonal Railways.
- He also mentioned that RDSO should develop additional sources for RDSO controlled items to ensure regular supply and also competition.

## **Points raised by Zonal railways**

### **ECoR & NFR**

- Indicated that EMD is not participating in tenders of the Railways. M/s EMD to be informed suitably.
- NFR expressed that inspite of PO placed and LC opened, elapse of 1½ year elapsed, material not supplied.
- NFR mentioned that some DLW approved sources are also not participating.

### **ER**

- Stressed for improving quality of Clutch Assembly, TSC and Expansion Joint assembly which are failing frequently in the field.
- Both EMD & GE not agreeing for warranty replacements.

### **SWR**

- M/s EMD have been asked to point out Life of Cards but M/s EMD is not responding.
- Items of M/s EMD are not having I-marks and Warranty are not being resolved.
- Requested deliberation on policy of consequential damages.
- NFR not lifting Turbo allotted in RSP. Board allotted the same to WR.
- RDSO should give guidelines for ACTM repair.

### **NR**

- Requested DLW to expedite Huck Bolting Machine and requested for overhaul contract of CCB.

### **NCR**

- Requested for AMC of HVAC and supply of Initial spares.

### **WR**

- Requested Power pack and early warranty settlements.
- Life is to be redefined for items failing frequently.

### **CR**

- Expressed concern on failures of new locos.

### **SCR**

- Requested to supply Main Bearing Shells, Connecting Rod bearings, Cylinder Power assembly and MTAs.

### **ECR**

- Requested for balance 8 tooling items from DLW.
- Requested Board for approving proposal sent by Railway under Plan Head 4200.
- WDP4 initial spares to be provided by DLW.

## **SR**

- Requested all Zonal Railways to send Power Packs for repair to GOC.

## **NWR**

- Requested assistance for 5 TSC, early settlement of warranty claims especially fuel pump motor to be resolved. RDSO to assist.
- Requested Board for allotment of Crank shafts.

## **SECR**

- Expressed concern on blended brake issue with Siemens system loco - DLW and RDSO to resolve.

## **NER**

- Bogies of M/s Ved yet not repaired. RDSO to advise firms.

## **WCR**

- Requested for MTA and Dampers.
- Lifting arrangement for RC Fan to be modified to handle 54" RC Fan.

## **Other issues – to be investigated and rectified by DLW.**

- Painting of locos to be done properly with proper surface preparation.
- Failure of TSC – Jumper bolt broken
- Failure of Turbo clutches.
- Problems with blended brakes
- One more BIM item added for 2018-19 – Rubber strip to PL No.17270753.

## **Supply Performance of DLW.**

- Supply performance of BIM items was discussed and DLW was asked to expedite supply of Initial spares and tooling items.
- Delay in Receipt of Vetted Indents from Zonal Railways was discussed and Target is fixed as 30th June 2016 for consumption year 2018-19.

## **Warranty related issues :-**

1. Railway wise pending warranty status including cases of cost deductions was discussed. DLW mentioned that material is issued to Zonal Railways against cost deduction cases, where the stocks permits. From last year, DLW has also started procurement of items for warranty replacements where cost has been recovered from the vendors and material has not been supplied to sheds. DLW also presented system wise and vendor wise analysis of warranty claims. Power pack and Turbocharger failures are concerned. Warranty compliance for specially M/s EMD is very poor.

2. Support required from Zonal Railways :

(a) Warranty claims should be logged with complete information to avoid warranty rejection at DLW.

(b) Monthly warranty reconciliation should be done by each shed with DLW in the first week of every month. Staff should be nominated to DLW for reconciliation.

(c) The seal of assembly / sub assembly for failure analysis shall be broken by shed only in presence of firm's representative to avoid breach of warranty claims.

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**Sub: MoM of Technical agenda for HHP BIM held on 20<sup>th</sup> and 21<sup>st</sup> Nov 2015**

MoM of Technical agenda for HHP BIM held on 20<sup>th</sup> and 21<sup>st</sup> Nov 2015 is as under-

**1. Performance of GE make Power Assemblies in terms of LOC & LOFR:**

**Agenda:**

DLW has fitted GE make Power Assemblies on following 10 locomotives.

SN	Road No.	Shed /Rly.	Dt of Dispatch	Remark
1	70069	Pune/CR	16/12/2014	Fitted with low lube oil piston rings
2	70345	SBI/WR	16/12/2014	
3	40210	JMP/ER	16/01/2015	---
4	40213	Pune/CR	27/01/2015	---
5	40219	BGKT/NWR	30/03/2015	---
6	Spare	UBL/SWR	11/12/2014	---
7	40212	Pune/CR	15/01/2015	---
8	70349	IZN/NER	27/01/2015	---
9	70348	NKJ/WCR	24/01/2015	---
10	40214	VSKP/ECOR	27/01/2015	---

- As stated above, out of 10 locomotives fitted with GE make Power Assembly, 2 locomotives were fitted with low lube oil piston rings of Kaydon/USA.
- It was recommended by RDSO to monitor performance for a period of at least 6 months.
- Average LOFR is found below 0.50 for loco fitted with regular piston ring sets.
- Average LOFR is found 0.31 for locos fitted with low lube oil piston ring sets.

**Deliberations:**

During discussions regarding GE make power assembly, it was pointed out that the lube oil consumption in GE make power assemblies is under control. Some of the power assemblies have completed more than six months of service. No component failure has been observed in these power assemblies so far.

**Decisions:**

- a. M/s GE/USA may be considered for approval as Part-II for Power Assembly Fork and Blade. Presently there is single source (EMD-Part I) scenario for these items.

- b. Based on the LOFR data of Power Assemblies fitted with low lube oil piston rings of Kaydon/USA make (supplied with GE Power Assemblies), procurement to be done for 100 loco sets of low lube oil piston rings from M/s Kaydon/USA for field trials.

## **2. Performance of improved design piston rings of HHP Locos**

### **Agenda:**

A new ring pack design offered by EMD had been fitted to reduce lubricating oil consumption in HHP locomotives. The fitment of EMD supplied improved design piston ring is as under.

SN	Shed/ Rly	DOD/ DOC	Loco No.	Location	Last Data received
1	NKJ/ NCR	12.06.13	12824	All location power assly fitted with new design piston rings sets.	Feb'2015
2	ED / SR*	30.06.13*	12808		Oct'2013
3	SGUJ/ NFR	07.07.13	12812		Feb'2014
4	IZN/ NER	27.07.13	40132		June'2015
5	KJM/ SWR	24.09.13	20019		June'2015
6	IZN/ NER	20.10.13	40154		Mar'2015
7	SBI/WR RTM	09.06.14	40177		Not received
8	SBI/WR RTM	21.05.14	40176		Not received
9	BGKT/ NWR	12.08.13	12835	Fork side fitted with new design piston rings sets & Blade side fitted with existing piston rings sets.	Nov'2014
10	BGKT/ NWR	23.08.13	12839		Oct'2014
11	BGKT/ NWR	23.08.13	12841		Dec'2014
12	ET/ WCR	09.10.13	40168		Not received
13	UBL/ SWR	03.11.13	12073		Oct'2014
14	TKD/ NR	10.12.13	40010		Not received

\* Loco transferred from GOC on 22.10.2013.

Above data shows that, many Diesel sheds are not sending the comprehensive data of LOC/LOFR regularly.

ZRs are requested to provide the same as per RDSO's trial scheme No.MP.TP-49, March-2013.

- Out of 10 loco sets low lube oil piston ring supplied by EMD, 7 loco sets have been fitted on all power assemblies while balance 3 loco sets have been fitted on 6 locos in Fork side power assemblies only.
- Based on encouraging feedback from ZRs for LOFR/LOC data as per RDSO trial scheme MP.TP-49 of March-2013, it was decided to procure 150 loco sets of low lube oil piston ring sets.
- Procurement is pending due to want of drawing from EMD.

### **Deliberations:**

During discussions regarding low lube oil piston rings, it was pointed out that lube oil consumption in locos fitted with these piston rings are under control.



Some of the loco have completed more than one year of service. No component failure has been observed in the power assemblies fitted with these piston rings.

**Decision:**

- a. M/s EMD to be followed up to provide drawings and procurement of improved design piston rings from M/s EMD to be expedited.

**3. Performance of Cylinder Liner :**

**(A) EMD make Cylinder Liner :**

**Agenda:**

Field failure of HHP cylinder liners was a matter of big concern since long. After taking of corrective actions, EMD has started supply of liners of serial no. 13A 0001 onwards are with improved quality. DLW had already requested to Zonal Railways to monitor field performance of improved lot liners. Till date 22 failures have been reported.

ZRs are requested to comment on it and provide comprehensive feedback.

**Deliberations:**

A presentation was made on failures of EMD make Cylinder liner. Improper shape and distribution of graphite flakes, availability of type 'B' graphite on wear surfaces, uneven wall thickness, excessive wear of laser hardened layer and improper brazing were observed during failure investigation. Accordingly EMD has taken corrective action and started supply of improved quality liner from serial no. 13 A1 0001.

**Decision:**

- a. Performance of M/s EMD supplied liners to be closely monitored by DLW. Sheds to keep DLW informed.

**(B) GE make Cylinder Liner:**

**Agenda:**

Field failure of GE make HHP cylinder liners has been observed. Cases of faster wear and failure of cylinder liners and power assemblies have been observed.

ZRs are requested to comment on it and provide comprehensive feedback.

**Deliberations:**

A presentation has been made on failures of GE make Cylinder line. Partial blockage in water passage between lower and upper water jacket, high inner wall thickness, abnormal wall thickness variation and sharp port edges were

observed during failure investigation. M/s GE has taken necessary corrective action to improve quality of liners and supplied 36 nos improved liners recently.

**Decision:**

- a. DLW to validate improved liners supplied by M/s GE and performance of these liners to be closely monitored in the field by DLW.

**(C) Machined Piston:**

**Agenda:**

Zonal Railways have been reporting of failures of HHP power assemblies.

- High LOFR and excessive ring wear reported from various sheds.
- Excessive end gap noticed in piston rings supplied by EMD. Light is passing on circumference beyond specified limits observed in EMD supplied Piston rings. EMD and RDSO have been informed. EMD is yet to take action.

**Deliberations:**

A presentation has been made on failures of HHP Pistons. Recent failure trend shows that all the failure of Pistons having deep scratch marks on Piston OD and abnormal high wear of the Piston rings. Piston OD surface is also looking bluish due to overheating. One failure has been observed on DLW test bed (within three hours) and one at LTS during testing. It was explained that the Piston rings supplied by EMD are not meeting the specification and supply chain issues were also discussed for piston ring due to single source item.

**Decision:**

- a. RDSO to investigate the problem in details as it is suspected that Piston failures are taking place due to use of incorrect/improper Piston rings.

**(D) Head to Cylinder Liner Gasket:**

**Agenda:**

Zonal Railways have been reporting of failures of HHP power assemblies.

**Deliberations:**

The issue of failure of head to liner gasket was discussed. Based on field performance observed at BGKT, drawing has been changed for improved design gasket by incorporating Viton (high temp) seal in place of Silicon & Teflon. Packaging condition has also been specified in the drawing. Future procurement to be done with revised drawing only.

The issue of uneven torquing and loosening of head to liner bolts resulting in burnt gases melt by the grommet, causing water leakage from head to liner

gasket were also discussed. The torquing procedure recommended by OEM (EAI 2127) was also discussed. BGKT shed has given their observation that gaskets at some locations are failing more than the others.

**Decision:**

- a. DLW to monitor performance of the revised design Head to Liner Gasket with Viton seals. RDSO to study failure trend of head to liner gasket at any particular location.

**4. Field Failures of Expansion Joints:**

**Agenda:**

Presently DLW is procuring Expansion Joints (10”& 14”) from M/s EMD (Part-I source), M/s V-Flex/Vadodara and M/s Vikrant/Kolkata (both Part-II source). Failure of both of the Expansion Joints is an agenda item in BIM since more than 05 years. Due to high failure rate of Expansion Joints supplied by indigenous vendors, DLW had switchover to import only from 2010 to 2013. Further, M/s V-Flex/Vadodara and M/s Vikrant/Kolkata are enlisted in approved vendor list on their supply/performance credential to improve supply chain. To monitor the performance, DLW has requested vide letter no. dlw.m.65.57G dated 14.08.2015 to UBL, KJM, GY, SGUJ, SBI, ET, TKD, BGKT, IZN, NKJ, UDL, VSKP, AMV, Pune, Raipur, BNDM and PTRU Diesel Sheds for failure data of Expansion Joints for last 02 years in the following format.

SN	Loco No.	Dt. of fitment	Date of failure	Life in months	Reason of failure	Make

Till date only Gooty Diesel shed has responded. ZRs are requested to provide comprehensive failure data of both Expansion joints (10”& 14”).

**Deliberations:**

During discussions, many railways reported that a large nos. of EMD supplied Expansion joints failed within a service life of 06 months only. To improve reliability, DLW has implemented the following design modifications since Sep’2014.

- TIG welding introduced in place of resistance seam welding between bellow asm & weld strip. EMD supplied Expansion Joints are already having TIG welding on this location.
- At Free End of liner, one ‘U’ shaped wrinkle has been provided to increase stiffness of the liner and minimize vibration effect.

DLW explained that identification marks were not found in the recent lot supplied by M/s EMD. 02 indigenous vendors have been enlisted as Part-II to improve supply chain.

### **Decisions:**

- a. Performance of indigenous vendors to be closely monitored by DLW.
- b. 10" Expansion joint has been working under higher specific air flow as compared to 14" Expansion Joint and also fitted with after screen. Therefore failure of 10" Expansion Joint can directly cause consequential damage of turbo. Change of 10" Expansion Joint in 03 yearly schedule in place of 06 yearly has been decided, in view of higher failures observed.
- c. M/s EMD to replace their defective lot and change the defective pieces against warranty.

### **5. Field Failure of HHP turbochargers:**

#### **Agenda:**

Zonal Railways have been reporting large number of failures of HHP turbochargers.

#### **Deliberations:**

A presentation was made for shed wise holding and failure trend. A comparison was shown among new HHP turbo, overhauled HHP turbo and new turbo supplied by EMD. Cause wise failures were also discussed. It was also explained how EMD supplied components are failing in the field. To arrest failure of turbochargers in the field, following DLW's initiatives were also explained:

- Training for Sheds officers & supervisors. 03 courses organized. 20 sheds covered.
- Issued Design Bulletin no. DB/01/2015/26,dt.11/05/15 for procedure of fitment and matching of turbocharger on HHP engines at Diesel sheds.
- Process audit of Turbo Charger Asm. has been carried out at DLW. Quality audit of Child Parts has also been carried out at DLW.

#### **Decisions:**

- a. One more training programme to be organized for remaining 09 sheds.
- b. The process audit of Turbo Charger Asm. & quality audit of Child Parts are to be carried out at DLW.
- c. Regular quality check at DLW may be conducted for 10% of all major child parts of Turbo.

### **6. Radiator Fan Contactors used in HHP Locomotives:**

#### **Agenda**

- a. Initially, 3 type of contactors were used in ECC-3 for making slow and fast speed of radiator fan, which details are as under:

Sn	Description	PL.Nos
1	Contactora AC-3 Pole-325 Amp	18140038
2	Contactora AC-2 Pole-150 Amp	18140040
3	Contactora AC-3 Pole-150 Amp	18140051

- b. Due to implementation of 54" Radiator Fan in HHP locomotives, failures of above 150 Amps AC-2 Pole & AC-3 Pole contactors increased, RDSO has issued IB no.MP.MOD.EM.03.04.11 dated 26.04.2011 to implement higher rating contactor i.e. 250 Amp in place of above 150 Amp Contactors.
- c. Accordingly, DLW has revised ECC#3 drawings/spec to procure higher current rating contactors. Now ECC3 is being procured with higher current rating contactor with following parts nos:

SN	Description	DLW Part No.
1	AC Contactora 3P 250 Amp	18140117
2	AC Contactora 2P 250 Amp	18140130

Higher current rating contactors have been fitted in DLW manufactured locomotive since April'2013 and has been dispatched to Zonal Railways.

In this regard, it is to mention that with above implementation, Siemens are supplying Schaltbau make 250 Amps where as Medha & EMD is supplying 325 Amps cutler hammer make in ECC-3. Failures of Schaltbau make 250 A & Eaton make 325 A contactor supplied by Siemens has been reported from SBI, GOC, IZN, PA, GY & BGKT/shed. The matter has been referred to RDSO for taking necessary action.

Further, a delay of 2 seconds between switching on/off (slow to fast and fast to slow) moment of Contactora has implemented with all three suppliers i.e. M/s EMD, Siemens & Medha .

Zonal Railways is requested to give their feedback on above implementation. Zonal Railways to share their experiences on failures type i.e. contact tip flashing, coil burning, contact tip welding etc.

#### **Deliberations:**

Reliability of contactors, expected service life, maintenance issues have been discussed. Make wise failures of OEMs i.e M/s Eaton & M/s Schaltbau, as reported by Zonal Railways has been analysed. It has been observed that M/s Schaltbau make contactors (6.8%) has higher rate of failures than the M/s Eaton make contactors (3.1%). Possibility for inclusion of RF Contactors in AMC of AC-AC Traction Control System have also discussed.

#### **Decisions:**

- a. Preventive maintenance of RF Contactors to be done by Sheds. M/s Schaltbau & M/s Eaton will provide contactor maintenance kit (moving

/fixed contact, fixing arrangements etc).Representative of M/s Schaltbau & M/s Eaton shall visit Diesel Sheds for imparting training for maintenance of contactors. This may be monitored by RDSO.

- b. RDSO to ensure that M/s EMD modifies software to provide 2 sec delay for ON/OFF of Slow & Fast speed contactors.
- c. A committee consisting of Dir/EC/RDSO, Dy.CDE/TC/DLW, Sr.DME/SBI & BGKT to review the items to be covered under AMC of AC-AC Traction System. Target-Jan 2016

**7. Computer Cards/Modules**

- a. Computer modules are vital parts of LCC as they bear responsibility for smooth operation of locomotives. Presently there are three AC-AC Traction System supplier i.e. M/s EMD, M/s Siemens and M/s Medha. Till date more than 1500 HHP Locos with three systems are running in field.
- b. Zonal Railways has reported failures of CPM, PRG, DIO, PSM, ADA & Interface Module (used in EMD system).
- c. The reported issues are communication link failures, no out-put in cards, premature failures, warranty pending and less average life of cards.

The failure reported by zonal Railways in year 2015-16:

<b>EMD</b>	<b>Siemens</b>	<b>Medha</b>
<b>27</b>	<b>4</b>	<b>4</b>

Zonal Railways are requested to share their views on performance of EMD modules with nature of failures and average life of computer cards /modules.

**Deliberations:**

Large scale failure of EMD system cards have been discussed. Reliability of cards, expected service etc. life has also been discussed. Zonal Railways emphasized that AC-AC Traction Control Systems of Siemens and Medha too have failures of computer cards.

**Decisions:**

- a. RDSO to take up cards failures in different AC-AC Traction Systems and will circulate their recommendation to Zonal Railways.
- b. Zonal Railways to follow Engineering Apparatus Instructions (**EAI- 2581**) for welding preparation in Loco.

## **8. Failure of Rectifier diode fitted in HHP locomotive Traction Alternator:**

### **Agenda:**

Large numbers of failures of Rectifier diodes of traction alternators are being reported by Zonal Railways. But location of the diodes failed are not being reported which is important for failure analysis. EMD has provided their format for diode failures reporting to RDSO on 24.07.15 and same is already circulated to Zonal Railways by RDSO.

Zonal Railways should provide the diode failure cases in given format.

### **Deliberations:**

Some Railways stated that they have not received any format for diode failure reporting from RDSO.

### **Decisions:**

- a. RDSO should circulate the format for diode failure reporting once again.
- b. Railways should provide diode failure in prescribed format.

## **9. HVAC Performance and AMC (Agenda item 8 & 9):**

### **Agenda:**

DLW has turned out 121 HHP locomotives fitted with HVAC units. A total of 193 HVAC units have been fitted by DLW till Sep'2015. The locos have been dispatched to various diesel sheds. The population of HVAC units in service on HHP locos is going to increase rapidly in future.

Presently, DLW is nodal agency for performance monitoring of HVACs. Performances of HVAC are not provided by Zonal Railways on time and DLW depends on the telephonic call to sheds supervisors for collecting performance.

As decided in last BIM, DLW prepared AMC specification and same was included in the purchase specification of HVAC for ensuring AMC in purchase order. But, due to higher cost of AMC, DLW decided to purchase HVAC without AMC and float tender for AMC separately. Now, tendering process for AMC of HVAC has already initiated by DLW for 1535 HVACs.

### **Deliberations:**

Zonal Railways have to ensure proper functioning of HVAC for crew comfort and regular performance monitoring. Zonal Railways stated that for proper working of Cab air conditioner, AMC is essential.

**Decisions:**

- a. DLW should expedite finalization of rate contract for AMC of HVAC and also ensure inclusion of AMC clauses in the purchase orders issued by DLW for procurement of HVAC units.
- b. Zonal Railways should ensure proper working of HVAC and should provide regular performance feedback to DLW timely for taking action with regards to reliability improvement.

**10. Overhaul/ Repair of AC traction motors:**

**Agenda:**

As decided during last BIM, DLW has initiated rate contract for Over Hauling of AC Traction motors, but as the rate of new traction motor has now drastically reduced and considering the finance observation on the issue, the same will be re-initiated after getting clarification of following finance observations:

- a. Technical vetting of specification prepared for over hauling of Traction motor by RDSO since same is RDSO controlled item.
- b. Concurrences of Finance Director of Railway Board for incurring expenditure on this work.
- c. Confirmation from Zonal Railways regarding centralized tender by DLW as ZRs are already empower to take decision on their own as there is much emphasis is being given on decentralization of power by Railway Board.
- d. Fresh Budgetary quotation has been asked from M/s Siemens as the rate of new TM has drastically reduced in recent tender, there may be a corresponding impact on the rate of overhauling.

**Deliberations:**

Repair and overhauling of HHP traction motor is not RDSO controlled item. Overhauling of AC traction motor for HHP Locomotive shall be done by RDSO approved sources. Repair and rehabilitation of HHP traction motors should be part of overhauling, the same should be done separately.

**Decisions:-**

- a. RDSO should also include overhauling/ repair of AC TMs in RDSO Vendor Directory, as AC TMs is an RDSO controlled item.
- b. DMW/Patiala should develop facilities and expertise for doing overhaul of AC TMs.
- c. Railways should advise number of traction motors becoming due for six yearly overhauls to DLW.



## 11. Failure of Compressors on HHP locomotives

### Agenda:

Complaints received and warranty lodged by Zonal Railways for failure of compressors in HHP locomotives. As directed by RDSO, 15 G&D and 8 ELGI compressors fitted with modified valves are on trial in service (G&D compressors on locomotives based at BGKT, SGUJ & KZJ and ELGI compressors based at BGKT and SGUJ). G&D modified compressors have completed around one year in service while ELGI modified compressors are completing 3 months in service.

### Reliability performance analysis based on Warranty data:

Firm's Name	No. of Failures (April'15 to Sep'15)	Warranty Population (April'13 to Sep'15)	%	Failure Analysis	Status
<b>ELGI</b>	<b>54</b>	<b>258</b>	<b>21</b>	Suction and Discharge Valve - 20	Modified ELGI valves on 4 locos each of BGKT and SGUJ (running since July 2015)
				Valve Spring-15	
				Inlet Cooler Assbly-5	
				Piston Seizure-2	
				Compressor Shaft ( Key Failure)-1	
				Others-9	
<b>G&amp;D</b>	<b>23</b>	<b>412</b>	<b>5.6</b>	Suction and Discharge Valve - 6	Modified G&D valves on 5 locos each of BGKT, SGUJ & KZJ (One year completed on 18 <sup>th</sup> Oct 2015).
				Valve Spring-6	
				Inlet Cooler Assbly-1	
				Piston Seizure-2	
				Compressor Shaft ( Key Failure)-2	
				Others-7	

Some railways had reported cases of coupling failure. Coupling assembly procedure has been audited. The specified coupling advance of 0.020" to 0.060" (as per EAI - 2127) with 650 ft-lb torque was not being achieved. DLW increased the torque to 950 ft-lb. The grub screw is being tightened to 20 ft-lb. This has been adopted by DLW from 11/05/2015 onwards.

Feedback on failure of compressor couplings, if any, in HHP locos dispatched by DLW having railroad numbers after WDG4 70122, WDP4D 40238 & WDG4D 70370 may be provided.

### **Deliberations:**

Reliability issues with **ELGI** make compressors were discussed. As per RDSO, action on necessary improvements in valve design has already been taken and modified valves supplied by ELGI have been put in service on trial. Meanwhile, RDSO is also considering trial fitment of an upgraded design G&D compressor having concentric valves on a limited number of HHP locomotives. On coupling failure, none of the railways reported coupling failure on HHP locomotives having railroad numbers greater than the cut-in numbers given above.

### **Decisions:**

- a. Performance of ELGI compressors fitted with modified valves needs to be monitored
- b. RDSO to consider introduction of new design G&D compressors (with concentric valves) keeping retrofitment in mind.

## **12. Failure of Indigenous Radiators**

### **Agenda:**

Reliability of HHP loco radiators manufactured and supplied by Indigenous sources was discussed during the last BIM held at DLW in the month of Aug'2014. A presentation was made by DLW. Details of process audit (including precautions to be taken during storage, handling, assembly & mounting) was done by DLW and need for compliance to OEM's instructions was presented in the forum. The details of design modifications done were also discussed. Changes implemented by DLW to avoid undue stress during handling and mounting and reduce structural vibrations affecting the radiator cores has been detailed and circulated vide Design Bulletin nos. DB/02/2014/05 dated 10.09.2014 and DB/02/2014/01 dated 10.02.2014.

Considering above modifications implemented by DLW, Zonal Railways may give feedback on radiator failures on HHP locos commissioned after Oct'14 onwards.

### **Reliability performance analysis based on Warranty data:**

<b><u>Make</u></b>	<b>No. of Failures (April'15 to Sep'15)</b>	<b>Warranty Population (April'13 to Sep'15)</b>	<b>%</b>	<b>Failure Analysis</b>
Banco	23	370	6.2	Tube Leakage -19
				Water Leakage from header Gasket Joint - 4
Lloyd	19	301	6.3	Tube Leakage -17

				Water Leakage from header Gasket Joint -1
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**Deliberations:**

Reliability issues with radiator assemblies were discussed. DLW reiterated the design modifications implemented a year back in MBR which included blocking of end tubes, stiffening of side channel (adopting Z-section in place of L), increased diameter of tie-rod, increased gap between tie rod and fin core, provision of spacer on tie-rod, expansion joint modification etc. These modifications have been covered in the above Design Bulletins issued by DLW. DLW also presented the findings of quality/process audit of M/s. Banco. DLW also apprised the forum that M/s. Banco has started supplying MBR with improved packaging (metallic cage) to avoid undue stress during handling. M/s. Banco has also started conducting leak test of MBRs at DLW before final fitment on HHP locomotives.

Quality of rubber shims being procured by Zonal Railways is suspect. This can lead to excessive vibrations and failure of radiator.

**Decision:**

- a. Process and quality audit of M/s. Llyod to be conducted by RDSO.
- b. Rubber shims for supporting radiator should be made BIM item so that procurement can be made to same quality standards as done by DLW for new locomotives.

**13. Failure of Fuel transfer pump**

**Agenda:**

Reliability of fuel pumps on HHP locomotives has been a cause of concern. DLW had investigated failures jointly with OEM (M/s. Paragon/USA) and the findings were circulated vide Design Bulletin No. DB/02/2013/01 dated 26.02.2013. DLW has since then relocated the fuel pump. It has been shifted to a location under the bottom plate of the centre-sill. Improvements expected from relocation were (i) improved suction head and (ii) reduction in Fuel pump temperature by almost 10°C. Loco nos. starting from WDG4 12803, WDP4D 40122 & WDG4D 70301, dispatched in June'13, July'13 & March'14 respectively, onwards are having fuel pump mounted under the platform.

**Comparative performance (before & after relocation):**

(Based on Warranty data)

Period	Loco dispatched by DLW	Warranty failures (reported by Zonal Rlys)	%	Location of Fuel Pump

Sept-2011 to Aug-2013	469	149	<b>32</b>	On Equipment Rack
Sept-2013 to Sept -2015	558	46	<b>8</b>	Relocated under the platform

**DLW** has recently fitted a higher rating pump on HHP loco no. WDG4D-70426 and procurement of 100 nos. of higher rating fuel pumps is in process, in order to further reduce the failures.

**Deliberations:**

DLW reiterated that while immediate action of re-locating the fuel pump was taken by DLW in Sept-2013, the action on switching over to higher inverter rating pump with inbuilt design features like over-voltage protection, over-current protection, grit protection etc. is yet to be implemented. Procedural hurdle faced by DLW in procuring upgraded design fuel pump, 2 times costlier than the existing pump, was also discussed. It was concluded that while some reliability improvement has been noticed with the shifting of pump location to underneath the platform (now 8% as compared to earlier 32% warranty failures), the problem is likely to be eliminated with switch-over to upgraded design fuel pumps.

DLW also presented the benefits of upgraded design over existing design to the forum and advised the forum that it has fitted an upgraded fuel pump on loco no. WDG4D-70426 currently based at MGS shed.

**Decisions:**

- a. DLW should follow up with DMW/PTA for procurement of upgraded design fuel pumps on priority against its indent.
- b. MGS shed should monitor the performance of upgraded fuel pump fitted on their loco No. WDG4D-70426 and keep DLW and RDSO apprised.

**14. Performance of Improved Indigenous Thrust pad**

**Agenda:-**

As per BIM 2016-17 discussion, it was decided that -

- (a) RDSO will issue a document clearly defining the boundary conditions with regards to use of lateral thrust pads, coil springs , secondary rubber springs etc.
- (b) DLW will arrange to fit 20 loco sets each of indigenous thrust pads on WDP4D series locomotives.

DLW has prepared a separate drawing for Pad ASM Lateral Thrust to part no. 17022708 to be used on freight services & further procurement is being done for freight services.

DLW has fitted Prag & GMT make Thrust Pad on WDP4D locomotives. Fitment details have been furnished to RDSO & Zonal Railways for performance feedback.

**Deliberations:-**

Performance of indigenous thrust pad of GMT & Prag make fitted on 20 loco each have been discussed, Performance feedback has been provided by some of the user Railways only.

**Decision:-**

- a. It has been decided that RDSO should collect performance feedback of all these indigenous make thrust pads & analyse and advise DLW for further proliferation or otherwise by January 2016..

**15. Performance of Indigenous Coil springs**

**Agenda:**

RSK/ Sithauli /Gwalior has developed & supplied Spring single coil for HHP locomotives. Which have been fitted on 5 WDG4D locomotives (both bogies in 3 locomotives & one bogie each in 2 locomotives), 64 WDG4 locomotives (17 locomotives with one bogie & 47 locomotives with both the bogies) & 15 WDP4B/WDP4D locomotives (13 locomotives with both the bogies & 02 locomotives with one bogie). No failure has been reported so far.

Other source i.e. B.P. Springs has also supplied WDG4/WDP4 series locomotive springs to DLW. 05 WDG4 & 3 WDP4D locomotives have been fitted with BP spring make spring.

Fitment details of RSK & BPS make spring has been provided to Zonal Railways and RDSO for monitoring their performance. EMD is not participating in the tender of WDG4D spring being a only Part-I source for this item.

**Deliberations:**

Performance of Spring of RSK/Sithauli and BPS/Howrah fitted on locomotive has been discussed. Some Railways have reported failures of RSK make springs.

**Decisions:**

- a. It has been decided that RDSO to take performance feed back of springs fitted on the locomotive of RSK & BPS make and to decide for inclusion in their Vendor directory accordingly.

- b. RDSO to take appropriate action against M/s EMD for not participating in the tender of WDG4D spring.  
(RDSO, vide its letter No. SV.Regn.EMD dated 22.12.2015.has informed that M/s EMD has been deleted from RDSO VD for this item.).

## **16. Performance of T M Air Duct**

### **Agenda:**

- During HHP BIM 2011 held at DLW, it was decided to induct 15% of the total DLW requirement with the leather bellows design.
- As per BIM 2013-14, a new part no. 17022460 was introduced for T M Air Duct ASM (Leather bellow).
- CME/DLW has approved to enhance the quantity of T M Air Duct ASM (Leather bellow) to DLW part no. 17022460 from 15% to 50% for further procurement.
- During the year 2014, a total of 61 HHP locomotives have been fitted with T M Air Duct ASM with Leather bellow to DLW part no. 17022460.

### **Deliberations:**

Performance of leather bellow TM air duct fitted on locomotive has been discussed. Failure of two nos bellow in one loco has been reported by NWR.

### **Decision:**

- a. It has been decided that, DLW to procure only 25 % of leather bellow in next procurement cycle. Decision will be taken for further proliferation in next BIM after review of performance of these leather bellows in locomotives.

## **17. Failures of Fab-II Bogie Frames of HHP locomotives**

### **Agenda:**

A total of 55 nos. failures have been reported till date by Zonal Railways. Out of these 55 failed bogie frames, 50 are of M/s Ved make, 4nos. of M/s Simplex & 01 no of M/s ECBT noticed in the WDP4D locomotives & in the middle axle area near to damper bracket of bogie frame.

A meeting was held in AM (ME)'s chambers at Railway Board on 30th June 2014. Following line of actions was decided during the meeting-

- RDSO will issue a Mod sheet for strengthening of HTSC fab-II bogie frame for HHP locomotives.
- For repairing of fab-II bogie frames, the sheds should follow repair procedure circulated by RDSO.
- DLW will provide spare fab-II strengthened bogie frames (around 25 bogie frames) to affected sheds for replacement

- Production of WDP4D locomotives with strengthened fab-II bogie frames should continued. Meanwhile, RDSO should design a new improved fabricated bogie frame design in 4 month.

**Compliance of instructions-**

- A total of 99 bogie frames have been strengthened at DLW.
- A total of 97 sets of strengthening plates have been supplied to Zonal Railways for strengthening of Fab-II bogie frames.
- Modified drawings have been issued by RDSO in Jan-2015.
- Accordingly DLW has revised the drawing & P.Os. have been placed on M/s Ved/CNB, M/s Simplex/Bhilai & BEC/Bhilai in May/June-2015 with new drawings.

Recently RDSO has further made some changes in the above design and end beam has been provided in the drawing which was removed in the earlier revised drawing.

**Deliberation:-**

Strengthening work has been done in most of the Railways by the manufacturers, However, some locos are still having unattended bogies.

**Decisions:-**

- a. Railways have been advised to expedite the strengthening of Fab-II bogie frame of locos not rectified so far.
- b. DLW to use Fab-II bogie frame without end beam received at DLW which has since been superseded, till the stock lasts. Vendors have been intimated to implement the latest revision made by RDSO i.e. restoring the end beam. All the three suppliers have given their consent to implement the above changes from next supply MA to PO in this regard has been issued by DLW.