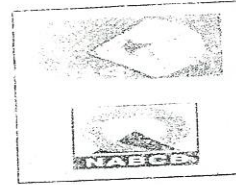


भारतीय रेल (रेल मंत्रालय)
डीजल रेल इंजन कारखाना
INDIAN RAILWAYS (MINISTRY OF RAILWAYS)
DIESEL LOCOMOTIVE WORKS
VAPANARI-221004, MD A



ISO 9001:2008
ISO 14001:2004
OHS 18001:2007

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No. dlw.m.65.262 &
DLW/TOT/1666

Date: 20.09.2013

DESIGN BULLETIN

1. **Design** DB/03/2013/06
2. **bulletin no.**
2. **Subject** Modification in electrical circuit to avoid discharge of battery in HHP locos due to repeated cranking.
3. **Background** In the existing electrical circuit, if fuel pump motor fails and cranking is attempted, starting motors starts drawing current and discharge the battery. In addition when EFCOR is in denergised/ drop out condition (open circuit of coil, defective NC interlock of SDR (Shut Down Relay) and open circuiting of wire from SZ6 wire to EFCOR coil), the starting motor shall draw current if cranking is attempted.

It is observed from the field that loco pilots/ shunters attempt cranking repeatedly if the trouble shooting practices are not known.
4. **Objective** To avoid discharge of battery due to repeated cranking in HHP locomotives
5. **Details of study/ Investigation** Loco No: WDP4B 40067 homed by Diesel Loco Shed, GOC had failed on 09.01.2013 due to engine not cranking. On investigation, it was found that EFCO relay operating coil open circuited resulting EFCO relay to drop out.

As a consequence,
 - a. DV solenoid gets supply through EFCO NC interlock
 - b. Fuel pump relay dropped out and fuel pump motor stopped functioning.
 - c. Digital input Signal (No EFCO input) to MLCC (Main Locomotive Control Computer) was in high due to the supply fed through 2 series connected NC interlocks (between wire Nos: PA91-SX9 SX3-SY3 & SY4-SZ4) of EFCO PB switch.
Even though EFCO Relay was in drop out condition, MLCC assumes that EFCO (Emergency Fuel Out OFF) request is received and permitted the loco to crank. Meanwhile, RPR failed to provide

fault gets logged in MLCC display, but the shunter did not acknowledge and also tried cranking for several times resulting complete battery discharging.

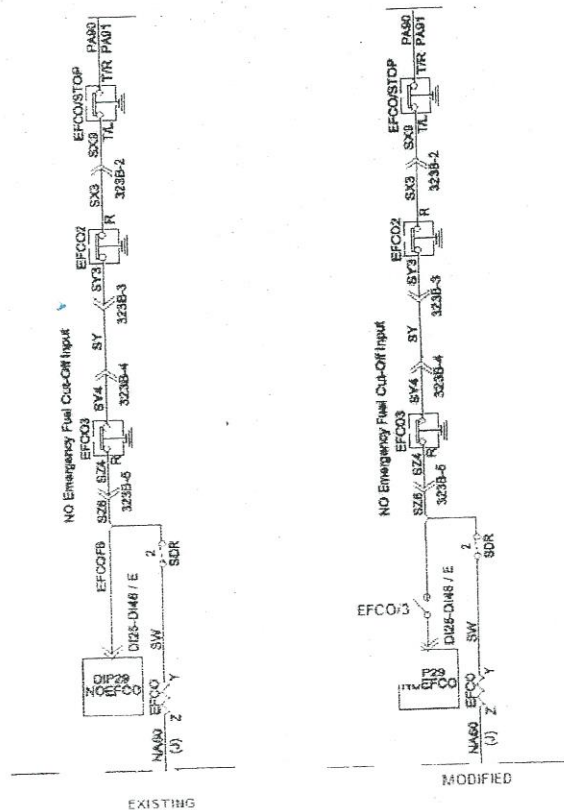
During analysis, it is noted that even if EFCOR is open circuited, digital input signal (NO EFCO FEEDBACK) shall be available to LCC; which permits the engine to crank, but firing shall not take place because DV solenoid shall be in energised condition. This causes draining of battery due to repeated cranking.

Above issue has also been discussed with RDSO during meeting on 26.07.013 and decided to modified the circuit as suggested by GOC/Shed.

6. Corrective action

NO interlocks of EFCOR is to be connected in series with EFCO push button switch NC interlocks EFCO1, EFCO2 and EFCO3 feeding supply Digital input signal (NO EFCO) to MLCC.

By implementing this circuit modification, cranking can be prevented during the occasions such as EFCOR coil open circuit, SDR NC interlock defect.



EFCO circuit modification for avoiding draining of battery

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- 8. **Drg/Spec/Test plan/QP modified** As above modified circuit.
- 9. **Implementation** To be implemented with immediate effect in all HHP locomotives
- 10. **Circulation** Dy. CME/Loco, Dy. CQAM, M/s Medha Servo Drives Pvt. Ltd. Hyderabad, M/s Siemens India New Delhi & M/s EMD Locomotive Technologies Pvt. Ltd. New Delhi


20/9/13
Dy. Chief Design Engineer/TC