SAFETY DEVICES AND ALARM FITTED ON DIESEL LOCO

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SAFETY DEVICES

- Safety Devices play a very important role in the diesel locomotive to avoid extensive damage of engine components as well as transmission components.
- Some safety devices are to ensure the safety of engine components & Diesel Engine
- Rest Safety Devices are for the safety of transmission components.

SAFETY DEVICES

- Low lube oil switch
- Hot engine alarm
- Low water level safety
- Ground in power circuit
- Safety auxiliary relay
- Over Speed Trip Mechanism
- Wheel slip protection
- MU stop button/ Switch
- Pneumatic control switch
- Flasher Light

1. LOW LUBE OIL SWITCH

- **With GE Governor**- An Oil Pressure Switch is provided in Driver Cabin. During starting it energised the clutch coil of governor & start the engine when lube oil pressure reaches at 1.8 kg/cm2.

- And when lube oil pressure falls upto1.3 kg/cm2 it de-energised the clutch coil of governor & shut down the engine.

(not in use now)

1. LOW LUBE OIL SWITCH

- **With WW Governor-** Low lube oil pressure switch is inbuilt in WW governor which shut down the engine when lube oil pressure falls up to 1.2 kg/cm2.

- **With MCBG-** There is a Pressure Sensor Box(PRS Box) which sense lube oil pressure at every notch and shut down the engine when lube oil pressure not sensed within given data limit.

MCBG Datas

Notch	Lube oil Pr.(kg/cm2)	Delay Time (sec)
Idle/1	1.1	45
2	1.5	10
3	1.8	10
4	2.2	10
5	2.6	10
6	3.0	10
7	3.5	10
8	4.0	10

2.HOT ENGINE ALARM

- This device is used to keep the cooling water temperature within permissible limit with the help of three Electric Temperature Switches-ETS1,ETS2 &ETS3.
- When cooling Water Temperature rises up to 64 degree C, ETS1 starts the Radiator fan to run at medium speed.
- If water temperature rises further up to 68 degree C, ETS2 starts the Radiator Fan to run at faster speed.
- If water temperature rises further up to 90 degree C, ETS3 operate & give **audio-visual alarm** to driver for action & safe working.

3.LOW WATER LEVEL SWITCH

- This safety device is provided against low cooling water level. If the cooling water level drops to a predetermined level the **alarm** sounds and the engine **shuts down**. The LWS contact opens in clutch coil circuit. The Governor clutch coil is de-energised. The Engine is shut down through the governor circuit.

- LWS also energises wire 5B thereby the **hot engine light** comes on. The signal relay is energised (SR) and the alarm gong rings.

- An **Electronic LWS** is also being provided to show the water level of Expansion tank to drivers as Full, Half & Empty by Green, Yellow & Red LED respectively.

4.GROUND RELAY

- The ground relay, GR, is energised whenever insulation resistance between main generator circuit and ground goes down. The reset knob of GR comes out. The ground relay GR contact opens and generator field contactor GF is de-energised. The Generator Field contact opens the generator field circuit, and power to motors is cut off.

- It senses the ground fault and brings the engine to **idle with audio visual indication**

5.SAFETY AUXILIARY RELAY

- Whenever the governor speed coil starts getting the reference current, the safety auxiliary relay SAR operating coil is energised and its contact picks up. This safety device is provided to prevent the Diesel Engine from over speeding in case any open circuit takes place in the speed coil circuit. If this condition arises SAR operating coil will be de-energised, resulting in de-energisation of the clutch coil. The Governor arms A and B are separated by bias spring and the engine comes to stop.

(Not in use)

6.Over Speed Trip Mechanism

- This is a mechanical device to prevent the Engine from over speeding. When the Diesel Engine speed goes to more than permissible limit, this device trips the engine to **shut mechanically** by moving the fuel racks to no fuel position.
- OST setting-1140-1160 rpm(Alco-400/1000 rpm)
- OST setting-1180-1220 rpm(400/1050 rpm & WW)
- OST setting-1205-1215 rpm(400/1050 rpm & MCBG).
- Microprocessor Locos with MCBG on trail without Mech. OST- Electrical OST setting-1200 rpm
- MEP OST setting-1300 rpm.

7. WHEEL SLIP PROTECTION

This device protects against the wheelslip.

In case of wheel slip takes place the wheel slip buzzer sounds and the **generator power gets reduced** through a control circuit thus Controlling wheelslip .

whenever wheel slip relay WSR1, WSR2, or WSR3 is energized Wheel slip buzzer sounds by wire 10 through wire13 and wheel sleep light comes on.

8. M.U.STOP BUTTON / SWITCH

- When it is desired to s**top all engines** working in multiple unit operation, this emergency stop button is pushed.

9. PNEUMATIC CONTROL SWITCH

This switch (PCS) trips during emergency brake application, train partition, vigilance control device being not minded by the driver at the specified time etc. When PCS trips, engine speed and power returns to notch one through the governor speed circuit.

10.Flasher Light

- This is an important safety device of the Locomotive to avoid accident.
- This is an automatic flickering light provided on both side of Locomotive.
- It blinks in event of Train Parting or Accident with **audio buzzer** in driver cabin or when ever Loco is on stand still position on line to indicate the other running train on the same line that the line is blocked and avoid accident.
- This feature brings the **Engine idle with application of train brake providing audio visual** indication automatically

Use of Alarm bell

This Alarm bell is provided on front panel and operate in following comndition’

1.Low lube oil condition

2.hot engine alarm operation

3. WSR operation

4.LWS operaion

5.GFLOR operation

6 GR operation

Self assessment exercises

Answer the following

1. What will happen if the pressure of diesel engine has fallen below the preset value?

2.. Which device senses the cooling water level in expansion tank and what does it do in such occurrence?

3. What does the ground relay do?

4. How do the wheel slip relay sense traction motor faults and what happens in such situation

5. How does the over speed safety device shut down the engine in diesel loco?

THANKS