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The Chief Mech. Engineers,
All Indian Railways.

Sub: Innovations and System improvements in Indian Railways

Ref.: Director, E&R(S&T)/RB L.No.2014/E&R/3(7)/2, Dated 28.10.14

As per above mentioned reference, Director, Efficiency &
Research/ Railway Board has informed about the following innovations/system
improvements in the month of September-2014, on the freight side.

(i) Door Pressing/ Renewal unit developed by Central Sick line, C&W
Depot, VSKP/ECoR to make the Bent BOXN/BCN Doors Re-
serviceable.

(ii) A New Bogie Manipulator, developed by Tank Wagon Depot,
BAAD/NCR, for down hand welding of BF Liner and SF Liners.

(iii) Modification to end top coping of BOXNLW & BOXNHL Wagons
innovated by Wagon Repair shop/Khutba/Kota/WCR.

(iv) Manual Centre Buffer Coupler(CBC), Lifting Device to maintain CBC
height with minimum timre and Man-power, developed by C&W Staff of
Rec. Yard, Itarsi(ET)/WCR.

The same innovations are enclosed for yours kind information please.

(Brijesh Dixit)
Director Mech. Engg.(Fr.)
Railway Board

Encl.: 04 Pages
Copy to: EDS (W)/RDSO.
Central Railway

- **Provision of cage in P trap in bio-toilet to avoid choking due to foreign object put inside by users**

Choking of bio-toilets has become one of the most challenging issues after the introduction of bio-toilets. Bio-toilets used to get choked due to object like nappy, bottles and polythene pieces dropped by passengers. In a major breakthrough, a steel cage (by modifying the existing stainless steel released bottle holder of coaches) is fitted at the bottom of bio-toilet in submerged state under the water. The cage stops approach of foreign objects dropped by the passengers and prevents choking of the toilets. On arrival of the train for trip maintenance foreign object trapped in the cage can be easily lifted and removed during the maintenance. Since the cage always remains submerged in water column of toilet bottom, it does not face any deposit of waste on it. Further, as the cage is positioned deep at the bottom of toilet, it is not visible to the users of the toilet. The results have been extremely encouraging and no choking has been found on toilets fitted with cages.

East Coast Railway

- **Door Pressing/Renewal Unit**

Door Pressing/Renewal unit has been developed by Central Sick Line C&W Depot, Visakhapatnam with available resources e.g. 2 nos. of 14” Brake Cylinders, Base, Air pressure 5 kg/sq.cm) pipe line. With this unit, bent BOXN/BCN doors could be made re-serviceable and put on wagons in place of defective doors. With this device so far about 30 bent doors have been renewed. The main advantages of this device are the bent doors could be made re-serviceable and inventory would be reduced.

- **Provision of Solar Lights to stationary patrolman on KK line**

Stationary patrolmen deployed at vulnerable locations prone to boulder fall in KK Line have been provided with solar lights to work in night time as lighting arrangement is not feasible in those locations and there is every chance of snake bite and threat of wild animals in night time. Keeping the difficulty in view especially in night time, in this hilly area, solar powered bulbs are most economical and almost maintenance-free.

- **Preventive measure for corrosion of rails**

In Waltair Division, Visakhapatnam-Vizianagaram is the most corrosion prone section due to passing of morning trains. To overcome this problem, Waltair division has invented & provided a small piece of plastic sheet having thickness of 1mm, under the liner, to avoid direct
contact with rail for a length of 1 km (Km.866 to 867) between Pendurthi-Simhachalam North on UP line giving satisfactory results.

**North Central Railway**

- **Diesel Loco Shed, Jhansi:**
  Lube oil temperature (LOT) sensor is provided at the outlet of lube oil pump in expresser compartment. This particular sensor is vulnerable to damage during maintenance of locomotive due to its location. To protect LOT sensor from damage during maintenance activities, LOT sensor guard is being provided to safeguard from mishandling. This modification has yielded favorable results.

- **Tank Wagon Depot, Baad:**
  A new Bogie Manipulator has been developed at Tank Wagon Depot, Baad with in-house efforts by using Gear system of BOBY wagons. With the help of Bogie Manipulator, down hand welding of BF liner and SF liners has been started and quality of welding improved.

**South Central Railway**

- **Alignment clamp**
  At present, alignment of rail for welding is being done by manually using crowbars, hammers and punches. Poor workmanship leads to misalignment resulting in High Joints or kinky welds. It affects fastenings and sleepers during the movement of the train. Sometimes, mishandling leads to injuries to welder/helper. Innovative alignment clamp can minimize all these human errors, saves time and get accurate tolerances especially in curves, where it is quite difficult and time consuming with old process. It is very portable, easy to carry (4-5 kg.) and economically viable.

- **Modified joggle fish plate for accommodating Mark III Pandrol clip**
  The basic purpose of providing a juggled fish plate is to protect the weld in case a weld failure. The provision of Joggle fish plates with J-clips and Cut liners induce tensile stress in rails/Welds.

  The provision of J-Clips with cut liners is often leading to the dropping of the J-Clips and becoming defunct.

  The inability to provide the mark-IV pandrol clips to juggled fish plates due to the thickness of the juggled fish plates at the bottom is overcome by reduction in the thickness of the juggled fish plate at bottom by 40 mm, will accommodate the mark-III pandrol clips with conventional liners ensuring the minimum length of rail in tension zone, reduces the tensile stresses and proper toe load is achieved. The modification to existing juggled
feedback signals were not received by MEP resulting in load meter zero. To overcome these problems, NKJ shed has started providing additional interlock parallel to GFC to transmit feedback signals to MEP system in case of malfunctioning of one interlock. So far 03 locos have been covered with this modification from July, 2014 in M-24 & M-48 schedules.

- **Modification to end top coping of BOXNLW & BOXNHL wagons Innovated by Wagon Repair Shop/Khutbav**

Top coping in BOXNLW & BOXNHL wagons are of stainless steel box section made of two ‘C’ section by welding. There are large numbers of cases of end top coping damage. These damages are occurring at the time of loading/unloading.

To strengthen the hollow top coping rib/stiffener of stainless steel plates of size 142 x162 x4 mm cost Rs 300/- are being welded inside it during in-house manufacturing of top coping. It strengthens the top coping.

- **Cleaning and Anti rust compound application inside Auxiliary Reservoir Tank Innovated by Wagon Repair Shop/Khutbav**

As per RDSO G-97 manual during POH the auxiliary reservoir needs to be cleaned and then applied with anti rust compound. The construction of the auxiliary reservoir is such that so far there was no equipment available in the workshop to apply the anti rust compound and application of anti rust compound to auxiliary reservoir was not being done. This was also a pending item of RDSO quality audit.

A spray gun attached with a small air pressure tank was purchased from the market. The gun is a long pipe with handle and jet. The gun can be inserted into the auxiliary reservoir through the side holes and anti rust compound can be sprayed inside. The length of the gun is long enough to cover the spraying on entire surface inside the auxiliary reservoir. It will reduce the rust inside A.R. tank hence life of auxiliary reservoir tank will increases. This device is developed at a cost of Rs. 550/- only.

- **Provision of Clamp for Multiple Unit (MU) Jumper Cable**

Loco no. (11275 + 11197) MU was failed on 28.08.14 in train no. 51156 at Dharur, South Central Railway due to the loosening of MU Jumper Cable and thereby power cut/Load meter Zero in trailing loco. Hitherto the clamp has provided at Long Hood of the loco to secure MU jumper cable. It has been experienced that the MU of the locos is also required to be made with Short Hood(SH)- Long Hood(LH) matching due to shortage of time or non availability of appropriate locomotive. In order to eliminate the failures of loco due to loosening of MU Jumper cable during run, a clamp is being provided at SH also for securing MU Jumper Cable. This modification will be helpful in avoiding the failure of loco due to aforesaid reason.
• **Manual Centre buffer coupler (CBC) Lifting Device**

Sometimes, wagons arrived in which CBC buffer height is beyond limit and unsafe to run due to CBC wear plate worn out or buffer height to be maintained, extra efforts are required to replace CBC wear plate.

To make it easy, C&W staff of Rec. Yard, Itarsi (ET) has developed a gadget which is kept below the CBC and screw rod manually rotated to lift CBC and after getting space between CBC shank and CBC housing, CBC wear plate fitted which helps to maintain CBC height.

This gadget is developed with scrap screwed rod and nut, 32mm MS Pipe, support base plate and stopper. This gadget helps to maintain CBC height with minimum time and manpower. This gadget is developed with existing available resources.

• To facilitate ease of pushing push valve and to ensure adequate water for flushing in Bio-toilets, a lever has been fitted over push valve, which operates push valve with less effort and ensures adequate flushing. This was demonstrated to Member Mechanical during his inspection of Coaching Depot, Jabalpur on 04.09.14.

• There are four Traction Substations (TSSs) in the Jabalpur division and all are unmanned and therefore, thefts inside the control room are happened. To prevent the theft, a monitoring system has been provided in these TSSs, which give alarm/indication at RCC/Jabalpur during opening and closing of gates/shutters of TSSs.

• **Computerized three-phase Electric loco trouble shooting module**

With a view to improve the operation three-phase electric locos and knowledge of LPs regarding trouble shooting, a computerized three-phase electric loco trouble shooting module has been installed in the lobby at Sagar.