



# Maintenance of Points and Crossings under Mixed Traffic Scenario of Semi High Speed and Heavy Axle Load - Challenges, Problems and their Innovative Solutions

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## Synopsis

*The vast network of Indian Railway practices mixed traffic operation. Passenger and freight trains share the same track. This practice on one hand seems to achieve economy as same railway infrastructure is shared by both passenger and freight traffic but on the other hand it causes problems for the maintenance engineers. The major problem is the maintenance of Point and Crossing areas which are subjected to high speed passenger trains and heavy axle loads of freight trains. Something beyond the regular maintenance practices and application of some innovative ideas is the need of hour to cope up with these challenges. This paper aims at describing the various innovative ideas which are tried in the Bardhaman subdivision of Eastern Railway and found useful and got appreciation from senior railway officials.*

*Key words:- Mixed Traffic, High Speed, Heavy Axle Load, Maintenance, Innovative ideas.*

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## **1. Introduction:**

- 1.1 The section of Bardhaman subdivision on grand chord line caters the busy suburban services, high speed trains such as Rajdhani, Shatabdi and Duranto running at 130kmph and heavy loads of freight trains. So the track structure is subjected to all sorts of stresses which can be thought of. In this scenario the maintenance of points and crossings become a typical task for the maintenance engineers as they are the weakest part of track structure which requires baby care, otherwise in long term it will lead to interruptions to normal traffic. In Para no. 237,317 & 1413 of IRPWM the detailed procedure of Inspection, maintenance, renewal & laying of points and crossings are discussed but in the scenario which is discussed above some additional efforts are required to deal with the other special type of problems which are arising due to increased speed and heavy axle load and troubling the P. way engineers. In the subsequent paragraphs of this paper, those problems and there solution using some innovative methods which are tried in the Bardhaman subdivision of Eastern Railway are discussed.

## **2. Problems and Innovative Methodologies for their Solutions**

### **2.1.1 Burr Formation on Stock Rail**

Burr is formed due to plastic deformation and flow of metal from gauge face corner, which if not attended within time, leads to non setting of points and breakage/chipping of tongue rail. Existing method of burrs removal in vogue is by using chisel and sledge hammer. This prevalent practice is clear-cut violation of handling instructions for 90UTS rails, and this may leads to development of stresses and consequent fracture of stock rail in long run.

### **2.1.2 Solution**

Use of portable hand grinders for removing of the burr as and when required, is the best solution to this problem. It is very much practical, safe and easy as far as its operation is concerned.



### 2.2.1 Shearing of plate screws

Plate screws are used to hold the slide chair but due to lateral thrust exerted by rolling stock, the plate screws get sheared off which results in the widening of the gauge and disturbance of alignment. Further it is also very difficult to remove the broken part of the plate screw and replace by the new one every now and then.



### 2.2.2 Solution

To bear the lateral thrust of rolling stock wheels flange, Inserts are provided on the outer side of the slide chair up to the heel block. This practice prevents the shearing of plate screws.



### 2.3.1 Dented sleepers in crossing portion

The sleepers below the crossing body i.e. sleeper no. 66 to 73 in case of 1 in 12 turnout and 43 to 48 in case of 1 in 8.5 gets dented





due to hammering impact of rolling stock while negotiating the crossing portion of turnout. This results in the further deterioration of crossing assembly due to loosening of rubber pad and the cross levels also changes and form twist under load thus resulting in bad riding. The fan shape sleepers are available in sets only, so if the dented crossing sleepers are changed by the new ones than the whole set has to be procured and the rest sleepers will be wasted.

### 2.3.2 Solution

This problem can be solved if the dent/groove developed in the sleepers is filled up by the mortar of epoxy and coarse sand mix. This mixture is a very good and reliable material to be used for filing the groves and dents of the sleepers. It is also highly durable and withstands the dynamic train loads.



### 2.4.1 Excessive lateral wear of switches near Stock Rail Joint

The problem of excessive lateral wear of switches is common on the turnouts which are laid on the inside of the curves. Due to the lateral wear the renewal of switch is required to be done before its service life or codal life is over and if not changed there is always a chance of fracture of tongue rail or stock rail and may cause serious mishap.

### 2.4.2 Solution

This problem can be minimised by regular application of grease on the gauge face of the tongue rail and providing a small check rail near the ATS of the switch of opposite side.





### 2.5.1 Elongation of Insert hole/Eye

The hole/eye of the inserts of the sleeper gets elongated due to wear and tear which in turn reduces the toe load significantly and even the ERC get loose and fall after passing of one train after driving them.

### 2.5.2 Solution

This problem can be satisfactorily solved by reconditioning of the inserts either by depositing the metal inside the insert hole/eye by the welding electrode or by inserting a metal pipe of suitable size inside the eye/hole of insert.



### 2.6.1 Fully worn out or corroded insert

Some time in highly corrosion prone areas the inserts in the points and crossings areas gets highly corroded and even breaks during the driving of ERCs. In these cases the PWIs use to change the sleepers and the remaining sleeper of the set is wasted.

### 2.6.2 Solution

There is a solution for this type of problem. The worn out inserts can be removed and new inserts can be fixed using the epoxy mix if the otherwise condition of sleeper is good. This practice is very economical in comparison to the replacing those sleepers with new one.



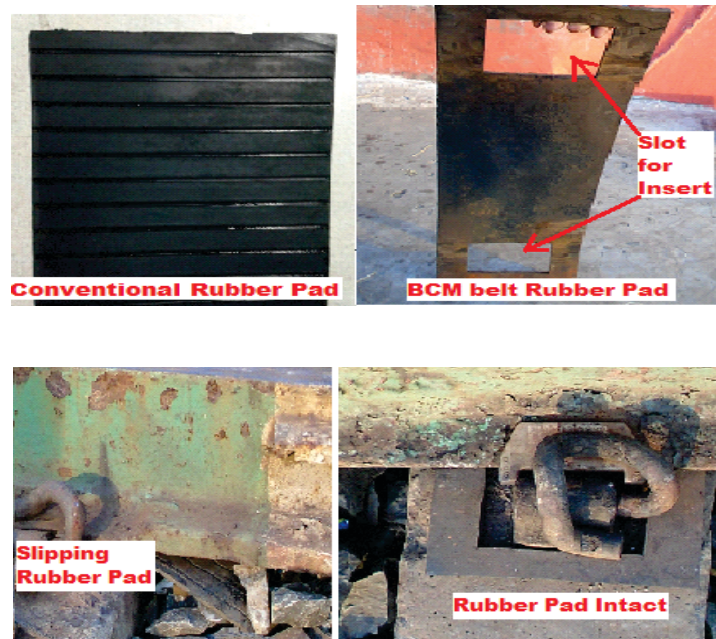
### 2.7.1 Slipping of the rubber pad under the crossing body from rail seat

The GRSP provided underneath the crossing tends to slip and come out and get dropped which in turn exposes the sleeper directly to the impact of rolling stock and thus damage the sleeper.



### 2.7.2 Solution

The conventional GRSP as shown in the photograph is not having any slot by which it can be kept attached to the insert and prevent its slipping. In our section we have used the BCM conveyor belt for this purpose by cutting it into suitable sizes as per requirement and making a slot in them for housing the MCI inserts so that it do not slip and come out. The thickness of BCM belt is also more so it protects the sleeper against impact more and also not easily crushed.



### 3. Conclusion:

Open Line Maintenance work is not just changing and replacing the existing assets by new one but it demands the maintenance engineers to think and apply their knowledge to maintain the asset in working condition by using the available resources and by introducing and enforcing the good maintenance practices. The innovative ideas, maintenance methodologies, and solution to different types of problems as discussed in this paper are very much practical and can be easily implemented over entire Indian Railways.