

Ballast Cleaning Machine (BCM)

M/s BHEL has developed Ballast Cleaning Machine (BCM) with collaboration. The technical details of the BCM to be manufactured are in line with IR specification having ballast cleaning capacity on turnouts also. The BCM is supposed to run on broad gauge & negotiate 10 degree curve. BCM has to be capable of excavating ballast bed up to a depth of 900mm below the rail top and entire width of ballast section. The width of the ballast section from mainline track centre may vary from 2700mm for plain track to 4800mm for turnouts. The machine is supposed to deep screen both left hand / right hand turnouts when approached from either direction i.e. from the switch or the crossing side, depending upon the site conditions. No turning of machine should be required for this. Indian Railways desires the machine to be capable to return the ballast sizes from 65mm maximum to 25mm minimum to the bed. The machine is required to be capable of cleaning, grading and profiling a minimum 550 cubic meter of ballast on plain track in an hour of working including hard, encrusted and caked ballast.

Our BCM machine is having two parts:

- a.) **Power Car**: This contains the power pack for driving the BCM having Bo-Bo bogie configuration and all the axles are powered by individual DC series traction motor. MENTOR (IGBT based controlled rectifier), which converts 415V 3 phase AC into controlled DC for controlling the speed of traction motor while the machine is in working mode, is placed in power car .
- b.) **Working Unit**: This unit has arrangements for cleaning of ballast and its controls. This was designed by our collaborator. This unit has got 3 cabins. One cabin is for keeping hydraulic tank and accessories, Control panel, work bench etc. Another cabin is rear cabin with drive control and braking of vehicle. Third cabin the hanging cabin with excavation and cleaning control, controls for movement during cleaning, track lifting, braking etc. This machine has got only two axles powered by DC series traction motors rest two axles are non -powered. The details of different parts of working unit have been elaborated in the presentation enclosed.

The BCM designed by BHEL & collaborator is having 1000mm dia wheels. The power car and working unit are coupled together by CBC (centre buffer coupler) and at both extreme ends of the BCM combined unit screw coupler has been provided.

PROBLEM BEING FACED

According to the design specification the machine has to perform both on straight track as well as on Turn outs. BCM machine complete with power car and working unit was tested for ballast cleaning on straight plain track. The working of machine was satisfactory. But the machine was not able to work on turn outs because the opening of hydraulic cylinders to enable the chute to open to reach the specified distance to cover turnout was not possible.

The ascending and descending chutes both along with their drive motor are connected to a frame which can adjust itself by moving up and down slightly while we open or close the chutes.

HELP REQUIRED

1. The capability of the chain, driving motor and other supporting structural parts needs to be examined for their capability as the power required to work on turn out is more as compared to straight track.
2. Modification of existing mechanism of opening and closing the chute to cover the turnouts.
3. Since we are not getting any support from our technical partner M/s MTH Praha Czech Republic we suggest IIT experts to visit BHEL Jhansi for better understanding the problem.

We are enclosing herewith following documents pertaining to functioning of Ballast Cleaning Machine

Annex-1: Presentation on functioning of major parts of working unit.

Annex-2: Sketch showing the excavation on plain track.

Annex-3: Sketch showing the excavation in turnout.

Annex 4: Sketch showing the ballast distribution on plain track.

Annex 5: OGA drawing of the BCM working UNIT.