**GOVERNMENT OF INDIA**
**MINISTRY OF RAILWAYS**
**(RAILWAY BOARD)**

No. 2006/CE-II/MB/2. New Delhi, Dt: 25.05.07.

The Principal Chief Engineer/Chief Engineer (Coord.),
All 16 Zonal Railways.

**Sub: Ballast procurement and its utilisation.**

Ballast is an important component of track structure. Sufficient cushion of clean and angular ballast is necessary for providing resilience to track and drainage of water. While crib ballast provides resistance against longitudinal movement of sleepers, the shoulder ballast of required profile commensurate with the sleepers in use is necessary for providing lateral stability to track against buckling. The role of shoulder ballast becomes even more important in LWR territory. Given the constraint of funds as well as limited capacity for movement of ballast, it is necessary that available quantity of ballast be used most efficiently with minimum wastage, giving priority to the locations where it will provide the maximum benefit in maintaining safety of track and minimize the maintenance efforts.

To achieve above noted objectives, special attention is required to be paid to the following:

## 1.0 Availability of Cess.

1.1 While planning for ballasting of the track, it should be ensured that the cess conforms to provision of para 263 of IRPWM. While low cess will result in additional quantity of ballast getting consumed in shoulders, insufficient width of cess will result in ballast rolling down the slope and thus lost.

## 2.0 Assessment of ballast requirement.

2.1 The requirement of ballast should be assessed every year (in January/February) as per the provisions of para 264 of IRPWM. Based on the assessment, ballast deficiency diagram containing depth of clean and caked cushion as well as the quantity of ballast required to make good the deficiency should be prepared and updated. Copies of these diagrams shall be available with SEs, AENs as well as in the division. Further planning for calling of tenders

and programme of DMT movement shall be made keeping this into account to ensure that sections vulnerable from the view of buckling are ballasted well before the onset of summer season, i.e. and March itself. No care of caution/other measures should arise for deficiency of ballast. As far as possible only Depot Ballast need to be taken. In new lines (inclusive of additional lines) also, after providing minimum required ballast by cess supply, rest of ballasting should be done through DMT.

2.2. The quantity so assessed shall also be reflected in the Track Health Monitoring Charts along with deep screening and shallow screening last done in continuation of ballast deficiency data being reflected.

## 3.0 Specifications of Track Ballast.

Track Ballast shall be procured conforming to Specification of Track Ballast – IRS-GE-1 (Jan.2004) issued by RDSO under RDSO's letter No.RS/F/7/4 dt.25/27.6.2004 as amended further, if any, subject to all modifications directed to be made by competent authority upto the date of calling of tenders. PCE may accord appropriate dispensation.

## 4.0 Management of Ballast depot – Supply and training out.

4.1 For ballast collected in depot, instructions contained in para 266 of IRPWM regarding register of ballast collection and training out, loading from the depots and quantity trained out should be adhered to.

4.2 Stacking area shall be level, firm and with good drainage. In case of large depots with annual training out capacity of more than 50,000 cum, the stacking area of the depot may be divided into convenient number of sub-depots. A separate contract may be awarded for each of the sub-depot, however, numb er of such sub depots shall not be more than 4 in one depot. Sub-depot shall be distinct, as along a face of a siding line and if otherwise, a physical barrier shall require to be erected to keep them distinct. Each Sub-Depot shall further be divided into zones for the purpose of segregation of stacking and loading areas. Zones shall be further divided into plots. In each plot ballast shall be collected in stacks such that there is only one stack in a plot. The stack/plot would be the basic entity for measurement of the ballast supplied.

Each depot may or may not have sub-depots and each sub-depot may have one or more zones (only one zone upto 5000 cum stacking capacity).

4.3 For each depot, a depot sketch with proper drawing number and approval of Sr.DEN/DEN in-charge of the depot shall be drawn clearly showing the Sub-Depots (if any), Zones and the Plots with specific identification number for each of the plots. Original of the sketch shall be retained in divisional drawing office

for record. At the time of tendering, a copy of the depot sketch shall form part of the tender papers clearly indicating the sub-depot (wherever existing) for which the tender was being invited. A copy of the depot sketch shall be available with ADEN & SE/JE in-charge of the depot.

4.4 For depot(s) with more than one contract i.e. having sub-depots, a separate sketch for each of the sub-depot may also be prepared in addition to overall depot sketch for incorporating details after measurement as defined in para 4.6 below.

4.5 There should be a buffer of at least one zone between the zones of collection and training to adequate segregate collection and training out simultaneously. This restriction, however, shall not be applicable between zones where a physical barrier like railway track exists between the two zones. In no case simultaneous collection & training out from the same zones shall be permitted. In case of small depots/sub–depots with stacking capacity less than 5,000 cum, simultaneous training out and collection shall not be allowed.

4.6 On the day of measurement of fresh stacks, the approved depot/zone sketch shall be augmented by SE/JE in-charge of the depot with the following in colours/hatching :

(i) stacks measured on date and yet to be paid for,
(ii) stacks measured earlier but not yet disturbed,
(iii) stacks measured earlier and already disturbed, and
(iv) stacks where the supply is in progress.

Besides signatures by SE/JE, the sketch should be got signed by authorized representative of the contractor and ADEN, duly certifying that position of stacks on the date of measurement has been correctly incorporated. Availability of the aforesaid augmented depot sketch shall be a pre-requisite for processing of the bill for payment in the Divisional office.

4.7 After collection of ballast/ boulders/quarry dust and recording of its measurement by the ADEN in a Depot, there should be an interval of at least, a week between the date of recording measurement by the ADEN and the date of commencement of loading and training out operations. In the aforesaid interval of one week, DEN/Sr.DEN has to carry out his prescribed test check(s). In case DEN/Sr.DEN does not intend to test check a particular measurement, he shall clearly record the same in Measurement Book and permit the loading and training out of the ballast after passing of the bill. In case DEN/Sr.DEN chooses to recommend training out earlier than a week, he may seek written approval of Sr.DEN/C. In case Sr.DEN/C is himself incharge of payments, permission of THOD shall be taken.

4.8 Supply on a plot shall be started only after certification by the ADEN in the ballast passing register based on his personal inspection that all the ballast earlier supplied in the plot has been trained out. Before recording his certificate and allowing further stacking, ADEN shall ensure that conditions laid down in para 4.5 above are fulfilled.

4.9 The details of measured ballast stacks shall be entered in a Stack Measurement Register/Ballast passing register, which should have columns for measurements and properties check by SE/JE, AEN/DEN and DEN/Sr.DEN. The register shall be an authentic initial record in the form of measurement book with machine numbered pages and instruction for preservation custody etc. Manuscript ruled registers should be used by proper machine numbering the pages.

The ballast passing register should bear the following information :

i) Reference to Agreement No.
ii) Date of measurement,
iii) Stack No.
iv) Measurement as recorded indicating the different dimensions and volume;
v) Results of the quantity check and qualitative check as per sieve analysis over size, quantity, dust, etc.

There should be no overwriting in the register, if any correction is required, the old entry should be struck off by drawing a line and a fresh entry made and initialed. No blank line should be left while recording. The recordings done at a time should be properly boxed by drawing a line at the start and close of the measurements. As entries passed in ballast passing register should be entered in Measurement Book, which shall form the basis for the contractors' bill.

4.10 No measurement should be done for part stack(s). After measurement of a stack is done, it should not be disturbed except for training out.

4.11 The contractor or his auithorized representative shall sign the ballast passing register as well as the measurement book in token of acceptance of measurements taken by ADEN. After the stack is passed and measured, the stack number should be clearly marked on the stack either by lime or by placing a board. In addition lime should be sprinkled along all the edges of the stack to indicate that the stack has been accepted.

4.12 In another register, the Ground Balance Register, the quantity of ballast measured in each plot should be entered. After subsequent training out of ballast from a plot, the successive reducing balances in that plot should be reflected date-wise. For the quantities loaded, the reference of challan No. should be shown. After the entire quantity in plot has been trained out, the ground balance should be reduced to zero and the plot shown as vacant.

Further stacking at the plot can start only after permission by ADEN as per para 4.8 above.

4.13 The bills for payments to the contractors should be prepared on the basis of the measurements recorded in the Stack Measurement Registers/Ballast Passing register. These details shall be copied in the MBs giving the dates and other details of measurements and checks and the bills prepared.

4.14 In order to streamline the procedure of movement of ballast DMTs and the verification of the challans thereof, the following action shall be taken:

a) The office of SE/JE incharge shall prepare the ballast challans on the prescribed proforma (Form E-1332) in 6 copes. One copy shall remain in the file of the concerned SE/JE incharge as the office copy, one copy shall be handed over to the ASM of station of ballast depot, who shall han d it over to the Guard working the ballast DMT. The remaining 4 copies of challans shall be later got verified from the consignee SE/JE incharge. One copy shall be retained by the consignee, one copy shall be retained by DEN/ballast, one copy sent to the office of Sr.DEN and the last copy sent along with the Final bill of the concerned supplier.

b) The Guard working the Ballast DMT shall hand over the copy of the Challan given to him to the SE/JE(P.Way), where the Ballast DMT is unloaded. It is the responsibility of the Consignee or his representative to make contact with the Guard for collecting this copy of challan. In case the Consignee or his representative does not collect the copy of this challan, the Guard shall hand it over to the SM of any of the either end block station where the DMTs is unloaded. The SM in turn shall send a Control message to MTS that the ballast challan is in his custody and has not been collected by the SE(P.Way).

c) After receiving the Ballast challan, if the consignee finds that the quantities entered for any wagon(s) in the ballast challan do not match the loading condition of the wagon actually, he shall note the actual quantities entered for any wagon(s) in the ballast challan do not match the loading condition of the wagon actually, he shall note the actual quantities on the copy of the challan, intimate the consignor, his senior and consignor's seniors right away.

d) Similarly, in case a consignee is not able to unload any or some wagons due to whatsoever reason and the ballast in these wagons is sent back along with the DMT, he shall note such quantities in the copy of challan. This copy of the challan shall thus help in verifying the ballast challans

e) The challans finally verified, test checked and accepted by the receiving SE/JE concerned and the contractor or his authorized representative shall then be sent to the ADEN Incharge of the

depot. The final payments for supplying and loading shall be based on the lower of the two measurements viz. the measurement taken at the originating depot and the measurement by the consignee.

f) In case, there is a dispute regarding the quality of ballast between the receiving ADEN and ADEN-Incharge of the ballast depot at which ballast is loaded, the matter should be referred to DEN/Sr.DEN incharge of the depot whose decision as regards the quality shall be final. In all such cases, the hoppers/wagons should not be unloaded directly on to the track but shall either be kept under load for inspection of the DEN/Sr.DEN or the ballast shall be unloaded and kept separately in stacks at some convenient place to facilitate inspection by DEN/Sr.DEN.

g) Within 1 day of a DMT having been dispatched, SE/JE(consignor) shall send 4 copies of Ballast challans for verification. The Consignee PWI shall promptly verify such ballast challans. These 4 challans shall be dispose in the manner mentioned in para 4.14 (a) above.

4 15 In case of failure of ballast due to faulty gradation, should the contractor chooses to rectify the defect either by breaking the oversized ballast or by screening the undersized ballast and if the ballast so offered is acceptable to the Railways, the same may be measured and accepted.

## 5.0 Cess supply

5.1 For ballast collection along Cess & its running out, instruction as given in Para 267 of IRPWM shall be adhered to.

5.2 Stacking area should be level, firm and with good drainage. Written permission for stacking shall be certified by ADEN (test checked at times by DEN/Sr.DEN) on the ballast passing register. Each stack shall be so formed that ratio of longer to smaller side does not exceed 2.5 except for areas where there is constraint of land width in which case the ratio upto 3.5 may be permitted. The height of stack shall not be less than 1.0 m except in hilly areas where it may be 0.5m. The height of stack shall not be more than 2.0 m. The side slopes of stack should not be flatter than 1.5:1 (Horizontal : Vertical) and the cubical content of each stack shall not be less than 30 cum in plain areas and 15 cum in hilly areas.

5.3 The plots for ballast stacks should be selected by SE/JE Incharge and approved by ADEN and should be on level ground and at such locations from where lifting and leading of the ballast into the track required minimum effort. The supply contractor should level the area at his own cost before stacking the ballast.

5.4 The quantity of ballast required in a TP length should be properly assessed in advance and advised to the contractor to avoid surplus collection in one TP length & less than required in another which may result in unnecessary lead.

5.5 Measurement of ballast should be done following generally the provision in Para 4.9, 4.10, 4.11, & 4.13 above. The collection and stacking of ballast should be complete in all respect in a TP length before measurements are taken i.e. measurement for ballast supplied in a particular TP length shall be taken only once during the currency of a contract.

5.6 In case of cess supply, cess supply sketch similar to depot sketch shall be drawn as mentioned in para 4.4 above by SE/JE incharge of the section. The diagram shall reflect all the stacks available on the section clearly indicating the following by different colour/hatching.

i) stacks measured on that date and yet to be paid for,
ii) stacks measured earlier but not yet disturbed,
iii) stacks measured earlier and already disturbed, and
iv) stacks where the supply is in progress

These diagrams should also be signed by contractor's representative and ADEN duly certifying that position of stacks on the date of measurement is correctly incorporated in the diagram. Availability of cess supply diagram shall be a pre-requisite for processing of the bill for payment in the Divisional office.

5.7 In case of supplies taken along the cess, ballast passed by the AEN should not be put into the track till the bill is passed by the Sr.DEN/DEN and a lapse of further seven days and the ballast is accounted for in the ballast ledger by the subordinate-in-charge and has been collected for 1 Km continuous length, unless a special written personal dispensation is given by the Sr.DEN/DEN to put the ballast into the track in urgent cases. But in all cases authorization shall specify the date on which the distribution is permitted. This date shall not be earlier than 15 days after the date of initial measurement.

5.8 There should be a buffer of at least one Km between the location of collection and running out of ballast. Any deviation of the stipulations shall not be allowed except by specific written approval of the Sr.DEN/C for the reasons to be recorded in writing and if he is the passing officer for payments, then deviation being approved by THOD.

## 6.0 Delegation of Powers for Management of Ballast.

6.1 The sectional DEN/Sr.DEN in whose jurisdiction the location falls shall deal with management of ballast procurement including tendering and contract management both for depots as well as for cess supply. Where exceptions are

to be made in control due to special working conditions/work-load of the depot, specific approval of the Pr.CE shall be required.

6.2 Sr.DEN/C shall be responsible for the overall planning of ballast requirement and distribution of quantities to various depots and for cess supply. He shall also control the availability of funds for ballast, both under Revenue and Track Renewals and shall coordinate the overall movement of ballast trains from depots.

6.3 All initial measurements of ballast stacks can be recorded by SE/JE holding independent charge subject to 100% check of these managements to be exercised by the Asstt. Engineer, both in respect of stack measurements as well as quality checks. Sr.DEN/DEN, who is the bill passing officer shall exercise 10% check, both in respect of stack measurement and quality before passing the bills. At least 30–33% of the bills should be covered by the test check to be carried out at the DEN/Sr.DEN's level. Bills should preferably be checked keeping an element of surprise but at no stage, more than three bills should be missed in continuation.

7.0 In case of Construction Organisations equivalent levels namely AEN/Con, XEN/Con, DyCE/Con etc. shall be applicable as the case may be.

## 8.0 Working of ballast DMT – Do's and Don't's:

The main Dos and Don'ts are given below for easy reference:

**Do's**

8.1 Ensure timely examination of ballast hoppers by TXR.
8.2 Ballast DMT must be manned by Guard.
8.3 Brake power must be checked by Driver.
8.4 Proper planning for unloading of ballast hoppers TP wise should be done by PWI in advance and clear signal should be shown to drivers to stop at exact required locations.
8.5 Ensure that doors of the ballast hoppers are functioning properly and there is no jamming of doors.
8.6 Ballast DMT must be accompanied by a Blacksmith for handling jammed gears of door flaps if any.
8.7 PWI must explain and brief the Mate, Keyman, Driver and Guard about the location and safe working of DMT before starting DMT.
8.8 Door flats of ballast hoppers should be opened slowly to avoid sudden discharge and thereby heaping of ballast.
8.9 PWI must move along with DMT while ballast is being unloaded and instruct the staff on DMT as per need.

**Don'ts**

8.10 Do not move DMTs at speeds higher than 8 to10 kmph while unloading ballast.

8.11 DMT shall move only in one direction and no pushing back should be done.

8.12 Don't stop DMT while unloading is in process.

8.13 Do not move DMT if it has stopped to any reason without ensuring clearance of ballast from track.

8.14 Ballast shall not be unloaded on and near Level-Xings, Points and Crossings and Girder Bridges.

8.15 Do not work DMTs after sunset and on foggy days.

8.16 Uneven unloading must be avoided.

**9.0** This supersedes the instructions issued by Board vide letter No. 91/CE-II/MB/3 dated 10/17.09.1993

25/5/07

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**Railway Board.**

Copy to:

1. CAO(C)/CE(Co)/Con, All 16 Zonal Railways, for kind information and necessary action please..
2. DG/RDSO, Lucknow, for kind information please.
3. Director/IRICEN, Pune, for kind information please.