East Central Railway

Office of the
General Manager(Engg.)/Hajipur

PCE's Circular No.-31/2009/Works
Sub. : Standards of flooring for goods handling area

Railway, being a major transporter of goods, different types of consignment are handled by East Central Railway. The handling of consignments are generally done in goods sidings, which necessitates provision of proper surface for these sidings in order to ensure its durability, maintainability and ease in handling of consignments. Different types of surfaces are being provided at different places. Therefore, a need has been felt to standardise the surfaces of loading/ unloading platform for different types of consignments, which may be classified into following categories:

a) Bagged consignments
b) Coal & Ore consignments
c) Heavy consignments

a)Ba gged consignments:

Generally such consignments are carried in covered wagons. Bags are light in weight and can be easily handled manually. Examples of such consignments are food grains, cement, salt, fertilisers
etc. The impact loading in case of handling of such consignments is not of much significance. The primary concern becomes that the surface should be smooth, non-eroding & firm as well as amenable to easy cleaning by sweeping or vacuum cleaning. The handling area shall normally be either high level with covered shed or rail level in open along the goods siding. The length of the platform should be full length for stacking area and width of the platform should normally be not less than 14m.

The suggested top surface in such cases shall be 75 mm thick plain cement concrete of grade M-25 made with 20mm nominal size of aggregate, as it shall normally be adequate to cater to the requirements. The concrete shall be well compacted with the use of surface vibrators, finished smooth and well cured. However, in case of mechanical handling involving movement of forklifts etc., the top surface shall consist of 100mm thick M-30 concrete with 20mm nominal size stone aggregate, vacuum dewatered and smooth

finished and nominal reinforcement of 6mm at top and use of hardonite material in the top 35mm with 10mm nominal size aggregate. Proper cross slope of 1 in 60 (away from track) shall be provided to ensure that there is no stagnation of water over the handling area. Composition of pavement layers below concrete has been indicated **vide item (d) below**. The expected life of such pavements **shall not be less than 10 year with minimal maintenance requirement.**

b) Coal and Ore consignments:

These consignments are bulk consignments and are carried normally in open wagons . Examples of such consignments are coal, stone chips etc. Normally, these are handled mechanically with the use of grab jaws/rakers etc. Manual handling involves use of hand shovels, hand rakers, phowrahs etc. The surface in all such cases should be strong enough to withstand tyred crane working and should also be able to withstand the rubbing action of shovels, phowrahs, grab tooth/rakers etc. Besides that the surface finish should be smooth with minimum number of joints and the joints should not have projections, so that it doesn't obstruct the movement of rakers/grab jaws etc. The handling area shall normally be rail level platform in open along the goods siding. Contamination with loose earth is to be avoided. The length of the handling area should be normally full rake length as far as possible for stacking area and width of the platform should normally be not less than 14m.

In all such cases, the suggested top surface shall be of 100mm thick M-30 concrete with 20mm nominal size stone aggregate, vacuum dewatered, smooth finished and nominal reinforcement of 6mm at top and use of hardonite material in the top 35mm with 10mm nominal size stone aggregate. All joints on top shall be filled with sand and sealed with bitumen in top 15mm. Proper slope of 1 in 60 away from track for quick drain off of water shall be maintained. Composition of pavement layers below concrete has been indicated **vide item (d) below**. The expected life of such pavements **shall not be less than 10 year with minimal maintenance requirement.**

(c) Heavy (Iron and Steel) Consignments:

These types of consignments are iron and steel consignmer ts, which include structural inverts & are also called 'Crane Consignments' as these consignments are normally handled by cranes. During loading as well as unloading processes of consignments, despite utmost care, the surface may be subject to some impact, therefore, the top surface should be impact resistant. The handling area shall normally be rail level in open along the goods siding. The length of the handling area should be normally full length as far as possible and width should normally be not less than 20m.

The suggested top layer in such cases shall be 100 mm thick M-30 concrete flooring. The nominal size of aggregate used in concrete shall be 20mm. The concrete shall be vacuum dewatered and shall be made smooth finished on top. A nominal reinforcement of 6mm shall be provided at the top. An additional overlay of 35mm thick hardonite shall be laid over the concrete surface. The nominal size of aggregate used in hardonite layer shall be 10mm. All joints on top shall be filled with sand and sealed with bitumen in top 15mm. Normally a slope of 1 in 60 shall be maintained away from track to ensure that there is no stagnation of water on the platform. Composition of pavement layers below concrete has been indicated **vide item (d) below**. The expected life of such pavements **shall not be less than 10 years with minimal maintenance requirement.**

(d) Composition of pavement layers below top layer: Adequate strength of pavement layers below the top surface is very important for proper performance of the top(wearing) surface, because the deficiencies in lower layers often get reflected in the top surface. The purpose of the lower layers is to receive stresses from the wearing layer within its bearing capacity and transfer it to a larger area of lower layers within their bearing capacity. Therefore, the entire pavement should be designed properly so that the load on wearing surfaces could be safely transferred to the subgrade. There are different methods available for design of flexible and rigid pavements. Normally for flexible pavement, method prescribed as in IRC:37 should be followed and for design of rigid pavements, method prescribed in IRC:58 should be followed.

Composition of pavement layers below the top layer of concrete for all the three types of floorings mentioned above, shall be as under:

(i) 75mm thick P.C.C. 1:3:6 layer, well compacted, with 40mm nominal stone aggregate.
(ii) 150mm thick well consolidated stone soling using 75mm nominal graded stone aggregate.
(iii) In case of poor formation soils, a layer of blanketing material (stone dust/ moorum) 150mm thick over subgrade to be provided.
(iv) Well consolidated subgrade with proper cross slope (1 in 60)

(e) Standards of approach road for sidings: The standards of approach road for the sidings shall be as under:

I. Well consolidated subgrade with proper cross slope (1 in 40)
However, in case of poor formation soils, a layer of blanketing material(stone dust/ moorum) 150mm thick over subgrade to be provided.
II. Overlaid by three layers of stone aggregate of various grading as under:
(i) Bottom layer- stone aggregate of size 110mm to 75mm -230mm thick.
(ii) Middle layer- stone aggregate of size 65mm to 45mm -100mm thick.
(iii) Upper layer- stone aggregate of size 55mm to 20mm- 75mm thick.
III. Top layer to be laid with 40mm thick premix carpet surface and seal coat.

Rolling with 8-10 Ton road roller is must and no hand rolling is permitted. The thickness of each compacted layer shall not be more than 10 cm. Proper drainage should be ensured so that there is no stagnation of water on the road. The edges of the roads should be protected by providing kerb stones.

The stated frequency of maintenance for re-topping of bituminous 40 mm thick carpet is **once in 2-3 years**. If good drainage conditions are maintained, the life could be more than 3 years.

The above details are in accordance with stipulations of Board's letter no. 2007/PL/25/1 dated 05.06.07

(f) The sketches for the three types of flooring along with approach road have been attached herewith as annexure 'A' to 'D'.

(g) Alterr ıtively to that stated in (a), (b), and (c) above in the areas where stone bricks are available at a cheaper rate, stone set flooring with such bricks can be laid over layers as specified **vide item 'd).** The joints between indi\idual stone bricks will be filled with sand- bitumen mix for proper holding.The top surface of stone bricks shall be levelled and should match with the rail level.

(h) However before taking up the actual execution suitability of scheme should be worked out judiciously taking into consideration of local soil conditions and availability of materials.

This has got the approval of PCE.

6-01-09
(V. Kumar)
Chief Engineer/Works

Docket No. W-2/118/09/Works Policy/ 477 Date- 06.01.09

Copy-

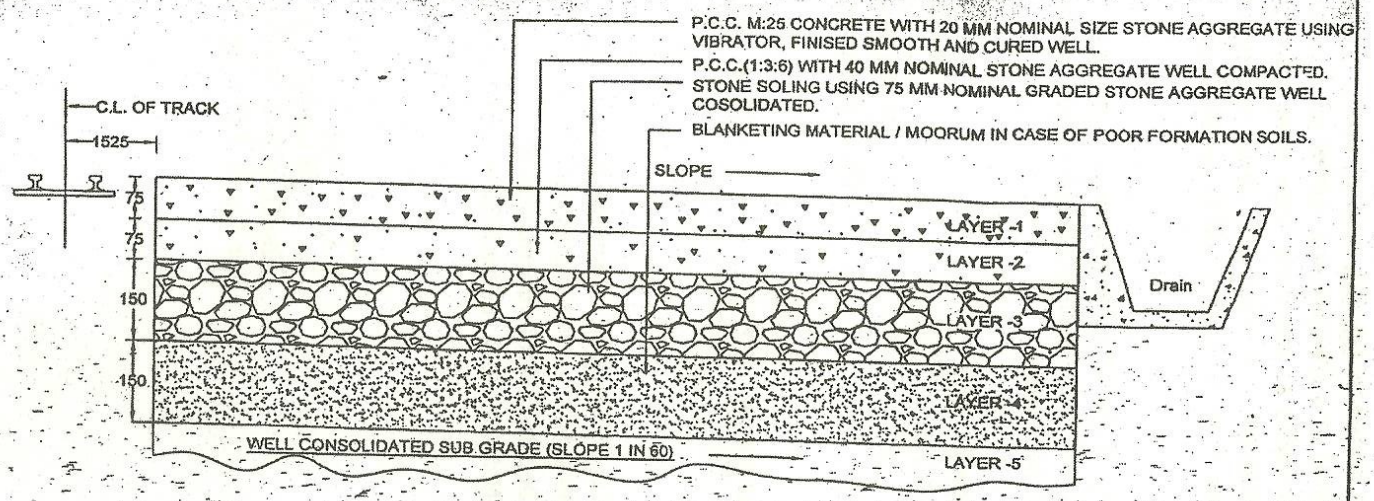
1. CAO/Con/N/MHX, CAO/Con/S/MHX for information pl.
2. DRM/DNR, DHN, MGS, SPJ & SEE for information pl.
3. All HOD, Dy HOD/ Engg. Deptt./ECR for information pl.
4. Sr. DEN/Co-ord./DNR, DHN, MGS, SPJ & SEE for information and necessary action.

Dy. Chief Engineer/Works
For General Manager (Engg)

ANNEXURE - A

STANDARDS OF FLOORING

(BAGGED CONNSIGNMENTS i.e. CEMENT, FOOD GRAINS, SALTS, FERTILIZERS ETC.)



NOTE :

1. ALL DIMENSONS ARE IN MM.
2. PROPER CROSS SLOPE SHOULD BE PROVIDED.
3. IN CASE OF MECHANICAL HANDLING INVOLVING MOVEMENT OF FORKLIFT ETC. AND IN CASE OF OPEN R.T. UNLOADING PLATFORMS THE CROSS SECTION AS PRESCRIBED FOR IRON STEEL CONSIGNMENTS SHALL BE FOLLOWED THAT IS TOP LAYER WILL BE REPLACED BY LAYER -1 AND LAYER -2 OF ANNEXURE-B.
4. IN CASE OF HIGH LEVEL GOODS PLATFORM, FLOORING AS INDICATED IN THE DRAWING SHOULD BE PROVIDED BEHIND THE PLATFORM WALL AND COPING WITH DISTANCE OF PLATFORM WALL AND COPING FROM CENTRE LINE OF TRACK AS PER S.O.D.
5. THE LENGTH OF PLATFORM SHOULD BE NORMALLY FULL RECK LENGTH AS FAR AS POSSIBLE FOR STACKING AREA AND WIDTH OF PLATFORM NORMALLY NOT LESS THAN 14M.
6. THIS DRG. IS BASED ON RLY. BD's L. No — 2007/PL/25/1 DT. 05.06.2007

CPDE	6.1.09	DY.CE/PLG.	16.01.09

EAST CENTRAL RAILWAY

STANDARDS OF FLOORING
(BAGGED CONSIGNMENTS i.e. CEMENT, FOOD GRAINS, SALTS, FERTILISERS ETC.)

C.E.'S DRG. NO. SK/MISC/04/2007

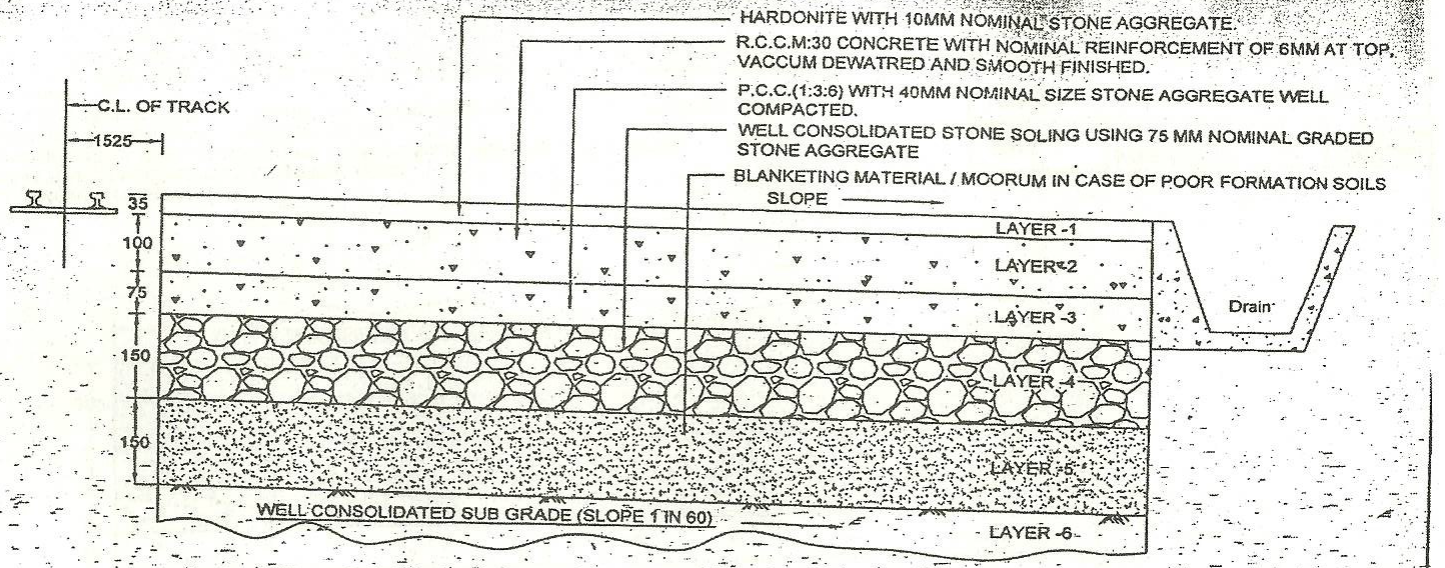
below. The capacity [illegible]
minimal maintenance requirement

[116]

ANNEXURE "B"

STANDARDS OF FLOORING

(COAL, IRON ORE AND OTHER LOOSE CONSIGNMENTS.)



NOTE :

1. ALL DIMENSONS ARE IN MM.
2. PROPER CROSS SLOPE SHOULD BE PROVIDED.
3. IN CASE OF HIGH LEVEL GOODS PLATFORM, FLOORING AS INDICATED IN THE DRAWING SHOULD BE PROVIDED BEHIND THE PLATFORM WALL AND COPING WITH DISTANCE OF PLATFORM WALL AND COPING FROM CENTRE LINE OF TRACK AS PER S.O.D.
4. ALL JOINTS SHALL BE FILLED WITH SAND AND SEALDED WITH BITUMEN IN TOP 15MM.
5. THE LENGTH OF PLATFORM SHOULD BE NORMALLY FULL RECK LENGTH AS FAR AS POSSIBLE FOR STACKING AREA AND WIDTH OF PLATFORM NORMALLY NOT LESS THAN 14M.
6. THIS DRG. IS BASED ON BLY. BDG L. No. - 2007/PL/25/1 DT. 05.06.2007

CPDE	6-1-09	DY.CE/PLG. 06.06.09
EAST CENTRAL RAILWAY		
STANDARDS OF FLOORING (COAL IRON - ORE AND OTHER LOOSE CONSIGNMENTS)		
C.E.'S DRG. NO. SK/MISC/05/2009		

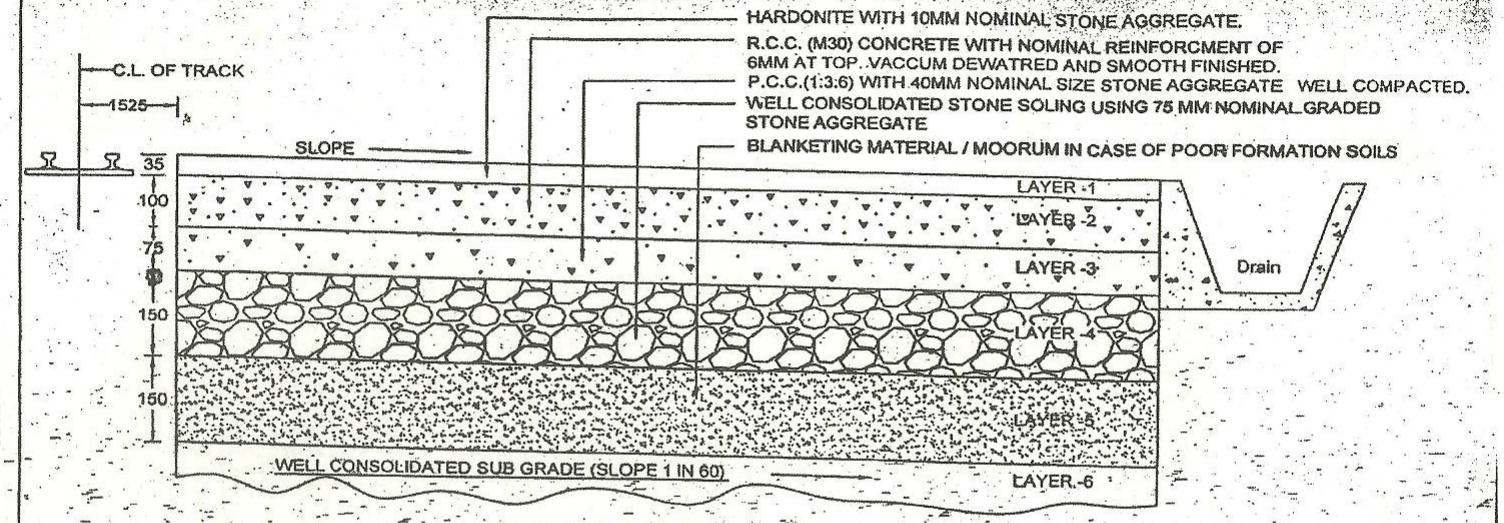
below. The expected life of such pavements shall not be less than 10 years each.

[117]

ANNEXURE - C

STANDARDS OF FLOORING

IRON AND STEEL CONSIGNMENTS / CONSIGNMENTS HANDLED BY CRANE



NOTE :

1. ALL DIMENSONS ARE IN MM.
2. PROPER CROSS SLOPE SHOULD BE PROVIDED.
3. HANDLING AREA SHALL NORMALY BE OPEN ON R.L. PLATFORM ALONG SIDING
4. HANDLING SHALL NORMALY BE WITH CRANES.
5. FACILITY FOR MOVEMENT OF CRANE FOR LOADING/UNLOADING OF CONSIGNMENT SHALL BE PROVIDED
6. IN CASE OF HIGH LEVEL GOODS PLATFORM, FLOORING AS INDICATED IN THE DRAWING SHOULD BE PROVIDED BEHIND THE PLATFORM WALL AND COPING WITH DISTANCE OF PLATFORM WALL AND COPING FROM CENTRE LINE OF TRACK AS PER S.O.D.
7. ALL JOINTS SHALL BE FILLED WITH SAND AND SEALDED WITH BITUMEN IN TOP 15MM.
8. THE LENGTH OF PLATFORM SHOULD BE NORMALLY FULL RECK LENGTH AS FAR AS POSSIBLE FOR STACKING AREA AND WIDTH OF PLATFORM NORMALLY NOT LESS THAN 14M.
9. THIS DRG. IS BASED ON RLY. BDs L. No.:-2007/PL/25/1 DT. 05.06.2007

CPDE	6.1.09	DY.CE/PLG.	06.1.09

EAST CENTRAL RAILWAY

STANDARDS OF FLOORING (IRON AND STEEL CONSIGNMENTS / CONSIGNMENTS HANDLED BY CRANE)

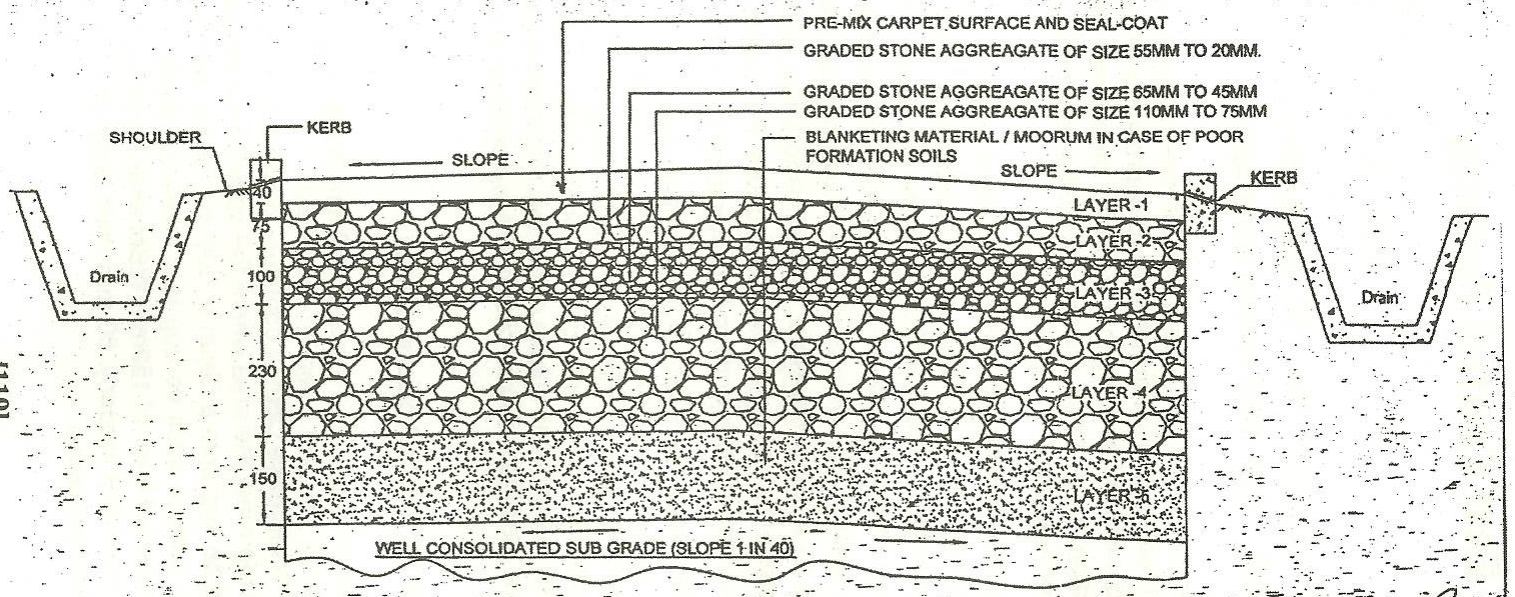
C.E.'S DRG. NO. - SK/PHSC/05/2009

[118]

ANNEXURE - D

STANDARD OF APPROACH ROAD

(HEAVY DUTY ROAD FOR MOVEMENT OF LOADED TRUCKS)



NOTE :

1. ALL DIMENSONS ARE IN MM.
2. EDGE PROTECTION SHALL BE DONE BY PROVIDING KERB STONES.
3. ROLLING SHAL BE DONE BY 10T ROLLER. NO HAND ROLLER IS ACCEPTABLE.
4. PROPER SPACE SHALL BE LEFT IN KERB TO DRAIN OUT WATER FROM ROAD SURFACE.
5. THIS DRG IS BASED ON RLY. BDs L.No.-2007/PL/25/1 Dt. 05.06.2007

CPDE	Dy.CE/PLG	
EAST CENTRAL RAILWAY		
STANDARDS OF APPROACH ROAD (HEAVY DUTY ROAD FOR MOVEMENT OF LOADED TRUCKS)		
C.E.'S DRG. NO. SR/MISC/07/2007		