

Special Conditions for TFTR work by Widening / Cess repairs / Toe Bank

- 1) Entire TFTR works are categorized into following categories
 - a) Cess side earthwork to make up the full cess width and toe banks
 - b) Cess side earthwork to make up the full cess width and toe banks and non cess side i.e. between tracks earthwork which would involve track crossing making temporary level crossing
 - c) Cess side earthwork to make up the full cess width and toe banks; non cess side i.e. between tracks earthwork which would involve track crossing making temporary level crossing and provision of central drains.
 - d) Cess side earthwork to make up the full cess width and toe banks ; non cess side i.e. between tracks earthwork which would involve track crossing making temporary level crossing; provision of central drains and provision of cross drains in embankment using pipe jacking techniques.
 - e) At zero embankment location, replacement of natural black cotton soil with SQ2 soil along the track from toe of ballast and beyond infringing dimensions for 3m perpendicular to track to a depth of 1m. This work has to be executed duly barricading the track and under suitable speed restriction. The excavation length at a given location shall not exceed 50m.
- 2) Work site protection as per IRPWM chapter 8 to be adhered at all times.
- 3) The Railway administration will not be responsible for the safety of contractor's labour engaged for their work and should be ensured that all the labour are medically fit with good eye sight so that they can safe guard themselves.
- 4) Rate to be quoted by the contractors should be inclusive of Royalty, seignorages, taxes etc., complete as applicable to state concern. Necessary mandatory deductions such as royalty, seignorages etc., as per State Govt. latest GOs will be followed by Railway.
- 5) The contractor must lay temporary ramps at suitable locations, using their own earth, for vehicles and machinery to cross the track and perform work on the non-cess side or between two tracks. Upon completion of the work, the temporary ramps must be dismantled. The dismantled earth may then be re used for laying the toe bank, etc. No extra payment shall be paid for making the ramps / temporary LCs.
- 6) No work shall be done without railway supervisor.
- 7) **Quality of Earth works should follow RDSO guide lines / specifications vide no. RDSO /2020/GE:IRS-0004,Sept.-2020**
- 8) Compacting of cess widening, toe bank, and side slopes will be done using vibratory rollers/compactors to achieve the Maximum Dry Density (MDD) as per Appendix E, pages 138 and 139 of RDSO guidelines/specifications, RDSO/2020/GE:IRS-0004, Sept. 2020."

- 9) SSE/P.Way / SSE/Works should maintain compaction registers. For every 500m, the soil test reports and dry density certificates should be submitted. If there is a change of quarry, irrespective of the quantity, the soil test report should be submitted. If these documents are not submitted along with the bill, the entire quantity of earth will be summarily rejected.
- 10) Additional width of embankment should be carried out at high bank locations, curves whenever required prior approval should be obtained from Sr.DEN / DEN.
- 11) Toe bank should be provided at locations approved by Sr.DEN. ADEN & SSE/P.Way should ensure side slopes of 2:1, if side slopes are below 2:1 slopes quantity of earth work should be summarily rejected.
- 12) The Contractors are advised to inspect the site and availability of road facility / approaches before quoting their rate.
- 13) No extra payment will be made for jungle clearance and repairs to service road or for formation of road if required for leading/transporting of earth to cess location.
- 14) Payment for the earth work will be made to the quantity arrived based on cross sectional measurements duly deducting as per specifications.
- 15) Contractor required to quote the rate duly considering the royalty, seignorage charges as applicable in Telangana, Andhra Pradesh, Karnataka state and revision thereof from time to time.
- 16) Approval of Soil Samples: The earthwork in both the cases for widening / toe bank has to be done with SQ2 quality soils (Soils containing fines from 12% to 50%) to be used and use of expansive soil is prohibited. The successful contractor is required to submit samples of SQ2 soil as per specification GE-004 within 15 days after issue of acceptance letter. Each sample shall be submitted in three wide mouthed sealed jars containing the representative sample approximately 0.0035cum (1/8 cft) in each bottle. Those soils which are approved shall only be used at site. No work should start until soil sample is approved. Any delay in submission /approval of soil sample will not be compensated. It is the responsibility of the agency to study necessary specification for soil and to submit soil sample which will confirm to the specifications.
- 17) Each layer should be compacted with recommended type of roller up to required level of compaction, commencing from the sides, before putting the next upper layer.
- 18) Extra embankment width of 500mm on either side shall be rolled / compacted to ensure proper compaction at the edges. The extra soil should be cut and dressed mechanically to achieve regular side slope and the slope shall be compacted with 6-8 passes of slope compactors (10-20 ton capacity).
- 19) Before executing the work, the concerned ADEN/SSE (Works/P.Way) should submit the numbered level books from the Divisional Office and obtain the numbering and signature of the concerned Sr. DEN/DEN. Only after this should the initial levels be recorded in the level books and submitted to the Divisional Office, along with the initial and proposed levels, as well as the graph sheets duly signed by the concerned SSE (Works/P.Way), ADEN, and Contractor.

- 20) After completion of earth work, new level books should be collected from Divisional office and final levels should be recorded and the same should be submitted to Divisional office along with graph sheets duly signed by SSE(Works/P.Way), ADEN and Contractor.
- 21) The soft copy of graph sheets and calculations must also be submitted in Excel format to the Divisional office, along with the hard copy.
- 22) Concerned SSE (Works/P.Way) has to certify on each graph sheet that the slope provided is 2:1.
- 23) If level books not submitted as per e above notes, the bills cannot be considered by Divisional office.

Setting up of GE lab at Construction Site

A well-equipped Geo-technical Engineering (GE) Field Laboratory shall be set up at all construction projects connected with new lines, doubling and gauge conversion works as well as, where rehabilitation of failing formation is being undertaken. Number of such GE labs to be established on a particular project/work site should be so decided that all quality control checks can be performed effectively. The field lab should be manned adequately by trained officials & staff capable of carrying out required investigation, soil testing and quality control at site.

- a) Aspects to be looked after by field GE lab are as under:
 - To ensure that the quality of supplied soil conforms to the accepted limits of gradation, classification, plasticity etc.
 - To evaluate methods of compaction by conducting tests in connection with field trials.
 - To exercise moisture and density control as the earthwork proceeds in layers rolled with the suitable equipment.
- b) Field lab shall be equipped with minimum equipment as listed below, to facilitate the following minimum tests:
 - Gradation Analysis-Sieve and Hydrometer.
 - Atterberg's Limits-Liquid Limit & plastic Limit
 - Optimum Moisture Content (OMC), Maximum Dry Density (MDD) and Relative Density.
 - Placement moisture content & in-situ Density.
 - CBR test

LIST OF EQUIPMENTS FOR FIELD LAB

S N.	Description of Equipment	Reference Of I.S. Code (latest version to be used)	UNIT
1	IS set of sieves with base & top lid 20mm,19mm,10mm, 4.75mm, 2mm	IS-460	sets
2	600mic, 425mic, 212mic, 75mic, Hand operated sieve shaker for above sieves.		1 no.
3	BALANCE i) Pan balance/Electronic weighing machine - 10 kg capacity (with 1.0 gm Least Count)		1 no. 1 no.
4	ii) Electronic balance - 500 gm capacity (with 0.1 gm Least Count) iii) Electronic weighing machine 200gm(LC-0.01g)		2 sets 5 sets 2 sets
5	Field density apparatus complete. sand replacement core cutter with dolly	2720-1974 part-XXVIII 2720-1975 part-XXIX 2720 part-8-1983	1 set 2 sets
6	Heavy Compaction Test apparatus full unit.	2720 part-16-1987	1 no.
7	Laboratory California Bearing Ratio(CBR) Test Apparatus & it's required accessories	2386 part-4 IS 2720 Part-5-1985	1 no. 3 no.
8	Abrasion Test Apparatus		
9	Liquid Limit apparatus hand operated with counter & grooving tools.	IS 2720 Part-6-1972	4 no. 6 no.
10	Shrinkage limit apparatus		
11	Stainless steel spatula - 25cm long		2 no.
12	Porcelain bowl for LL - 15cm dia.		2 no.
13	Aluminium dish with lid - 5cm dia.		2 no.
14	Wash bottle - 1 lit. capacity		2 no.
15	500ml capacity		3 no.
16	Glass plate 10mm thick 50x50 cm		3 no.
17	Ground glass 5mm thick 50x50 cm		10 no.
18	Enameled trays 45x30cm		10 no.
19	20x20cm		
20	& Enameled plates 6inch dia		3 no.
21	8 inch dia.		2 no.
	10 inch dia.		3 no.
	Frying pans		3 no.
	Stove janta		1 no.
	Straight edge 300mm long		2 no.
	Sample Tube (Size Dia-150mm, Length-450mm)		5 no.

S. NO.	DESCRIPTION OF EQUIPMENT	REFERENCE OF I.S. CODE (latest version to be used)	UNIT
22	Grain size analyser of fines a)Hydrometer b)Thermometer 0 to 50 c c) Glass cylinder 1000cc capacity with 60mm dia. d) Nomogram chart e) Stop Watch	IS-2720 part-4-1985	2 no. 2 no. 5 no.
22	Desiccators as IS -6128		1no. 1no.
23	Gallon of 10 litter capacity for distilled water		2 no. 3 no.
24	Wooden mortar and pestle.		1 no.
25	Specific gravity test apparatus.		2 no.
26	Density bottle-50ml capacity		2 no.
27	Glass cylinder 100 cc capacity (for Free Swell index test)		1 no.
28	Oven- thermostatically controlled to maintain a temperature 105-110c		
29	Relative Density test Apparatus	IS-2720 Part-14-1983	1 no.
30	Standard Penetration Test (SPT) Appratus	IS- 2131- 1981(Reffeed- 1997)	1 no.
31	Nuclear Moisture Density Gauge (NMDG) Apparatus		
32	Note -Preparation of dry soil samples for various test	Follow IS-2720 Part-1- 1983	
33	Consumable Item		
34	Sieve brush		
35	Wire brush		
36	Sodium carbonate		
37	Sodium hexa meta phosphate.		
38	Kerosene		
39	Mercury		
40	Additional Equipment Hand auger 150mm dia with extension rod Sampling tube 100mm dia. And 450mm length		
41	All machines and equipments should have Calibration Certificate.		

Maintenance of Records

At the work site, details of works along with materials being used are to be properly recorded so that work of satisfactory quality can be achieved which can also be verified at later stage. Records are also required to become permanent records of the section and could be helpful in future to plan developmental activities and remedial measures if need be.

Quality Control test on Construction Material

This is required to ascertain the suitability of the material for construction of Embankment and to decide the OMC/MDD and other relevant tests, which becomes the quality control inputs. Quality control tests are required to be conducted on borrow material.

Suitability tests at source

Borrow Material (Embankment fill as well as prepared subgrade)

- **Following specific tests to be conducted on borrow Material**

- Sieve analysis
- Hydrometer analysis
- Consistency limits
- CBR test
- Test for organic content in soil
- Crumb test, double hydrometer test, pin hole & chemical test-for Dispersive soil only
- OMC/MDD

Fill material proposed to be used either from Railway land or from outside would have to be assessed for its suitability as well as to decide thickness of the blanket layer after conducting soil classification and other relevant tests as per site requirement. On the basis of the tests, areas for borrow material, especially from outside the Railway land, need to be earmarked. Once the material has been found fit for use as fill material for Embankment, further lab tests, to assess OMC, MDD/Relative Density, need to be conducted.

In case, slope stability analysis, as explained in **Chapter - 5** is required, tri axial shear test will also need to be done to find effective shear strength parameters.

- **Frequency of Testing** : The frequency of testing before laying for borrow material should be as detailed

Note: It would be in the interest of the execution agency to have frequent tests conducted at source/manufacturing point on his own to judge the suitability of the material to avoid any complication at a later stage. However the final acceptance of the borrow material should be at the site before laying.

Summary of quality control tests in Borrow material/ finished earthwork

Item / Material	Parameters to be determined	Location of sampling for quality control	IS Code Ref. (Latest version)	Frequency of test	Acceptance Criteria
(i) Borrow material					
(a) Subgrade/ Prepared Subgrade	(i) Soil classification	At site before laying	IS: 1498	At least one test at every change of subgrade/ prepared-subgrade material subject to minimum of one test for every 5000 cum.	Soil should not be "unsuitable type" as given in Para 3.7 and should conform to specification given in Para 3.10 for 25T/32.5T Axle load of Chapter 3
	(ii) CBR		IS: 2720-Part-16		
	(iii) Plasticity Index (Prepared Subgrade)		IS: 2720- Part-5		
	(iv) OMC & MDD		IS: 2720 – Part-8		
(b)Blanket material	(i) Gradation	At site before laying	IS: 2720-Part-4	Minimum one test for every 500 cum or part thereof	
	(ii) Cc & Cu				
	(iii) Fines (passing 75 μ)		IS: 2386 – Part-4		
	(iv) Abrasion value				
	(v) CBR		IS: 2720-Part-16		
	(vi) Filter criteria		IS: 2720 – Part-4		
	(vii) OMC & MDD		IS: 2720 – Part-8		
	(viii) γ_{max} & γ_{min} (Determined in Relative Density test If fines are upto 5%)		IS: 2720-Part-14		
(ii) Finished earthwork					
(Subgrade /Prepared Subgrade/ Blanket)	(i) Ev_2	Top of final finished surface of Blanket/ Prepared subgrade & Subgrade	DIN 18134 – 2012	One test per Km (*)	Acceptance Criteria as specified in Para 3.10 of Chapter 3
	(ii) Compaction	Every compacted layer	IS: 2720 (Part-28/29) or NMDG(as per Procedure issued by RDSO)	As per note given below	
	(iii) Density Index (Relative Density if fines are upto 5%)	Every compacted layer	IS: 2720 – Part-14		Minimum 70%

** Additionally this test can also be done by third party (i.e. IIT, NIT, Govt. Labs or any NABL approved Lab) having testing facilities, to cross check the results achieved at site. Frequency of testing in this case shall be decided/approved at the level of Chief Engineer(Con). In PSUs, frequency of such tests shall be decided as per existing delegations for testing.*

Note: Frequency of Tests: Density check would be done for every layer of compacted fill / blanket material as per following minimum frequency:

- i) At least one density check for every 30 m length for blanket layers and top one metre of prepared subgrade/subgrade along the alignment in a staggered pattern of each compacted layer.
- ii) At least one density check for layers other than as specified in (i) above, every 500m² or 75 m c/c whichever occurs earlier along the alignment in a staggered pattern of each compacted layer.

In case of important bridge approaches (100 m length on either side), at least one density check for every 25m length shall be adopted.

- **Methods of In-situ Dry Density Measurements:** Any of the following methods could be adopted as per the requirements at site.

Method of measurement	Procedure of test	Parameters to be measured	Remarks
i) Sand Replacement Method	As per IS-2720 (Part 28) - latest version	In-situ Dry Density Moisture Content	May be adopted for all type of soils
ii) Core Cutter Method	As per IS-2720 (Part 29) – latest version	-do-	In some of the coarse-grained soils (with little fines) taking core cutter samples is difficult. In such cases, a sand replacement method may be used for density measurement.
iii) Nuclear Moisture Density Gauge	As per Appendix-H	a) Bulk density b) Moisture Content c) Dry density d) Degree of compaction	It is a faster Method and should be widely used for large construction projects.

- **Acceptance Criteria**

Coarse grained soils which contain fines passing 75 micron IS Sieve, up to 5 percent should have the Density Index (Relative Density) a minimum of 70% as obtained in accordance with IS: 2720 (Part 14) – 1983 (Reaffirmed 2015).

- In field compaction trial, the maximum attainable dry density should not be less than 98% of MDD value as obtained by Heavy Compaction Test (IS:2720 (Part 8) – (Reaffirmed 2015) in the laboratory. In case, there are difficulties in achieving 98% of the MDD values as obtained by Laboratory test, in the field trials, the same may be relaxed up to 95% of MDD with the specific approval of Chief Engineer/Construction, recording reasons for such relaxation. The level of compaction to be achieved in field, as a percentage of MDD value achieved in field compaction trial, for various layers shall be as per Table 3.3 to 3.6 of Chapter 3. In case of PSU, existing provision of Equivalent authority for acceptance criteria shall continue.

- During widening of embankment in case of gauge conversion and rehabilitation of unstable formation, compaction of earthwork should be minimum 95% of MDD as obtained by Laboratory test as per Heavy Compaction Test (IS:2720 Part8–2013) or 70% Relative Density for Coarse grained soils which contains fines (passing 75 micron IS Sieve) up to 5 percent (IS:2720 (Part14)–1983(Reaffirmed 2015)).

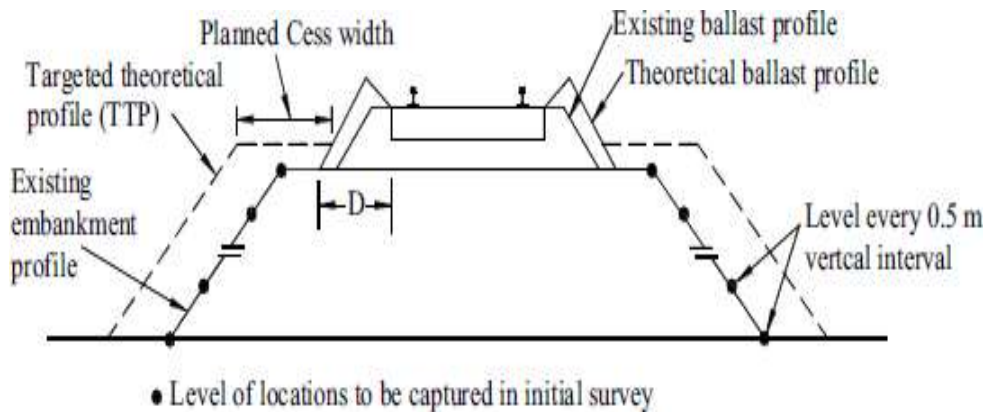
Preliminary works

The work of cess repairs may be planned when the distance of edge of formation, from center of track, becomes less than 3300 mm and the cess width should be made minimum 1200mm during the cess repair work. Cess width for new construction with formation width of 7.85m (single line) is around 1100mm, hence considering additional extra margin for any shrinkage/settlement, 1200mm cess width is required to be provided during cess repair works.

Before undertaking the cess repair work, a detailed field survey should be carried out to plot the existing profile of track including embankment, identification of suitable earth for carrying out cess repair and fixing Targeted Theoretical Profile (TTP) of cess for proposed work. The TTP should include cess width to be made up, proposed raising of cess if any and flattening of side slopes.

(i) Field survey to plot existing profile of track including embankment

- Longitudinal level of rail at every 30m interval should be recorded along with existing cess level.
- Cross sectional profile including that of existing embankment should be taken at every 30m. The distinctive points of reference in cross section are rail level, toe of ballast, edge of cess and level at every 50cm interval (vertical height) of slope of embankment.



- The TTP with required longitudinal level of rail and cess at every 30m and also cross section as mentioned in above para should also be plotted. These levels should be recorded by SSE/SE and got approved by ADEN.
- In case of existence of level crossings, bridges or any other prominent track features, additional cross sections should be drawn based on site specific requirements.
- Location of Trolley Refuges etc. should also be identified and levels at these locations should be taken in sufficient detail to work out the quantity of earth required.
- To the extent possible, railway earth if found suitable may be used for cess

repairs. The borrow pits should be dug along the edge of the railway boundary, duly ensuring that no borrow pits are dug within $(H+3)$ m distance from the toe of the embankment, where “H” is the height of embankment. In case of non-availability of railway earth, suitable contractor’s earth may be used.

(ii) Targeted Theoretical Profile (TTP)

- In case, track renewal, deep screening, track lifting works are sanctioned, targeted theoretical profile should be finalized taking into account proposed longitudinal level of rail & cess, additional cess width required and sub bank if any required.
- Proposed TTP should be drawn for longitudinal levels of Rail/Cess and at every cross section.
- Proposed rail level, cess level, edge of cess and level at every 50cm vertical interval on slope for TTP should be calculated and plotted.
- Due care should be taken while fixing TTP and must take into account any future proposed lifting to improve track geometry.
- On bridge approaches (up to the length of 50m on either side) where height of bank is more than 3m, extra 300mm cess width should be provided in addition to calculated above for cess repaired.
- The TTP should also include any additional width of cess or milder slope of embankment or sub-bank requirement based on site conditions and specific requirements with approval of Sr.DEN/DEN in charge of section.

Execution

- During earth work on slopes, benching at the interval of 0.3m (vertical height must be done).

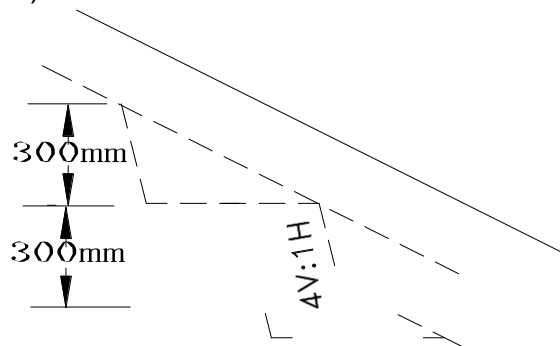


Fig-9.4

- Moisture to be added in the earth, to bring it near the Optimum Moisture Content value, shall be calculated and added to the soil. The moisture shall be mixed thoroughly using suitable means.
- After the final layer’s compaction, the surface of earthwork executed must be as per desired level and slope to the satisfaction of the engineer in-charge’s representative.
- The earthwork shall be done in layers, compacting each layer with 10 passes of small width vibratory rollers. In top layers, where the working of rollers is not practical, suitable plate compactor may be used. After completing the earth work of full height, the slope may be dressed and compacted with 10 passes of slope vibratory roller/compactor.

- e) For the repair work done on slope(s) of the embankment, suitable erosion control measures shall be adopted.
- f) Levels should be recorded at 30m length after completion of cess repair work and “as done” profiles should be plotted on the same sheets. Payment of cess repairs shall be based on the quantities worked out from the cross sectional calculations.
- g) Any excess repair work done beyond 10cm of the TTP shall not be paid.
- h) In cess repair work, field measurement of compaction such as density and moisture content may not be insisted upon. Instead, record of compaction done, with machinery used & number of passes shall be maintained for each layer of earth work done by concerned SSE, duly checked by ADEN/AXEN.

General Conditions for Earth work -

1. Payment will be made based on cross sectional measurements after deducting for voids/subsidence as per Indian Railway Unified Standard Specifications 2021 with up to date correction slips.
2. The quantity of the earthwork indicated in the above schedule is only approximate and is intended for the information and guidance of the tenderer/contractor. Payment will be made of the actual quantity of earthwork done, which shall be arrived at based on cross section measurement.
3. The description of the item of works mentioned in the schedule is not exhaustive, but it gives rough idea about the work to be done by the contractor. The contractor has to carry out all the works connected with the main items of work as required by the Engineer in charge at site.
4. The jungle clearance required for the execution of the work, shall be carried out by the contractor. No additional payment shall be made on account of this.
5. The tenderer/Contractor is responsible to lay and maintain the service approach roads at his own cost for plying of his road vehicles.
6. **Prior to commencement of earth work the initial levels should be submitted to DRM/W/Office/Hyderabad for record and reference.**
7. The widening of cess work should be carried out as per RDSO GE-004/2020
8. **The Railway may collect samples of earth at random and get it tested/approved at SM Lab/Secunderabad for its suitability. If it is not found suitable the contractor should not use it and should remove away from railway premises.**
9. Railway administration will not be responsible for the safety of labour engaged by the contractor for this work and the contractor should indemnify the Railway for any compensation to be paid for the loss of human life or injury sustained by his labour.
10. For all items of schedule, the rates quoted is inclusive of any crossing of track, if necessary.
11. Black Cotton soil of any kind and very fine soil will not be permitted.
12. Rate is inclusive of royalty, seignorage and all taxes, etc., and others payable to government complete. No extra will be paid on this account.

13. Levy of conservancy cess charges will be recovered from the contractor's bill for the labour engaged as per Dy. Director Finance (Exp) vide Rly Board letter No. F(X) I/95/1/1 dt. 31.5.06 communicated by Principal Chief Engineer vide Ir No. W.148/P/Vol.V dt. 21.7.2006 or latest guidelines.
14. The vehicles and equipment's of contractor's can be drafted by railway administration in case of accidents/natural calamities involving human lives.
15. The contractor's own earth should be obtained keeping a minimum distance of 200 metres from Railway boundary.
16. While doing earth work care should be taken that excessive work is not carried out either in the width or in the height of the cess. Proper templates should be used and level pegs should be fixed in advance. Excessive work even if done, (without instructions of Rly. Administration) will not be paid for, unless specially ordered by the Sr.DEN/DEN.
17. The work should be done with proper care. All Railway assets/Installations like cables, pipe lines, posts etc., should be taken care and the contractor must ensure that no Railway asset is damaged during his course of working. In case of any damage to Railway property, the cost of rectification of the same along with penalty as decided by the Divisional Engineer shall be recovered from the contractor.
18. Contractor has to execute the work as per the railway requirement and railway will not pay any extra rate for this and initial accepted rates will apply throughout the agreement period.

1. LEVELS AND CROSS-SECTIONS:

- 1.1. It shall be the responsibility of the Contractor to ensure that no work on the embankment is commenced until the existing ground levels at different cross-sections have been taken and recorded and such records of levels have been jointly signed and dated by the Contractor and the Engineer or their authorized representatives. Cross- Sectional profiles plotted on the basis of the observed ground levels shall also be jointly signed by the contractor and the Engineer. The point at which the cross-sectional ground levels are to be recorded and the extent of leveling work to be done shall be decided by the Engineer. The Contractor may bring to the notice of the Engineer such additional cross-sections that in his opinion should be taken for proper assessment of quantities. Such representations, however, should be made while taking the levels jointly before the commencement of any earthwork. The engineer's decision thereon shall, however be final and binding on the Contractor. The Contractor should inspect the site and make himself familiar with the work to be done and the site conditions.
- 1.2. The levels taken at field should be plotted in graph and proposed cross section i.e., cross section required as per standards also should be plotted. After completion of work the final levels should be plotted. These three lines should have differentiation i.e., clearly visible.
- 1.3. Formation work is to be carried out on new additional line/on either side of embankments. The top level of the formation shall be to the formation level as per the IRPWM 2024 with up to date correction slips. The top of the formation shall be 6.85m/7.85m in width and the side slopes are to be built to 2:1. Increase

in formation width beyond specified should have prior approval of Sr.DEN/DEN. Due to any reason the proposed formation level/width are altered by the railway resulting variation in the quantities, the actual quantities executed only will be paid, and the contractor will not have any claim in this regard.

- 1.4. In case the new bank is made in conjunction with the slope of the existing bank, the slopes shall be cleared off all jungle, grass, shrubs, trees including roots etc. The rates quoted are deemed to include the charges for all such work of clearance of jungle, shrubs, trees and removal of roots etc. Large trees shall not be cut without specific orders from the engineer. Contractor shall have no claim to the trees or other material removed during site clearance and the same shall be the property of the Railway.
- 1.5. The earthwork for the approach banks is required to be done in the proximity of the existing running line. For this, protective barricades will have to be provided by the contractor and the Railway will post flagmen and the contractor shall ply the vehicles without causing any infringement to the running trains. The contractor's workmen should obey the directions of the Railway's flagmen/supervisors etc., to observe the safety precautions, as required by them.
- 1.6. The earthwork in the embankment shall be done with contractor's own earth obtained from outside railway limits by carting with contractor's vehicles except cut spoil lead from the cuttings and surplus earth of the foundations. The earthwork shall be done with the earth (SQ2).
- 1.7. Earthwork in embankment shall be carried out under embankments as per Indian Railway Unified Standard Specifications 2021. The embankments so made shall consist of soil other than organic clays and silts and peat. Profiles for banks shall be setup by the contractor at interval of 25m, on the straight and at every 15 meters on curves with radius sharper than 600 meters. Profiles shall be set up in additional places as ordered by the Engineer.
- 1.8. All payments for earthwork, unless otherwise specified will be made on the basis of cross-sectional measurements of the finished work of embankment. It shall be the responsibility of the contractor to ensure that no work on embankment shall be commenced until the existing ground level at the different cross sections have been observed and recorded and such record of levels has to be jointly signed by the contractor and the Engineer or their authorized representatives.
- 1.9. The contractor and the Engineer shall also jointly sign cross sectional profiles, plotted on the basis of the ground levels recorded. The Engineer shall decide the point at which cross sectional ground levels are to be recorded and extent of leveling work to be done. The contractor may bring to the Engineer such additional cross-sections that in his opinion should be observed for proper assessment of quantities. Such representation however should be made before the commencement of any Earthwork. The Engineer's decision thereon shall, however be final and binding on the contractor.
- 1.10. When earthwork in bank is done along the running line, the contractor shall take adequate precautions to avoid accidents/damages to running trains or to any other property of the Railway, persons or property of others from whatsoever in connection with the works. The zone of activities for execution of work close to the track shall be clearly demarcated at site by the contractor as directed by the Engineer. The contractor shall do the demarcation of the area by providing temporary rope barricades with bamboo or bullies or any approved method at his cost. Railway will arrange to provide flagmen at the cost of Railway. The flagmen will give indication of the running trains and directions to ensure that the work

does not interfere with the running trains. The contractor, as per the directions given to him, without infringing the moving dimensions, should execute the work. No vehicles should go beyond the barricading, infringing the schedule of dimensions.

- 1.11. Earth work should be carried out as per Engineering Standing Order No.51/2006 and also guide lines for earth work in railway project-2020.
- 1.12. The contractor's own earth should be obtained keeping a minimum distance of 200metres from Railway boundary.
- 1.13. While doing earth work care should be taken that excessive work is not carried out either in the width or in the height of the cess. Proper templates should be used and level pegs should be given in advance.
- 1.14. Payment will be made based on cross sectional level after deducting for voids/subsidence as per Indian Railway Unified Standard Specifications 2021

SPECIAL CONDITIONS OF CONTRACT

1.0 GENERAL:

1. Quantities mentioned in schedule are approximate to give an idea about the quantities to be executed by the contractor for making necessary arrangements. The payment shall be made to the actual work done.
2. The time of completion mentioned in the tender schedule is binding on the contractor.
3. The contractor should nominate one authorized representative / supervisor with communication facility for each SSE/SE/JE jurisdiction, who will report to the concerned SSE/SE/JE and a log book will be maintained as a token of his presence he will put his signature.
4. While on execution of subject works, if the contractor causes any damages to railway property the contractor is solely responsible for the same and Railway will not pay any compensation.
5. The contractor has to carry out all the works as per the instructions of Engineer-in-charge / his representative at site. In case any deviation in works is noticed there will be no payment for the extra / deviated quantities.
6. While on execution of work, if any damages will take place to the Railway assets, the contractors has to rectify/replace the same with his own cost.
7. The contractor should clear the site by removing left over materials like debris, scaffolding / form works, machinery and keep in original position of any disturbed furniture, house hold items etc., with contractors own cost.
8. Railway administration will not be responsible for the safety of labour engaged by the contractor for this work and the contractor should indemnify the Railway for any compensation to be paid for the loss of human life or injury sustained by his labour.
9. In order to improve quality of Civil Engineering works, it is necessary to use the materials of reputed brand. Approved list of Brands/Makes of materials list issued vide Hqrs is given under annexure. In case, materials from approved list of Brand/Makes is not available, other reputed Brands/Makes have better aesthetic and life may be used with the approval of Sr.DEN/Co-ordination or Project in charge as the case may be. Materials from Govt./Semi-Govt. subsidiaries amongst the approved Brands/Makes should be given 1st priority. Only in case of non-availability, other brand should be used if required for expeditious

- execution of the work.
10. Contractor should provide adequate standby machinery, generator, vibrators etc. to ensure uninterrupted work.
 11. Railway will post an in-charge, who may be SSE/JE/Works of any grade at site for technical supervision of the work. The work shall be executed by the Contractor in a workman like manner to the satisfaction of the Engineer-in-charge. The contractor and his labour shall be guided by the instructions of the Engineer-in-charge. In the event of any accident/injures occurring at the work site and it is established during the departmental enquiry by the Railway or by the Statutory enquiry of LEO that the injures/accident occurred wholly or partly due to any act the Tent amounting to negligence on the part of the contractor or his labour in not adhering to their instructions of the Engineer-in-charge, the contractor shall render himself liable for damages and also legal prosecution if loss of life or injuries to persons are involved.
 12. For reinforcement the rate inclusive of cutting and bending of reinforcement, binding with contractor's Galvanized binding wire as illustrated in the drawing.
 13. No substandard work will be permitted. If any item of the work, at any stage, if Railway finds less consumption of cement/steel were effected, such item of work will be rejected and the portion of the work will be removed at the cost of the contractor and has to be made good by the contractor without any extra payment. The decision of the Engineer-in-charge will be final in regard to quality and quantity of work. No claims will be entertained in this matter.
 14. The payment of steel shall be made on the basis of quantity arrived by converting the lengths into weights as per bar bending schedule. While working out the quantity consumed, the over laps, hooks, bends, etc., will be taken into account. No wastage will be allowed. The wastage and the cost of binding wire shall be borne by the contractor.
 15. The rate includes crossing of track wherever necessary.
 16. Work has to be carried out electrified (i.e. OHE) territory. Contractor has to ensure full safety precautions for his labour while execution and necessary power blocks are to be ensured before execution of the work if any required.
 17. The cement, steel, structural steel, GI/CI/DI pipes, Galvalume sheet, vitrified/ceramics tiles etc., supplied by the contractor shall be covered by a test certificate from reputed test laboratory/ recognized engineering college/manufacture certificate and the contractor shall bear the cost of testing without extra payment.
 18. The rates quoted should be deemed to include all taxes, direct or indirect leviable under Central, State or local bodies act and rules, Octroi, toll, Royalty, seinorage, cess and Excise/sales Tax etc., and similar imports that may be prevailing from time to time in respect of land structures and all materials supplied in the performance of this contract.
 19. Tools and plants such as vibrators, grouting equipment and concrete mixer with crew and consumable stores and other accessories like ladders, scaffolding, shuttering and centering materials etc., required for the work shall be provided by the Tenderer/Contractor at his/their own cost.
 20. The contractor has to arrange for adequate number of skilled workers trained in this particular type of work. Competent supervisor for execution of this work shall also be employed and safety connected instructions of the Engineer-in- Charge shall be strictly followed.

21. Power supply will not be arranged by Railways. Contractor has to make his own arrangements for supply required for the work.
22. The contractor shall be responsible to take all precautions to ensure the safety of the public wherein on public or Railway and shall post such look-out men as may in the opinion of the engineer-in-charge required to comply with regulation as pertaining to the work.
23. Fresh water required to the work should be arranged by the contractor at his own cost. However, if available the Railway will supply water at a charge of 1% on the amount of which water has been used by the contract and such charges shall be deducted from the dues payable to the contractor from time to time. If additional pipe lines to these already existing are called for by the contractor, the cost of the same and all charges incurred by the Railway in their laying including supervision charges will be paid by the contractor or the contractor provided and lay his own pipe line at the discretion of the Engineer.

2.0 SPECIFICATIONS:

The execution of all works under this contract shall conform to the specifications and codes of practice mentioned below up to latest correction slips.

- i) CPWD Delhi Schedule of Rates & Specification Vol. I & II – 2021 (upto latest correction slip) & DSR – Horticulture & land scaping
- ii) IS:269 of 1989
- iii) IS:8112;
- iv) IS:12269
- v) Indian Railway Works Manual.
- vi) IS:456 of 2000
- vii) IS:1786 of 1985
- viii) IS:432 of 1966

- ix) IS: 2062 for steel.
- x) IS-800 for Fabrication and Erection.
- xi) IS:9595 for welding and IS:1148-1964 for rivet steel
- xii) PCE/CTE circulars and standing orders issued from time to time.
- xiii) Research Designs and Standards Organization's (RDSO) guidelines for earth work in Railway Projects 2020.
- xiv) SCR USSR – 2021 (up to latest correction slips) & its specifications
- xiv) All other relevant IRS/IS/RDSO codes.

NOTE:

- a) All the codes mentioned above should be followed with latest edition/latest correction slip if any. All the specifications of IRS codes will govern. In case some specification is not available in IRS code IS code can be referred for that with approval of Railways
- b) CPWD DSR & USSR rates, specifications, amendments / correction slips etc., which are being uploaded by Ministry of Railways on Civil Engineering Directorate Web Page has only to be followed strictly and irrespective of CPWD web site.
- c) The railway reserves the right to reject or alter any part of the work executed by the contractor, which in the judgment of the railway does not conform to the specifications. The decision of the railway shall be final and conclusive for all purposes. Contractor cannot put forth any claim on this account.

3.0 CONCRETE WORKS:

- 3.1 Concrete required for all works shall be CONTROLLED CONCRETE (design mix) machine mixed only. Hand mixing will not be permitted. Only weigh batching is permitted. The concrete must also be properly vibrated with mechanical vibrator. The concreting for RCC works shall be as per relevant IS code/IRWM/ Specifications. The mix design should be got approved by Railways. Contractor should submit the mix design for each grade of concrete with sealed samples of coarse aggregate and fine aggregate. The mix design should be as per specification and criteria issued by railways.
- 3.2 The materials proposed to be used for the work should pass tests/analysis as prescribed by the specifications. Any approval given by the Railway is consequence of such tests or analysis shall in no way limit absolute right of the Railway to reject the whole or portions of such works which in the judgment of the Railway do not comply with the specifications. The decision of the Railway in this regard shall be final and conclusive for all purposes.
- 3.3 The contractor should prepare at his own cost standard cubes of concrete as per rules/ specifications during concreting operations under the supervision of the Engineer or his representative. The cement required for casting cubes shall be supplied by the contractor at his own cost.
- 3.4 All the concrete mixes specified in the schedule of items for various works shall be designed by conducting tests on raw materials such as aggregate sand and cement as per specifications. This design mixes shall be approved by the Engineer-in-charge before commencement of concrete works.
- 3.5 The Railway reserves the right to inspect the storage accommodation of the contractor and to reject in the event of any clotted/damaged cement is noticed or

any other cement which is not suitable for usage in works and not confirm to specifications.

- 3.6 The contractor shall ensure the consumption of cement specified for each item of work correctly. No substandard work on this account will be permitted. If for any item of work at any stage, if Railway finds that the less consumptions were affected such item of work will be rejected and cost of removal of such items of work shall be to the contractors account, the decision of Engineer-in-charge shall be final and binding on the contractor. No claims will be entertained on this account.
- 3.7 All concrete for C.C and R.C.C works shall be mixed by approved mechanical mixer and consolidated by approved mechanical vibrator.
- 3.8 All exposed surfaces of these works shall be finished neatly and smoothly on removal of shuttering without any extra cost. The rate quoted shall be inclusive of this also.
- 3.9 Necessary slump test should be frequently carried out during concreting.
- 3.10 The concreting shall be vibrated properly by using surface/needle vibratos as per the instructions of Engineer-in-charge. While carrying out the concreting/vibrating in necessary arrangements will be made by the contractor to ensure proper concreting/vibration as per the instructions of Engineer-in-charge at site.

4.0 SITE FACILITIES:

The quoted rates would be deemed to include charges for any and all site facilities that are considered necessary for execution of the work unless otherwise indicated in the contract. In this connection specific attention is drawn to stipulations in clause 19(1) of the General conditions of contract and intending tenderers are advised to acquaint themselves well with site conditions.

5.0 INSPECTIONS:

The work shall be carried under supervision of Engineer-in-charge/Engineer's representative. The contractor shall give all necessary help for inspections.

6.0 Maintenance:

The work shall be maintained after completion as specified in tender document.

7.0 CEMENT:

- 7.1 For Concrete/masonry and other works involving using of cement under schedule will have to be done with Contractor's own cement.
- 7.2 The contractor shall, along with the bill of purchase of Cement, also obtain a test certificate issued by the manufacturer and shall submit the copies of the same to the railway for verification and record.
- 7.3 The contractor shall make his own arrangements for storage of cement to see that no damage will take place during storage period. The storage of cement should conform to standard heights in a column to avoid damage during storage. The contractor shall take all precautions effectively to safe guard the cement between the period of procurement and the period of use.
- 7.4 The Railway reserves the right to inspect the storage accommodation of the contractor, and to reject in the event of any clotted cement is noticed or any other cement which is not suitable for usage in works and not confirming to the specifications.
- 7.5 The actual consumption of cement depends upon the requirement as per design and nominal mix, the cement consumption shall be as specified in CPWD Delhi Schedule of Rates & Specification Vol. I & II – 2019 (up to latest correction slip)& USSR-2021

- 7.6 The contractor should prepare adequate number of standard cubes for various concrete works at his own cost during concreting operations, under the supervision of the Engineer in charge at site or his representative. The testing of cubes shall be arranged by the contractor at its own cost, from a Govt. Engineering collage/ approved reputed laboratory.
- 7.7 The contractor shall ensure the consumption of cement specified under each item of work correctly as per design mix. No substandard work on this account will be permitted, in any item of work at any stage, if Railway finds that less consumption were affected; removing such item of work and redoing the same shall be at the contractor's account. The decision of the Engineer-in-charge/representative in this regard shall be final and binding on the contractor. No claims will be entertained on this account.
- 7.8 The Railway reserves the right to collect the sample of cement during the progress/beginning of the work and get it tested for its suitability, and to reject in the event of its being not suitable for usage in works and not conforming to the specifications.

8.0 PRECAUTIONS TO CONTRACTOR'S VEHICLES:

- 8.1 Precautions to be adopted by the contractor while plying vehicles adjacent to the running track. The contractor shall not allow any road vehicles belonging to him or his supplier etc., to ply in the Railway land next to the running line. If, for execution of certain works viz. Earth work for parallel railway line and supply of ballast for new or existing rail line, etc., road vehicles are necessary to be used in Railway land next to the Railway line. The contractor shall apply to the Engineer in charge for permission giving the type and number of the vehicles, names and license particulars of the drivers, location, duration and timing for carrying such work/movement. The Engineer in charge or his authorized representative will personally counsel, examine and certify the road vehicle drivers, contractor's flagmen and supervisors and will give written permission giving names of the road vehicles drivers, contractor's flagmen and supervisors to be deployed in the work, location, period and timings of the work.
- 8.2 This permission will be subject to the following obligatory conditions.
- 8.3 Road vehicles can ply along the track after suitable cordoning of track minimum distance of 6.00meters from the center of nearest track. For plying of road vehicles during night hours, adequate measures to be communicated in writing along with a site sketch to the contractor/contractors representative and controlling Engineer/Supervisors in charge of the work including officers and the in charge of the section.
- 8.4 Nominated vehicles and drivers will be allowed to work in the presence of at least one flagman and one supervisor who are authorized to supervise the work.
- 8.5 The Vehicles shall ply 6m clearance of track. Any movement of work at less than 6m and up to minimum 3.5m clearance of track center shall be done only in the presence of Railway Employee authorized by the Engineer-in-charge. NO part of the road vehicle will be allowed at less than 3.5m from the track center. Cost of such Railway employee shall be borne by the Railway.

- 8.6 The contractor shall remain fully responsible for ensuring safety and in case of any accident, shall bear cost of all damages to his equipment and men and also damages to Railway, and its passengers.
- 8.7 Engineer-in-charge may impose any other condition necessary for a particular work at site.

9.0 STEEL REINFORCEMENT AND FABRICATED STEEL WORKS: (Contractor's Steel)

- 9.1 The reinforcement required for RCC works under schedule shall be with TMT Fe-500 grade steel. The rate for RCC items is excluding the cost of steel which will be paid under separate item except otherwise stated in the schedule.
- 9.2 The Railway reserves the right to inspect the storage yard of the contractor where the steel materials are stored and collect the samples whenever considered necessary during the progress/beginning of the work and get them tested by any agency and if the same is found unsuitable and not as per specifications, the same shall be rejected. The contractor cannot claim, in such event, the losses/damages, expenditure incurred by him and Railway shall not entertain any claim on this account.
- 9.3 Payment for the steel reinforcement for the RCC items shall be paid under relevant item of the Schedule unless otherwise mentioned in the schedule of item and shall be arrived based on the bar bending schedule recorded before concreting and weight shall be arrived at by converting the lengths multiplied by the theoretical standard section weight.
- 9.4 While working out the quantity, the overlaps, hooks, bends, chairs etc., shall be taken into account. No wastage of steel will be allowed for the payment. The cost of the binding wire shall also be to the contractor's account.
- 9.5 The contractor shall, along with the bills of purchase of steel, should also obtain the test certificate issued by the manufacturer/authorized agency and shall submit the copy of the same to the Railway for verification and record.
- 9.6 The binding wire used for tying reinforcement shall be galvanized wire only.
- 9.7 No re-rolled steel will be accepted.

10.0 Structural steel works:

- 10.1 The tenderer/contractor is for the mainly supplying, fabrication and erection all steel work as given in the schedule. The work includes the fabrication with contractor's new steel, painting as required, transport to site of work and erection of all steel work, concrete work for all foundations also from part of this contract.
- 10.2 The shelters/foot over bridge shall consists of bolts and welded construction for columns, trusses, bracing's and wind bracings etc., and site assemble shall be done with contractor's mild steel bolts and nuts as per specifications. The weight for the structural work shall be arrived by multiplying the area /length with the theoretical weights of the sections. Payment of fabricated steel work shall be made based on calculated weight of finished work. In calculating the weight, the overall length of the member used will be taken into account and no deduction made for rivets/bolts holes. Skew cuts, notches, gussets etc., will be measured as per the dimensions least enveloping rectangle. In riveted work, allowance is to be made for weight of rivet heads, unless otherwise specified an addition of 3% on the weigh of structure shall be made for shop and site rivet heads in riveted steel structures. No deduction shall be made for rivet or bolt holes (excluding holes on anchor or holding down bolts. Deduction in case of rivet or bolt hole

shall however be made if its area exceeds 0.02Sqm. The weight of steel sheets, plates and strips shall be taken from relevant Indian Standards based on 7.85Kg/Sqm for every millimeter sheet thickness. For rolled sections, steel rods and steel strips weight given in relevant Indian standard shall be used.

10.3 Re-rolled steel shall not be used.

11.0 ELECTRIC CONNECTION:

There is no facility available for electric connection. Contractor should make his own arrangements for electric connection required for execution of work. Railway may however assist in recommending his application to the electricity authorities for the power supply. If power is available for sparing the railway may consider supply of power to the contractor. Providing the agreed to abide by the terms and conditions laid down for the purpose.

12.0 HIRE OF TOOLS, PLANT AND MACHINERY:

12.1 The contractor shall make his own arrangements for all plant, machinery, equipment and tools, including spare parts, fuel and consumable stores and all labour required to ensure efficient and methodical execution of the work. The quoted rates shall be deemed to be inclusive of all charges for such items.

12.2 All the equipment's, vibrators, grouting, generator, weigh batching equipment's for concrete work, vehicles for transportation etc should be arranged by the contractor.

12.3 Shuttering material used for concreting work should be approved by Railways and should be certified by the Engineer-in-charge.

12.4 Rejected materials, portion of work if any should be immediately removed from the site of work

No extra payment whatsoever will be made in respect of any of the above-mentioned conditions and the contractor is deemed to have considered these aspects while quoting his rates.

13.0 Special Conditions of JCB:

13.1. Total information of the work in the section likely to be carried out with details such as 1] Name of the work 2] Name of the agency and address 3] Date commencement of the work at site 4] Date likely to be completed 5] JCB No. 6] Tel.No. of the contractor 7] Permission letter no & date 8] Site in charge of the work, should be recorded with the Engineering control who in turn will make the entry in the test room [SE/Sig/SE/Tele], SE/ELe for onward information to the connected staff.

13.2. Agency should keep the permission letter at site without fail and keep informed of the daily position from commencement of the work to completion of the work.

13.3. Any damage caused to OFC/Quad cable or electrical cable during the execution of the work, a flat penalty of Rupees One lakh will be imposed, as per the instructions contained vide Director/ Telecom (Rly Bd) letter No 2003/Tele/RCIL/I/Pt.IX dated 04-05-2007.

13.4. The contract agency should study the cable plan and follow meticulously to ensure that the safety of the cable is not endangered. SSE/SE/S&T, SSE/SE/Elec. shall depute their supervisor or competent technical staff to be present there at time of execution of work at site. Presence of staff does not absolve responsibility of executing agency in damaging the cables. Executing agency shall take due care and precautions in protecting the cables and installations.

13.5. The Section SE/P.Way, SE / Works shall give written information to the concerned SE/Sig, SE/Tele or SE/Elec. five days before the commencement of the work and obtain acknowledgement. SE/Sig, SE/Tele or SE/Elec. shall inspect the site jointly along with SSE/SE (P.Way and Works) within three days and ensure that all adequate precautions are taken for protecting the assets and no damages are likely to be caused.

15.0 Special Instructions to Staff Working in Traction Area:

15.1 Need for precautions - Precautions are required to be taken on account of following:-

(a) **Proximity of a Live Conductor** - The risk of direct contact with live O.H.E. is ever present while working in electrified sections such as for painting of steel work of through spans of bridges and platform cover.

(b) **Buildup of potential due to return current in rails** - The return current in the rails may cause a potential difference –

i) Between rail and the surrounding mass of earth

ii) Between two ends of fractured rail.

iii) Between the two rails at an insulated joint.

iv) Between earth and any other metallic mass.

15.2 The following precautions should, therefore, be taken while working in traction areas:-

a. No work shall be done within a distance of two meters from the live parts of the O.H.E. without a 'permit-to-work'.

b. For work adjacent to overhead equipment the Engineering Inspector shall apply to the proper authority sufficiently in advance for sanctioning the traffic and power block required.

c. "No part of the tree shall be nearer than 4 mts from the nearest live conductor. Any tree or branches likely to fall on the live conductor should be cut or trimmed periodically to maintain the safety clearances. The responsibility for wholesale cutting of the tress i.e., cutting of tree trunks, will rest with the Engineering Department. In the electrified territories, however, the cutting of the trees shall be done by the Engineering Department in the presence of authorized TRD staff to ensure safety and satisfactory completion of the work. The day to day trimming of the tree branches, wherever required, to maintain the 4 m safety clearances from OHE shall be done by the authorized TRD staff and Supervisor. The Traction Power Controller through Traction Foreman will arrange to isolate and earth the section concerned on the date and at the time specified in consultation with the Traffic Controller. He shall then issue 'permit-to-work' to the Engineering Inspector. On completion of the work the 'Permit-to-work' should be cancelled and Traction power controller advised, who will then arrange to remove the earth and restore power supply. In case of dispute, the decision whether to cut or trim a tree, shall be taken through a joint inspection of Engineering and Electrical officials.

The modalities to be adopted for cutting/trimming of the trees i.e., contractually or departmentally, may be decided by the respective departments based on local conditions. Accountable and disposal of trees cut wholesale will be done by the Engineering department while the disposal of the trimmed tree branches will be the responsibility of the TRD department. The expenditure for cutting / trimming of trees to maintain safe clearance of OHE shall be debited to revenue grant of TRD department".

d. No fallen wire or wires shall be touched unless power is switched off and the wire or wires suitably earthed. In case the wires drop at a level crossing, the Gatekeeper shall immediately make arrangements to stop all road traffic.

e. Work on Station roofs and signal Gentries – Staff working on station roofs and signal gentries and similar structures adjacent to Live Overhead Equipment shall not use any measuring tapes, tools and materials when there is a possibility of their being dropped or carried by wind on to the live overhead equipment.

f. Earth work - For excavation work adjacent to tracks, the following action is taken:

(i) In D.C. traction areas, intimation should be given in writing sufficiently in advance to the concerned Traction Distribution Officer to enable him to depute the Traction staff to be present in order to prevent possible damage to the traction underground feeder cables which are always located near the running lines.

(ii) In A.C. traction areas, intimation should be given to the concerned officers of the Electrical General services and also S&T Department, since all the S&T and Electrical lines are cabled on account of Electrical Induction.

In all A.C and D.C traction areas, cable markers showing location of cables are provided by the Traction Department. In addition, the cables are protected by tiles and bricks, and during excavation if workmen come across such tiles or bricks in an arranged manner, they should at once report the matter to the higher officials. Any further excavation should be carried out only in the presence of the authorized staff of Electrical Traction and or S&T Department as the case may be.

g. Alteration to Tracks - The relative alignments of the centerline of the track with respect to the alignment of the contact wire must be maintained within the specified tolerances. This applies to both horizontal and vertical clearances. Slewing or lifting of track must not be done outside the agreed maintenance limits, unless the position of the contact wire is altered at the same time. Adjustment of cant has a magnified effect of the horizontal displacement of the centerline of the track with respect to the alignment of the contact wire.

Horizontal clearances to structures within the limits laid down in the Schedule of Dimensions must be maintained. For slewing or alterations to track involving adjustment of contact wire (outside the agreed maintenance limits) sufficient notice should be given to the traction staff so that they arrange to adjust the overhead equipment.

h. Alterations to Track bonding: - All bonds removed by the staff of the Engineering Department shall be replaced by the staff of the Engineering Department and all such removals and replacements shall be reported to the Assistant Electrical Engineer, Track Distribution in charge, concerned without delay.

i. Working of Cranes: - No crane shall be worked except on the authorized 'permit-to-work'. In every case of working a crane, arrangement should be made for the presence of authorized overhead equipment staff to ensure that all safety precautions are taken.

j. Inspection of Tunnels: - For inspection of roofs and sides of a tunnel, the overhead equipment shall be rendered 'dead'. Special insulated apparatus should be used if sounding the unlined portions to locate loose rock in the roof and sides, is required to be carried out, when the overhead equipment's is 'live'.

k. As far as possible closed wagons shall be used for materials trains. In case open or hopper wagons are used, loading and unloading of such wagons in electrified tracks shall be done under the supervision of an Engineering Officials not below the rank of a Permanent Way Mistry, who shall personally ensure that no tools or any part of body of the workers comes within the 'danger zone' i.e., within 2m of OHE.

l. Steel tapes or metallic tapes with woven metal reinforcement should not be used in electrified tracks. Linen tapes are safer and, therefore, should be used even though they are not accurate.

m. The top foundation blocks in electrified structures should be kept clear of all materials.

Machinery to be deployed by the Contractor:

1. As far as possible sufficient traffic block will be arranged during daylight hours. Due to movement of heavy traffic or any other reason block cannot be arranged or cancelled on some days, in such case contractor will not have any claim or compensation against Railways towards loss of time, wastage of machinery engaged etc.,
2. Contractor has to mobilize required number of machinery along with operator & consumables & labour to the work site well in advance before commencement of the line block work at his own cost.
3. Contractor has to mobilize sufficient capacity of machinery such as cranes, JCB, Power rollers etc., **per set/Location.**
4. Railway reserves the right to increase/decrease the capacity of the machine or number of above machinery or additional new machinery as per requirement after awarding the work. Contractor has to mobilize the required number of machinery as per instructions of the Engineer-in-charge. No extra payment will be made by the railway for this and the initial quoted percentages should be final for all the schedules & items throughout the agreement period.
5. The instructions of Engineer-in-charge will be final and contractor has to abide to the same and no claim will be entertained during & after execution of work.
6. Contractor has to follow the sequence of the work issued by the Railway Engineer-in-charge at site.
7. Contractor has to take all safety precautions while executing the work with machinery. Railway is not responsible for the safety of the Contractor labour, machinery.
8. Agency should prepare for executing work at 2 locations (either in same block section or different block sections) simultaneously after intimation by Engineer-in-charge regarding the same with 10 days prior notice. No extra payment will be made for opening 2 worksites simultaneously. Rates to be quoted for working at two different locations simultaneously.

SPECIAL CONDITIONS

1. The Work should be done under traffic condition. Contractor should take care of his labour and Material and any incidence occurred due to his negligence, he will be held responsible for the same, and the contractor should carry out the entire work within the allotted time period.
2. In the event of any accident at the site of work and it is established during the departmental enquiry by the railways that the accident occurred wholly or partly due to any act / omission tantamounting to negligence on the part of the contractor or his labour not adhering to the instructions of the engineer in charge, the contractor shall remain himself liable for such damage and also should face legal prosecution for loss of life if involved.
3. No claim will be admissible towards loss of time, wastage of labour employed, etc., that may be incurred by the contractor due to movement of trains. The

- rate quoted should cover all such contingencies
4. Wherever the road vehicles and / or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose, the area where road vehicles and / or machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning / reversal of road vehicles / machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as site condition
 5. In case the work is required to be executed beyond daylight hours, proper lighting arrangements shall be ensured
 6. Safety at work spot and safe working of contractors: The contractor is primarily responsible for safety of traffic and also that of his staff working on track. No compensation what so ever towards damage to men, material of the contractor will be paid by railways it is essential that adequate safety measures are taken for safety of the trains as well as the work force. Engineer-in-charge may impose any other conditions necessary for a particular work or site
 7. If contractor damages any of Signaling & Telecom cables a penalty (as applicable rate at the time of working) will be recovered from his bill
 8. The contractor has to develop service roads/approach roads wherever required. For that no extra payment will be made. No separate payment will be made for the ramps provided by the contractor
 9. The quantities shown in the schedule is approximate and will be operated in full or part at the discretion of Engineer-in-charge.
 10. Jungle clearance: Before the work is started, the contractor shall clear the area between the toes of the proposed bank of all the jungle, grass, shrubs, bushes trees etc. The jungle and trees so cleared shall be given to the contractor free of cost except trees having girth of more than 30 cm, which shall be the property of railways. The rates adopted for earthwork are deemed to include the charges for clearance of jungle, shrubs, trees and removal of roots etc.
 11. Before undertaking the cess repair work, a detailed field survey should be carried out to plot the existing profile of track including embankment, identification of suitable earth for carrying out cess repair and fixing Targeted Theoretical Profile (TTP) of cess for proposed work. The TTP should include cess width to be made up, proposed raising of cess if any and flattening of side slopes.
 12. Compaction of earth at cess shall be done with the help of slope earth compactors.
 13. Rain cuts shall be attended by agency, if found any.
 14. In TFTR work, earthwork compaction shall be done with rollers in layers of 30 cm mentioned in GE:0004 and GE:14. After layer compaction only, other layer to be laid.
 15. Approval of soil before dumping
 16. The soil is specified as SQ2, for carrying out the earthwork. In case agency bring higher quality of soil, still payment will be done as per SQ2 Rate only. Inferior quality of soil will be rejected.
 17. Entire TFTR works are categorized into following categories
 - a) Cess side earthwork to make up the full cess width and toe banks
 - b) At zero embankment location, replacement of natural black cotton soil with SQ2 soil along the track from toe of ballast and beyond infringing dimensions for 3m perpendicular to track to a depth of 1m. The excavation length at a given location shall not exceed 50m.
 18. Work site protection as per IRPWM chapter 8 to be adhered at all times.
 19. The Railway administration will not be responsible for the safety of contractor's labour engaged for their work and should be ensured that all the labour are medically fit with good eye sight so that they can safe guard themselves.
 20. Rate to be quoted by the contractors should be inclusive of Royalty, seignorages, taxes etc., complete as applicable is to state concern.
 21. Before the execution of work, jungle clearance will be undertaken to confirm the

- methodology of TFTR work to be executed.
22. The contractor must lay temporary ramps at suitable locations, using their own earth, for vehicles and machinery to cross the track and perform work on the other cess side. Upon completion of the work, the temporary ramps must be dismantled. The dismantled earth may then be re used for laying the toe bank, etc. No extra payment shall be paid for making the ramps/ temporary LCs.
 23. No work shall be done without railway supervisor.
 24. For cables of S&T/Electrical prior intimation to be given.
 25. Quality of Earth works should follow RDSO guide lines / specifications vide no. RDSO /2020/GE: IRS-0004, Sept.-2020
 26. Compacting of cess widening, toe bank, and side slopes will be done using vibratory rollers/compactors to achieve the Maximum Dry Density (MDD) as per Appendix E, pages 138 and 139 of RDSO guidelines/specifications, RDSO/2020/GE: IRS-0004, Sept. 2020."
 27. SSE/P.Way / SSE/Works should maintain compaction registers. For every 500m, the soil test reports and dry density certificates should be submitted. If there is a change of quarry, irrespective of the quantity, the soil test report should be submitted. If these documents are not submitted along with the bill, the entire quantity of earth will be summarily rejected.
 28. Additional width of embankment should be carried out at high bank locations, curves whenever required prior approval should be obtained from Sr.DEN / DEN
 29. Toe bank should be provided at locations approved by Sr.DEN. ADEN & SSE/P.Way should ensure side slopes is 2:1, if side slopes are below 2:1 slope quantity of earth work should summarily reject.
 30. The Contractors are advised to inspect the site and availability of road facility / approaches before quoting their rate.
 31. No extra payment will be made for jungle clearance and repairs to service road or for formation of road if required for leading/transporting of earth to cess location.
 32. Payment for the earth work will be made to the quantity arrived based on cross sectional measurements duly deducting as per specifications.
 33. Contractor required to quote the rate duly considering the royalty, seignorage charges as applicable in Telangana, Andhra Pradesh state and revision thereof from time to time as mentioned in latest G.O.
 34. Approval of Soil Samples: The earthwork in both the cases for widening / toe bank has to be done with non- expansive soils (SQ2 quality soils to be used) and use of expansive soil is prohibited. The successful contractor is required to submit samples of SQ2 soil as per specification GE-004 within 15 days after issue of acceptance letter. Each sample shall be submitted in three wide mouthed sealed jars containing the representative sample approximately 0.0035cum (1/8 cft) in each bottle. Those soils which are approved shall only be used at site. No work should start until soil sample is approved. Any delay in submission /approval of soil sample will not be compensated. It is the responsibility of the agency to study necessary specification for soil and to submit soil sample which will confirm to the specifications.

Soils to be normally avoided

- a) There are some soils, which are normally unsuitable for construction of formation as listed below:
 - i) Organic clays, organic silts, peat, chalks, marl, dispersive soils and soil containing soluble material (e.g. Rock salt or gypsum).
 - ii) Poorly graded sand and gravel with $C_u < 2.0$, should not be used to safe guard against liquefaction. Generally, most liquefiable soils as falling in gradation zone as indicated in the Fig-L1 of Appendix-L & having coefficient of uniformity, $C_u < 2$ shall not be used. (Reference Sketch given in Appendix-L) of RDSO/2020/GE: IRS-0004 September 2020.
 - iii) Clays and Silts of high plasticity (CH& MH) in top 3m of Embankment.

- iv) Shale and soft rocks which become muddy after coming into contact with water.

Soil Quality

For Design of Railway Formation, the soils for their use in Indian Railway Embankment have been grouped based on percentage of fines present in the soil, as given below:

Description of Soil Quality Class	
Description w.r.t. Fine-Particles (size less than 75micron)	Soil Quality Class,
Soils containing fines > 50%	SQ1
Soils containing fines from 12% to 50%	SQ2
Soils containing fines < 12%	SQ3

- i) Each layer should be compacted with recommended type of roller up to required level of compaction, commencing from the sides, before putting the next upper layer.
- c) Extra embankment width of 500mm on either side shall be rolled / compacted to ensure proper compaction at the edges. The extra soil should be cut and dressed mechanically to achieve regular side slope and the slope shall be compacted with 6-8 passes of slope compactors (10–20-ton capacity).
35. Before executing the work, concerned ADEN/SSE (Works/P.Way) should submit numbered level books from Divisional office and obtain numbering and signature of concerned Sr. DEN/ DEN, only after that the initial levels should be recorded in level books and submitted to divisional office with Initial and proposed levels along with graph sheets duly signed by concerned SSE (Works/P.Way), ADEN and Contractor.
36. After completion of earth work, new level books should be collected from Divisional office and final levels should be recorded and the same should be submitted to Divisional office along with graph sheets duly signed by SSE(Works/P.Way), ADEN and Contractor.
37. The soft copy of graph sheets and calculations must also be submitted in Excel format to the Divisional office, along with the hard copy.
38. Concerned SSE (Works/P.Way) has to certify on each graph sheet that the slope provided is 2:1.
39. If level books not submitted vide above note No.39, 40 & 41, the bills cannot be considered by Divisional office.
40. Tentative sketch cess widening/TFTR is mentioned below. If any changes to this schematic drawing occurs as per HQ/Engineer-in-charge is required will be done.
41. Suitable flagmen/ detonators shall be provided wherever necessary for protection of trains
42. The contractor is responsible for the safe passage of the trains. The contractor will allow all trains with the specific approval of supervisor at site in charge in the portion of track under repair. Any violation in this regard the contractor will be held responsible for all damages occurred out of negligence, manipulation by his staff.
43. In the event of any accident at the site of work and it is established during the departmental enquiry by the railways that the accident occurred wholly or partly due to any act / omission tantamounting to negligence on the part of the contractor or his labour not adhering to the instructions of the engineer in charge, the contractor shall remain himself liable for damage and also legal prosecution of loss of life is

- involved
44. No claim will be admissible towards loss of time, wastage of labour employed, etc., that may be incurred by the contractor due to movement of trains. The rate quoted should cover all such contingencies
 45. Track gauge shall be ensured by the contractor/ representative of the contractor before passing the train.
 46. All the P.Way fittings will be supplied to the contractor at SE/ SSE/ P.Way depot. The contractor should make his own arrangements to cart the same to the work spot at his own cost and no extra payment will be admissible in this regard.
 47. The Railway administration will not be responsible for the safety of contractor's labour engaged for this work.
 48. Vehicles and equipment of contractors can be drafted by railway administration in Case of accidents/ natural calamities involving human lives.
 49. Safety at work spot and safe working of contractors the contractor is primarily responsible for safety of traffic and also that of his staff working on track. No compensation what so ever towards damage to men, material of the contractor will be paid by railways it is essential that adequate safety measures are taken for safety of the trains as well as the work force. Engineer-in-charge may impose any other conditions necessary for a particular work or site.
 50. If contractor damages any of Signalling & Telecom cables, a penalty of Rs. 1.25 lakh or as deemed fit as per norms in vogue whichever is higher will be recovered from his bill.
 51. The contractor has to develop service roads/approach roads wherever required. For that no extra payment will be made. No separate payment will be made for the ramps provided by the contractor.
 - 55 The look out men and whistle caution orders shall be issued to the trains and speed restrictions imposed wherever considered necessary.
 56. The description given for schedules is only brief. The detailed description is available in USSOR 2021 including its correction slips.
 57. The quantities shown in the schedule is approximate and will be operated in full or part at the discretion of Engineer in charge.

10

(f) All other safety measures / precautions as specified in
Engg. Standing order No.23/2002 and 65/2010.

(SSE / PWAY)

(ADEN)

Dy.CE / Con.

Sr.DEN / Co.Ord

Annexure-2

COMPANY CERTIFICATE

Certified that Shri _____ P.way supervisor of
M/s _____ has been examined regarding P.way
working on _____ work.

His knowledge has been found satisfactory and he is
capable of supervising the work safely.

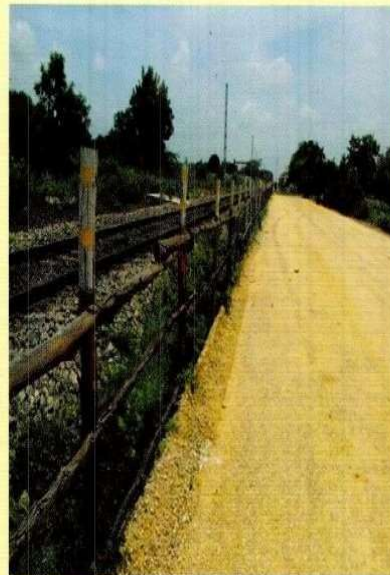
Assistant Engineer



11

★ Safety Consciousness Enhances Overall Performance.

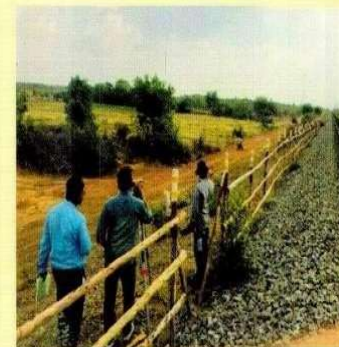
★ If it is unsafe - Report It, Remove It, Replace It.



ENGINEERING DEPARTMENT
SOUTH CENTRAL RAILWAY

SAFETY REMINDER

SAFETY PRECAUTIONS AT WORKS SITE NEAR RUNNING TRACK



ENGINEERING DEPARTMENT



January 2019

SOUTH CENTRAL RAILWAY

SAFETY FIRST SAFETY ALWAYS

SAFETY HAS NO HOLIDAY

1 SAFETY REMINDER - AT A GLANCE

SAFETY PRECAUTIONS AT WORK SITE NEAR RUNNING TRACK

1. Introduction:

- Responsibility of safe of Train operation primarily vests with Open Line Organization and agencies executing project work. Issues related to safety have to be necessarily addressed and ways & means are to be devised for implementation of safety norms by agencies responsible for execution and those responsible for supervision of works as well as officials of Open Line directly responsible overseeing safety of train operation at field levels.
- Engineering personnel in charge of Open Line sections are responsible not only for safety of trains while directly supervising the work being executed by Open Line but are also required to continuously monitor that necessary safety precautions are taken by other associated organizations like Construction Organization, RE Organization, RVNL/RITES etc., when working along the running lines.
- Incidents of road vehicles and cranes and other construction machinery working in close proximity to track and causing infringement, leading to unsafe conditions needs to be curbed.

- Open Line officers / staff are to monitor closely to ensure that safety related instructions on the extant subject are being complied

2. Green Notice System:

(Green Notice Procedure to Ensure Safety at Work Sites):

(Annexure 1: Proforma of Green Notice)

- Practice of taking up the work with issue of GREEN NOTICE is important and must be ensured.
 - Before commencement of work, the Engineer in charge of work site is required to submit a certificate with request for issuing GREEN NOTICE, to Sr.DEN/Co Ord. through sectional ADEN and DEN/Sr.DEN, that all the prescribed methods and arrangement for protecting the running line have been put in place. The work shall not be allowed to start without GREEN NOTICE.
- #### 3. Systematic Planning and Implementation:
- All the works planned for execution close to the running lines and fixed structures, on bridges, in side tunnels, cuttings, constricted areas etc. should be carried out only after preparation of detailed plans for the same, getting clearances from the Engineering Department of the Open Line and approval of competent authority to ensure that the execution of the works will not in any way infringe the

prescribed schedule of dimensions or aggravate existing permissible infringements.

➤ The following aspects may be considered during execution of works adjacent to running track:

- ✓ Erection and maintenance of suitable barricading all along the track in the entire work site till the completion of the entire work in the stretch. This is essential to prevent the vehicles from coming too close to the track and infringe the moving dimensions.
- ✓ The executing organization to ensure barricading all along the site for period of execution of work. Deployment of security team by executing Organization (Const Org./RVNL/RITES etc.) and their contractors to prevent the theft of barricading materials if required.
- ✓ Issue of permit to the authorized road vehicles deployed by Organization (Const Org./RVNL/RITES etc.) and their contractors with suitable training to the staff operating them. Supervisor / workman should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma (Annexure-2) shall be issued by AEN, which will be valid only for the work for which it has been issued.

ALERTNESS AND TIMELY ACTION CAN
PREVENT MANY ACCIDENTS

SAFETY IS NOT A PART TIME AFFAIR
BUT A FULL TIME CONCERN

KEEP YOUR RULE BOOKS CURRENT AND
EQUIPMENTS COMPLETE

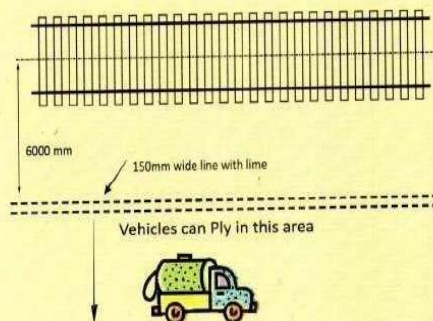
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4. Measures to be ensured Prior to start of the work:

➤ Work site away from the running track.

Construction machinery and vehicles should ply 6m away from the centre line of track.

The Vehicle shall ply 6m away from track.
Marking of White Line with Lime.



Marking of white line with lime should be made adjacent to running track. Road vehicles / machines to ply in a way so that these do not infringe the line of demarcation.

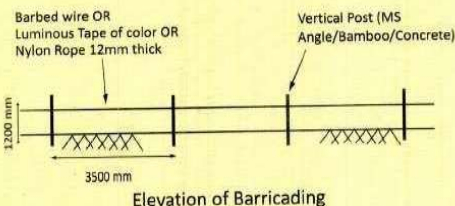
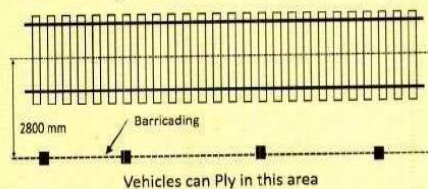
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➤ Work site in vicinity of track.

✓ **BARRICADING:** Sturdy semi-permanent barbed wire fencing or luminous tape of Red colour or nylon rope of 12mm thick with 1.2m height vertical post (MS angle posts/Bamboo/Concrete post), embedded in concrete, at an interval of 3.5m should be provided to forewarn the road vehicle driver, working in the vicinity of the Railway Track

✓ Barricading as per above design shall be provided in full length of work area.

✓ Barricading should be provided along side of track at a distance of not less than 2.8m from centre line of nearest running track.

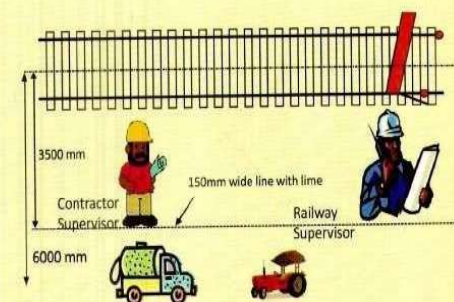


Elevation of Barricading

6

Plying of Vehicles between 3.5m and 6m from centre line of track:

Plying of Vehicles between 3.5 M and 6 M from centre line of Railway track:
Only in presence of Railway employee and Contractor Supervisor (with Caution Order.)



In case movement of vehicle at less than 6m, but more than 3.5m away from track is inescapable, it should be permitted in the presence of Railway employee (authorized by Engineer-in-charge) duly issuing the Caution Order.

A SOUND PERMANENT WAY ENHANCES
SAFETY AND SPEED

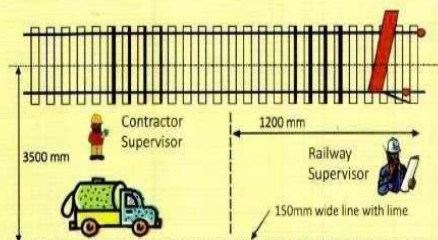
THERE IS NO SUBSTITUTE FOR SAFETY

PROPER PROTECTION WILL ELIMINATE
MISHAPS IN MID - SECTIONS.

7

**Plying of Vehicles within 3.5m
from centre of track:**

Plying of Vehicles within 3.5 M.
In presence of Railway employee and Contractor
Supervisor duly Protecting the Track
(BLOCK PROTECTION)



In case work is planned to be done within 3.5m of centre line of running track, ensure that work is done under BLOCK PROTECTION.

8

5. IMPORTANT POINTS:

- The work site shall be suitably demarcated to keep public and passenger way from work area.
- Signage boards such as "WORK IN PROGRESS" etc. to be provided at appropriate locations to warn public /passengers.
- All temporary arrangements required to be made during execution of work to be made in such a manner that moving dimensions do not infringe.
- Contractor's road vehicles /machinery to ply only between Sunrise and Sunset. In case of emergency, night working may be allowed with provision of sufficient light and additional staff, with the approval of competent authority only in presence of Railway supervisor.

IT MAY PLEASE BE ENSURED THAT SAFETY PROVISIONS ARE FOLLOWED IN TOTALITY TO AVOID ANY UNTOWARDS FOR PUBLIC AND RUNNING TRAFFIC.

Authority:

Above information is as per IRPWM; Railway Boards letters/ circulars; Engineering Standing orders and letters issued by SCRailway, Please refer the same for further details.

9

Annexure-1

GREEN NOTICE

No.

Dt

- 1.Nature of Work :
 - 2.Location of Work :
 - 3.Probable Date of Commencement :
 - 4.Duration Required (Months / Days) :
 - 5.Speed Restriction Required :
 6. (i) Agency : (ii) Supervisor's Name :
 - 7.Railway's Supervisor (In charge of the work) :
 - 8.Certified that :
- (a) Fixed Engineering indicator boards have been exhibited at Km.....to
- (b) Exhibiting Engineering signals at the specified distances according to rules and posting of Flagmen with necessary equipment to man them as per the category of Engg works as envisaged in Para 804 to 809/810 of IRPWM.
- (c) Contractor's supervisor / workmen are counseled about the safety measures.
- (d) Precautions as mentioned vide Para 826 Of IRPWM have been ensured including provision of proper barricading arrangements, in case of contractor's vehicles plying in the vicinity of work site.
- (e)The unloaded ballast /rails / sleepers / other Pway materials etc. after unloading along the track are kept clear of moving dimensions and stacked as per specified heights and distances from the running lines.

**A SMALL ERROR SPELLS OUT
A MAJOR DISASTER**

**IT IS BETTER TO BE CAREFUL
THAN TO BE SORRY**

MAKE SAFETY STAY ON PERMANENT WAY