**CENTRAL RAILWAY**

Central Railway
Principal Chief Engineer's Office,
Chhatrapati Shivaji Maharaja
Terminus
Mumbai-400 001

No. W.100.Heriage

Date:- 16.01.2025

**Sr DEN (CO)/BB, BSL, NGP, PA & SUR**

**Sub:** Comprehensive procedure order for ensuring safety at worksites.

**Ref:** 1. PCSO/CSMT letter no. SFT/I/safety activity dt 07.11.23.
2. RB letter no. 2023/CE-IV/Misc. dated 10.08.2023.
3. CE Circular No. 190 dated 18.01.2008.

Recently there has been a mishap on account of failure of shuttering on a Railway. There is need to improve upon safety at worksites on CR to avoid any such incidences.

Earlier, 'Comprehensive Procedure Order for ensuring safety at the worksite' was issued by PCSO as per Ref 1. Also CE Circular No 190 (Ref 3) was issued as per Ref 3.

'Comprehensive Procedure Order for ensuring safety at the worksite' along with checklists for important activities are being sent herewith for strict implementation at worksites. It is desired that the instructions and precautions incorporated therein shall be imparted to all field officials/staff and contractual officials/staff by conducting seminars. Assurance Registers shall be maintained at all the worksites in the divisions to improve upon safety.

During the execution of works in the field, the specifications of USSOR shall be followed strictly. The formwork for the concrete work shall be complied with as per Clause 2.10 of specification for USSOR-2021.

RAJKUMAR WANKHEDE
Digitally signed by RAJKUMAR WANKHEDE
Date: 2025.01.16 18:29:58 +05'30'

(Rajkumar Wankhede)
CPDE

**C/- DRM/BB, BSL, NGP, PA & SUR**
**C/- Sr DSO/ BB, BSL, NGP, PA & SUR : For necessary action.**

**C/- PCE, PCSO : For information.**

**CHECK LIST FOR RCC WORK**

| SN | Description | Yes/ No/ N.A. |
|---|---|---|
| **A. Cement** | | |
| 1 | Whether the Supplier/ Manufacturer as per approved list? | |
| 2 | Has the Cement got tested from approved laboratory (for Initial Setting Time, Final Setting Time, Soundness, Fineness, Chemical Tests) as per IS codal provisions? | |
| 3. | Whether the above test certificates are attached? | |
| **B. Coarse Aggregate** | | |
| 1 | Whether the Supply is from an approved source? | |
| 2 | Have the aggregates been got tested from reputed laboratory as per IS:383, IS:2386, IS:1760 and IS:2317 for Size & Gradation, Flakiness and Elongation Index, Deleterious Materials, Specific Gravity, Density, Moisture Content, Impact value, Crushing Value, Chloride and Sulphate Content, etc. | |
| 3. | Whether the above test certificates are attached? | |
| **C. Checklist for Fine Aggregate** | | |
| 1 | Whether the Supply is from an Approved Source? | |
| 2 | Have the aggregates been tested from reputed laboratory as per IS:383, IS:2386, IS:1760 and IS:2317 for Size & Gradation, Silt content, Deleterious Materials, Specific Gravity, Moisture Content, Chloride and Sulphate Content, etc. | |
| 3 | Whether the above test certificates are attached? | |
| **D. Checklist for Water** | | |
| 1 | Whether the supply of water is from an approved source? | |
| 2 | Has the water been tested for pH value, Sulphate content, Chloride content, Organic Impurities, Inorganic Impurities, suspended matter, etc. from reputed laboratory as per IS:3025. | |
| 3 | Whether the above test certificates attached? | |
| **E. Checklist for Admixtures** | | |
| 1 | Whether the material is from approved Manufacturer/ Supplier: | |
| 2 | Whether the material satisfies the Test requirement as per IS:9103 for Relative Density, Chloride Content, Ash Content, pH value, Water Content, etc. | |
| 3 | Whether the above test certificates attached? | |
| **F. Checklist for Reinforcement Steel** | | |
| 1 | Whether the material is from approved Manufacturer/ Supplier | |
| 2 | Whether the material satisfies the Test requirement as per IS:432(Part-1), IS:1786, IS:2062, IS:16651 for Diameter, Unit Weight, Ultimate Tensile Strength, Yield Strength, % Elongation, Bend & Rebend Test, Chemical Tests | |
| 3 | Whether the above test certificates attached? | |
| **G. Checklist for Formwork** | | |
| 1 | Is the Shuttering material (Wood/ Steel) as approved? | |
| 2 | Are the Shuttering plates as approved? | |
| 3 | Is the thickness of Stiffener approved? | |
| 4 | Is the Preassembly of shuttering checked and elements of individual shuttering checked before use? | |
| 5 | Is the arrangement of Formwork as per approved dimensions? | |

| | | |
|---|---|---|
| 6 | Has the alignment and levels of the shuttering/ form work checked? | |
| 7 | Is the verticality checked (Max limit- 1 in 1000)? | |
| 8 | Is shuttering watertight and weather foam and rubber sheet provided? | |
| 9 | Are shuttering plates suitable to give shutter finish of concrete i.e., free from dents, scales or pitting etc.? | |
| 10 | Is shuttering adequately supported and braced? | |
| 11 | Are shutter vibrators provided as approved? | |
| 12 | Are joints between panels flush (no steps/ lips)? | |
| 13 | Are spacers between shutters adequately provided wherever required? | |
| 14 | Are End Stoppers provided? | |
| 15 | Is the oiling of forms done with approved release oil? | |
| 16 | Are the Water stops fixed as required? | |
| **H. Checklist for Staging** | | |
| 1 | Has the Staging been designed and got approved in advance? | |
| 2 | Is the base preparation done as per the approved methodology? | |
| 3 | Is the placing of Concrete block as per drawing? | |
| 4 | Is the erection of temporary Columns true to Plumb? | |
| 5 | Is the connection of Horizontal and Diagonal Bracings as per Drawings? | |
| 6 | Has all the Joints been properly made and Stiffened? | |
| 7 | Is the Placing of Longitudinal Girder and Transverse Girders as per Drawings? | |
| 8 | Has Staging been done as per approved design? | |
| 9 | Is the Spacing of temporary Column according to Approved design? | |
| **I. Checklist for Concrete** | | |
| 1 | Are Construction Joints provided as approved? | |
| 2 | Has the old concrete surface been roughened? | |
| 3 | Is Batching plant calibration checked? | |
| 4 | Has the Concreting sequence been approved? | |
| 5 | Has the arrangement for protection from extreme weather during or after concreting been made? | |
| 6 | Are the Platforms and access for materials and labour movement provided? | |
| 7 | Is adequate illumination arrangement provided? | |
| 8 | Are safety measures as per Safety Assurance Record taken? | |
| 9 | Does the Slump of concrete meet the requirement? | |
| 10 | Are Cube specimens prepared as per Codal provisions? | |
| 11 | Is the previously placed layer of Concrete green to receive the succeeding layer of amalgamation? | |
| 12 | Is proper vibration done to ensure compaction? | |
| **J. Checklist for Reinforcement** | | |
| 1 | Is Bar Bending Schedule approved? | |
| 2 | Is Bar bending and cutting satisfactory? | |
| 3 | Has corrosion treatment of bars been carried out in case of scaling of bars? | |
| 4 | Are Bar sizes correct as per Drawing? | |
| 5 | Are Bar spacing correct as per Drawing? | |
| 6 | Are Bar Lap lengths correct as per the structural drawing? | |
| 7 | Are Bar Lap at correct locations as per the structural drawing? | |
| 8 | Are all joints tied properly with binders using double knot? | |

| | | |
|---|---|---|
| 9 | Is bar assembly rigid and adequately supported (including spacers/ chair supports)? | |
| 10 | Is the Concrete for cover blocks of the same grade as the main Concrete? | |
| | Are cover blocks of proper size and fixed at proper spacing? | |
| **K. Checklist for Concrete Placing** | | |
| 1 | Has the temperature of Concrete before pouring been checked? | |
| 2 | Are the vibrators available for proper compaction of Concrete? | |
| 3 | Have precautions been taken for hot weather concreting as per IRS Concrete Bridge Code and IS: 7861 (part-1)? | |
| 4 | Have precautions been taken for cold weather concreting as per IRS Concrete Bridge Code and IS: 7861 (part-2)? | |
| **L. Checklist for Post Concrete Inspection** | | |
| 1 | Is the alignment correct? | |
| 2 | Are the dimensions correct? | |
| 3 | Is there any honey combing? | |
| 4 | Are there any bubbles? | |
| 5 | Are there any cold joints? | |
| 6 | Is shutter finish obtained? | |
| **M.** | **Remarks of defects noticed** | |

G20
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No.SFT/I/safety activity

Date: 07.11.2023

**CAO/C, PCSTE, PCE, PCEE,**
**PCOM, PCME**
**& All DRMS**

**Sub: -Comprehensive procedure order for ensuring safety at worksite.**

Number of works in connection with multi tracking, RE, traffic facilities, bridge, LC gate closure, S&T works, replacement of assets and other maintenance works etc., are being regularly carried out as per various instructions/procedure orders issued from time to time by Railway Board/Zonal Railways/open line/construction organization/divisions.

A need, therefore, was felt to have a comprehensive guidelines/procedure order covering all the existing and new instructions to be followed by the workmen for ensuring safety at worksites. Accordingly, a comprehensive procedure order has been made.

Henceforth, open line and construction Departments must adhere to these instructions while planning and carrying out works involving earthwork, excavation and operation of vehicles/ machines and equipment near the running tracks etc.

These safety rules should be incorporated in all the contractual agreements. Regular and surprise inspections by officers must be carried out to ensure compliance of the prescribed safety instructions.

This comprehensive procedure order shall be implemented with immediate effect.

This is issued with the approval of Competent Authority.

DA : Comprehensive procedure order.

(Maninder Uppal)
PCSO

C/- **CTE/CR**
**CEE/Const/CR**
**CSTE/C(I)/CR, CSTE/C(II)/CR**
**CE/C/North, South, Central, MUTP**
**All Sr.DEN/CO, All Sr.DSTE**
**Director Project/MRVC**
**Director Operation/RVNL**
**All CPM's Gatishakti**
**CPM/C/NGP**
**CPM DFCCIL**
**CPM/RLDA/CSMT**
**CPM/RLDA/NGP**

## SUB: PROCEDURE ORDER FOR ENSURING SAFETY AT WORK SITES

Large number of works in connection with doubling, third line, Railway electrification, traffic facilities, bridge, LC Gate closures, replacement of assets and other maintenance works etc., are being carried out in the vicinity of the running tracks. These include Engineering, S&T and Electrical works. While carrying out these works in the vicinity of the running tracks there is a possibility of infringement to running trains, disturbance to the existing track geometry, damage to the S&T and Electrical cables which may result into unusuals including hampering the Railway and Contractor staff safety at the work sites. Works are being carried out as per various instructions issued from time to time by RB/Zonal Railways/open line/construction organizations/divisions. A need was felt to have a comprehensive guidelines/procedure order to be followed by the workmen for ensuring safety at the work site.

Henceforth, the Open Line and Construction Department must adhere to the following instructions while planning and carrying out works involving earthwork, excavation, and the operation of vehicles and equipment near running tracks.

**These safety rules should be incorporated into all contractual agreements. Regular and surprise inspections by officers shall be conducted to ensure compliance of the prescribed safety instructions.**

**Part A: Undertaking any type of work adjacent / adjoining to the running track :**

**1.1** Prior to commencing any work near the running track, the Engineer Incharge must provide written information to the Open Line SSE/ (P.Way), ADEN, and sectional Sr.DEN, detailing

1.1.1 The Nature and location of the work,

1.1.2 Name of the executing agency, Construction/PSU/Other Deptt. Name with designation and mobile no of railway and contractual supervisors available at each site of work.

1.1.3 The expected duration of work.

1.1.4 The types and approximate number of vehicles to be deployed.

1.1.5 The planned work areas.

1.1.6 Safety measures to be implemented.

1.1.7 Assurance Certificate from Contractor as per **Annexure-V.**

**1.1.8** Certifications should be obtained from Executing agency viz Construction/PSU etc regarding:

**i)** Competency certificate to contactor supervisor /machine operators /drivers to be issued as per Annexure VI. ***In case of executing agencies other than Construction, this certificate shall be issued by ADEN/Sr. DEN.***

ii) Engineering work permit (EWP) to be submitted to open line as per Annexure VII. ***In case of executing agencies other than Construction, this permit shall be issued by ADEN/Sr. DEN.***

iii) The availability of both Railway's supervisors and competent authorized supervisors from the contractor.

iv) Competency certificate for supervisor should be in accordance with IRPWM Para 819 (4) similar to Annexure 8/5 of IRPWM, by Assistant Engineer in charge of the site, if required to be issued. (**Annexure -II** to this circular).

v) Imposition of Caution orders / OEHS, and WF instructions etc wherever necessary.

vi) Giving information to relevant departments (Engineering, Electrical, and S&T) as required, before actual starting of the work.

vii) All safety measures for protecting the existing embankment, such as shoring and micro piles, must be ensured based on site conditions and approved plans (GAD/Plans).

**1.1.9** Work Site shall be jointly inspected by Contractor's supervisor and Railway's/Executive Agency's supervisor for identification of safety measures required, including protection of track in case of requirement.

1.1.10 A checklist as per **Annexure IV** will be jointly signed by Open line supervisor and Supervisor of executing agency at the start of work. The same Annexure IV shall also be signed by inspecting officials visiting site during execution of the work.

1.1.11 No work should commence without approved plans, L-sections, ESP, GADs, etc., asrequired.

**2. Measures to be adopted during execution of the work adjoining to the track:**

2.1: The availability of both Railway's/Executing agency's supervisors and competent authorized supervisors from the contractor.

2.2 : **Wearing of Luminous Jackets/Band by all personnel:** All Personnel should wear luminous (retro-reflective) jackets/Bands, while working in the vicinity of track.

2.3: The excavation does not cause any damage to the formation or the cess, disturbance or settlement to the running track, obstruction to the drainage or the existing drains of track.

2.4: There is no infringement to the maximum moving dimensions for the safe running of trains.

2.5: Before carrying out any excavation/earth work within Railway boundary the detailed procedure/guidelines issued by RB and CR HQs vide their letter no. 2021/Tele/5(2)/3Part(1)(3425647) Dated 12/06/2023 respectively shall be strictly followed to avoid cutting/damage to Signalling and Telecom cables which carry important Safety and Communications circuits.

2.6: Equipment, cables, and other installations are not damaged during the excavation. If any new cable is found during digging or a known cable is cut, digging/cutting should be stopped and concerned ASM, supervisor of S&T or Electrical as the case may be, should be informed immediately.

2.7: In the case of mass labour deployment, caution orders regarding the observation of engineering hand signals and the whistle freely (OEHS and WF) should be issued for the duration of the work. Look out man with whistle to be available to warn the labour of the incoming train(s).

2.8: Designated register must be diligently maintained at the site, meticulously documenting all "Safety Measures" being implemented, along with a thorough record of the precautions being taken. During routine inspections, appointed officers are obligated to review and scrutinize the efficacy of the various safety measures in place and duly record their observations for further reference. They should also check & sign Annexure IV as part of their inspection note whenever possible.

2.9: The cutting/blasting and protection scheme shall be approved by the CBE office.

2.10 : **Measures to be adopted for the movement of the of Vehicles adjoining the track** –

2.10.1 : Before the start of work, the land strip adjacent to running track where road vehicle/ machinery are to ply for the work shall be prominently demarcated by a thick line in advance at an appropriate distance from the centreof existing track in consultation with railway supervisor of open line.

2.10.2 : Unless there is a physical barrier preventing movement of vehicle or any part of vehicle from coming nearer to track than 3.5m clear of the track, Barricading as per drawing and design given in **ANNEXURE-III**, shall be provided in the complete length of the work area along the track.

2.10.3 : Contractor shall be allowed to ply road vehicles Only **between Sunrise and sunset**. In case of emergency where it is necessary to work beyond sunset, sufficient illumination shall be ensured in the entire work area. Also necessary additional staff shall be posted for night working including information to the respective Eng. Control Office of the division giving confirmation of the compliance of the precaution stipulated for protection at the work site including compliance of provisions of this circular and those of IRPWM.

2.10.4 : The engineer Incharge of the work or his representative (min Astt. Engg.) will personally examine and certify the road vehicle/ equipments, counsel the driver, protection man and supervisor and will give written permission to contractorgiving number and type of road vehicle driver and supervisor to be deployed on the location, period and timing of the work. The Contactor shall not be allowed to workat site without prior written permission from Engineering Incharge or his representative.

2.10.5 : Check list given in **Annexure-I** shall be used to ensure that all the requisite measures have been taken before start of the work. Also, a copy of the check list duly signed shall be kept in the work contract file.

2.10.6 : If the work is planned to be executed beyond 6.0 meters from the centerline of the nearest running track, the adjacent land strip where road vehicles or machinery will operate must be clearly demarcated. A 150mm wide lime line should be marked at a distance of 6 meters from the center of the existing track. The contractor must acknowledge this demarcation to ensure that vehicles and machinery do not cross this line or come closer than 6.0 meters to the running tracks.

2.10.7 : When the work is planned to be conducted between 6.0 meters and 3.5 meters from the centerline of the track, the following measures must be taken.

2.10.7.1 : Barricading of corrugated PPGI sheets of 0.45 mm thick/barbed wire fencing as per drawing and design given in **ANNEXURE-III or** any other suitable design and drawing approved by the competent authority, shall be provided in the complete length of the work area along the track, and watchmen shall be posted by the executing department. Work shall be carried out by imposing suitable caution order as per site condition.

2.10.7.2 : The contractor's as well as Executing agency's (Construction/PSU/Open Line) supervisor at site shall possess the contact numbers of the nearest station master, SSE/P Way, & Engineering Control. In unusual circumstances, where driver/operator/contractor's supervisor apprehends infringement totrack while working vehicles or machinery near running track, following action shall be taken:

i) Contractor's concerned staff/supervisor shall pass on immediate information to the Railway representative available at site. Railway supervisor/look out man available at site shall take immediate action as per para 1004 (8) of IRPWM for protection of track. He shall then inform immediately to nearest ASM/LC Gate on the side from which train is expected/expected first on infringed line, & if they do not respond, to SSE P.way/Engineering control. Contractor's concerned staff/supervisor shall also assist Railway representative at site in protecting the track.

ii) In case a railway official is not available at site, contractor's supervisor shall inform immediately to nearest ASM/LC Gate on the side from which train is expected/expected first on infringed line, & if they do not respond, to SSE P.way/Engineering control, and simultaneously take all precautionary protection measures to protect the track & stop the incoming train by showing red hand/light signal.

2.10.8 : In case, work is planned to be done within 3.5 m of center line of running track' it shall be ensured that the work is done under block protection only andnecessary safety precautions for protection to track as per Para No.: 806 and 807 of IRPWM are taken. Additionally, the presence of a Railway Supervisor of at least JE rank must be ensured at the work site.

2.10.9 : Individual vehicle/machinery shall not be left un-attended at site of work ifit is unavoidable and becomes necessary to stable the road vehicle/machinery at plant near the running track, these shall be properly secured against any possibleroll-off.

2.10.10 : When a road vehicle is to be reversed :

i) The location where vehicle is to take a turn shall be properly demarcated and reversal of vehicle shall only be done at designated location.

ii) The road vehicle driver should always face the Railway track during the course of turning or reversing his vehicle.

2.10.11 : The worksite shall be suitably demarcated to keep public and passengers away from work area. Necessary signage board such as "Work in progress" etc" shall be provided at appropriate locations to warn the public/passengers.

2.10.12 : Where it is necessary to work during night hours, sufficient lighting shall be ensured in the complete work area for the safety of public and passengers' Also additional staff shall be posted as necessary for night working.

2.10.13 : Wherever provided, the engineering indicator boards (except retro-reflective boards) shall be lit during night hours as per the provisions of P.Way Manual.

2.10.14 : Vehicle drivers, machine operators shall not play loud audio systems and connect earphones while working and not to used mobile phone while working.

**PART B-**

**3.0 WORKING ON THE RUNNING TRACK - EXISTING LINES:**

3.1 A gang shall not commence or carry on any work that may involve danger to trains or to traffic without the previous permission of the inspector of way or works or of some competent Railway servant appointed in this behalf by special instructions, and the Railway servant who gives such permission shall himself represent to superintend such work and shall see that provision of rules under GR 15.08 and 15.09 are observed.

Provided that in case of emergency when the requirement of Safety warrant the commencement of any such works before the said Railway servant can arrive, the Gangmate may commence the work at once and shall himself ensure that provisions of rules 15.09 are observed.

Various works involving interference with traffic are classified and enumerated as per SR 15.06-1 & 15.06-2.

3.2 The precautions which should be taken up by the work in-charge before commencing operations which would obstruct the line shall be followed as per GR 15.08.

3.3 Whenever, due to lines being under repair or due to any other obstruction it is necessary to indicate to the LP that he has to stop or proceed at a restricted speed, the signals which shall be shown, where prescribe, detonators used, and caution indicators on double line and single line sections in block section and within station limits shall be done strictly as enumerated under GR 15.09-1, 15.09.2 & 15.09-3 & 15.09-4.

3.4 For the engineering works on open line, hand signaling arrangements as prescribe under SR 15.09-1, shall be followed.

3.5 Any work that may infringe on the moving dimensions should only commence after imposing a block and ensuring track protection according to Para 806 & 807 of I R P.Way Manual and Para 15.09 of G&SR, as applicable.

3.6 When executing engineering works on the running tracks, such as inserting turnout sleepers or laying glued joints, the Engineer Incharge must temporarily take over the relevant track portion in line with Joint Engineering & Construction Circular No. 148. The track shall be handed back to the sectional Incharge after lifting the caution order. The Engineer Incharge of the work should ensure track safety during this period.

3.7 At deep screening work/TSR location, proper ramping is required to be provided. Proper packing of sleepers at this location with correct track parameters at close of work is the key to safety. Railway & Agency supervisors must be sensitized about it. The location of the curves requires special attention w.r.t Versines & Cross levels.

3.8 On construction lines, before taking up tamping, tamping machines equipped with ALC shall essentially take a measuring run. For other machines, track parameters shall be jointly recorded and signed by construction & O/L or TM officials before taking up tamping.

3.9 On construction lines, rectification of track geometry shall be done gradually if required, in more than one round so as not to create twist beyond permissible limits.

3.10 At locations where night working is unavoidable, proper lighting arrangements should be made.

3.11 Publish Draft circular notice, if required, as per the Engineer Incharge's advice.

3.12 Adequate Stacking areas for released materials shall be identified in advance in consultation with open line P Way supervisor.

3.13 Recording of Assurance (in Assurance register kept at site, which is numbered and certified by an official not below SSE/P Way) at the time of closure of work for –

i) Track geometry has been checked and recorded and it is found to be in fit condition to carry traffic at restricted speed mentioned in track fitness memo.

ii) Released materials, such as rails, sleepers, etc., have been kept clear of any infringement from the running track at pre-identified stacking areas.

iii) All temporary arrangement, tools & plants, machineries etc have been kept clear of moving dimensions and secured so that they cannot be moved closer to track by unauthorised persons miscreants

**Part C-**

**4.0 ADDITIONAL PRECAUTIONS FOR WORK IN OR ON TOP OF CUTTINGS:**

4.1 Shifting of machines within railway boundaries should occur under railway supervision, with track protection or a traffic block when necessary.

4.2 Earth handling machines and tipplers should not be allowed to move once a train enters the block section until the train passes the work site.

4.3 Loose boulders or steep slopes prone to slipping should not be left near the passage of trains at the work site. If, during execution of work, unstable slope prone to imminent slip, or loose boulder/s are exposed, which may endanger safety of traffic, immediate action shall be taken to protect the track as per GR 15.09 and normal traffic resumed only after removing loose boulder/s or rectifying unstable slope.

4.4 All earth movers, excavator's machine should stand ensuring the safe moving SOD for running traffic.

4.5 Cutting slope site to be ensured as per approved GAD.

4.6 Assurance register to be maintained for the operator of the machine involved in excavation.

**Part D-**

**5.0 Stacking of Material along Railway Track:**

5.1 The sites for stacking materials shall be identified in advance so that no part of stacked material infringes Standard moving dimensions.

5.2 The selected locations shall be marked in lime in advance before taking up unloading and stacking of materials.

5.3 Presence of an authorized Railway representative shall be ensured while unloading and stacking.

5.4 A numbered assurance register (may be combined with assurance register for the main work for which material is being stacked, or a separate one if work is planned later) shall be maintained and the authorized Railway representative shall record his assurance in the register of having complied all the safety norms specified in this circular at 5.1-5.3.

**Part E-**

**6.0 Additional safety Precautions to be taken for Bridge Works:**

6.1 No bridge work affecting running track/existing bridge/embankment shall be undertaken without approval of GAD and TAD by CBE. PCE sanction shall be taken wherever required.

6.2 Precautions/Protection works like suitably designed protection piles/shoring/strutting as per approved GAD/TAD shall be ensured & Speed restriction as per approved GAD/TAD imposed before commencement of work.

6.3 No work/preparatory work involving any possibility of affecting running lines/their embankment/formation shall be commenced except under supervision of Authorized & competent Railway supervisor.

6.4 After insertion of Relieving girders till their removal, regular monitoring to check visual sign of settlement, and measurement of track parameters for cross level, alignment, gauge shall be done and observations recorded in a page numbered register kept at site for this purpose. The register to be test checked by the visiting/inspecting official.

6.5 Officials suffering from acrophobia, vertigo, dizziness, seizures or similar conditions shall not be deployed to work at heights.

6.6 Use of safety equipment like safety belt, helmets, gloves etc shall be ensured for staff working at heights below locations susceptible to material/tools falling. Safety nets shall be provided at locations where there is movement of people below the working area.

6.7 Launching of girders shall be done exactly as per approved launching scheme. Even in cases of launching with road cranes under traffic block, and power block approved scheme including capacity and placement of cranes shall be ensured by Engineer-in-charge before commencement of work.

6.8 Capacity of crane vis-à-vis the height and radius of working, SOD to befollowed for standing crane during works, shall be checked, firmness of ground shall be verified, suitable strengthening of ground where required shall be done, and preferably a physical trial with similar loads at slightly higher working radius shall be taken before actual work. During trial, height of operation shall be kept minimum and trial shall be carried out at a location such that any failure/tilting/sinking/overturning shall not lead to any infringement to moving dimensions. Availability of the valid crane capacity certification from competent authority, soil exploration report(in case crane used for LHS box insertion) and load chart analysis must be checked and studied by the Incharge of the work, much before taken up the work in hand.

6.9 During cutting works in Bridges, proper slope for cutting to be maintained to avoid bank failure.

6.10 All temporary arrangements like scaffolding, ropes, challies etc shall be checked for integrity, strength/load carrying capacity. Weakened arrangements/components shall be discarded & not used.

6.11 All areas involving danger to passer-byes shall be adequately barricaded to prevent entry of any person other than those involved in the work and suitable signboards displaying "work in progress"/danger as required shall be placed near all possible entry points.

6.12 No cable laying, pipeline laying etc shall be permitted over bridges except strictly as per scheme approved by CBE.

6.13 Adequacy of mobilization/preparatory works etc shall be ensured by an officer of at least JAG level, before entering into any works, failure of which may affect safety/operation of train running.

6.14 As a specific example of item 6.13 above, work of steel stool fixing on bridges shall be taken up only after adequate arrangement for lifting, ballasting & packing/tamping of approach track to required matching levels/gradient has been ensured.

6.15 Inspection ladders/Inspection platforms shall be provided on all bridges to ensure thorough inspection of all bridge components at any time.

6.16 Sand blasting work for metalising of girders shall be stopped before a train approaches work site. For this, a suitable arrangement (like look out man with whistle) for informing train approaching shall be established at such work sites, particularly at sites with restricted visibility. Contractual staff carrying out sand blasting work shall be pre-sensitized by SSE/Bridge to this aspect before deploying him at site and proper record of the same kept. The use of the safety belt, helmet to be ensured.

6.17 Wherever, work involves movement of workmen/supervisors on/near track, suitable speed restriction, OEHS & Continuous Whistle caution at adequate distance ahead shall be imposed for safety of work force. If the work involves possibility of affecting safety of running trains, flagmen with detonators shallbe deputed for protection of track as per IRPWM.

6.18 No handling of bridge materials, which involves possibility of infringement to moving dimensions even accidentally, shall be carried out except under traffic blocks. Where such infringements are easy & quick to remove, work under suitable speed restriction may be permitted. However, such works shall be stopped on the face of approaching train.

6.19 Materials brought for any bridge work shall be suitably stored away from track and stacked in a manner so that there is no possibility of infringement to moving dimension even in case of accidental rolling down of material.

6.20 Bridge work in the vicinity of OHE/involving OHE related safety or OHE work near bridges:

i) Painting within 2 m radius of OHE or involving possibility of any equipment/rope/metallic part etc coming within 2m radius of OHE shall only be executed under Power block & with issue of "Permit to work"under the supervision of engineering official not below the rank of JE(P.Way), who shall personally ensure that no tool or any part of body of the workers comes within the 'danger zone' i.e. within 2m of OHE.

ii) Earth bonds provided with the bridge structures shall not be disturbed. If these need to be disturbed, it should be done in presence of OHE staff and promptly re-connected immediately on completion of work. The work shall not be considered completed or closed for the day without re-connection of these bonds.

iii) In case of alignment correction of bridge/track over bridge, the same shall be operated as a joint block to be declared complete after checking of OHE alignment after completion of Engg. work.

iv) No OHE work close to bridge shall be undertaken without prior intimation to concerned SSE/P Way & SSE/Br.

v) Rail replacement on bridge in RE area , to be taken up after intimation to SSE/TRD and with clear instruction to all P.way staff to ensure proper continuity, of return current, using Metallic jumpers of approved designed, more over parts of rail shall not be touch with bare hands gloves ofapproved quality shall be used

**Part F-**

**7.0 Steps to ensure safety during block working by Tower Wagons**; Track Machines, EUR rake rail unloading, **Material Trains, and other departmental Vehicles-**

**7.1** The working of Track Maintenance Machines one or coupled or with Tower Wagon/Material trains during Integrated Blocks is to be done strictly as perGR 4.65.

**7.2** SR 4.65-1 shall be followed for movement of Track Machines. One or coupledTrack Machines shall be permitted to move from one station to another under one authority to proceed. Up to 7 Track Machines shall be allowed forworking within block section. All Track Machines must leave/arrive at the station in convoy. In double line section in wrong direction work and proceedis not permitted.

**7.3** Track Machines shall not be permitted following a train, however, during Integrated Block material trains, Track Machines, Tower Wagons shall be allowed to work following each other. While working in block minimum 200m distance to be maintained and it may be reduced depending on site working condition by taking necessary precautions.

**7.4** The Track Machine in-charge shall be responsible to ensure availability ofthe safety equipment as per SR 4.65-2.

**7.5** The procedure to be adopted by official in-charge P/Way, for working of Track Machines shall be strictly as per SR 4.65-3.

**7.6** The working during Integrated Block – Material Train, Track Machines and Tower Wagons shall be as per SR 4.65.-4.

**7.7** The protections measures and precautions to be taken by officer in- charge P/way/ overall in-charge (integrated block) for working of Track Machines/Tower Wagons shall be as per SR 4.65-5.

**7.8 Speed Restriction:** Tower Wagons, Track machines, Material trains and other departmental vehicles moving in the direction opposite to normal direction of traffic will run at a speed not exceeding 25 Kmph. This is similar to SR 6.02-1(11) i.e. speed restriction for single line working in double line section. This Speed restriction should be endorsed in caution order column of **"Block requisition notice and permit integrated Block requisition notice and permit"**, in addition to any existing speed restrictions; by Station Master of block permittingstation.

7.9 **Whistle freely and Observe Hand Signal:** Operators/Pilots of Tower Wagons, Track machines, Material trains and other departmental Vehicle should drive cautiously, whistle freely and observe hand signals to stop short of any obstruction. This should be endorsed in caution order column of **Block requisition notice and permit"/ "Integrated Block requisition notice and permit"**, by Station Master of block permitting station.

7.10 **Switching of Flasher Light:** on double line sections, operators /pilots of the Tower wagons, track machines, Material trains and other departmental vehicles, moving in the direction opposite to the normal direction of the traffic , should switch on flash light.

7.11 **Communication of block granted:** Communication of block granted, number of vehicles, sequence of movement of vehicles into the block section, time when block is granted as mentioned in the block requisition and permit, location of working of individual vehicle (track machine/tower wagon) should be conveyed on mobile phone to all site in-charges, of all departments by the official incharge (P.Way)/Overall in-charge(integrated block). The same should be conveyed by the in-charges to the workers in the field.

7.12 **Protection of worksite:** Work site should be protected adequately as per Para 806(2) IRPWM and Para SR 4.65-5(IV) & GR 15.09 and SR there on, as applicable.

7.13 **Wearing of Luminous Jackets/Band by all personnel working in the Block:** All Personnel should wear luminous (retro-reflective) jackets/Bands, while working in the Block for the entire duration of the block.

7.14 In integrated blocks, all vehicles involved in integrated block shall move at the speed of the slowest vehicle in the complement irrespective of sequence of movement.

7.15 There shall be a single supervisor in charge for an integrated block who shall upon requisition, define sequence of movement and location of work of each vehicle, mention the same in requisition, operate and clear the block duly ensuring that all vehicles have safely cleared the section and that all works have been satisfactorily completed and all infringements cleared to make the section fit for resumption of traffic.

**Part -G**

**8 Safety aspects to be observed while working in the OHE area:**

8.1 No electrical work close to the running track shall be carried out without the permission of a railway representative.

8.2 A minimum distance of 2 meters must be maintained between live OHE wires and the bodies, tools, or metallic supports of workers etc.

8.3 No electric connections or tapping from the OHE system are permitted.

8.4 Authorized OHE staff invariably be present whenever relaying workor any major work is carried out.

8.5 Power blocks must be correctly implemented, and "permits to work"should be issued.

8.6 Structure bonds, track bonds, cross bonds, and longitudinal railbonds must not be disturbed.

8.7 If they are disconnected for the work, they should be reconnectedproperly upon completion.

8.8 The track level must not be raised beyond the permissible limitduring the work.

8.9 The concerned supervisors from the Open Line departments (i.e.Engineering, S&T, TRD, etc.) shall be advised to assign their staff as and when required.

8.10 The contractor's supervisor and the Railway's Supervisor Incharge of the work should visit the site to assess the precautions to be taken during work. A detailed plan of work, including the protection ofthe track and proposed safety measures, should be listed out.

8.11 Precautions listed out shall be maintained at site. All precautions implemented must be recorded. Inspecting officials should verifyand record the various safety measures during their inspections.

8.12 Respective RDSO's guidelines for handling and stacking of materials from material trains to be strictly followed like CT-35 etc.

**Part-H –**

**9.0 Safety precaution for operation Ballast train & EUR Rakes.**

9.1 Following Joint procedure orders for must be followed strictly:

9.1.1 Ballast train joint procedure orders for loading/unloading and transportation of Ballast material train issued by Dy.CE/Track-II/CR vide letter no W.742/T-II/J.P.O dated31.05.2023.

9.1.2 Joint procedure order for operations of EUR Rakes issued by Dy.Chief Engineer/TP/CRletter no W.742/T-II/J.P.O dated 06.07.2023.

**Part I –**

10.0 General Instructions:

10.1 The gists of important instructions issued vide various letters/circulars on safety measures at work site are given as under, for ensuring strict compliance during execution of work.

| SN | Date | Letter No. | Subject |
|---|---|---|---|
| 1 | 28/7/02 | EW/187/R/465/9/VII.II | Compendium on training to supervisors and operators of contractors |
| 2 | 6/11/02 | EW/187/R/465/9/VII.II | Compendium of instruction on safety issued by Northen Railway |
| 3 | 9/2/04 & 8/6/04 | EW/187/R/465/Compendium Cir | Handbook on safety at construction work sites |
| 4 | 1/9/04 | EW/187/R/WKS-Policy/V | Correctin slip No. 69 dated 23.5.2001 for para No.826 of IRPWM regrading safe working. |
| 5 | 17/8/06 | CON/CAO(C)/Misc./Gen/2006 | Safety measures to be adopted at work sites |
| 6 | 15/12/06 | EW/187/R/465/Safety Policy | Safety in dismantling of bridges and structures |
| 7 | 12/06/2023 | letter no. 2021/Tele/5(2)/3Part(1)(3425647) | Undertaking digging work in the vicinity of underground signaling, electrical and tlecommunication cables. |

10.2 All officials inspecting any work site shall include a para on compliance of these instructions in their inspection reports.

10.3 Periodic special drives may be taken at the level of BOs of Divisions to monitor implementation. Any transgression shall be reported and any transgression of serious nature which may be a potential cause of serious accident or any repeat transgression shall be taken up under D & A.

10.4 These instructions are in the nature of additional check points for improving work-site safety and do not over-ride any provisions of various codes, manuals or G&SR. Provisions of manuals and G&SR shall be scrupulously followed.

10.5 Attempt should be to open less numbers of sites and achieve higher progress of work by pooling of resources.

10.6 A review of all worksites should be conducted periodically by inspections at minimum sectional DEN level for ensuring safety measures. Compromises found at worksite to be taken up severely with working agencies & supervisory staff. Conduct first such review in next fortnight to cover all sites.

10.7 For items of barricading, Sign Boards like **"Work in Progress"**, Walkie-talkie s mobiles phones, look out man etc., suitable provision may be incorporated in tender conditions as per site requirement.

10.8 In addition to all above stipulation all the precaution enumerated/specified in other provisions of IRPWM, Indian railway track machine Manual, Indian Railway Bridge manual and G&SR must be scrupulously followed.

**11. REFERENCE TO SPECIALIZED SAFETY CIRCULARS:**

Refer to the following circulars for safety precautions regarding specializedworks:

- Joint Circular No. 146 for blasting, cutting widening, and bridge extension works (file No.W.742.TM.19).
- Joint Circular No. 148 for works affecting track safety, such as bridgeextension and cutting widening.
- Handbook on "Safety at Construction Work Sites" circulated to construction officers (letter No.EW/187/R/465//Comp./Cir dt.09-02-2004).
- JPO No. 1/Sig/2004 for digging work near signalling, electrical, and telecommunication cables (CRB's D.O. letter No. 2004/Sig/G7/ dt.17.12.2007)."

**12. The above order shall be implemented with immediate effect.**

This issues with the approval of. List of PCE/CR

**Annexure: Annexure I to VII as above.**

Annexure - I: Check List (Before starting the work).
Annexure - II: Competency certificate.
Annexure - III: Typical details of Barricading for safety at work site.
Annexure - IV: Check List (While work is in progress).
Annexure - V: Assurance Certificate.
Annexure – VI: Competency Certificate.
Annexure – VII: Engineering Work Permit

***PCE, C.Rly.***

HARI PRAKASH TRIPATHI

Digitally signed by HARI PRAKASH TRIPATHI
Date: 2023.11.01 19:29:17 +05'30'

HARISHANKAR CHATURVEDI

Digitally signed by HARISHANKAR CHATURVEDI
Date: 2023.11.02 11:58:16 +05'30'

MANINDER SINGH UPPAL

Digitally signed by MANINDER SINGH UPPAL
DN: c=IN, o=CENTRAL RAILWAY, ou=SAFETY, 2.5.4.20=7c0bdeb0190dba2dbb1ef1292dca0cf69c56f7d232accbf0ccf1c8ee1540e2ec, postalCode=400001, st=Maharashtra, serialNumber=31cc5c18187ccf74efc1dd5853cb1761f4074d4f7e842fe5bc1f59bc3dfc4f05, cn=MANINDER SINGH UPPAL
Date: 2023.11.03 15:19:36 +05'30'

**ANNEXUE-I**

## CHECK LIST TO BE FILLED BEFORE STARTING THE WORK

Name of the work:_____

Location:_____

Duration of work: From_____To_____

| Sr No. | Details to be checked | YES | NO |
|---|---|---|---|
| 1. | Name ( _____ ) of the Contractor's supervisor, who is going to be a site Incharge? | | |
| 2. | Training imparled to contractor's supervisor and Certificate issue. | | |
| 3. | Safety pre-caution to be taken, identified and listed. | | |
| 4. | Submission of details as per para no 1.1 to open line AEN/IOW & PWI. | | |
| 5. | Before start of work, proper line marking/Barricading done at sit of work as per para 1.2.9/1.2.10 (Annexure – III ) | | |
| 6. | Men deputed for protection of track alongwith safety equipment's. | | |
| 7. | Caution order issued for the train drivers in case work is being done within 6mts. of centre of running track. | | |
| 8. | Drivers of vehicles/machinery counselled about the safe working and Competency Certificate issued. | | |
| 9. | Sufficient lighting provided at site of work for night working. | | |
| 10. | Infringements checked and found OK. | | |
| 11. | Engineer Incharge has satisfied himself regarding safetyarrangements. | | |
| 12. | Availability of Walkie – talkie sets / mobile phones for communication. | | |

**Date:**_____

**Contractor representative**

**Signature of Engineer Incharge of the site.**

**(Construction/Other Departments).**

**Annexure: II**

**As per 8/5 Para 819/4 IRPWM 2020**

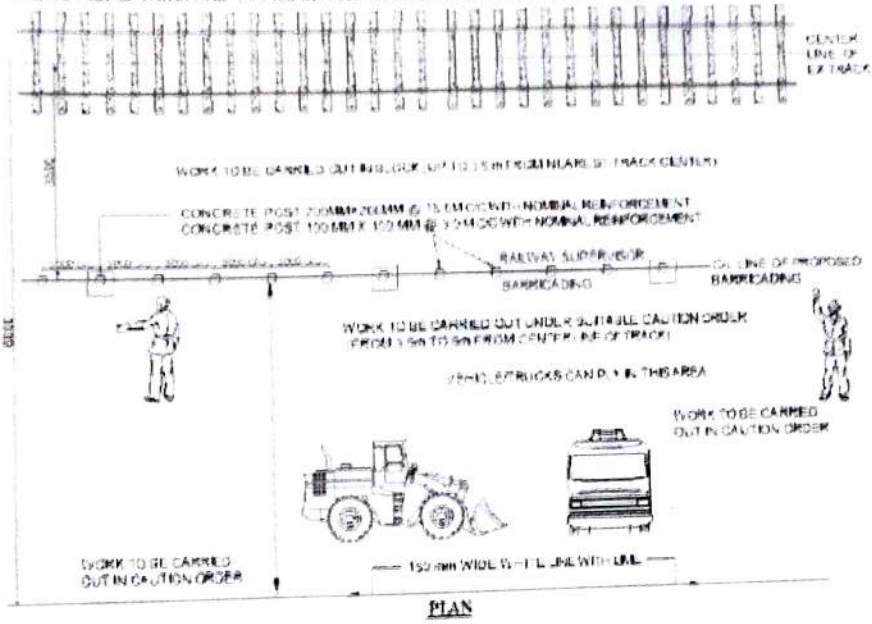
## Competency certificate.

**Certified that Shri ..... P.Way supervisor 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.**

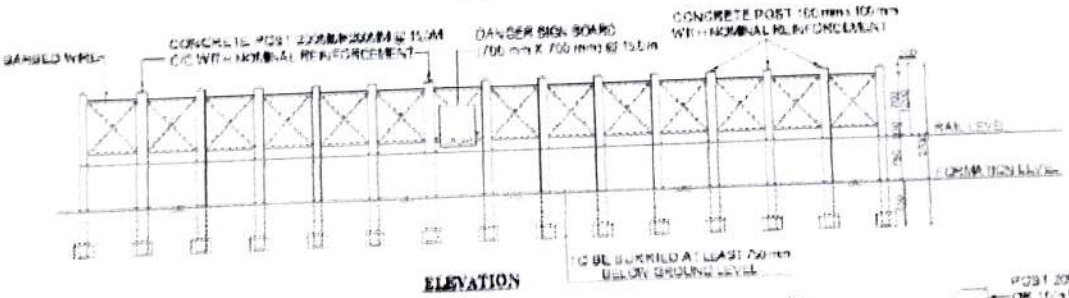
**Assistant Divisional Engineer**

**ANNEXURE III**

EXECUTION OF WORK AND PLYING OF VEHICLES/MACHINERY WITHIN 8m FROM CENTER LINE OF TRACK




PLAN

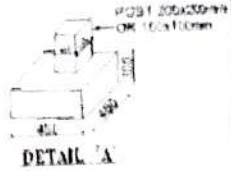



ELEVATION

NOTES

1. ALL DIMENSIONS ARE IN METERS.
2. BARRICADING AT WORK SITES SHOULD BE PROVIDED AS FAR FROM CENTRE LINE OF TRACK AS POSSIBLE BUT LESS THAN 3.5m FROM CENTER LINE OF TRACK AT 3.5m FROM CENTER LINE.
3. TWIN TYPE BARRICADING IS PROVIDED PARRALEL TO TRACK AT 3.5m FROM CENTER LINE. BARRICADING PARALLEL TO THE TRACK ALSO NEED TO BE PROVIDED AT TERMINATING ENDS UPTO 15.0m FROM CENTER LINE OF TRACK TO AVOID MOVEMENT OF ANY ROAD VEHICLE BETWEEN BARRICADING AND THE TRACK

DETAIL 'A'



DETAIL 'A'

**ANNEXUE-IV**

CHECK LIST TO BE FILLED WHILE WORK IS IN PROGRESS

Name of the work:_____

Location:_____

Duration of work: Form_____To_____

Date of Inspection_____

| Sr No. | | YES | NO |
|---|---|---|---|
| 1. | Does the Contractor's has the Valid permit to work at this site? | | |
| 2. | Does the Contractor's supervisor has the Valid Competency Cerificate? | | |
| 3. | Does the knowledge of contractor's supervisor on safety of track and work site upto the mark. | | |
| 4. | Is Railway's Supervisor of Concern executing department's available at site. | | |
| 5. | Is knowledge of Railway's Supervisor O.K? | | |
| 6. | Is line marking / barricading done as per para 2.1.3? | | |
| 7. | Is adequate safety precaution taken a per the list? | | |
| 8. | Is communication facility (Walkie-Talkie sets) available at site? | | |
| 9. | Does the driver of vehicles/machinery aware about safety precaution? | | |
| 10. | Is whole work site safe for working of men/vehicles and trains? | | |
| 11. | Adequate lighting arrangements done at site? | | |
| 12. | Adequate protection equipments available at site? | | |
| 13. | Is caution order to trains being issued? | | |
| 14. | Are train drivers following the enforced temporary speed restrictions? | | |
| 15. | Has work permit been taken for working in Electrified territory/station yards (P&C areas) | | |

Remarks, if any.....

Date: ____ ____ _

Signature of Inspecting Officer

Designation.

**Annexure-V**

## ASSURANCE CERTIFICATE

(Authority-RB letter no 98/CE-II/PRA/32 Dtd. 23.05.2001)

**Para 819 of IRPWM 2020.**

**Safe working of contractors.** It is essential that adequate safety measures are taken for safety of the trains as well as the work force. The following measures shall invariably be adopted.

**(i)** The contractor shall not start any work without the presence of railway supervisor at site.

**(ii)** 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 per site conditions.

**(iii)** The look out and whistle caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flagmen/detonators shall be provided where necessary for protection of trains.

**(iv)** The supervisor/workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by ADEN. Which will be valid only for the work for which it has been issued. **(Annexure VI)**

**(v)** The ballast/rails/sleepers/other P.Way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the ruining track.

**(vi)** Supplementary site specific instructions, wherever considered necessary shall be issued by the Engineer in charge.

**(vii)** Engineer in-charged shall approved the methodology proposed to be adopted by the contractor, with a view to ensured safety of trains, passengers and workers and he shall also ensured that the methods and arrangements are acutely available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted/followed while executing the work.

There shall be an Assurance register kept at each site, which will have to be signed by both, i.e. Railway Supervisors or his representative as well as the contractor's supervisors as a token of their having understood the safety precautions to be observed at site.

**Certified that we have understood above instructions and will abide by all the safety provisions and instructions given by Engineer-in-charge or his representative from time to time.**

**Signature of the Contractor**

**Annexure VI**

## COMPETENCY CERTIFICATE

Certified that Shri ..... (Designation... .....) of M/s ..... has been trained and examined in safety measures to be followed while working in the vicinity of running railway track for the work "..... ..... ..... ....."

His knowledge has been found satisfactory and he is capable of supervising the work safely. This certificate is valid only for the work mentioned on this certificate only.

JE/SSE
CENTRAL RAILWAY

AXEN/XEN
CENTRAL RAILWAY

**Annexure VII**

## Engineering Work Permit (EWP)

**Name of Work:**

**Name of Agency:**
**CA No.:**
**Details of work:-**

**Working hours:-**

**Duration of work: -**
**Details of Staff:-**

**A. Railway:-**

| Sr.No. | Name | Designation | Mobile No. |
|---|---|---|---|
| 1. | Shri | | |
| 2. | Shri. | | |
| 3. | Shri | | |

**B. Contractor Staff**

| Sr.no | Name | Designation | Mobile No. |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |

**C. Additional Procedure of Working (as per site conditions)**

**Note: Additional Procedure of working will be mentioned in this work permit. If work is to be executed only in presence of Railway supervisor, the same shall also be mentioned in the work permit. Requirement of presence of contractor's and/or Railway's look out men with whistle/flags shall also be mentioned, where that is required.)**

Notes:

1. Procedure of working shall be followed on the basis of distance from track centre as given in "PROCEDURE ORDER FOR ENSURING SAFETY AT WORK SITES issued by PCSO/CR"
2. With respect to safety, proper training to contractor's supervisors, operators, drivers and other staff has been given & Id cards and competency certificates have been issued, in compliance with CE Circular 190.
3. Machineries deployed total in numbers along with type and function to be mentioned. Further the, EWP shall be periodically given in order to account for changing machineries

This permit is subject to compliance of all the conditions mentioned in the permit by the executing agency. Failure to comply with any provisions shall render the permit null & void.

**JE/SSE**
**CENTRAL RAILWAY**

**AXEN/XEN- ADEN/DEN**
**CENTRAL RAILWAY**

**Dy.CE(C)/Sr. DEN**
**CENTRAL RAILWAY**

**GOVERNMENT OF INDIA (BHARAT SARKAR)**
**MINISTRY OF RAILWAYS (RAIL MANTRALAYA)**
**(RAILWAY BOARD)**

**No. 2023/CE-IV/Misc.** **New Delhi, dated 10.08.2023**

**Principal Chief Engineers,**
**All Zonal Railways.**

**Chief Administrative Office,**
**All Zonal Railways.**

**Sub:** Precaution and Safety at ROB/RUB/Bridge work sites.

Recently, on one of the Railways, formwork collapsed while concreting, resulting in the death of one worker. Similar accidents of various severities have been reported repeatedly as a result of formwork failures. The importance of the formwork system in the construction sector for the building of reinforced concrete structures is once again stressed. Failures in the formwork system increase the cost, time, and labor needed for construction in addition to losing credibility as an institution.

Vide letter No. 2020/CE-I/USSOR/W&M/I dated 05.07.2022, Board has issued Indian Railways Unified Standard Schedule of Rates' (IR-USSOR-2021), along with specifications for execution of Bridges works, Formation works and P.Way works. Relevant Para of USSOR specifications 2021 regarding shuttering/formwork design is re-iterated hereunder:-

**Para no. 2.10.2 Material and Design:** ***The Contractor shall furnish the design and drawing of complete form work (i.e. the forms as well as their supports) for approval of the Engineer before any erection is taken up).***

From the above, it is evident that all sorts of Form work design should be approved by the Engineer. However, it is noted that, aside from some significant PSC Box Girder bridges, the form work design is typically not approved by the Engineer, and monitoring & execution of this activity are left to the judgment of the shuttering subcontractor/workers. This is not only a violation of the conditions of contracts but also unsafe for the work sites.

As such it is again reiterated that USSOR specifications w.r.t form work should be strictly adhered.

Beside this followings precautions should also be ensured:-

1. **Proper Stripping and Shore Removal:**-Early striping of forms and careless practices in re-shoring should be avoided
2. **Inadequate Bracing:**-Poor bracing generates lateral force and hence creates lateral deformation of supporting members as such it should be avoided.
3. **Inadequate Control of Concrete Placement:** - Improper rate and order of placing concrete on horizontal formwork introduce unbalanced loadings and consequent failures of formwork. This should be avoided.

10.08.23

4. **Inadequate Concrete Strength Development:-** It must be ensured before next lift of concrete, applicable for slip-form shuttering or climb shuttering.
5. **Vibration and Impact:** Vibration and impact due to passing traffic, movement of workers and equipment on formwork, can displace supporting props or jacks of formwork system as such it should be controlled.
6. **Unstable Soil under Mudsills and Out of Plumb Shores:** Unstable soil and out of plumb shores are another factor that jeopardize the stability of the formwork system. It must be accounted for while approving formwork design.
7. **Lack of Attention to Formwork Details:** Assemblage errors such as insufficient nailing, failure to tighten the locking devices on metal props, demands of skilled workmanship for an effective and safe formwork. It must be ensured.

10.02.23

(L L. Meena)
**Director Civil Engg./ B&S-II**
**Railway Board**