

***INSTRUCTIONS FOR  
NEW LINE OPENING /  
ELECTRIFICATION /  
DOUBLE / TRIPLE /  
QUADRUPLE LINES***

*CHIEF SAFETY OFFICER*

*HEADQUARTERS SAFETY ORGANISATION*

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## FOREWORD

*Capacity building in Railways rests a lot on the growth of infrastructure. South Central Railway which is focused to accord due attention in this direction, has set a target of 315.46 KMs of Railway line for commissioning during this current year. In this financial year upto July 2017, 21 KMs of new Railway line in GTL Division between Kadapa – Pendlimarri was commissioned and 19 KMs between Mathampalli – Revu Ramapuram in SC Division & 42 KMs of line between Gulbarga – Kamalapur stations of SC Division is completed. In regard to electrification of railway lines, a record of 443 route KMs is completed in the current fiscal year. These apart, new lines are completed between Nandyal – Yerraguntla, Nizamabad – Morthad, Devarkadra – Jaklair, doubling of Kosgi – Mantralayam Road & Parbhani – Mirkhol stations in the recent past. Also, a part of KZJ – BPQ section, the third line was commissioned. Several other projects are in progress and likely to be commissioned in the coming days.*

*In the backdrop of above, a decision is taken by Headquarters Safety Branch to bring out this booklet on “Instructions for opening of new lines, electrification of lines, double / triple / quadruple lines” which will certainly be guiding the Supervisors and Officers in understanding the standard procedures to be adopted and the opening documents to be submitted CRS for sanctions / approvals.*

**D.K. SINGH**  
**CHIEF SAFETY OFFICER**

## MESSAGE

In order to ensure that the Construction, Engineering, Electrical, S&T and Operating Department Officers and Supervisory Officials possess updated knowledge and thorough insight into the instructions related to new lines opening, doubling, tripling, quadrupling and electrification works, Headquarters Safety Branch has brought out a consolidated booklet. I hope this booklet will help the concerned Officials in ensuring the desired standards while executing the new lines / doubling / tripling / quadrupling / electrification of lines and submitting the opening documents to CRS.

I congratulate the Safety Organisation for taking the pain of compiling the guidelines and bringing out this booklet.

V.K. YADAV  
GENERAL MANAGER

*The information provided in this booklet is for the purpose of general guidance only. Though efforts are made to ensure that the booklet is authentic and accurate, in case of any conflict, ACT provisions and instructions issued from time to time by Ministry of Railways and other Codal instructions would override this document.*

## CHAPTER – I

- A.** Instructions to works arising subsequent to the first opening of a railway or a section of railway are governed by Indian Railways – General Rules for working railways under construction 1937.
- B.** Safety of travelling public is ensured by the rules laid down in
- Railways Act – 1989
  - General Rules for IR (Open Lines) – 1976
  - Rules for the opening of a railway or a section of a railway for the public carriage of passengers 1983; and
  - Indian Railways SOD
- C.** The rules provide for the legal authorisation that must be obtained for any work which affects the running line before the work is started or brought into use and before a new section of the line is opened for public traffic, sanction of Central Government to the opening of rail, as per

**Section 21.** No railway shall be opened for the public carriage of passengers until the Central Government has, by order, sanctioned the opening thereof for that purpose.

**Section 22.** Formalities to be complied with before giving sanction to the opening of a railway

- (1) The Central Government, shall, before giving its sanction to the opening of a railway under Section 21, obtain a report from the Commissioner that
- (a) He has made a careful inspection of the rail and the rolling stock that may be used thereon;
  - (b) The moving and fixed dimensions as laid down by the Central Government have not been infringed;
  - (c) The structure of rails, strength of bridges, general structural character of the works and the size of, and maximum gross load upon the axles of any rolling stock, comply with the requirements laid down by the Central Government; and
  - (d) In his opinion, the railway can be opened for the public carriage of passengers without any danger to the public using it.
- (2) If the Commissioner is of the opinion that the railway cannot be opened without any danger to the public using it, he shall, in his report, state the grounds therefore, as also the requirements,

which in his opinion, are to be complied with before sanction is given by the Central Government.

- (3) The Central Government, after considering the report of the Commissioner, may sanction the opening of a railway under Section 21 as such or subject to such conditions as maybe considered necessary by it for the safety of the public.

**Section 23:** Section 21 and 22 to apply to the opening of certain works – the provisions of Section 21 & 22 shall apply to the opening of the following works if they form part of, or are directly connected with, a railway used for the public carriage of passengers and have been constructed subsequent to the giving of a report by the Commissioner under Section 22, namely;

- (a) Opening of additional lines of railway and deviation lines;
- (b) Opening of station, junction and level crossings
- (c) Remodelling of yards and rebuilding of bridges
- (d) Introduction of electric traction; and
- (e) Any alteration or reconstruction materially affecting the structural character of any work to which the provisions of Section 21 and 22 apply or are extended by this section.

- D. Application of sanction for works** – application to the CRS for sanction for carrying out works affecting running lines shall be made by the DRM through the HODs for track, bridge and signalling & interlocking works.
- E. Application for running of new types of locomotives and for rolling stock and for increase in speed** – Annexure 13/4 of IRPWM. Application shall be made by the CE along with documents such as load diagram, certificate for track strength, certificate for strength of girders, certificate or test runs (if required by CRS) obtained from Operating Branch, certificate signed jointly by CME & CE, a statement detailing any infringement of maximum and minimum dimensions involved in the running of the locomotive or rolling stock (Refer Para 4 of Appendix V to G&SR).
- F. Documents to accompany application for sanction** – documents to accompany the application for sanction are detailed in Form No. ES 1 (Annexure 13/1 of IRPWM) and they should be complete in every respect. For major bridge or where non-standard girder designs are used, the certificate, Form No.E.B.9 (Annexure 13/3 of IRPWM), issued by CBE to the effect that the bridge/s are designed adequately to carry the axle loads proposed to be run, shall accompany the application. For the purpose of furnishing the track certificates and certificates of the CBE, the COM should be



consulted in regard to the types of locomotives and rolling stock to be used and their axle loads and speeds.

- G. Inspection by CRS** – when CRS notifies his intention to inspect a work prior to opening for public traffic, advise of when the work will be ready for inspection shall be given to him at least 14 days before it is proposed to be opened.
- H. Safety Certificate** (Annexure 13/5) – the CRS in according his sanction may or may not propose to inspect the works. If decided to inspect, the safety certificate together with the certificates referred above should be completed and submitted. Copy of the certificate should also be sent to DRM, CE & CSTE. The safety certificate for engineering works shall ordinarily be signed by AEN except special cases which are to be signed by DEN. In case of works involving tracks and bridges and / or signalling and interlocking, the safety certificate should be signed jointly by the Engineers concerned.

**Special instructions regarding safety certificate for signalling works.**

- Sanction of CRS is required under Rule 4.10 to speeds over 15 KMPH over turnout and crossovers.
  - Safety certificate posted prior to opening and subsequently to be countersigned by an S&T Engineer upto a speed of 15 KMPH.
  - Only S&T Engineer shall initiate (certify the arrangements are in accordance with the signalling plan sanctioned by the CRS) the safety certificate for works involving any new signal in anyway interlocked, any alterations to points and crossings involving alterations to signals or to the interlocking arrangements of points, any alterations to signals that involve a change in the working rules
- I. Deviation from plans approved by the CRS** – any deviation from the original plans that are approved by CRS, should again be submitted for his approval.
- J. Opening of Temporary diversions or bridges –**
- At least 14 days before, the DRM shall forward a notice in Form No. CE480 to Sr.DOM, the CSTE, TXR Depot in-charge of stations at both end of the run of the LPs, Guards concerned.
  - This notice shall be followed by another notice 7 days in advance in Form No. CE 481.
  - SMs of stations where Guards are headquartered shall acknowledge as per Rule 4.30, even LPs shall acknowledge.
  - DOM of the Division shall prepare temporary special instructions, when required.
- K. Opening of new works within station limits –**
- On receipt of sanction to open a new work, the DEN or the DSTE shall arrange with DOM the date on which the work is to be handed and taken over. After that, the DEN or DSTE shall advise CE.

- When the work is important and affects the running line, the Engineering and/or Signal Officer should be present at the time of handing over.
- When the work is not important and not affect the running line, the Officer may authorise the SSE/P.Way and / or the SSE/Signals to hand over work and the DOM may authorise the TI or SM to take over the work.
- The Operating Officer or TI who takes over the new work, should satisfy themselves about the installation objects.
- Before issue of safety certificate and taking any interlocking installation, the Operating Official should instruct the station staff responsible for working shall test and satisfy.
- After the new interlocking arrangements have been brought into use, the SSE/Signals should remain at the site for at least the remaining part of the day to ensure that the installation works smoothly.

**L. Opening of new works outside station limits –**

When the sanction to open a work outside station limits has been received, the DEN should after testing and passing it, declare it open from that date and advise the DRM, the CE and others concerned.

**M. Provision for locking bolts, cotters, padlocks and clamps –**

When the new lines are opened for traffic, adequate number of bolts, cotters, padlocks and clamps shall be provided in accordance with SR 3.38 (4).

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## CHAPTER – II

### PREPARATION FOR OPENING OF RAILWAYS

#### **Reference to the Commissioner:**

1. Every Railway Administration shall ensure that the railway line or a portion thereof to be opened for public carriage of passengers is complete in all respects as per the Indian Railways Standard Codes and Manuals of Practice and for such opening all the administrative formalities are complete and that the working of the railway is regulated by the Indian Railways (Open Line) General Rules, 1976.
2. The Chief Executive of the Railway Administration of a non-Government Railway, before making a reference to the Commissioner under Sub-rule (3) for inspection of any railway, shall obtain a clearance from the Central Government that the railway which is sought to be opened had been constructed and maintained by that administration in accordance with the Indian Railways Standard Codes and Manuals of Practice and the working is governed by the Indian Railways (Open Line) General Rules, 1976.
3. Where the GM of a Zonal Railway, or the Chief Executive of a non-Government railway is of the opinion that any railway or part thereof is required to be opened for public carriage of passengers, he shall refer the matter to the Commissioner for inspection and report the safety of that railway.
4. **Supply of certain documents to Commissioner.**
  - (1) The GM of a Zonal Railway or the Chief Executive of the non-Government railway shall furnish all the relevant documents to the Commissioner while making reference to the Commissioner for inspection under rule 3 from the following list of documents, namely;
    - a. Tabulated details
    - b. Index plan and section of railway
    - c. Drawing of works
    - d. List of questions and answers
    - e. Certificates
    - f. List of infringements of maximum and minimum dimensions
    - g. Working orders to be enforced at each station; and
    - h. Administrative note giving the salient features of the project.
  - (2) The documents referred to in sub rule (1) shall indicate the distances from the same “fixed point”, in KMs and decimals upto two digits and the fixed point shall be clearly defined in a Note and on the Plan and Section sheets of the work documents.

(3) The datum adopted shall be “Mean Sea Level” as fixed by the Survey of India and all heights shall be mentioned with reference to the datum in meters and decimals upto two digits.

**5. Contents of documents to be supplied** – The documents referred to in rule 4 shall contain the details as specified below;

**(1)** Tabulated details which shall consist of important characteristics of the railway or a portion of railway to be opened for public carriage of passengers and in particular include;

- a. Curve abstract as specified in Form I
- b. Gradient abstract as specified in Form II
- c. Bridge abstract as specified in Form III
- d. Important bridges – particulars of waterway and construction as specified in Form IV
- e. Ballast and P.Way as specified in Form V.
- f. Stations and station sites as specified in Form VI
- g. Station accommodation as specified in Form VII
- h. Station machinery as specified in Form VIII
- i. Level crossing abstract as specified in Form IX
- j. Brief particulars of traction installations as specified in Form X
- k. Power supply installation abstract as specified in Form XI
- l. Traction maintenance Depot abstract as specified in Form XII
- m. Restricted OHE clearances abstract as specified in Form XIII and
- n. Electrical crossing over railway track abstract as specified in Form XIV

**(2)** Index Plan and Section sheet shall be prepared as laid down in Paragraphs 443 to 451 of the IR Code for Engineering Department reproduced in Schedule.

- a. Completion drawings of bridges, with drawings showing each type of girders used and giving the loading standard for which each is designed, and (if called for the Commissioner), details of the calculations of their strength;
- b. Completion drawings of tunnels, if any;
- c. Diagrammatic plans of station yards showing the gradients, the layout of tracks and particulars of turn out, block working and for any signals and interlocking installed;
- d. Implantation of diagrams of OHE masts, if applicable

**(3)** List of questions and answers shall be prepared in terms of questions enlisted in Form XV.

**(4)** Certificates of works shall comprise;

- a. Certificate in Form XVI containing the comments on the following matters, namely;

- i. Maximum and minimum dimensions
  - ii. Strength of bridges
  - iii. Number of engines on one span
  - iv. Brake and communications
  - v. Accommodation in coaches to cater for different categories of passengers
  - vi. System of working
  - vii. Electric traction equipment (only if applicable) and
  - viii. Types of rolling stock proposed along with the list of restrictions.
- (5) List of infringements of maximum and minimum dimensions shall be prepared in Form XVII and shall show the gauge of the railway and items infringed and shall contain full explanation for the infringement is permitted or allowed.
- (6) Working orders to be enforced at each station on the railway to be opened shall be prepared in accordance with the rules provided in Chapter V of the General Rules and shall specify any special conditions that are required to be met with.
- (7) Where it involves introduction of electric traction on the railway line, the working orders shall include traction working rules.

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## CHAPTER – III

### DUTIES OF THE GENERAL MANAGER

- 6. Deviation from or infringement of standard codes and manuals of practice to be notified –**
  1. The General Manager shall ensure that the railway proposed to be opened is operationally fit in every respect before inspection.
  2. The General Manager shall, while making the reference under rule 3, bring to the notice of the Commissioner any deviation in design, material and construction of the works, rolling stocks or appliances of the railway, instances in which maximum and minimum dimensions have not been observed, or the bridges, tunnels are not capable of carrying the prescribed or standard load without exceeding the stress specified in the Indian Railways Standard Codes and Manuals of Practice.
- 7. General Manager to make special arrangements–**
  1. The General Manager shall make such arrangements as are necessary to facilitate the inspection by the Commissioner of the railway, which is to be opened.
  2. The General Manager shall be responsible to make such special arrangements as the Commissioner may require for inspection and testing of bridges and tunnels on the railway, which is to be opened.
- 8. Supply of information to Commissioner –** The General Manager shall supply all the information and give all the assistance in his power to the Commissioner and supply or provide all instruments and apparatus required for making measurements, testing of bridges and electrical and other installations.
- 9. Dismantling of any work on request by Commissioner –**
  1. The General Manager shall, on receipt of a request made by the Commissioner, make arrangements to dismantle any structure on the railway to be opened, with a view to make complete examination of the details or workmanship of the structure as quickly and completely as possible.
  2. The Commissioner, while requesting the dismantling of the structure, shall be responsible to see that such dismantling does not affect the utility or strength of the structure, unless total dismantling is necessary for its proper inspection.
- 10. General Manager to accompany Commissioner at inspection –**
  - a. The General Manager may accompany the Commissioner throughout the inspection.

- b. If, for any unavoidable reason it is not possible for the General Manager to accompany the Commissioner, then, CAO or CE (co-ordination) along with concerned Officers shall accompany the Commissioner and shall be present during the entire period of inspection. The DRM with concerned Branch Officers shall also accompany the Commissioner during the entire period of inspection.
- c. During the inspection of each portion or Division of the railway. The engineer or officer who is or was in immediate charge of that portion or division of the railway during its construction may also be present.
- d. An officer not below the rank of Assistant Engineer shall be made responsible for making arrangements for testing bridges on the railway line.

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## CHAPTER – IV

### DUTIES OF THE COMMISSIONER

#### **11. Commissioner to make full and complete examination –**

1. On receiving a reference under rule 3 from General Manager of any railway for inspection of a railway to be opened for public carriage of passengers, the Commissioner shall, with a view to determine whether it is fit to be opened, enquire into all matters which appears to him relevant for the safety of public carriage of passengers and goods, on that railway.
2. The Commissioner shall satisfy himself that –
  - a) The Indian Railways (Open Line) General Rules, 1976 have been applied to the railway or portion of a railway proposed to be opened;
  - b) The maximum and minimum dimensions have been observed;
  - c) The works, structures, rolling stocks and appliances belonging to, or working on, the railway are designed properly or constructed in such manner so as to guard the system against accident and failure.

#### **12. Provisions for handling traffic at stations –** The Commissioner shall satisfy himself that every station on a railway proposed to be opened –

- a) Adequate provisions have been made for handling of traffic of passengers and goods; and
- b) Arrangements have been made for easy access by road.

#### **13. Accommodation works –** where the accommodation works made under section 16 are to be inspected, the Commissioner shall ensure that such works are sufficient and suitable for the purpose for which they are provided and constructed.

#### **14. Inspection of light railways –** The Commissioner shall, while inspecting any light railway to be opened for public carriage of passengers, take into consideration –

- a) Speed limits which are specified with reference to narrow gauge of the line and the kind of traffic proposed to be handled;
- b) Standard of convenience of the passengers keeping in view the condition in which the light railway shall be operated, and shall lay down the speed limits to be observed and the kind of traffic the light railway may be allowed to handle.

#### **15. List of questions and answers –**

- a) The Commissioner shall take into consideration the answers provided by the General Manager to the questions listed in the list of questions and answers submitted in relation to them under sub-rule (4) of rule 5 and



satisfy himself that the points enumerated therein have been duly observed by the concerned railway administration.

- b) The Commissioner may, if he considers it necessary, modify the requirements specified in answers in accordance with the circumstances of each case.

#### **16. Inspection of railway bridges –**

- a) The Commissioner shall satisfy himself that the railway bridges and other elevated structures on the railway proposed to be opened for public carriage of passengers are designed and constructed as to the loads specification specified in the IRS Bridges Rules, 1964 and that the loads specification and stress limits are not exceeded.
- b) The Commissioner shall be responsible to see that under no circumstances the stresses specified in the Standard Codes of Practice for Bridges are exceeded, unless the Central Government, by general or specified order, specify different stresses or loads specification, for the reasons recorded therein, in a specific base.
- c) Where the Commissioner is satisfied that first class standards are not required in the cases such as temporary bridges, railway worked at low speed or with small axle loads, he may recommend departure from the IRS Bridges Rules, 1964 and the Standard Codes of Practice on such conditions as he may deem fit, provided that the Commissioner shall forward with his report the calculations showing that the Commissioner shall forward with his report the calculations showing that the opening of such bridges, railway or axle loads will not be dangerous to the public carriage of passengers and the railway servants.
- d) Where the particular bridge is not upto the standards mentioned in sub-rules (1) to (3), the Commissioner shall submit the design of the bridge along with the standard of loading to the Central Government along with his recommendations as to whether the bridge may be brought in use and if so, under what conditions.

#### **17. Procedure for inspection of bridges –**

1. The Commissioner shall examine at least one bridge of each different pattern or type and satisfy himself about the adequacy with reference to safety of –
  - a) The general design of the bridge;
  - b) Designs of different parts or portions of the bridge;
  - c) The construction and erection of the whole structure of the bridge;
  - d) Girder spans and their bedding at all four supports; and

- e) Type and design of bearings in regard to pre-stressed bridges.
- 2. Where the Commissioner feels that it is necessary for the purpose of inspection and to see whether any riveting has been properly and efficiently executed, he may order the cutting out any rivets and may also order the dismantling of any part of the structure of the bridge for more detailed examination.
- 3. If the Commissioner considers it necessary, in addition to the certificate of a Bridge Engineer employed for the purpose, he can call for the Load Detection Test under the loads for which the bridge is designed and where this is not possible under the heaviest loads available.
- 4. (a) When making Card Deflection Test, the test cards are to be placed at right angles to the centre line of the track, in order to record oscillation and the recording pencil point should be as fine as possible.  
(b) When central deflection is measures, allowances shall be made for the deflection, if any, of the abutments.
- 5. In order to record the static deflection, the test shall be carried out at dead slow speed and at the MPS of the section and the speed shall be carefully measured by the stop watch or by some automatic means.
- 6. The actual deflection cards shall be submitted to the Commissioner together with a statement of deflections and oscillations in Form XVIII.
- 7. The deflection of the girder shall be worked out theoretically and shall be shown in column 12 of Form XVIII to enable a comparison being made with the observed deflection.
- 8. In addition to the Card Detection Test, the Commissioner, may at his discretion, requires Stress Recorder Test to be carried out on any plate or open web girders of clear spans exceeding 30m.
- 9. (a) Stress Recorder Test shall be carried out with a stress recorder of approved type.  
(b) Tests loads and speeds shall be as specified for Card Deflection Tests.  
(c) Tests shall be taken, on the chords or flanges at mid span and on such web and floor members as the Commissioner shall specify.  
(d) If a sufficient number of instruments are available, these tests shall be made simultaneously.
- 10. The stress recorder diagrams together with calculations showing how the maximum stress under the design load with full impact (including dead load stresses) is deduced from the measures stress shall be submitted to the Commissioner who shall, before sanctioning the opening of the bridge, satisfy himself that the stresses in the girders will not exceed those specified in the IRS Steel Bridge Code, 1962.

11. If the Commissioner is satisfied that the girder has been properly designed for the work it is intended to perform, then, the open web and plate girders are not required to be tested.
12. New plate girders of standard designs need not be tested if those girders were inspected at the time of their manufacture by the RDSO or any other inspecting agency and a certificate of satisfactory erection including the seating of the bearings and field riveting has been given.
13. The Commissioner may decide that the second hand plate girders are not required to be tested if he is satisfied that –
  - (i) The girder is strong enough for the work it is intended to perform; and
  - (ii) The responsible officer of the concerned railway has certified that the condition of the material and workmanship are such that the use of the girder for the specified loading shall not involve stresses in excess of those permitted in the IRS Steel Bridge Code, 1962, provided that this sub-rule shall not apply to welded girders.
14. The Commissioner may have tests of any number of spans made and may have a span tested any number of times and at any speeds as he considers desirable, upto the MPS of the section.
15. Card Deflection Test shall be carried out for each welded girder including second hand girders, and results of such tests, together with the cards, shall be supplied to the Commissioner.
16. The Commissioner shall examine as many welded girders as possible and shall also have Card Deflection Test of any welded girder carried out in his presence.
17. The Commissioner shall be supplied with a certificate from the engineer (not below the JAG) responsible for design and construction of the bridge to the effect that welds have been designed in accordance with the IRS Code for Mild Steel Bridges carrying rail, 1972 and executed to the satisfaction of the said engineer.
18. If radiographic examination of welds is specified in the drawing or procedure sheet or is required to be done in accordance with the provisions of the IRS Code for Mild Steel Bridges carrying rail, 1972, the results of such examination shall be annexed to the certificate.

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## CHAPTER – V

### THE INSPECTION REPORT

**18. Contents of Inspection Report –**

- (1) The inspection report of the Commissioner shall specify that –
  - (a) he has made a careful inspection of the railway and the rolling stock that may be used thereon;
  - (b) the moving and fixed dimensions as laid down have not been infringed.
  - (c) the structure of lines of rails, strength of bridges, general structural character of the works and the size of, and maximum gross load upon the axles of any rolling stock, comply with the requirements laid down; and
  - (d) in his opinion, the railway can be opened for the public carriage of passengers without any danger to the public using it.
- (2) The Inspection Report shall be clear and concise and shall deal with all matters which are required to be considered, particularly whether the railway line is designed for standard loading and the instances of the deviation or infringement of maximum and minimum dimensions.

**19. Documents accompanying inspection report –** The following documents shall accompany the inspection report, namely:–

- (i) Index plan and Section of railways;
- (ii) Tabulated details in Forms I to XIV;
- (iii) List of Questions and Answers inform XV;
- (iv) Certificate by the GM of the concerned railway in Form XVI;
- (v) Results of the bridge test in Form XVIII;

**Explanation** – When sanction is required for the initiation of electric traction on a line already opened for passenger traffic, the documents specified in items (j), (k), (l), (m) and (n) of sub-rule (1) item (d) of sub-rule (20 and item (a) (vii) of sub-rule (4) of rule 5 shall be forwarded to the Commissioner.

**20. Submission of report to Central Government –** In respect of every reference made to him under sub-rule (3) of rule 3, the Commissioner shall submit an inspection report to the Central Government.

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## CHAPTER VI

### SANCTION FOR OPEN RAILWAY FOR PUBLIC CARRIAGE OF PASSENGERS

#### 21. Sanctioning of opening of railway –

1. The Central Government may, after considering the inspection report of the Commissioner, sanction the opening of any railway or a portion of a railway for the public carriage of passengers.
2. While sanctioning of the opening of any railway, the Central Government shall give due consideration to the suggestions or conditions subject to which the Commissioner has recommended the opening of the railway.
3. Where the Commissioner has not recommended the opening of any railway, or has proposed to cancel the sanction already given, the Central Government shall confirm, modify or cancel the sanction given to the opening of such railway or a portion thereof and shall take steps to remove the defects or shortcomings pointed out by the Commissioner in his Inspection Report in the case of Government railway, and in the case of non-Government railway direct the General Manager concerned to remove the defects or shortcomings reported by the Commissioner.
4. Where the defects or shortcomings are such that they cannot be removed unless the railway or a portion thereof is dismantled, then the Central Government shall order the closing of the railway forthwith for the public carriage of the passengers.
5. A railway line, which is closed for the public carriage of passengers under Section 25, shall not be reopened unless it is duly inspected by the Commissioner in accordance with the provisions of Chapter IV of these rules and the Commissioner recommends the reopening of such railway line.
6. The actual date of opening of a new railway line or a section or portion of such line for passenger traffic shall be notified by the concerned General Manager, after consulting the Central Government, by notification in the Official Gazette, and in the local newspapers of the areas through which the railway line passes.

**Explanation** – In this Chapter new lines of railway shall include;

- a. Extensions of existing railways. New double, treble or other running lines laid alongside existing lines and conversion from one gauge to another;
- b. The initiation of electric traction on the existing lines.

#### 22. Temporary opening of railways by Commissioner –

1. The Commissioner may sanction the temporary opening of new railway lines for public carriage of passengers, subject to such conditions as he may impose during the period of inspection in the interest of the passengers.

2. On receipt of the Inspection Report of the Commissioner, the Central Government may confirm, modify or cancel the sanction given under sub-rule (1) subject to such conditions, alterations and relaxation as may be considered necessary.

**23. Sanction to use locomotive engines and rolling stock on new lines –**

1. The Commissioner may sanction the use of locomotive engines, rolling stock or any other motive power under Section 27 which is already running on any Zonal Railway, or any Division or section of any non-Government railway or on any new lines in accordance with the provisions of the Indian Railways (Open Line) General Rules, 1976 or orders on the subject issued by the Central Government from time to time.
2. Before according sanction under sub-section (1), the Commissioner shall ascertain that the application of the Indian Railways (Open Line) General Rules, 1976 by the concerned railway administration which operated the line has been previously sanctioned and notified in the Official Gazette.

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## CHAPTER VII

### OPENING OF BRIDGES, MINOR WORKS, DIVERSIONS AND USE OF NEW TYPES OF ROLLING STOCK ON EXISTING RAILWAYS

**24. Notice of construction of deviation lines, etc., –**

1. Where it is proposed, on the railway which had been opened after inspection, to construct any deviation lines, stations, junctions or crossings on the level, or to make any addition, alteration or reconstruction materially affecting the character of any work and such work forms part of, or is directly connected with the working of that railway. The railway administration concerned shall give notice to that effect to the Commissioner.
2. Before any such work, the execution of which may affect the running of trains carrying passengers, is put in hand, the concerned railway administration shall furnish to the Commissioner for his approval drawings or particulars of the work and of any temporary arrangements necessary for carrying it out.
3. Every temporary deviation line irrespective of its length and any permanent diversion less than 2 KMs in length, where no new station is involved, shall be treated as new minor works.
4. In case of an accident, temporary diversions may be opened under section 24 after a railway servant in-charge of the work of the concerned railway certifies that the use of such diversion will not be attended with danger to passengers or to the railway servants.
5. Where the use of the temporary diversion is likely to be extended to for more than 3 days, the Commissioner shall, if he considers it necessary, take the earliest possible opportunity of inspecting it.

**25. Power of Commissioner to open minor works –**

1. The Commissioner may, without previous notice, sanction the opening of any minor work for passenger traffic, if he is satisfied, either with or without inspection, that the provisions of clauses (b) (c) and (d) of sub-section (1) of Section 22 have been fully fulfilled.
2. For the works opened without inspection, the Commissioner shall take steps for carrying out a subsequent inspection.
3. The authority for opening any work shall be communicated in writing by the Commissioner to the concerned railway administration and a record of all works so authorised during each year, with particulars of the prior or subsequent inspection, if made, shall be maintained by the Commissioner.

**26. Infringements of maximum and minimum dimensions** – No infringement of the maximum and minimum dimensions shall be permitted without the prior sanction of the Commissioner or of the Central Government.

**27. Opening of new or strengthened bridges** –

1. No railway bridge shall be erected or reopened to traffic, after strengthening without the sanction of the Commissioner even though it is able to carry the loads without exceeding the stresses prescribed in the relevant Codes of Practice or in the absence of any such reference, the design criteria approved by the Central Government.
2. No load shall be imposed on any railway bridge which would cause in any member thereof stresses greater than those specified in sub-rule (1), without the sanction of the Commissioner.
3. Closure of an existing bridge shall require the sanction of the Commissioner.

**28. Use of new types of locomotives or rolling stock** –

1. Any railway administration which desires to use new types of locomotives or rolling stock different from those already running on any section or division of its railway, shall apply for sanction for the same to the Central Government through the Commissioner.
2. The application under sub-rule (2) shall be accompanied by –
  - (i) Such diagrams as may be necessary to give full particulars of the axle loads, wheel spacing, length over buffers and other principal dimensions of the rolling stock for which sanction is required.
  - (ii) A certificate signed by the Chief Engineer, the Chief Mechanical Engineer and the Chief Electrical Engineer (for electric loco) of the concerned railway in the Form given below;

**CERTIFICATE**

Certified that it is safe to run ..... (particulars of locomotive and rolling stock proposed to run) not exceeding ..... units (in the case of locomotive) coupled together on the section (station) ..... to (station) from ..... (KM) to ..... (KM) of the ..... Railway at a maximum speed of ..... KMPH against a maximum speed of ..... KMPH certified by RDSO, subject to the following speed restrictions and conditions:-

(a) Speed Restrictions

SL No.	From KM to KM	Nature of speed restriction	Brief	Reason for Restriction
-----				

(b) Special Conditions

- 1.....
- 2.....



3.....

4.....

---

To be signed by:

1. CME
  2. PCE
  3. CEE
  4. CSTE
  5. COM
- 

Note.

1. The COM and CSTE should be associated when the increase in the speed of a loco / rolling stock is contemplated over the maximum sanctioned speed for a specific category of train (Passenger or Goods) over a particular section of the railway.
  2. Over the railways where both the shop maintenance and open line maintenance of electric locos and EMUs rolling stock are under the control of Electric Department only, the CEE, otherwise the CME should also sign.
  3. When motive power with chopper control is to be used, the CEE and CSTE should sign the certificate.
- 

- (iii) Such calculations and stress sheets showing
  - a) The conclusions arrived at;
  - b) The external forces on which the stress calculations are based;
  - c) The stresses which will be produced in the various bridges over which the proposed rolling stock will run; and
  - d) The effects which the said rolling stock will have on various structures or tracks as compared with those caused by the rolling stock already in use, or allowed by the existing Government orders.
- (iv) The calculations, stress sheets must show as to what allowance has been made for any secondary or deformation stresses in addition to the primary stresses caused by the external forces and what relief of stress, if any, has been included.
- (v) The cost of modification to signalling and telecommunication installations necessitated by the use, if any, of chopper or thyristor control systems shall also be indicated.
- (vi) An approximate estimate of the cost of such improvements in existing structures or track as the use of the proposed rolling stock is like to render

necessary on the railway concerned, whether immediately or in the near future.

3. The proposal must be scrutinised by the Commissioner and his recommendations thereon shall be submitted to the Central Government for its orders.
4. No new type of engine or rolling stock which would cause stresses exceeding those specified in the IRS Bridge Rules, 1964, or the Standard Codes of Practice, or in the absence of any such reference, the design criteria approved by the Central Government for existing structures of excessive stresses in track shall be ordered until the sanction of the Central Government has been received through the Commissioner for doing so.
5. (a) For permitting new designs of locomotives, the Commissioner may require oscillation trials to be conducted and call for the records for his scrutiny.  
(b) The certificate referred to in clause (ii) of sub-rule (1) shall indicate clearly that the speed certified does not exceed the limits laid down by RDSO. In addition, the maximum number of motive power units proposed to be coupled together for multiple operation shall be specifically mentioned.  
**Note** – Provisions contained in this clause shall also apply for increasing the speed of existing rolling stock by making improvements.  
(c) For increase of speed beyond 105 KMPH on BG and 75 on MG of nominated trains on specific routes, the Commissioner may require route proving run by probable accelerometer or confirmatory oscillograph car run as per the instructions for the time being in force on the entire route at the maximum proposed speed. The CSTE and COM shall sign the Joint Safety Certificate in this case also.
6. Any modifications in the bridges of the coach will alters the system of operation and control over the rolling stock, like change in the braking system or change in the principle of traction shall be considered as a material modification and shall constitute a change in the type and design of the rolling stock.
7. Any modification in the coach or rolling stock affecting the salient dimensions or suspension system or running gears and any other modifications including body, seating arrangements and the like irrespective of whether such modifications affect the riding quality of the rolling stock or not, shall also constitute a change in type or design of the rolling stock.
8. Introduction of any train consisting of new coaching stocks of different design or type which are not already running on the section of a railway system shall also require the sanction of the Commissioner.

**29. Testing of bridges** – Before sanctioning the opening of new or strengthened bridges or the running of heavier loads over existing bridges, the Commissioner may require Card Deflection or Stress Recorder Test to be carried out as specified in Chapter IV. Tests on pre-stress concrete girder or composite girder bridge may also be carried out.

**30. Use of new types of block instruments –**

1. A railway administration, which desires to use a new type of block instrument or main signalling instrument, which is not an approved type, shall apply for sanction to the Commissioner.
2. The application under sub-rule (1) must be accompanied by
  - (i) A list of the requirements which the instrument fulfils, together with the results of the field trial conducted by the railway concerned;
  - (ii) A certificate from the CSTE in the form given below;

**CERTIFICATE**

---

Certified that it is safe to use (particulars of the equipment) at the station / on the section of the railway, with the following precautions.–

1.....

2.....

3.....

4..... etc.,

---

(Sd/-)

CSTE

**Note:** The application should be scrutinised by the Commissioner, who is satisfied, will communicate his sanction to the concerned railway. In case he is not fully satisfied, he will give his comments and recommendations for suitable further action.

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- (iii) A statement whether the equipment complies with the specifications approved by the Central Government.
- (iv) A statement giving comments on the performance of the equipment as a result of bench trials conducted by RDSO.
- (v) The circuit diagrams and other relevant diagrams and explanations, as may be necessary, to give full particulars of the principles of operation and safety features incorporated.
- (vi) A copy of instructions approved by COM, to be issued for the operation of the equipment by the Operating Staff, including those instructions for working under abnormal or failure conditions;

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## CHAPTER VIII

### REQUIREMENTS AND RECOMMENDATIONS FOR SIGNALLING AND INTERLOCKING INSTALLATIONS

#### **31. Signals –**

1. The number of signals provided and the height of such signals shall be limited to the extent to the actual necessity for safety and traffic purposes.
2. The distance between the Distant / Warner and the FSS ahead shall be such that a train approaching the former at the highest authorised speed with due allowance for weight, braking power, gradient and sighting distance can be stopped before passing the latter.
3. The Subsidiary Signals shall be readily distinguishable from the running signals.
4. Where a signal or its back light is not visible to the railways servant operating the signals, the aspect of the signal and the condition of the light shall be repeated at the place of operation.
5. It is desirable that the signalling at all block stations and interlocked level crossings in the same section shall conform to the same standard and type.
6. Signals shall also be designed as to give the most restrictive aspect in the event of failure of any part of the mechanism, which operated them.
7. The location and type of signals shall be in accordance with the provisions contained in Chapter VII of the IRSEM Part I and Chapter III of the Indian Railways (Open Lines) General Rules, 1976.

#### **32. Points –**

1. Points shall be so located that movements over them shall be within the view of the cabin or the location from which they are worked unless an approved alternative arrangement for direct vision is provided.
2. The points, locks and bars shall not be worked by wire but by rodding or by power generation.
3. Spring points shall not be used.
4. Movable crossings and movable diamond crossings on passenger lines shall be provided with complete facing point equipment of approved type.
5. The requirements of points as stipulated in Chapter VII of the IRSEM, Part I shall be followed.

#### **33. Interlocking –**

1. Signal and interlocking apparatus and installations shall be in accordance with Chapter VII of IRSEM, Part I.

2. Apparatus provided for operation and control of signals, points, etc., shall be interlocked and arranged to comply with the essentials of interlocking and other requirements as laid down in Chapter VII of the IRSEM, Part I.
3. The operation of the signalling gears may be from a lever frame or a panel with individual operation of points, signals and other functions or a panel providing operation of route setting type or any other approved means in accordance with the provisions of Chapter VII of the IRSEM, Part I.
4. When a signal is controlled by more than one agency, it shall be possible for every such controlling agency to replace the signal to 'on' position.
5. The SM shall be provided with interlocked mechanical or electrical control of the Home and LSS except where the conditions stipulated in the IRSEM are fulfilled.
6. Standards of signalling and interlocking shall arrange to comply with the requirements of the IRSEM.

**34. Siding and Trap Points –**

1. Sidings shall be arranged in such a manner that shunting operations upon them shall involve the least possible use of, or obstruction to running lines.
2. Trap points shall be provided upon Goods lines and Sidings at their junctions with passenger lines, with the points normally set against the passenger lines and interlocked with the signals.
3. Bay and loop platforms lines and refuge loops shall be isolated from main through lines.

**35. Junctions –** Bars or other approved devices shall be provided in order to define the fouling points of junctions, loops, sidings connections, crossings and the like.

**36. Provisions of isolation at stations –**

1. The speed of trains running through stations shall be governed by the General Rules for all open lines administered by the railway administrations, both Government and the non-Government railways and shall be subject also to the restrictions relating to standards of interlocking prescribed in IRSEM.
2. At no station at which isolation has not been provided, through running trains shall be permitted unless the conditions laid down in the second Paragraph of rule 4.11 of the General Rules are complied with.
3. At any station where there is a speed restriction for through running trains different from neighbouring stations, a speed restriction board should be erected at the first approach signal or where no signals are provided, at full braking distance outside the first facing point.

4. In order to maintain safety for through running, points for trap sidings must not be inserted in the main line or through line, except under approved special instructions in accordance with the IRSEM, Part I.
5. All passenger running lines shall be isolated from all goods lines or sidings connected thereto.
6. All goods running lines may be isolated from all sidings connected thereto.
7. It is not necessary to isolate one goods receiving line from another
8. Isolation may be accomplished by
  - a. Connection to another line or long siding
  - b. The provision of short dead end siding; or
  - c. The provision of trap.

#### **Note**

1. Whichever may be method of isolation, a Starter Signal shall be provided, except when omitted under approved special instructions.
2. When a trap is provided, the trap switch should be located with the heel of the switch in rear of the fouling mark and preferably on the straight. The switch should be in the rail away from the line to be protected.
9. The various methods of isolation are illustrated in the diagrams given in Appendix 'A' attached to these rules and the following instructions apply to their use in the case of running lines, namely:-

**Method 'A':** This method shall apply to cases in which the line on which the train will run when the points are set for isolation of the through line, is kept clear for the adequate distance prescribed in Rule 3.40 of the Indian Railways (Open Lines) General Rules, 1976.

**Method 'B':** When a short dead end siding is provided, it shall not ordinarily be long enough to permit of vehicles being stabled thereon. To obtain the adequate distance prescribed under Rule 3.40 of the General Rules the points of the dead end siding shall be set for the cross over and against the siding, before a train is admitted on a line trapped by this method. Where it is necessary for the short dead end siding to be extended for the purpose of stabling vehicles, the above rule shall apply, unless a trap is provided on the dead end siding at a distance of not less than 180m (120m in case of stations provided with multi-aspect signalling) from the Starter Signal where provided or from points leading to the main or through line. No train shall be admitted on the running line unless the trap is set and locked against vehicles occupying the further part of the dead end siding.

**Method 'C':** When a trap is used, a train must not be admitted on to the trapped line unless the trap has been closed, so that the train will not be derailed if the LP overshoots the trap.

10. When method 'A' cannot be used, and for any reason it is not convenient to use method 'B' or method 'C' and to provide adequate distance by setting the points of the short dead end siding or trap for the cross over and against the siding or trap. A sand hump of approved design should be used as a substitute for adequate distance as provided in rule 3.40 (4) of Indian Railways (Open Lines) General Rules, 1976. In that case, the length of the siding should be at least one rail length and formation should be made up for a short distance beyond the hump.

**37. General –**

1. The requirements and regulation of block instruments shall be in accordance with section 'N' and section 'R' of Chapter VII of IRSEM, Part II.
2. The requirements of Centralised Traffic Control (CTC) shall be in accordance with Section 'Q' of Chapter VII of IRSEM, Part I.

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## CHAPTER IX

### RULES FOR THE DESIGN AND INSPECTION OF EQUIPMENT FOR ELECTRIC TRACTION

#### **38. Designs of Electric Traction –**

1. The design of all electrical installations, namely, transmission and distribution lines, sub-station, switching stations, OHE etc., shall be according to approved standards laid down by the Central Government and the Indian Electricity Rules, 1956 or any other relevant, statutory rules for the time being in force. Wherever, any departure from accepted norms becomes necessary, approval of the Central Government shall be obtained.
2. (a) Adequate protective arrangements shall be made to ensure that the public cannot come in contact with the electric equipment on line within the railway premises.  
(b) Suitable protective screens shall be provided where live conductors pass under or over bridges.
3. The structures protecting overhead equipment shall be designed in accordance with the relevant Indian Standards. The wind pressure to be adopted in such cases shall be generally in accordance with IS 875-64 except when a higher value is prescribed by the State Government, which should be ascertained by a reference to the State Government, unless a notification on the subject in connection with the electric installation other than the electric traction on railways is already issued by the State Government.
4. When the distribution system involves overhead wires carried on steel structures including bridges and roofs and a return circuit via running rails or earth, all such structures, masts and associated tracks shall be effectively earthed and bonded or other precautions taken to ensure that contact with the steel work of the structure will not be dangerous to the public and the railway staff. In AC traction earthing and bonding shall be as per the approved Code for Bonding and Earthing.
5. Earthing arrangements at power supply installations shall strictly conform to the Indian Electricity Rules, 1956 and accepted Codes of Practice for Bonding and Earthing for AC traction.
6. No earth wire shall cross any track. Where structures to be connected to an earth wire are located on opposite sides of a track, separate wire runs shall be used for connecting the structures. In complicated areas, structures may be connected to individual earthing stations.
7. When over head lines transmitting electric power (other than lines forming part of the railway traction equipment) have to be carried across railway track, the



details of the equipment provided in connection with such lines must be designed with the object of minimising danger in the event of breakage and in accordance with the regulations for Electrical Crossing, 1987. Those details must be approved of the Electrical Inspector to the Government of India (EIG)

**Note:** The CEE of the Zonal Railway functions as the Electrical Inspector to the Government of India.

8. Lightning arresters of standard or approved types shall be provided wherever they are necessary.
9. All component parts of the equipment which carry live conductors shall be provided with devices approved by the Electrical Inspector to the Government of India to prevent unauthorised persons climbing them. Anti-climbing device shall also be provided, wherever necessary, on structures carrying high-tension equipment within railway premises.
10. On both sides of roads at level crossings, gauges of suitable design shall be provided to ensure that no part of any road vehicle or its load shall come in contact with overhead equipment.
11. Warning notices shall be erected in conspicuous positions at level crossings and the like indicating to the existence of the live electrical equipment.

**39. Display of caution boards and notices** – The following caution board and notices written in English, Hindi and the regional language shall be displayed at various locations indicated below;

- a. “Treatment for electric shock” boards, giving instructions for treatment of electric shock at all railway stations signalling cabins, Offices of the Station Managers, SSE/P.Way, SSE/Works, SSE/Signals, OHE Maintenance Depots, sub-stations, switching station cubicles or pillars supporting platform roof.
- b. General “Caution Notices” regarding danger of high voltage traction wires for public at various entrances to railway stations and for staff at prominent places at each station, particularly on stanchions or pillars supporting platform roof.
- c. “25 KV Caution Boards” shall be affixed on to the screen erected on FOBs and ROB.
- d. “Danger” boards on level crossing height gauges.
- e. “Engine Stop” boards, at termination of OHE in the sections to be energised.
- f. “Caution Unwired Turnout” boards ahead of all unwired turnouts or crossovers taking ‘off’ from wired tracks.
- g. “Warning” boards for neutral sections.
- h. Board for “Switching On” and “Switching Off” of power at neutral sections.
- i. “Danger” boards to be installed on OHE near watering stations, if any.
- j. “25/2 x 25 KV Caution” boards at sub-stations and switching stations.

- k. "Caution" notices on all diesel, electric and steam locos, which work on the energised section, including those owned by Private parties.
  - l. "Caution" boards at such signal posts where protective screening cannot be provided for S&T Staff.
- 40. Protection of private property against inductive effects of AC traction** – Under 25/2 x 25 KV traction, there is a heavy induction on all metallic structures and conductors in the vicinity of track. Inductive effects show themselves on any overhead conductor, such as metallic clothes lines, power lines and the like belonging to private parties running parallel and close to the electrified tracks. Wide publicity shall be given to the effects of the induction, so that special precautions may be taken by private parties concerned against the possibility of electric shocks from conductors running in their premises.
- 41. Approval of energisation of high tension installations** –
1. Application shall be submitted at least a fortnight before energisation to the CEE and EIG of the concerned railways for the following:
    - a. Formal approval, if not already received to the design and layout of all high voltage equipment including traction sub-stations, transmission lines, 25KV/2 x 25 KV feeders, switching stations, booster stations etc.,
    - b. Approval for energisation of HT installations mentioned above including OHE;
    - c. The application should be accompanied by documents as prescribed in Volume II (Part I) of the Manual of AC Traction Maintenance and Operations, 1994 (sub-Para 21007).
  2. On receipt of an application under sub-rule (1), the Electrical Inspector shall scrutinise and inspect the design and installations in respect of the following, namely;
    - a. The layout and design for sub-stations, OHE and other installations for compliance with the Indian Electricity Act, 1910 (9 of 1910) and the rules made there under.
    - b. Inspection of the completed installations, either personally or by deputing his Officers for compliance with the safety requirements.
  3. After conducting the inspection under sub-rule (2), the Inspector shall convey his approval for the energisation of 25 KV/2x25 feeder lines from traction sub-station to feeding posts, switching stations, booster transformer stations and auxiliary transformer stations, subject to such directions as he may consider necessary.
- 42. Submission of application to Commissioner** – An application shall be submitted to the Commissioner with all relevant documents and certificates and notifications mentioned in Paragraph 21008 and sub-Para 2 of paragraph 21009 of the Manual

of AC Traction Maintenance and Operation, 1994, Volume II (Part I) along with the approval of the Electrical Inspector to the Government of India for energisation.

**43. Procedure for energisation of traction installations –**

1. (i) After obtaining the sanction of the Electrical Inspector to the Government of India for energisation under rule 41, the sub-station should be commissioned sufficiently in advance of the energisation of OHE.

(ii) Before energisation of the sub-station, full communication facilities should be available and power supply authorities should be ready to give power supply.

(iii) After final measuring of the whole installation and check on the satisfactory operation of all equipments including protective relays, the traction sub-stations and other installations may be energised.

2. In addition to giving wide publicity through newspapers and other media, the SM shall –

i. Warn all passengers about the danger of 25/2KV AC OHE and not allow them to ride on tops of coaches;

ii. Advise all diesel and steam engine LPs not to climb on engines when they are under the OHE.

iii. Warn all members of the staff engaged in watering not to climb on the carriages without power being made off and obtaining order of the concerned controlling authority.

3. Energisation of OHE shall be progressively undertaken starting with 25/2KVx25KV feeders from the sub-station to the feeding posts, bus bars of the feeding posts followed by one sub-sector after another.

4. Before running electric rolling stock on the newly electrified section a confirmatory field test for the proper operation of the protective relays shall be conducted.

5. (i) The inspection of the entire section shall be carried out by means of an OHE Inspection Car by the Commissioner.

(ii) A responsible Officer preferably as CPM or the CEE/Construction and a SAG Officer of Electrical Department nominated by the General Manager (Open Lines) should accompany the Commissioner throughout the inspection.

(iii) The engineers who had been in-charge of the section during construction, the DRM and concerned Divisional Officers should also be present.

(iv) During inspection, particular attention shall be paid to the safety and operational aspects of the train movements and to see that staff are in possession of statutory rule books, instruction books, registers, forms etc., and the Transportation, Electrical, Permanent Way and S&T staff are fully acquainted with the duties to be carried out after AC traction is introduced.

6. Subject to the inspection being satisfactory an 'all-concerned message' may be issued by the Commissioner communicating his sanction for the introduction of commercial services under electric traction.

7. The S&T requirements in 25 KV 50Hz AC electrified sections shall be in accordance with the provisions of section 'R' of the IRSEM, Part I and Telecommunication Manual for 25 KV 50 Hz traction.

**Note** – A catechism dealing with the requirements of signalling and telecommunication installations for 25 KV 50 Hz AC electrified sections are enlisted as Appendices B and C to these rules.

## **SCHEDULE**

**(See rule 5 (2) )**

### **Paragraph 443 to 451 of the Indian Railways Code for the Engineering Department**

**443 Plans, Sections and Design for Works** – A set of plans and sections for a project should consist of –

- i. General map of the country traversed by the project scale about 25 KM to 1 cm.
- ii. Index map, scale about 2.5 KM to 1 cm.
- iii. Index plan and sections.
- iv. Detailed plans and sections.
- v. Plans and cross sections.
- vi. Plans of station yards.
- vii. Detailed drawings of strictures.
- viii. Plans of junction arrangements.

**444** As exceptions to this rule, Index Plans and sections and plans of stations may be longer than 1200mm if necessary; to enable all the information to be shown on one sheet. In such cases, however, the width of 840mm should still be kept to, and the length in excess which however should not exceed 1020mm should be folded so as not to project beyond the edges of the other sheets.

A catalogue of maps published by the Survey of India is obtainable from the Director, Map of Publication Survey of India, Hathibarkala Estate, Post Box No.28, Dehradun – 248 000.

2. The latest information on availability of maps and aerial photographs of the region would be available from the concerned Regional Director of Survey of India.

**445** Throughout each set of plans and sections the kilometrage should be reckoned from the same fixed point. This fixed point should, if practiceable, be at that end which is

in the direction of the nearest sea port with which the line is in through communication by rail, and should be clearly defined on the Index Plan and section and on at least the first and last sheets of the Detailed Plans and sections. If the line takes off from an existing railway station, the zero point should be fixed at the centre of the existing station yard, and when it ends at an existing station the end of the survey should be taken as the centre of that station. Each sheet should be plotted in the direction of the through kilometrage so that the kilometrage may be read from left to right.

- 446** The datum used for all plans and sections should be Mean Sea Level, and all heights should be referred to this datum in metres and decimals. If any other datum is adopted for temporary use during the progress of the survey, the figures referring to such temporary datum should be reduced to Mean Sea Level before being entered on the plans and sections.
- 447** On each sheet should be noted a reference of letter, the name of the railway or section of the railway, the gauge and the scale. The scale may be described in words and need not be drawn. The magnetic north should be indicated on each map and plan by a line not less than 150mm in length.
- 448** The Index Plan and Section and the first and last sheets of the set of Detailed Plans and Sections should be signed and dated by the Engineer in-charge of the survey. Every sheet should be signed and dated by the officer responsible for its preparation.
- 449** **Index Plan and Section** – The Index Plan and Section should be drawn to a scale of 0.5 KM to a cm horizontal and 10m to a cm vertical, the plan being drawn above the section on the same sheet.
- 450** **The Index Plan** – On the Index Plan should be shown all towns, roads, canals, rivers, hills boundaries of states and districts within a distance of 10 KM on each side of the railway. The centre line of the proposed railway should be indicated by a full red line 0.8mm in thickness. The degree and radius of all curves should be figured. The position of each station should be shown by a red block, the name of the station being given. The kilometrage from the ‘fixed point’ should be marked and figured at every kilometre and extent of each sheet of the detailed plan shown. Where practicable, the Index Plan should be traced from the sheets of the Survey of India map published to a scale of 0.5 km to a cm. The details in the immediate neighbourhood of the railway being filled in or corrected, if necessary, from the information given by the railway survey. For a districts where a map to the scale of 0.5 Km to a cm is not available, the information required should be plotted to that scale from such other maps or data as can be obtained.
- 451** **The Index Section**– The Index Section should show the formation level by a red line; the gradients should be figured, and the height of formation above Mean Sea Level

entered at each change of gradient. The position of each important bridge with the name of river and number and size of bridge spans should be indicated, also level crossings with their classification “as special”, “A”, “B”, “C” or “D” Class and position to each station with its name and distance from the “fixed point”. The kilometrage from the “fixed point” should be marked and figured at every kilometrage.

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**FORM I**

(Rule 5 (1) (a))

**Curve Abstract****Section:****Railway:****Gauge:****Length:**

Degree of curvature and radius	Number of each	Length of kilometre of primary curve
1	2	3
4.00 degree (radius 437.5m)	1	0.49 KM
3.00 degree (radius 583.33m)	3	1.13 KM
2.00 degree (radius 875m)	2	1.30 KM
<b>Total</b>	<b>6</b>	<b>2.92 KM</b>
<b>Ratio of curved length to total length of line 31.97%</b>		

**FORM II**

(Rule 5 (1) (b))

**Gradient Abstract****Section:****Railway:****Gauge:****Length:**

Gradient (compensated) and radius	Number of each	Length of kilometre	Percentage to total length of line
1	2	3	4
1 in 100 or 1 percent	....	....	....
1 in 101 to 1 in 150	....	....	....
1 in 151 to 1 in 200	....	....	....
1 in 201 to 1 in 300	1	0.51	5.55 %
1 in 301 to 1 in 400	2	0.64	6.96 %
1 in 401 to 1 in 500	2	1.00	10.88 %
1 in 501 to 1 in 1000	1	1.10	11.97 %
1 in 1001 to level	9	5.94	64.64 %
<b>Total</b>	<b>15</b>	<b>9.19 KM</b>	<b>100.00%</b>
<b>Steps compensated Grade 1 in 3000 (fall)</b> <b>Longest continuous length of steepest Grade 0.51 KM</b> <b>followed by. Level for 0.10 KM</b>			

## FORM III

**(Rule 5 (1) (c))**

## Bridge Abstract

Section:

### Railway:

Gauge:

Length:

Class of bridge	Clear span in metres	Total no. of spans	Waterway in lineal metre	Loading standard for which designed	Reference to type plan in case of girder bridges
Steel Girder (riveted)	....	....	....	....	Drawing No. B.A- 1123 to B.A-1124
Steel Girder (Welded)	30.50	2	61.00	MBG loading	
PSC Girder	....	....	....	....	
Composite girder	....	....	....	....	
RC/PSC/Slab/BOX	....	....	....	....	
(i) RCC slab	5.00	1	5.00	MBG loading	
(ii) RCC slab	3.05	2	6.10	"	
(iii) RCC slab	2.00	9	18.00	"	
(iv) RCC Slab	1.83	2	3.66	"	
(v) RCC Box	3.05	2	6.10	"	
(vi) RCC Box	2.90	3	8.70	"	
Arches	....	....	....	....	
Major bridges		2	61.00		
Minor bridges		19	47.56		
Total		21	108.56		
Water way per KM + (major bridges) 6.64m (Minor bridges) 5.17m Total 11.81m					
Note (1) : "Major bridges are those having a total waterway of 18 lineal metres or upwards or having a clear opening of 12 lineal metres or upwards in any one span".					
Note (2) : The particulars furnished above are illustrative.					



**FORM III – A**

**Bridge Abstract Waterway Abstract**

**Section.**

**Railway.**

**Gauge.**

**Length.**

S No.	Class of Bridge	Clear span metres	Total no. of spans	Waterway in linear metres	Loading standard to which designed	Remarks

**FORM III – B**

**Details of tunnels**

**Section.**

**Railway.**

**Gauge.**

**Length.**

Tunnel No.

Between stations.

Length of tunnel: ..... From KM .... To ..... KM

Year of construction.

Curve / Straight.

Details of construction.

Brief particulars of soil met with in tunnel portion.

Portions lined and thickness of lining.

Brief particulars of ventilation.

Brief particulars of lighting.

Brief particulars of drainage.

Minimum height above rail level along centre line of track.

Minimum lateral distance from centre line of track.

Reference to completion of plans.

**FORM IV**

(Rule 5 (1) (d))

**Important Bridges****Section:****Railway:****Gauge:****Length:**

Name of the river	Kilometrage	Drainage area (Sq KM)	Rise of ordinary flood above low water number of each (Metre)	Slope of bed per KM (Metre)	Mean velocity in flood per second (Metre)
1	2	3	4	5	6

Sectional area in flood (Sq KM)	Discharge per second cub metre	Span		Height of underside of girder		Average depth of foundations below low water level (Metre)
		Metre	No.	Above low water metre	Above flood level metre	
7	8	9	10	11	12	13

**FORM V**

(Rule 5 (1) (e))

**Ballast and P.Way****Section:****Railway:****Gauge:****Length:**

1. The P. Way consists of 52 kg/90 UTS new rails of "indigeneous make" 13m long (partly on single rails and partly on 3-rail welded panels) laid on concrete sleepers with the density of M+7 (1540 sleeper per KM) and 50mm stone ballast with minimum cushion of 250mm under the sleepers.
2. All the turnouts to be negotiated by passenger trains are of 1 in 12 (curved switch) elsewhere 1 in 8.5 certified that tested and approved P. Way materials have been used in this section.

Note: A brief description to be given of the rails, fastenings, sleepers and ballast provided. Details of dimension of the rails, fishplates etc., should not be given in the case of standard section. It should be stated whether any of the material is second hand and if so, its approximate age should be given.

In the case of new rails and fishplates manufactured in India, the name of the producer should be given. If they are imported, the name of the country of origin should be indicated.

A certificate should also be submitted by the CE/Engineer in-chief that the materials are of tested and approved quality and comply with the accepted specifications.

### FORM VI

(Rule 5 (1) (f))

#### Station and station sites

Section.                      Railway.                      Gauge.                      Length.

Name of station	Class E- Engine changing X-Crossing F-Flag	KM from fixed point*
1	2	3

Distance apart			Clear length of crossing loop	Remarks
Sites	Crossing	Engine changing		
4	5	6	7	8

Note \* - These should ordinarily agree with the kilometerage figured on kilometre posts and telegraph posts.

**FORM VII**

(Rule 5 (1) (g))

**Station and station sites**

**Section:** **Railway:** **Gauge:** **Length:**

Name of the station	Station Building			
	Station Offices (Sq M)	Waiting Room (Sq M)	Waiting Hall (SL) (Sq M)	Toilets (Nos.)
1	2	3	4	5

Goods Shed (Sq M)	Passenger platforms		Goods platform length (M)	Water supply for passengers
	Length (M)	Height above rail level (M)		
6	7	8	9	10

Note: In case of existing accommodation is to be utilised, indicate so by (a)

**FORM VIII**

(Rule 5 (1) (h))

**Station Machinery**

**Section:** **Railway:** **Gauge:** **Length:**

Name of the station	Interlocking	
	Interlocked	Non-interlocked
1	2	3

Signals					
Isolation	Warner / Distant	Outer	Home	Starter	Advanced Starter
4	5	6	7	8	9

Type of block working	Weigh bridge No. & capacity
10	11

**FORM IX**

(Rule 5 (1) (i))

**Level Crossing Abstract****Section:****Railway:****Gauge:****Length:**

LC No.	Location	Class as per IRPWM	Length of the guard rail
1	2	3	4

Width of gates at right angle to the centre line of road	Distance of gate posts from centre line of nearest track	Wicket gate provided or not	Length of straight portion of road outside gates
5	6	7	8

Angle of crossing between gates	Radius of centre line of road on approaches within (50m) of the centre lines of track	Interlocking of gates with signals & provision of telephone	Gradient of road way (a) between gates (b) outside gates
9	10	11	12

Width of metalling between gates	Distance of gate lodge from (i) centre of the nearest track (ii) edge of road metal	Whether road traffic has been warned about the proximity of level crossing	Provision of rumble strip / speed breaker
13	14	15	16

**FORM X**

(Rule 5 (1) (j))

**Brief particulars of Traction Installation****Section:****Railway:****Gauge:****Length:**

1. Total track KMs electrified section =
2. Brief particulars of traction system =

The type of OHE installed on main line of the section is of the simple polygonal with swivelling brackets having tensions in the conductors regulated automatically. The tension

in the catenary and contact wire is kept as 1000 kgf each. The contact wire has been given a presage of 103mm for a span of 72m (suitably reduced for smaller spans). On secondary lines and yards, the OHE is of fixed type and unregulated. The contact wire is grooved hard drawn copper with 107 sq.mm cross section supported by means of copper droppers from catenary which is standard (19.210mm) with 65mm cross section made up of cadmium copper having 80% conductivity. The maximum wind pressure for design of masts and foundation has been taken as 112.5 kg/sqm. Maximum span adopted on main lines is 63m. The OHE has been designed for a maximum speed of 160 KMPH.

The power supply is taken from State Electricity Board at a single point (name of the location) from where Railways own transmission lines are run for feeding the sub-stations located at ..... (name of location). At each of the sub-stations two power transformers 12.5 MVA, 132/25 KV are installed, one of them acting as standby. Standard arrangement of having neutral section 41m length (conventional) or PTFE has been provided between two sub-stations for separation of phases. From sectioning and isolating facilities sub-sectioning and paralleling stations have been provided. All the switching operations at power supply stations are remote controlled from a single remote control centre located at ... (name of the location).

Pro-forma 10.22

### FORM X

(See Rule 5 (1) (i) of the Railways Opening for Public Carriage of Passengers Rules, 2000)

#### BRIEF PARTICULARS OF TRACTION INSTALLATION

(Sample)

Section.	Railway.	Length.	Gauge.
1.	Total track KMs electrified section –		
2.	Brief particulars of traction system –		

The type of OHE installed on mainline of the section is of the simple polygonal type with swivelling brackets having tensions in the conductors regulated automatically. The tension in the catenary and contact wire is kept as 1000 kgf each. The contact wire has been given a pre-sag of 103mm for a span of 72m (suitably reduced for smaller spans). On secondary lines and yards, the OHE is of fixed type and unregulated. The contact wire is grooved hard drawn copper with 107 sq.mm cross section supported by means of copper droppers from catenary which is stranded (19/2.10 mm) with 65 sq.mm cross section made up of cadmium copper having 80% conductivity. The maximum wind pressure for design of

masts and foundation has been taken ..... kg/sqm. Maximum span adopted on mainlines is 63m. The OHE has been designed for a maximum speed of 160 KMPH.

The power supply is taken from ...SEB at a single point viz; ..... from where railways run their own transmission lines, for feeding the sub-stations located at ....., ..... & ..... At each of the sub-stations two power transformers 12.5 MVA, 132/25 KV are installed, one of them acting as standby. Standard arrangement of having neutral of normal / short PTFE type have been provided at the sectioning post between two sub-stations for separation of phases. For sectioning and isolating facilities, sub-sectioning and paralleling posts have been provided. All the switching operations at power supply stations are remote controlled from a single remote control centre located at ..... the RCC / SCADA system has been provided by ..... (Manufacturer) and is of ..... type (Microprocessor / PC based). The same will be commissioned by ..... (target date, if not commissioned at the time of making application to CRS).

CPM or CEE (in-charge of Project)                      or                      CEE/Construction, Open line of Railway

### FORM XI

(Rule 5 (1) (k))

#### Power Supply Installation Abstract

**Section.**

**Railway.**

**Gauge.**

**Length.**

S. No.	Type of switching stations	Total Nos.	Location and nearest railway stations	Remarks
1	2	3	4	5

Proforma – 10.23

**FORM XI**

(See rule 5 (I) (k) of the Railways opening for public carriage of passengers Rules, 2000)

**Power Supply Installation Abstract**

**Section:**                      **Railway:**                      **Length:..... KMs**                      **Gauge: .....mm**

S. No.	Type of switching stations	Total Nos.	Location and nearest Railway stations	Remarks
1	Traction sub-station and feeding stations			
2	Sectioning and paralleling station			
3	Sub-sectioning and paralleling station			
4	Sub-sectioning stations			
5	Booster transformer stations		(list to be attached)	
6	LT Supply transformer stations		(list to be attached)	

CPM or CEE (in-charge) of Project

OR

CEE/C, Open Railway

**FORM XII**

(Rule 5 (1) (l))

**Maintenance Depot Abstract**

**Section:**                      **Railway:**                      **Gauge:**                      **Length:**

S. No.	Location	Name of the nearest railway station and distance there from	Whether with OHE maintenance car (Tower Car provided or not)	Remarks
1	2	3	4	5



**FORM XII**

(See Rule 5 (I) (1) of the Railways opening for public carriage of Passengers Rules, 2000)

**Maintenance Depot Abstract****Section.****Railway.****Gauge.****Length.**

S. No.	Location	Name of the nearest railway station and distance there from	No. of OHE maintenance car (Tower Car) and emergency road vehicles provided	Remarks
1	2	3	4	5

CPM or CEE (in-charge) of Project

OR

CEE/C, Open Railway

Proforma – 10.25

**FORM XIII**

(See Rule 5 (I) (m) of the Railways opening for public carriage of passengers Rules, 2000)

**RECTIFIED OHE CLEARANCE ABSTRACT****Section.****Railway.****Gauge.****Length.****A. Overview Structure**

S. No.	Location of overline structure	Type of structure	Clearance from RL to bottom of structure	Height of contact wire below the structure	Whether Catenary is anchored or freely running below / above the structure	Minimum static clearance between 25 KV live parts and earth	Remarks
1	2	3	4	5	6	7	8

B. Location of OHE where specified (2.0m) working clearance are not available

S. No.	Location	Type of nearest earthed part	Actual distance between live part and earth	Remarks
1	2	3	4	5

**FORM XIV**

(Rule 5 (1) (n))

Electrical crossing over electrified tracks Abstract

Section:

Railway:

Gauge:

Length

S. No.	Location	Brief technical particulars including voltage	Whether with guards or without guards	Owned by	Whether clearance as per the regulations for electrical crossing available	Remarks
1	2	3	4	5	6	7

Proforma – 10.26

**FORM XIV**

(See rule 5 (I) (n) of the railways opening for public carriage of Passenger Rules, 2000)

Electrical crossing over electrified tracks Abstract

Section:

Railway:

Gauge:

Length

S. No.	Location	Brief technical particulars including voltage	Whether with guards or without guards	Owned by	Whether clearance as per the regulations for electrical crossing available	Remarks
1	2	3	4	5	6	7

CPM or CEE (in-charge) of Project

OR

CEE/C, Open Railway

**FORM XV****(Rule 5 (3))****Electrical crossing over electrified tracks Abstract****Section:****Railway:****Gauge:****Length**

<b>S. No. (1)</b>	<b>Questions (2)</b>	<b>Answers (3)</b>
<b>1</b>	<b><u>Formation Earthwork</u></b> Are there any sections of the line over which special precautions to ensure safe working are necessary, owing to sharp curves or steel grades?	
<b>2</b>	What widths of formation have been adopted. (a) In bank (b) In cutting (exclusive of side drains)?	
<b>3</b>	Have any special precautions been taken against slips in cutting and embankments?	
<b>4</b>	Are side drains to the formation and catch water drains above the side slopes, provided for all cuttings?	
<b>5</b>	Are trolley refugees necessary in any long cuttings, and if so, have they been provided at suitable intervals?	
<b>6</b>	<b><u>Tunnels</u></b> Are there any tunnels not fully lined? If so, are they safe without further lining?	
<b>7</b>	Do any portions of the sides or roof of any tunnel infringe maximum and minimum dimensions?	
<b>8</b>	Have adequate facilities been provided to enable workmen to escape from an approaching train without difficulty?	
<b>9</b>	Have the tunnels been properly ventilated?	

10	<p><b><u>Bridges</u></b></p> <p>Are the bridges / elevated structures designed in accordance with the provisions contained in Bridge Rules, having regard to the standards of loading which they are intended to carry/ full particulars should be appended of any case of departure from the requirements?</p>	
11	Has the due care been taken to provide sufficient waterway to guard against scour?	
12	Are free board and vertical clearance under the bridge provided according to bridge sub-structure code? If not, quote sanction number with date.	
13	Has due notice been taken of Railway affected works in the catchment of the waterways and all necessary safeguards provided for washways and breaches due to breaching of tanks / bunds?	
14	Have the waterways provided been formally approved by the Local Government?	
15	Have sufficient head-way been provided for crafts plying or likely to ply, on navigable waters?	
16	<p>Are there any bridges intended for use by the public?</p> <p>(a) If so, in the case of a road or pathway clear of the track, have adequate handrails or parapets been provided?</p> <p>(b) Or in the case of a passage common with the track, have suitable gates across the roadway, and signals for trains been provided?</p>	
17	Are long bridges provided with adequate facilities to enable workmen to stand clear of an approaching train without difficulty?	

18	Have trolley refugees been provided, if necessary?	
19	Are the wooden sleepers adequately protected from fire?	
20	Are all girder bridges provided with guardrails? Are there any bridges where it is necessary to provide guard rails but not provided?	
21	Has information of the nature and depth of the foundation and hidden work in bridges, culverts and other structures likely to be exposed to scour, been recorded on the structures themselves?	
22	Have surplussing arrangements been made for canals crossing track?	
23	Have completion drawings of all important and other structures been provided? Do these contain all information regarding foundations and other hidden work as actually executed? Where are they recorded?	
24	<b><u>Land boundaries and fencing</u></b> Have the boundaries of the Railway land been properly defined by suitable marks, which can readily be found and identified?	
25	Have complete and accurate land plans been prepared and do they bear the signatures of the responsible Civil and Railway Officer concerned? Where are they recorded?	
26	<b><u>Level Crossings</u></b> Has the Local Government approved the sitting and classification of the level crossings?	
27	Have all level crossings been constructed in accordance with the standard specifications for level crossings (vide Chapter	

	IX of IRPWM) according to class of crossing? If not, at which crossings and in what respects do they fall short of them?	
<b>28</b>	<b><u>KM and gradient posts</u></b> Are proper KM and gradient posts provided? (a) Are the telegraph posts are numbered and (b) Can the figures be read with ease from passing trains and trolleys?	
<b>29</b>	From which fixed point has the kilometerage been reckoned?	
<b>30</b>	<b><u>Ballast and P.Way</u></b> Is the ballast provided of good quality and sufficient in quantity for the traffic anticipated?	
<b>31</b>	Is the P.Way properly laid, complete with fastenings, and is it suitable for the proposed speeds and loads?	
<b>32</b>	Are there any especially sharp curves at which checkrails are considered necessary? Have they been provided at all such curves?	
<b>33</b>	Are the curves laid out with transition curves at each end?	
<b>34</b>	Have all curves been adequately super elevated for the speeds in force? Is the super elevation to be given to each curve indicated at site?	
<b>35</b>	<b><u>Station facilities</u></b> Have maximum and minimum dimensions in station yards been observed?	
<b>36</b>	Has suitable accommodation for passengers been provided at all stations?	
<b>37</b>	Have latrines been provided on platforms and are they	

	properly situated, constructed and lighted?	
38	Are there proper arrangements for supplying drinking water?	
39	Is FOB or sub-ways for crossing the line provided where necessary? Are any landings provided? Are the rise and tread of steps properly proportioned? *If the total height of steps exceeds 4.57m, it is usually desirable that there should be an intermediates landing not less than 1.22m in length.	
40	Are the names of stations shown both in Hindi and English and in vernacular, in large and distinct letters in conspicuous positions so as to be seen readily by passengers in the trains both during day and night?	
41	Are clocks provided at all block stations?	
42	<b><u>S&amp;T / Block working</u></b> Have the requirements and recommendations for signalling and interlocking, and the catechism for S&T installations vide Chapter VII of these rules and the Appendix thereto, being fully complied with, according to the class of S&T installed? If not, in what respect do the arrangements provided fall short of them?	
43	Have the requirements and recommendations for S&T installations in accordance with the instructions issued for the installations of S&T equipment in 25 kV 50 Hz electrified sections been complied with? If not, in what respect the arrangements provided fall short of them?	
44	<b><u>Station Working</u></b> Is provision made, whether by trap points or other means to prevent vehicles standing on Sidings, from fouling any	

	running line?	
45	Are there any stations situated on a steeper grade than 1 in 400? If so, what special safety devices are adopted and/or special rules enforced at those stations?*	
46	<p>What safety, sidings are provided?</p> <p>Are they suitable? @</p> <p>Are any other necessary?</p> <p><b>*Note 1:</b> No station should be constructed nor should any siding join a passenger line on a steeper gradient than 1 in 260, except where it is unavoidable, and then only with the previous sanction of the Railway Board obtained through the CRS, when a Slip Siding or other arrangements is made, sufficient to prevent accidents.</p> <p><b>@Note 2:</b> At any station situated in the immediate neighbourhood of an incline steeper than 1 in 80 falling towards the station, a Catch Siding in the former case, and a Slip Siding in the latter case, should be provided, if necessary, in a suitable position. The take off points to a Catch Siding or a Slip Siding should normally be set and locked for the Siding except where required to be trailed through. "for the purpose of the footnotes marked* 1 &amp; 2, the definition of a station yard is given in item 2 of Chapter II of SOD shall apply"</p>	
47	Are station yards so arranged that shunting past junctions or level crossings may be avoided as far as possible?	
48	Are shunting necks for goods working provided in large yards, where shunting operations cannot otherwise be carried on without interfering with incoming trains?	
49	<p><b><u>Rolling Stock</u></b></p> <p>Is the following information noted in a conspicuous position on each vehicle?</p> <p>(i) <u>Passenger Carriages</u>: The maximum number of passenger intended to be carried in each</p>	



	<p>compartment of every description of carriage?*</p> <p>(ii) <u>Goods Wagons</u>. The tare weight of the empty wagon (including wheels, axles and ale boxes and springs) and the maximum load in tonnes which the wagon is constructed to carry?</p>	
50	Are means of communications between passengers and the Guard provided in all trains carrying passengers?*	
51	Have all engines and all vehicles intended to run on passenger trains been fitted with the air brake?	
52	<p>Are all locomotive and motor coaches provided with</p> <p>(a) Cattle guards</p> <p>(b) High power headlights</p> <p>(c) Other prescribed safety equipments</p> <p>*Note: This information should be in the vernacular as well as in English and Hindi.</p> <p>**Except in the case of complete or partial failure of air brake, trains carrying passengers may run without such means of communication, only in accordance with GR 4.18.</p>	
53	<p><b><u>Facilities for Booking</u></b></p> <p>Are suitable arrangements made at all stations for the booking of passengers?</p>	
54	Are suitable weighing machines provided at all stations open for Goods / Parcel booking?	
55	Are time and fare tables placed in a convenient position for inspection by the Public at each station? Are these documents clearly exhibited in Hindi and English and also the vernacular of the District?	
56	Is a copy of General Rules for regulating the working of the railway available for inspection at every station?	

57	Is every station provided with station diagram, SWR, coaching and goods tariffs, and all other necessary manuals or instructions, forms and registers for the work of a station?	
58	Do the working instructions provide suitably for all special conditions met with each station?	
59	<p><b><u>Electrical</u></b> Have the rules for the Design and Inspection of equipment for Electric Traction (Vide Chapter VIII of these rules) been individually and fully complied with? If not, where and in what respect, do the arrangements provided fall short of them?</p> <p><b><u>General</u></b> What provision of Medical First Aid equipment has been made for use in the event of accident?</p>	

Pro-forma 10.19/1

**FORM XV-1, XVI & XVII**

(See Rule 5 (3-42,43 & 59), 5.(4), 5(5) and Chapter VII of the Railways Opening for Public Carriage of Passengers Rules, 2000)

**GENERAL SAFETY CERTIFICATE**

(As per Sub-Para 2 (a) of Para 21009 of ACTM)

Description of work:

Section	Chainage	
	From	To

We do hereby certify that in the work mentioned above:-

- i) There is no infringement to the SOD due to OHE / Signal structures (or the sanction of Railway Board regarding infringement of SOD due to OHE / Signalling structures has been obtained as the case may be).

**Infringement of maximum and minimum dimensions (Form XVII) Rule 5 (5).**

b	Location (Division, section, KM)	Name of the structures which infringe	Prescribed minimum and maximum dimensions	Existing actual dimensions	Amount of infringement	Particulars of sanctions to infringement and remarks

- ii) All the works have been carried out in accordance with the standard drawings, designs and specifications.
- iii) Masts / Structures are such as per prescribed norms.
- iv) The signalling / interlocking / block signalling has been carried out in accordance with signalling and interlocking plans and the requirement laid down in the manuals of instructions for the installation and maintenance of signalling, interlocking and block-signalling apparatus have been fully complied with.
- v) The work has been carried out in accordance with the provisions of the ACTM.

We hereby certify that the section has been carefully inspected and tested. It is also certified that the above work has been properly completed and is in good working order. The work can be opened for public carriage of passengers and goods traffic without endangering the safety of the travelling public or of the employees of the railways.

**CEE (C)**

**Or Dy.CEE/RE**

**CSTE (C)**

**or Dy.CSTE/RE**

**(Countersigned by CPM or CEE (in-charge of project))**

Pro-forma 10.20

**Form XV – 2**

(see rule 5 (3) (59) and Chapter VIII of the Railways Opening for Public Carriage of Passenger rules, 2005)

**CERTIFICATE FOR ELECTRICAL WORKS**

(as per sub-Para 2 (b) of Para 21009 of ACTM)

Section	Chainage	
	From	To

It is certified that. –

- i) Adequate arrangements have been made to warn the public regarding the dangers of coming in contact with live OHE within railway premises.
- ii) The design of steel structures of OHE complies with the Indian Electricity Rules. The wind pressure of ..... has been adopted for the section and wind pressure of ..... has been adopted at bridges.
- iii) Bonding of rails by means of mild steel flats has been done at various locations where public or Railway staff come frequently in contact with the rails. Track bonding is done in accordance with the “Code for bonding & earthing” as laid down in the ACTM.
- iv) All the traction structures and other structures to which the OHE is attached are also bonded to the rails in accordance with the “Code for bonding & earthing” referred to above.
- v) The overhead lines and underground cables crossing the railway tracks are in accordance with the “Regulations for Electrical crossings of railway track” and the crossing plans as approved by Railway’s Chief Electrical Engineer who is also the Electrical Inspector for such installations.
- vi) There are no railway structures carrying 25 KV live conductor outside the Railway’ premises in the above section.
- vii) The height gauges have been provided, so that no part of any road vehicle or its load comes in contact with live OHE and have adequate clearances, on either side of railway premises at level crossings.
- viii) The height gauges are provided with danger boards and clearance above road level maintained as per ACTM.
- ix) No unauthorised cables / wires are crossing the railway tracks.

CPM or CEE  
(In-charge of Project)

CEE  
(Open Line Railway)

..... RAILWAY  
**JOINT SAFETY CERTIFICATE No.....**

Certified that it is safe to run ..... Class of locomotive, single or doubled, having maximum axle load ..... at the maximum speed and on the section given in the table below. The maximum permissible speed as certified by RDSO is given in juxta position.

S. No.	Class of loco & drawing No.	Section		KM		Existing permissible speed of the section (KMPH)	Proposed permissible speed (KMPH)	MPS certified by RDSO (KMPH)	Speed restriction (Temporary / Permanent)	Reasons for SR	Remarks
		From	To	From	To						
1	2	3	4	5	6	7	8	9	10	11	12

**CSTE**  
Railway

**COM**  
Railway

**CME**  
Railway

**CEE**  
Railway

**PCE**  
Railway

**FORM XVI**

**(Rule 5 (4))**

**Certificates to be given by the General Manager**

**I do hereby certify:-**

- (i) That the maximum dimensions for railways in India have in every case been worked to, with the exceptions detailed in the statement herewith annexed\*.  
Also, that the standard dimensions will be observed in future, and that no work or structure infringing the standard dimensions will hereafter be permitted without the sanction of the Central Government.
- (ii) That each bridge is of such design, dimensions and construction as will enable it to bear the dead load of the structure itself (with flooring, roadway, permanent way etc., complete) and in addition thereto, the equivalents of the live loads specified in the rules prescribing standards of the design and loading for Railways bridges, without exceeding the maximum permissible stress on the available material in any member or portion of the structure.
- (iii) That more than two engines shall not under any circumstances be allowed at one time on the same track of one span of any bridge.
- (iv) That every coaching vehicle constructed or procured for the use of the railway in mail and passenger trains is, and shall be provided with air brake and effective means of communication between passengers, Guard and LP.

Note: this item of certificate is not necessary for those light lines on which the use of air brake has not been insisted upon.

- (v) That one compartment or such number of berth or seats as the Railway Administration may think fit, of a second class carriage of every train carrying passengers shall be reserved for the exclusive use of female passengers.
- (vi) That the Railway shall be worked on the system known as Absolute Block System in accordance with the regulations prescribed in Section Chapter VIII of General Rules for Railways in India.

**Note:** In the statement showing the cases in which the maximum and minimum dimensions have been infringed, full details for each case must be given, in the form attached (Form XVII) with explanation of the necessity for such infringements and a reference to the authority under which it was permitted. If there have been no infringements of the maximum and minimum dimensions the words “with the exception detailed in the statement herewith annexed” should be omitted or struck out.

- (vii) #that the electric traction equipment can be used for the public carriage of passengers without danger to the public and that the rules for design and inspection of equipment for electric traction of Chapter VIII of these Rules have been complied with.
- (viii) That the S&T equipment have been installed in accordance with the approved instructions and they are safe for passing traffic.
- (ix) That ..... has been delegated to accompany the CRs on his inspection and all information supplied or engagements entered into by him shall bear my authority.

**Note:** To be included only where applicable.

(Sd/ .....)

General Manager

### FORM XVII

(Rule 5 (5))

#### Infringement of Maximum and Minimum dimensions

Section.

Railway.

Gauge.

Length

S. No.	Location		Name of the structures which infringe	Prescribed maximum and minimum dimensions		Existing actual dimension	Amount of infringement	Particulars of sanction to infringement and remarks
	Division & section	KM		Chapter / Item	Maximum & Minimum			
1	2	3	4	5	6	7	8	9

# FORM XVIII

(Rule 17 (6) & (7))

## Deflection Test of Bridges

Section:

Railway:

Gauge:

Length:

Date of test:

Description of test load (including engine No.)

Bridge No.	KM	Material of girders	Clear span between bearing plates	Overall depth of girders	Speed of train
1	2	3	4	5	6

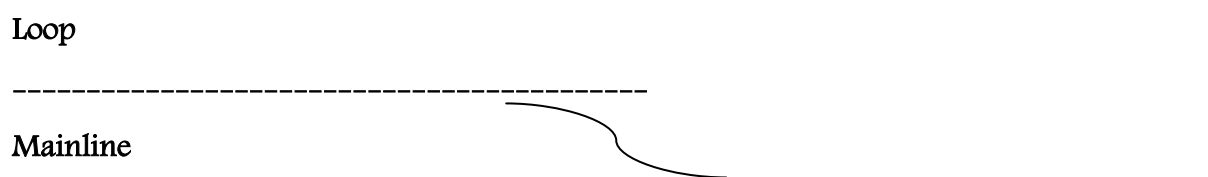
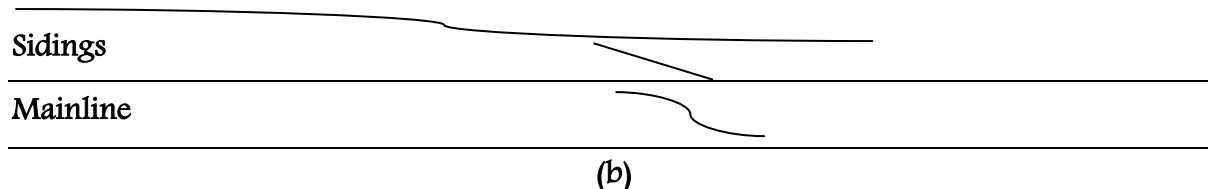
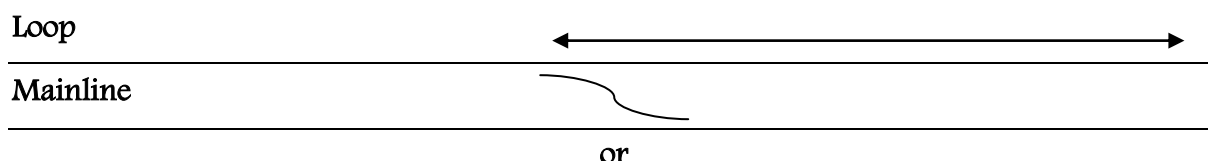
Test load EUDL	Deflection in M.M	Design load EUDL for B.M	Ration of design load B.M to test load B.M	Reduced deflection under design load (for slow speed tests) - (8x10)	Theoretical (calculated) deflection (aprox.) under designed load
7	8	9	10	11	12

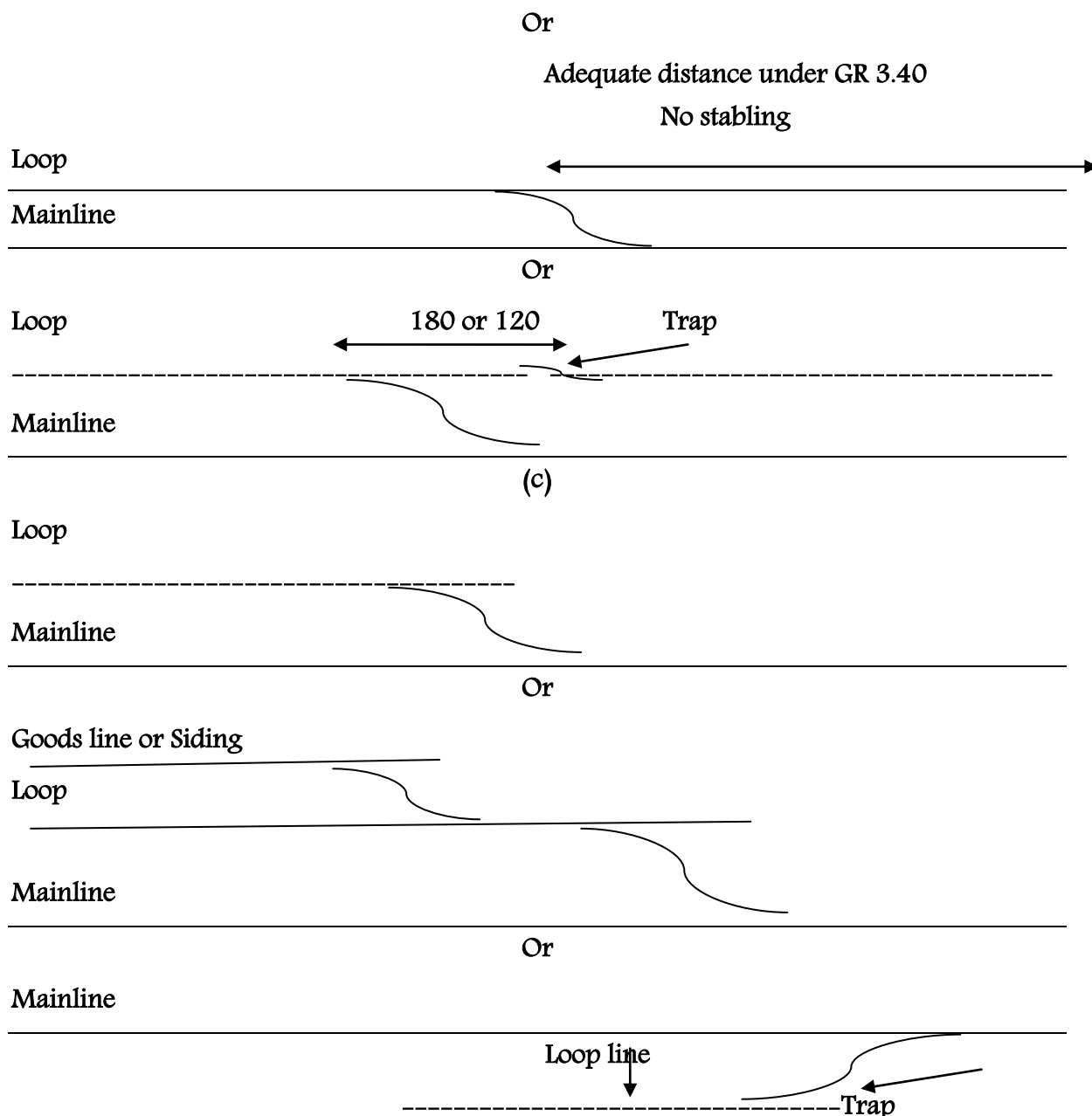
# Appendix "A"

(Rule 36 (9))

Diagram illustrating method of providing isolation

(a) Adequate distance of 120/180m





## Appendix "B"

(Rule 43 (7) )

### Catechism for S&T Installations

#### Inspection at the Signals.

- (1) Are all running signals controlling trains placed in such a position and at such a height above rail level so that they can be clearly seen by LPs in sufficient time and be readily distinguished by night or by day from the subsidiary signals?
- (2) Are all signals constructed so that their normal position is at 'on' or most restrictive and that they stand at or return to this position in case of a failure of any part of the signals or their connections?



Note. This paragraph does not apply to Automatic Signals, the normal position of which is 'off'

(3) Do all the signals come fully 'off' when worked and return freely to the 'on' position?

(4) In the case of slotted or controlled signals, can the signals be freely returned to danger by either of the controlling agencies?

Note. This paragraph does not apply where signals are controlled by key transmitters or similar form of control.

(5) Are signal counter weights, where possible, fixed out of reach?

(6) Is the facing side of the arms of all semaphore signals (including miniature and disc signals) painted the same colour as the light exhibited in the 'on' position?

Note. This paragraph does not apply to Calling-on signals.

(7) Are signals not in use fixed at 'on' and distinguished by having two crossed bars attached to them each bar being not less than 1m long and 100 mm wide?

(8) Are all signals of standard type and do they comply with the requirements as laid down in the GR and have they been passed by a Sighting Committee?

(9) (i) Are all fixed signals, the front light of which cannot be seen from the point from which they are worked, provided with a small white back light not larger than is actually necessary and visible only when the signal is at 'on'? Also, is the fixed green light of every Warner, which is used by it, provided with a white back light?

(ii) Do all the Distant Signals in multiple aspect area show two back lights in the 'on' position and no light in any other position or where electric lighting of Distant signals is provided, it shows at least one back light in the 'on' position?

Note. Colour light signals need not be provided with back lights since these are provided with visual indicators.

(10) Do miniature and dwarf signals, used to control shunting show the same front and back lights, as are prescribed for running signals and are the lenses small enough to make them distinguishable from running signals?

(11) Are signal lamp brackets fixed on the posts, and is suitable provision made for lighting and cleaning lamps?

(12) If any signal is placed at more than 180m away from the facing point it controls, is arrangement made to keep the points locked until the train has passed them?

(13) Are all the signal arms placed on the left hand side of the post as seen by the LP of approaching trains to which the signals refer?

(14) Are all signal posts placed on the left hand side of the track of approaching trains to which they refer? If placed otherwise, for what reason?

- (15) Where two or more lines diverge, are the signals fixed on a bracket post or on separate doll posts carried on a single bridge?
- (16) Where two or more lines converge, are the signals fixed on altogether separate posts or on separate doll posts carried on a signal bridge?
- (17) Are bracket and bridge signals arranged so that each signal from left to right, from the point of view of approaching trains applies to each corresponding line from left to right, and are they distinguished by 'grouping' and by making the more important signals higher than those of lesser importance?  
Note: The highest arm must always refer to the straight line.
- (18) In the case of two or more signals referring to parallel lines, are they arranged in transverse line as nearly as circumstances allow?
- (19) Does any case occur of more than one signal referring to trains moving in the same direction being placed on the same post, other than Warner, Shunt or calling-on signals?
- (20) (a) Are Warner Signals fixed 1.5m to 2m below a stop arm or fixed green light?  
(b) Are Co-acting or Calling-on signals placed not less than 2.5m below the semaphore arm above?
- (21) Are Warner signals, which are unworked, secured in the 'on' position?
- (22) Are arrangements made to render it impossible for the Warner arm to be taken 'off' independently of the stop arm above it and when the arm returns to danger, the Warner if 'off' automatically returns to danger?
- (23) At diverging junction, is one Warner signal only provided applying to the through line?
- (24) (a) Do all signal lights show red in the 'on' position or yellow / double yellow in the case of Distant signals or no light in the case of Calling-on signals?  
(b) Do all running signal lights show green in the 'off' position in two aspect signalling sections and yellow / double yellow / green in case of multiple aspect signalling sections?
- (25) Are signals where necessary effectively guyed?

#### Inspection at the Points.

- 1. Is the locking of facing points such that the points cannot be or become unlocked while a train is passing over them? i.e.,
  - (a) Are lock bars provided of a length exceeding the greatest distance between any two adjacent axles likely to be used on the line or alternatively is the point or lock lever electrically controlled by track circuits?
  - (b) In the case of key locks, are the locks either under the train and therefore inaccessible, or if not place under the train, is the arrangement such that the key

is used to release the signals and that it cannot be brought back to the points until such signals have been put to the 'on' position?

2. Is the arrangement such that the operation of the facing point lock depends on the correct operation of the lock bar where used, and is it impossible for the lock bar to be forced over while a train is passing over it?
3. Are the locks of a substantial pattern and make? Are they fixed in such a manner as to secure the necessary rigidity and are key sufficiently large and strong to minimise the chance of their being mislaid or broken?
4. Do key locks fitted to facing points on passenger running lines lock both switches?
5. Are switches adjusted to come tight against stock rails? Does the insertion of a 5mm obstruction piece between the switch and stock rails 150mm from the toe of the switch prevent the points being locked and prevent the relevant signal from being taken 'off', the giving of which is preceded by the locking of the points?
6. Do facing point lock plungers clear the stretcher blade when the points are unbolted and in the event of there being an obstruction at the points, it is impossible for the point lock plunger to enter the stretcher blade and for the point lock lever to be forced into its normal or reverse position?
7. Are all facing points fitted with a gauge tie plate where steel sleepers are not provided at the tow of the switches, and are they provided with split stretcher bars or other fitting giving equal security?
8. Are all point locks and detectors securely fixed?
9. (a) Are detectors fitted to all facing points and do they efficiently detect with both switches the signals controlling the movement of trains over them?  
(b) In case where the lock and switches are actuated by the same lever, do they detect the locking mechanism as well as switches?
10. Are trailing points on passenger running lines used in the facing direction for shunt movements which are not fitted with facing point locks detected with the relative Shunt Signals?
11. Is it possible for any detector slide to enter a notch other than that intended for it?
12. Do point indicators show the prescribed indications i.e., while for straight and green for the turn out in both directions and where fitted to trap points or to derails where there are still in use, red in both directions when the trap is open or the derail is on the line, and green in both directions when the trap is closed or the derail is off the line.
13. Where the point indicators of the directional type have been provided, has this been done under approved special instructions?

Inspection of the track.

1. Are all through lines isolated from each other, from other running lines and from all Sidings?
2. Are the running lines isolated from all Sidings and Goods lines, either by
  - (a) Trapping into dead ends taking 'off' the sidings or goods lines or
  - (b) Derailing switches or derails placed on the lines giving access from the sidings or goods lines to the running lines?

**Note:** The use of details is now obsolete. Existing ones may, however, continue to be used but what they require replacement, trap points should be substituted.

3. Are the dead ends traps, derailing switches or derails where these are still in use, so locked as to prevent any possibility of the running line being fouled for which signals have been taken off?
4. Are the dead end traps, derailing switches or derails where these are still in use, fitted with indicators or are they protected by signals?
5. Are these dead end traps, derailing switches or derails where these are still in use, placed in such a position as to ensure that any vehicles that may be derailed by them shall not foul any running line?
6. (i) Are all points worked by rodding within a distance of 320m from the lever operating them or in case of facing points on a passenger running line operated and locked by the same lever within a distance of 180m?  
 (ii) If the distances are greater than those are specified above, are they within 460m and 275m respectively, and are a stroke of not less than 200mm provided at the lever trail?
7. Is the rodding efficiently laid and properly compensated where necessary and means for adjustment provided?
8. Are all signal connections efficiently installed and means for adjustment provided?

#### **IV INSPECTION IN THE CABIN OR AT THE LEVER FRAME WHERE THERE IS NO CABIN**

1. Is the signal cabin provided with the following essentials?
  - a. A clock in cabins where train movements are registered.
  - b. A diagram correctly representing the arrangements of the points and signals worked from the cabin in their normal position and the number of points and signals.
  - c. Lights so arranged as not to be mistaken for running signals or interfere with their sighting.
2. Is there sufficient space in the cabin to allow the Cabinman or operator freedom of movements for manipulating the levers or other apparatus in the cabin?
3. Is the gear leading off from the cabin or frame securely fixed?

4. Are the levers painted with distinguishing colours and in addition to its own number does each lever bear the number of the levers, which must proceed it, and in the proper order?
5. Is the cabin so located and built as to enable the Cabinman to have the best possible view of all points and signals, the working of which he is responsible for and also for all movements under his control?
6. Are all signals, which are not visible from the cabin or frame electrically repeated? If so, does the repeater repeat the light as well as the arm?
7. Have instructions for working been issued to the staff and included in the working instructions, and are they correct and sufficient?
8. Is the SM provided with interlocked mechanical or electrical control of the Home and LSS?

#### **V. TEST TO BE MADE IN THE LEVER CABIN OR AT THE LEVER FRAME**

**Note.** It is essential that the interlocking of all signals with the points must be so effected as to ensure the following conditions, which may be tested from the cabin or frame by pulling over the levers for each combination allowed by the locking table and checking the security of each such combination by attempting to infringe it.

1. Is it possible to take 'off' conflicting signals at the same time?
2. Is it possible to take 'off' a signal until:
  - a. All points on the running line including overlap are correctly set and the facing points locked?
  - b. All points, give access to the running line from sidings and goods lines, are set against the running line?
  - c. LC Gates, if included in or controlled by the interlocking, are locked across the roadway?
  - d. A signal lever, when operated locks or back locks as necessary, the levers operating the points and gate locks referred to in this paragraph?
3. When all signals are 'on', are all points, which would be locked by the taking 'off' of such signals, free for shunting purposes?
4. Is it possible to take 'off' a Warner Signal until all the relative stop signals in advance have been first been taken 'off' and when 'off, does it back lock such signals?
5. Does the locking in the frame correspond with that shown in the approved locking table?
6. Is the locking strong, durable and accurate, i.e., can any tappet enter a notch other than that for which it is intended, or can the locking be forced?

7. Does the locking in the lever frame act on the commencement of the movement of the lever in case of direct locking type of lever frames and pressing the catch handle in case of catch handle / DW type of lever frame?
8. Is release locking not effective before the completion of the movement of the lever?

## APPENDIX B

### ADDITIONAL CATCHISM FOR POWER OPERATED POINTS AND SIGNALS

**Note.** These rules must be followed in conjunction with those laid down in the catechism for signalling and interlocking installations so far as they are applicable to power working.

#### **I. SIGNALS.**

1. Is the mechanism case weather proof and protected from unauthorised interference?
2. Do the indication contacts close if the arm is more than + or - 5° from 'on' or 'off' position?
3. Is the signal and hold off mechanism so constructed, that in the event of a failure, the signal shall go to the 'on' position?
4. With the exception of motor commutators etc., is a surface leakage distance of not less than 6mm provided between any exposed metallic part of the mechanism carrying current and any other metallic part thereof?

The following regulations shall apply to colour light signals only.

5. Are the signals so bright so as to cause confusion in reading at night?
6. When lamps are operated at normal voltages is the range (on a straight track) of signals used to govern high-speed trains, not less than 200m on a clear day with a bright sun at or near its zenith?
7. Are the signals so bright as to cause confusion in reading at night?
8. Does the signal give a distinct indication to drivers when approaching or stopped at a signal?

#### **II. POINTS.**

1. Is the switch operating mechanism of substantial design securely fixed and protected from unauthorised interference?
2. Is the mechanism provided with means of emergency operation in the event of a failure?
3. Does the use of the bank or other apparatus for emergency operation disconnect the power supply to the motor and prevent clearance of signal for which such points are required to be set?

4. With the exception of motor commutators, is there a surface leakage distance of not less than 6mm provided between any exposed metallic part carrying current and any other metallic part of the mechanism?
5. Is the mechanism so constructed that it can be stopped reversed or obstructed at any point of its movement with damage?
6. Is the mechanism so constructed that it cannot give a 'normal' or 'reverse' indication, unless the closed switch be within 5mm of the stock rail and in the case of facing points the switches are properly locked?
7. In order to prevent the movement of points while a train is passing over them, are facing points provided with a lock bar, (alternatively) with track circuit locking of the point lever?
8. Where the movements of trains over the points are not within easy visibility of the cabin, is occupation of the section between the stop signals leading over the points and the fouling point ahead of such points, electrically indicated in the cabin?

### III. CABIN & LEVERFRAME.

1. In the case of power interlocking frames, is the lever frame mechanism completely enclosed with removal covers giving free access to all parts and provisions made for securing such covers against unauthorised opening?
2. Have all exposed metallic parts carrying current, not less than 6mm surface leakage distance between them and any other metallic part of the mechanism?
3. Are the levers operating power worked points provided with 'normal' and 'reverse' indication locks, adapted directly to prevent the full movement of the lever, unless the point mechanism has made the required movement and the points are in a position corresponding to that of the lever and in case of facing points unless they are securely locked?

Note. This test need not apply where approved alternative electric locking is provided.

4. Are levers operating power worked signals provided with 'normal' indication locks, adopted directly to prevent the full return movement of the lever to the normal position, unless the arm has returned to the 'on' position?

Note. The test need not apply to a mechanical lever frame, if the signal is repeated at the place of operation through an arm and light repeater.

5. Are all electric locks mechanically replaced to the locking position?
6. Is all the wiring between different parts of the apparatus made with suitably insulated wire and efficiently protected?
7. Is the lever frame properly earthed and are efficient safeguards provided to prevent injury to the operator, in the event of a short circuit or other similar circumstances?

### IV. CABLE & CIRCUITS.

1. Do all main cable terminals in properly sealed boxes?
2. Are circuits controlling the operating and indication of signals so arranged, that as far as practicable, a cross connection or a short circuit on any of the wires, cannot give a false 'clear' indication?
3. Are circuits controlling the operation and indication of points so arranged that, as far as practicable, a cross connection or a short circuit, cannot operate the switch, or give a false indication of the position of the points?
4. Is the battery or power supply for line circuits, as far as practicable, arranged at the end of the circuit farthest from the operated unit?
5. (a) Are all main track circuits as far as practicable so arranged as to provide the best protection against broken rails, points crossings etc.,?  
(b) Are the adjacent track circuits staggered in polarity?
6. Are sidings and junctions track circuited up to the fouling mark or sidings derailing where this is still in use?
7. Are hand worked switches, in or leading to automatic signalling territory, equipped with a circuit controller operated by the normally closed switch?
8. Are such switches electrically locked by the approaching track circuits to prevent their movement in the face of an approaching train?

#### APPENDIX "C"

(see Rule 43 (7) )

### CATCHISM FOR SIGNALLING AND TELECOMMUNICATION INSTALLATIONS FOR 25 KV 50 HZ, SINGLE PHASE AC ELECTRIFIED SECTIONS

#### SECTION – I – SIGNALS.

1. Are the signals located in accordance with the approved instructions as per manual of instructions for installation of S&T equipment in 25 kv, 50 Hz Ac electrified sections?
2. Have the protective iron screens as required for signals / fittings within 2m of live conductor / parts been provided and earthed?
3. Where it is not possible to provide protective iron screens, has a caution board been provided on the signal posts in accordance with the approved instructions?
4. Has the signal sighting committee, certified that the LP's view of the signal is clear?
5. Have only multi-aspect signals been used in CLS area?
6. Is the AC power supply arrangement for the CLS of a type approved for RE areas?

#### SECTION– II – POINTS.



Have the rodding transmission of points and other apparatus been insulated as per the approved instructions?

#### SECTION – III – ELECTRICAL SIGNALLING EQUIPMENT.

1. Does the design of signalling equipment and the circuits used in RE areas provide for a safety factor of 1.5 against AC interference.
2. Has it been ensured that the signalling equipment not suitable for RE areas on external circuits like banner type indicators, luminous indicators, telephone type relays, electrical lever locks, rotary key transmitter, DC neutral polar relays, 250 ohms DC neutral line relays and door coils of IRS block instrument etc., have not been used?
3. Has it been ensured that all stick relay have at least 4 front 4 back contacts and their pick up transfer time is not less than 300 milli-seconds.

#### SECTION – IV – CABLING AND WIRING OF CIRCUITS.

1. Have all telephone circuits, except cabin to cabin and cabin to ASM circuits, which may be retained on signalling cable, been transferred to separate underground telecommunication cable?
2. Have all OHE circuits have been shifted or cabled as per the approved instructions?
3. Has it been checked that the voltages induced due to parallelism in the telecommunication cable under normal and short circuit conditions are within safe limits (limits specified by Consulting Committee of International Telegraph and Telephones?).
4. Has it been ensured that the earth return circuits are not retained and have been replaced by metallic return circuits except the block circuits?
5. Has the principle of double cutting been used for all external signalling circuits?
6. Have the external circuits and batteries been isolated from internal circuits and batteries?
7. Has it been ensured that the induced voltages in the length of inter-cabin telephone circuits in signalling cables does not exceed 60 V?

#### SECTION-V – BATTERIES.

1. Has it been ensured that power supply for internal and external circuits and for each block instrument are isolated?
2. Has it been ensured that the battery for signalling equipment is separate from the battery for telecommunication equipment?

#### SECTION – VI – EARTHING.

1. Have the lever frames and other equipment been earthed in accordance with the approved instructions?
2. Has it been checked that no earthing pipe is less than 3m away from any other earthing pipe?
3. Has it been tested that the earth resistance does not exceed 10 ohms for the signalling equipment and 1 ohm for telecommunication copper cable earth?
4. Has the screening of the telecommunication cable terminated at the sectionalising points and repeater stations been earthed in accordance with approved instructions?

#### SECTION – VII – TRACK CIRCUITS.

1. Has it been ensured that track circuits are of approved type?
2. Have measurements of DC track currents been taken before installations of DC single rail track circuits and whether these are within limits?
3. Has the longitudinal and transverse bonding in track circuited areas been provided as per the approved instructions?
4. Have the DC single rail track circuits of closed type been installed in accordance with the approved instructions?
5. Have the protective measures like surge discharges (intervals of discharge) been provided on track circuits, where required, as per the approved instructions?

#### SECTION – VIII – EMERGENCY CONTROL.

Have emergency control telephone post been provided at correct regular intervals along the track in electrified areas as per the approved instructions?

#### SECTION – IX – BLOCK INSTRUMENTS.

1. Are the block instruments installed of a type approved for use in AC electrified sections?
2. Have block filters for single and double line block instruments been provided in accordance with the approved instructions?
3. Are the filter units of an approved design?
4. Have the line terminals of block filters been painted red to caution the maintenance staff against high voltages?
5. Where a block section falls between an electrified and non-electrified section, has it been ensured that block filters have been provided for block instruments at either ends of such block section?
6. Have the block telephones been provided on a separate pair of conductors in accordance with the approved instructions?

7. Have the block circuits been provided on underground cables as per the approved instructions?
8. Have position polarised relays of SGE block instruments been provided in accordance with the approved instructions?
9. Have the block release and advance starter control of block instrument been provided in accordance with the approved circuit?
10. Has it been ensured that the circuits from a non-electrified section approaching and electrified section and vice-versa been cabled for a length of 1 KM beyond the electrified sections?

#### SECTION – X – GENERAL SAFETY:

1. Has the chart on method of treating electric shock been displayed in cabins and relay rooms etc.,
2. Has the rubber matting been provided in relay rooms, repeater stations and cable huts etc., as per the approved instructions?
3. Have special instructions been issued to the personnel that the accessible parts of the installation and apparatus in the repeater stations and cable huts, connected to the telecom cable are likely to attain an induced voltage of 150 V Ac under 5 normal working conditions and have such parts of installation and apparatus suitably marked to indicate this?
4. Have the metallic cabinets / covers / frames of telecommunication equipments provided in RE areas been earthed properly?
5. Are the protective devices installed on telephones provided at grid stations, 25 KV sub-stations and switching posts as per the approved instructions?
6. Are the tools used by maintenance staff properly insulated?

#### Para 21009, Sub-Para 1. Introduction of services on electric traction.

Prior to introduction of services with electric traction on any section, following certificates and documents are pre-requisite;

- (a) General safety certificate of works, signed by field level SAG / SG / JAG Officer directly in-charge of the Railway Electrification works.
- (b) Safety certificate for electrical works signed by field level Electrical Officer of SAG / SG / JAG rank from the Organisation undertaking the electrification works and countersigned by CEE (Open line) in acceptance thereof.
- (c) Safety certificate in respect of electric rolling stock signed by CEE, CME, COM, PCE & CSTE of the open line Railway.

(d) Certificate issued by Divisional Officers and countersigned by DRM as per pro-forma 10.05.

(e) Copy of SWRs which have been distributed to the various SMs.

**CHECKLIST FOR OPENING OF RAILWAY OR SECTION OF RAILWAY (ELECTRIFIED) FOR**

**PUBLIC CARRIAGE OF PASSENGERS**

S. No.	Description of the item	Railway remarks
2.1 (a)	Tabulated details	
2.1 (b)	Index plan and section of Railway	
2.1 (c)	Drawings of works	
2.1 (d)	List of questions and answers	
2.1 (e)	Certificates	
2.1 (f)	List of infringements of maximum and minimum dimensions. Whether the infringement has been condoned by Railway Board?	
2.1 (g)	Diagram of proposed testing train	
2.1 (h)	Working orders to be enforced at each station	
2.1 (i)	Results of bridge test as Form XVIII	
2.2 (a)	General Safety Certificate of works, signed by CEE and CSTE of the construction unit as per pro-forma – 10.19/1	
2.2 (b)	Safety certificates for electrical works to be signed by the CEE of Open line and CPM / CEE / Dy.CEE of Construction Organisation as per pro-forma 10.20	
2.2 (c)	Certificates regarding electric rolling stock to be signed by the CEE, CME, COM & PCE of the Openline of Railways as per pro-forma 10.21	
2.2 (d)	Certificate of Openline Officers and the knowledge of their staff regarding safety rules for electrified sections, existing pro-forma 10.05. It is also required to be signed by DRM.	
2.2 (e)	Copies of SWRs, traction working rules and diagrams which have been distributed to various station managers.	
2.2 (f)	Notification regarding energisation of OHE as required in terms of Para 21008 of ACTM, Vol. II, Part I, 1994	
2.2 (g)	Any other documents as desired by CRS.	

2.2 (g) (i)	Brief particulars of traction installations (Form X) as per pro-forma 10.22	
2.2 (g) (ii)	Power supply installation abstract (Form XI) as per pro-forma 10.23	
2.2 (g) (iii)	Traction Maintenance Depot abstract (Form XII) as per pro-forma 10.24	
2.2 (g) (iv)	Restricted OHE clearance abstract (Form XIII) as per pro-forma 10.25	
2.2 (g) (v)	Electrical crossing over railway track abstract (Form XIV) as per pro-forma 10.26	
2.2 (g) (vi)	The layout plan of the section or list of implantation of fixed structures where implantation is less than specified, alongside the track.	
2.2 (g) (vii)	The approval of energisation of HT installations mentioned including OHE issued by Electrical Inspector to Government of India	
2.2 (g) (viii)	Statement showing that the signalling works have been done in accordance with CORE Chapter XXII of IRSEM – Special requirement of signalling in AC electrified area – Jan.89	
3	Whether approval of BSNL is obtained and the validity thereof.	

Government of India  
Ministry of Railways  
Railway Board

No. 2014.CEDO/ORI/O/02

New Delhi 28.01.2015

The General Managers  
All Indian Railways

Sub: The Railways (open line for public carriage of passengers) (amendment) Rules, 2005 regarding signature of Officers on CRS application and its forms.

Ref: SWR letter No. W.347/DL/CN/BNC/AJP – HSD dated 06.8.2014.

1. Vide reference referred above, SWR had requested Board for clarification on matter relating to signing on CRS application and all the Forms by Railway Officers in accordance with Rule 2(f) (i) of “The Railways (Opening for Public Carriage of Passengers) (Amendment) rules, 2005.
2. The concerning extracts of “The Railways (Opening for Public Carriage of Passengers) (Amendment) rules, 2005 are as under:
  - (i) **Rule 2 (f) (i):** “In case of Government Railway”; the General Manager of a Zonal Railway, appointed under Section 4 and includes the Chief Administrative Officer, the Chief Projects Manager or any other Officer, not below the rank of Under Secretary to the Government of India, who is the Head of the Department and to whom the powers of the GM have been delegated by general or special order Under Section – 28”.
  - (ii) **Form No. XV:** It is list of questions and answers pertaining to Engineering, commercial, S&T, Operating, electrical and Mechanical Departments and the Annexures is being signed by respective Chief Engineer (Construction).
  - (iii) **Form XVI:** It is the certificate to be given by the General Manager with specific reference of Form XVII.
  - (iv) **Form XVII:** Infringement of maximum and minimum dimensions with reference to IRSOD.
3. This practice of signing the above mentioned documents i.e., form XV, XVI & XVII by respective Chief Engineer / Construction is continuing since long. CRS/Southern Circle vide his letter No. R.12027/2/2013-SR/470-471 dated 02.7.2014 to SWR had observed as under w.r.t. forms XV, XVI and XVII of CRS application.  
 “Therefore, it is desired that following documents, henceforth be signed by the General Manager”
  - (1) Reference letter, forwarding opening documents.
  - (2) Form No. XV – list of questions and answers.
  - (3) Form XVI – certificate to be given by General Manager.
  - (4) Form XVII – infringement of maximum and minimum dimensions.
4. The matter has been examined in Board and comments with board’s approval on CRS observations are as under;
  - (i) Since under Section 28, CE (C) in-charge of the project has been delegated power on behalf of the GM to apply to CRs for opening of the section, the forwarding document of the application should be signed by the CE in-charge of the project, as also being practiced.
  - (ii) Form XV – since these ‘questions and answers’ pertain to various departments involved in execution of the project, these need to be signed by Jag Officers of the concerned Departments and finally by the CE in-charge of the project.

(iii) Form XVI – this is the certificate to be given by the General Manager and hence, current practice of signature by all the concerned PHODs and the GM of the Railway shall continue.

(iv) Form XVII – It is the list of infringements to maximum and minimum dimensions w.r.t. IRSOD. Therefore, it needs to be signed by the CE in-charge of the project.

5. Further, there are many Forms specified to be submitted nu the Railway to CRS while applying for opening of the section in terms of Rules 4 & 5 of “The Railways (Opening for Public Carriage of Passengers) (Amendment) Rules, 2005”. The formats of these forms have no mention about signatory of the documents and at times, it also creates confusion on the railways/

6. It has, therefore, been decided by Board that signatories to various Forms shall be as under;

S. No.	Form No.	Contents	To be signed by
1	I	Curve Abstract	CE (C)
2	II	Gradient Abstract	CE (C)
3	III	Bridge Abstract	CE (C)
4	IV	Important Bridges – particulars of waterway and construction	CE (C)
5	V	Ballast and P. Way	CE (C)
6	VI	Station and station sites	CE (C)
7	VII	Station accommodation	CE (C)
8	VIII	Station machinery	CSTE (C) & CE (C)
9	IX	Level Crossing Abstract	CSTE (C) & CE (C)
10	X	Brief particulars of Traction installations	CEE (C)
11	XI	Power supply installation Abstract	CEE (C)
12	XII	Traction maintenance Depot Abstract	CEE (C)
13	XIII	Restricted OHE clearance Abstract	CEE (C)
14	XIV	Electrical crossing over railway track Abstract	CEE (C)
15	XV	list of questions and answers	JAG Officers of the concerned Departments and CE (C)
16	XVI	Certificate to be given by the General Manager	CE (C), CSTE (C), CEE (C), CAO/C, CCM, COM, CME, CEE, CSTE, PCE & GM

17	XVII	List of infringements of maximum and minimum dimensions	CE (C)
18	XVIII	Deflection test of Bridges	CE (C)

7. This issues with the approval of Board (MT, ML, MM & ME).

Enclosures : (Form I to Form XVIII)

(Alok Kumar)  
ED/CE

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

**No. RB/Safety-I/2004  
ALL General Managers**

**Date: 27.2.2004**

Sub: Guidelines for ensuring continuous visibility of signals and safety in the execution of electrification works.

In supersession of the earlier instructions contained in Board's letter of even number dated 28.3.2003, following revised guidelines for strict compliance:-

In the recent past there have been incidences where visibility of existing signals has been reported to be obstructed due to the erection of the OHE masts during the execution of the RE works on the approach to the stations. In order to ensure safety, specially continuous visibility of the signals for safe running of trains, the following guidelines are issued;

- 2.0 In the semaphore signalling territory, the CLS work should precede the OHE work. However, a timeframe should be agreed upon for charging the OHE and ATs (Auxiliary Transformers) to extend power supply to S&T installations. Wherever it is considered inescapable, the scheme for execution of RE works will be finalised by the CPM of the RE project in consultation with the COM, CEE & CSTE of the concerned Zonal Railway. In such cases, while executing the RE works, it must be ensured that:
- 2.1 No parts of OHE equipments viz., masts, booms, drop arms, brackets, wiring itself etc., come in the way of clear visibility of signals of the station to the LPs and Guards of the running trains.



- 2.2 In the mid-section, caution has to be exercised near LC Gates so as to ensure clear visibility of Gate Signals. Thereafter, near to and in station areas, caution has to be exercised.
- 2.3 OHE masts can be erected; brackets can be installed, but those may need swivelling parallel to the track along the masts, so as not to come in the way of signal visibility. While OHE portal booms would normally not obstruct the signals, the erection of drop arms may be deferred in case those come in the way of signal visibility.
- 2.4 Periodical foot-plate – cab inspections may be got conducted jointly by Traffic Inspectors, Signalling Inspectors, Loco Inspectors and OHE supervisors, to make sure that visibility of existing signals to the driving crew of running trains is not impaired by OHE.
- 2.5 The Supervisors of OHE, Signaling and Traffic, as also the Officers of the project should travel frequently with the LPs in the cabs to ascertain from the driving crew about the signal visibility.
- 2.6 OHE layout and sectioning diagrams for 25 KV AC traction should be made indicating the existing semaphore signals and the tentative position of proposed CLS and for the better visibility, higher implantation to OHE structures in front of the proposed CLS should be also indicated as prescribed or as per the site conditions on the advice of S&T Officers of the project.
- 2.7 The tentative locations of each mast / structures should also be marked on the rails. A joint inspection of site should then be conducted by the Electrical (OHE/Designs) and S&T engineers of the project. During the joint foot-to-foot inspections, the pre-pegging plans should be verified and if required, modified to suite the field conditions.
- 2.8 On electrified sections, the mats, portal insulators, wires and supports should not obstruct the visibility of signals. In addition, the signals have to so erected that they maintain a minimum clearance from the live parts of the OHE. The actual visibility shall, in all cases, be checked by a Sighting committee consisting of Officers of Traffic, Mechanical/Electrical, S&T and Civil Departments and action to improve the visibility taken on the recommendations of the Committee.
- 2.9 The distance between the signal posts and traction masts shall be as large as possible. In case, the traction mast is located in front of a signal post, the distance between the traction mast and signal post should not be less than 30m. In addition, it should be ensured that no traction mast is located in advance of a signal post at a distance less than 10m.
- 2.10 It is preferable to have the signals erected on the side other than that of the OHE mats. This may not be practicable in the case of signals on double line sections as

well as signals in station yards etc., When signals have to be erected on the same side of the track as the OHE masts, the following steps shall be taken to achieve adequate visibility;

- (a) For visibility of signals on tangent tracks, it is desirable that the signal shall be located within the OHE structure i.e., the distance of the signal from the track centre shall be less than the distance of the OHE mast from the track centre. To achieve this, the setting of OHE masts in the vicinity of CLS shall be as per Para 20.5 of Appendix – I of the ACTM, Volume II (Part II).
- (b) In the case of curved tracks, it may be desirable to place the signal outside the OHE mast for good visibility. The location and height of the signal in each case shall be decided by the sighting Committee.

- 3.0 Following additional precautions also need to be observed in the execution of Re works to ensure safety of train running:
- 3.1 Before 25 KV AC traction is introduced, necessary modifications to the existing electrical power distribution system / installations in the vicinity of tracks to be electrified may be carried out for safety and equipment and convenience of operation.
- 3.2 While doing foundations actually on site, the slope of the embankment should be observed from the point of view of soundness.
- 3.3 After erection of mast but before the grouting, the mast should be kept tilted away from the track.
- 3.4 During the erection of bracket assemblies, these should be aligned in the direction of the track and across the track.
- 3.5 During wiring, the concerned wires should be supported properly to avoid any entangling.
- 3.6 During Dropping and clipping, banner flags should be used invariably.
- 3.7 The drilling of holes for providing traction jumpers in rails should be done accurately with proper drill machines.
- 3.8 On sanction of the project, the foot-by-foot survey should be carried out and documents such as track survey plan, OHE pre-pegging plan, OHE pegging / layout plans etc., should be made.
- 3.9 Track survey plan should indicate all the important features of the tracks, other trackside installation and their chainage and distance from the centre lines of the nearest track. Some of the important features are signals, chainage, height and type of signalling (LQ, MAUQ, CLS), platform shed, their profile across the tracks, height and distance of column, edges of shelters, S&T overhead line running parallel and/or across the tracks, details of over line structures i.e., ROB,

FOB, fly-over and clearance, height, width of bridges, location, level crossing particulars, location of gradient posts and signal posts etc.,

- 3.10 The clearance study of over line structure should also take into account the maximum permissible speed of the section.
- 3.11 Based on the basic drawings / location finalised at cost-cum-feasibility survey, the detailed location plan should be prepared by the Civil Engineer of the project in consultation and close co-ordination with the Electrical and S&T Engineers for their respective items of service building. These location plans should be approved by the concerned DRM.
- 3.12 As the foundation work is generally done without any cautions, strict vigilance should be kept to avoid any mishaps due to train movements. In loose soil cases, shuttering and shorting may be necessary. In extreme cases of very large pits in loose soils, the work may be done in consultation with Railway engineers under traffic blocks, to ensure safety of track and train operation (Works as indicated in items 3.2 to 3.7, should be undertaken by advising SMs of adjoining stations in writing).
- 3.13 Core hole covers should be provided promptly on the casting of foundation (within 45 hours) and their edges cemented to foundation blocks. In case of platform areas and level crossings, the core holes should be filled with sand before provision of core hole covers so as to prevent any injury to rail users even if the core hole cover gets damaged or is displaced.
- 3.14 The excavated earth should be removed well clear of the area so as to avoid mixing up with the track ballast or any obstruction to track drains.
- 3.15 All structural steel should be so stored and handled at site and the members are not subjected to excessive stresses and damage to galvanisation also.

**(M.G. Arora)**  
**ED/Safety**  
**Railway Board**

**(Arun Saxena)**  
**ED/Signals**  
**Railway Board**

**(Mehtab Singh)**  
**ED/RE**  
**Railway Board**

## General Safety Precautions to be observed in OHE Territory

### S&T Department

#### DOs

- ✓ Warn the staff about the danger of coming in close contact to the live traction overhead wires within 2m.
- ✓ Do report any abnormality in OHE which may adversely affect safety to the TPC. If the damage is heavy or the moving dimensions are infringed take steps to protect the lines.
- ✓ While working on signal posts, keep away from OHE live conductors. If necessary, take 'power block' and 'permit to work' from TRD.

#### DON'Ts

- ✗ Do not work on any portion of a signal post or its fittings falling within a radius of 2m from 25 KV live OHE unless such portion is protected with a metallic screen or power to the live OHE has been switched 'off' and a 'permit to work' has been obtained. Paint a red band of 10cm wide all around the signal post at a height of 3m above the rail level at such locations. Counsel the staff accordingly.
- ✗ Do not depute the staff to work on a signal post where protective screen is not provided.
- ✗ Do not carry out any works within a distance of 2m from the live parts of overhead traction wires unless they are made dead and earthed; and 'permit to work' is obtained.
- ✗ Do not use steel measuring tapes or long metallic wires rod or levelling staff.
- ✗ Do not disturb track bonding / earthing of TRD installations.
- ✗ Do not touch the two ends of fractured rails with bare hands.
- ✗ Do not change track circuits without the knowledge of Traction Staff.

### Engineering Department

#### DOs

- ✓ Warn all the staff about the danger of coming in close contact to the live traction overhead wires within 2m.
- ✓ All staff to report immediately about any abnormality on the OHE which may adversely affect safety to the TPC. If damage is heavy or the moving dimensions are infringed take steps to protect the lines.
- ✓ The risk of direct contact with the live OHE is ever present while working in electrified sections such as for painting of steel work of through spans of bridges and platform covered sheds, etc., Therefore no work shall be done within a distance of 2m from the

live OHE without 'permit to work'. Also, no tool or any part of the body of the worker comes within the danger zone.

- ✓ The return current in the rails may cause a potential difference between two ends of a fractured rail and at an insulated joint, etc., provide temporary electrical connection invariably.
- ✓ When unloading the rails along side of the track, do ensure that rails do not touch each other to form a continuous metallic mass of length greater than 300m.
- ✓ During maintenance / renewal of track, continuity of rails shall invariably be maintained. For bridging gaps which may be due to removal of fishplates, breakage of rail etc., jumpers to be provided. The two ends of fractured rail should be temporarily connected by metallic jumpers of approved design taking necessary precautions.
- ✓ Since relaying unit involves removal of existing rails along with all the different types of traction bonds, provide temporary jumpers for passage of return current till such time the permanent bonds are fixed to the new rails.
- ✓ Maintain implantation as per SOD in consultation with TRD.
- ✓ In track circuited area, do not bridge insulated jointed rails with bare hands or with any metallic article. Also, do not have simultaneous contact with an insulated section of rail and non-insulated section of rails. Ensure availability of TRD, S&T staff at site for removing and replacing the traction bonds and jumper / bonding connections wherever required. Cancel the block to resume the normal traffic only after ensuring that traction bonds / cable jumpers have been reconnected by TRD, S&T staff.
- ✓ Do take care when carrying or handling long pipes, poles, ladders, overhanging on shoulders which may inadvertently come in contact with or within 2m of live OHE.
- ✓ Do always keep clear of all materials, the top of foundation block of OHE mast. Keep the top of foundation blocks of traction structures clear of all materials and tidy.
- ✓ Do give notice of 48 hours in advance to the TRD staff having alteration to alignment or level of track / relaying work of any major work on track in electrified territory is carried out.
- ✓ Do ensure that while excavating or digging near a mast foundation, the foundation is not exposed. All such works to be done under intimation to TRD staff.
- ✓ At LC Gate, do maintain approaching road levels such that the clearance between the top member of the LC gauge and the road level shall not exceed 4.67m.
- ✓ Provide continuous protective screens / parapet walls on all FOBs / ROBs and also ensure commissioning of FOBs only after completion of the work with all statutory provisions like screening, electrical earthing of FOBs steel work etc., Until then, the entry for FOB under construction shall be physically blocked for the use of public.

- ✓ While working on service buildings and structures in the proximity of OHE, do exercise special care to ensure that tools, measuring tapes, materials, welding cables are not placed in a position where they are likely to fall or may come in contact with OHE.
- ✓ While carrying excavation works adjacent tracks and cable routes in an electrified area, take adequate precautions for the safety of staff and to avoid damage to underground cables and rail bonds.
- ✓ No crane shall be worked adjacent to OHE unless OHE is made dead and earthed and authorised OHE staff is present.
- ✓ In case of wire snaps at level crossing, the Gate Keeper shall immediately make arrangements to stop all road traffic and inform the nearest SM / TPC / OHE section in-charge.
- ✓ As far as possible, use closed wagons for Engineering Material train.
- ✓ No part of a tree shall be nearer than 4m from the nearest live conductor. Any tree or branches likely to fall on live conductor should be cut or trimmed periodically to maintain this clearance.

#### **DON'Ts**

- ✗ Do not use steel measuring tapes, metal tapes, tapes with woven metal reinforcement, metallic levelling staff and long metallic wire rods on the electrified track.
- ✗ Do not touch fallen or hanging traction wires. In case the wires drop at a level crossing, the Gate Keeper shall make arrangements to stop all road traffic and keep the public away.
- ✗ Avoid contact with the rails when an electrically hauled train is within 250m.
- ✗ Do not touch two ends of the rail with bare hands. Gloves of approved quality shall only be used.
- ✗ Do not carry out any works within a distance of 2m from the live parts of overhead traction wires unless the traction wires are made dead and earthed and 'permit to work' is obtained from TRD.
- ✗ Do not cut or trim a tree near the traction OHE without the presence of an authorised traction staff and without obtaining 'permit to work' from TRD.
- ✗ Do not disturb track bonding or bonding provided to OHE structures. If any bond is disconnected / disturbed, immediately inform the traction staff.
- ✗ Do not remove / loosen the fishplates without making a temporary connection with a jumper or approved design.
- ✗ Do not bridge with bare hands or any metallic articles, the insulated joints or rails in track circuited area.
- ✗ Do not have simultaneous contact with an isolated section of rail and non-isolated section of rail of the same or other track.
- ✗ Do not use rails as route path for sitting or for such other purposes.

- ✗ Do not carry long pipes, poles, ladders, vertically which will come within the danger zone of 2m of live overhead traction equipment.
- ✗ Do not open temporary jumper without informing the TRD staff.
- ✗ Do not hang / keep loose the welding cable while ROB works are under progress.
- ✗ Do not raise the rail level under FOBs, ROBs and other over line structures. Do not slew track / realign without the knowledge of traction staff.
- ✗ Do not use any kind of tools or metal articles such as paint pots, oil case, metal bars, etc., which can be either lifted or be dropped or be carried by the wind on to the live OHE.

### Mechanical Department (C&W and LOCO)

#### DO's

- ✓ Warn all staff about the danger of coming in contact with the live traction within 2m.
- ✓ All staff to report immediately about any abnormality on the OHE which may adversely affect safety to the TPC. If the damage is heavy or the moving dimensions are infringed, take steps to protect the lines.
- ✓ No crane shall be worked on or near OHE unless an authorised representative of OHE is present. When so working, care shall be taken to avoid hitting or damaging OHE structures.
- ✓ Observe Caution Orders and signals exhibited by OHE staff working at site.

#### DON'Ts

- ✗ Do not climb / get on to the locomotives / carriages standing below the OHE unless the OHE is made dead and earthed.
- ✗ Never direct a jet from a hose towards OHE while filling water, the jet of water should only be directed horizontally far away from the live OHE and not vertically.
- ✗ Do not carry long poles or any other articles which may come within the danger zone of 2m of the live traction wires.
- ✗ Do not open water filling hydrants till the other end of the hose pipe has been inserted in the tank of the carriages. Do not withdraw the hose pipe from carriage tank till the hydrant is closed. This is necessary to avoid accidental contact of a water jet with the live overhead traction wires.
- ✗ While attending the diesel loco, do ensure that tools do not get within the danger zone of 2m of the OHE.

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GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS (RAILWAY BOARD)

RB/L&A/005/2012 No. 2012/LM (PA)/3/5

New Delhi, dt.11.09.2012

**General Managers,  
All Indian Railways**

**Sub.        Comprehensive instructions for provision of Passenger Amenities at  
Stations.**

Railway Board had constituted a Committee of Executive Directors to review the norms for provision of passenger amenities. The terms of reference of the committee included a review of the norms for provision of Passenger Amenities viz., minimum essential, recommended and desirable amenities at stations prescribed vide Board's letters no. 94/LMB/2/175 dated 17.1.2007 and 15.02.2007, in view of the changing requirements and technological improvements in the country and suggesting measures for improving General Cleanliness and environment conditions at stations.

2. Accordingly, the Committee examined in detail the entire gamut of amenities provided at stations and reviewed the existing instructions on level of passenger amenities at stations and submitted a report, which has been approved by Board. Based on this report, revised comprehensive instructions on provision of passenger amenities (enclosed) have been prepared.

3. Salient features of the changes made with reference to Board's letters no. 94/LMB/2/175 dated 17.1.2007 and 15.2.2007 are as follows:

- a. For the purpose of categorization of stations, criteria have been revised.
- b. Adequate number of water taps to be provided and located suitably to serve passengers of general second class coaches. Push button taps to be provided at 'E' category stations with suitable alternate arrangements where piped water supply is not available. One tap at every alternate water booth to be designed to meet the requirement of persons with disabilities.
- c. Provision of water coolers as per norms on platforms at 'A1' to 'D' category stations as Minimum Essential Amenity (MEA).
- d. Induction of solar energy technology for improved lighting and segregation of lighting levels during "no train" and "train" periods.
- e. Platform shelters to be suitably spaced to cover the area where general second class coaches stop. Norms for platform shelters for 'D' and 'E' category stations revised.
- f. Escalators/elevators to be introduced at 'A1' category and escalators at 'A' category, 'C' category and stations of tourist importance under desirable amenities.



- g. Travellator as ramp to be provided at 'Al' and 'A' category stations as desirable amenities.
- h. Provision of standard signage has been extended to 'A' and 'B' category stations under Minimum Essential Amenities.
- i. Dustbins to be provided at a spacing of 50 meters at 'Al', 'A' and 'B' category stations without obstructing the movement of passengers.
- j. Washable aprons with water hydrants/water jet system to be provided on platforms where trains stop for longer duration during the morning period.
- k. Provision of Foot Over Bridges (FOB) at crossing stations, during doubling or gauge conversion upto 'D' category station, wherever no FOB is available.
- l. AC VIP Lounge/ Executive Lounge to be provided at 'Al' category stations under desirable amenities.
- m. Coin Operated Ticket Vending Machines to be provided at 'Al', 'A', 'B' and 'C' category stations under desirable amenities.
- n. Passenger operated Touch Screen Enquiry terminals extended to 'B' category stations also under desirable amenities.
- o. N-Max i.e. maximum number of passengers dealt at stations during peak hours has been defined clearly.
- p. Strategic measures to ensure cleanliness at stations have been introduced.

4. The scheme of Adarsh stations was introduced in the year 2009. It is considered that there is an urgent need to shift the focus of Adarsh stations from beautification to utility, comfort and cleanliness and also to facilitate cleanliness and upkeep of the station. Accordingly, revised instructions on Adarsh stations in supersession of Board's letter No. 2009/TG-IV/ 10/PA/Adarsh Stations dated 17/09/2009 are being issued separately.

5. Railways are requested to disseminate the contents of the revised Circular (which supersedes the earlier circular issued under Board's letter No. 94/LMB/2/175 dated 17.1.2007 & 15.2.07) widely in the field and take necessary action for its early implementation.

This issues in consultation with the Finance Directorate of the Ministry of Railways. Please acknowledge receipt.

(DESH RATAN GUPTA)  
Exec. Director(Land & Amenities)-III  
DA: 20 pages

(A. MADHUKUMA REDDY)  
Exec. Director (Passenger Marketing)

Copy forwarded for information to the FA&SCAOs, all Indian Railways

For Financial Commissioner, Railways

## **COMPREHENSIVE INSTRUCTIONS ON PROVISION OF PASSENGER AMENITIES**

### **1. GENERAL.**

- 1.1 Indian Railways carry the highest volume of passengers. Considering the large volume of passenger traffic, Indian Railways need to create infrastructure to meet the growing aspirations of rail users.
- 1.2 Comprehensive instructions issued in Jan' 2007 on provision of passenger amenities at railway stations, have been reviewed in view of technological advances and to fulfill the increased expectations of our passengers for enhanced amenities/facilities at railway stations.
- 1.3 While planning for provision/augmentation of amenities, due consideration needs to be given to the importance of the station from the point of view of passenger traffic.

### **2. CATEGORISATION OF STATIONS.**

- 2.1 Stations have been categorized in seven categories, i.e. A1, A, B, C, D, E & F depending upon the earning which is the indicator of passenger traffic. Criteria for categorization of stations are enclosed as Annexure-I.
- 2.2 The categorization of stations shall be reviewed every five years. The last review was done in 2007-08 based on the earnings of 2006-07. Categorization based on the earnings of 2011-12 shall be reviewed in 2012-13. Zonal Railways are advised to review the station categorization in accordance with the earnings for the year 2011-12 as the revised categorization shall remain unchanged for the next 5 years. The number of stations falling under various categories shall remain unchanged till next review is done.
- 2.3 For the purpose of categorization of stations, the basic parameter is the passenger earnings of each station, from both reserved and unreserved passengers. The earnings are to be calculated on the basis of the number of passengers boarding at a particular station (both, reserved and unreserved), irrespective of the location from where the ticket has been issued. The data of passenger earning should be collected from PRS, UTS, SPTM and JTBS etc.,

### **3. MINIMUM ESSENTIAL AMENITIES (MEA).**

- 3.1 When a station is constructed, certain minimum amenities are required to be provided at each category of station (on the basis of projected traffic/earnings). These are called Minimum Essential Amenities (MEA).
- 3.2 Keeping in view of need for enhanced amenities at stations, norms of some MEAs have been revised. Norms for provision of Minimum Essential Amenities required to

be provided in each category of stations are enclosed as Annexure -H and quantum for provision of Minimum Essential Amenities required to be provided are enclosed as Annexure III. Availability of these amenities will have to be ensured. Railways will immediately undertake a survey to confirm availability of the minimum amenities as per the prescribed scale, at all the stations on the basis of earnings of the station and provide minimum essential amenities as per the prescribed scale. Minimum Essential Amenities as per revised scale prescribed in this circular, based on categorization of stations as per passenger earnings for 2011-12, are required to be provided by 31st March, 2016. Subsequently, quinquennial review is to be conducted with respect to availability of minimum essential amenities vis-à-vis category of stations at that time.

4. **RECOMMENDED AMENITIES.** Provision of Amenities as per recommended scale.
  - 4.1 The availability of amenities at station as per norms of "Minimum Essential Amenities" (vide Annexure-III) may not be commensurate with the actual passenger traffic dealt at the station. Hence, the requirement of actual amenities based on traffic as per the norms laid down in Annexure IV should be worked out and any augmentation based on this, will be known as Recommended Amenities.
  - 4.2 Powers of GM of the Railway to review – In case quantum of amenities as worked out on the basis of norms for Recommended Amenities in Annexure IV is less than quantum prescribed for Minimum Essential Amenities in Annexure 'III', the actual quantum of Minimum Essential Amenities to be provided could be reduced, with the approval of GM and Board should be intimated of the same. No further delegation is permitted for such approval.
  - 4.3 Provision of recommended level of amenities at stations, which is a parameter of adequacy of the scale of amenities provided as per actual passenger volume, has not received adequate attention. Railways should review the existing facilities vis-à-vis requirements for recommended amenities and a time-bound action plan be made for augmenting shortfalls, as a thrust area.
5. **DESIRABLE AMENITIES.**
  - 5.1 Desirable amenities are those amenities which are considered desirable to improve customer satisfaction and interface process at the station. The quantum of these amenities would depend upon the category of the station. Norms for Desirable level of amenities at various categories of stations are given at Annexure -V.
  - 5.2 Various amenities out of the list given in Annexure 'V' should be provided based on the need and relative importance of the station.
  - 5.3 Calculation of passenger volume.

- 5.3.1 The method of calculation of number of passengers per day and maximum passengers at any time per day should be uniform. Zonal Railways should ensure that the number of passengers per day (originating passengers) is calculated as an average number of passengers (reserved and unreserved category) booked by PRS and UTS/other system over a period of one year (excluding the month pertaining to the period of Mela traffic.). Normally, the number of passengers handled at stations is double of reserved/booked passengers to account for the inward passengers. However, the criteria for provision of facilities at stations would continue to be based on earnings.
- 5.3.2 For the purpose of calculating N Max(the maximum number of passengers), Zonal Railways should consider maximum number of trains dealt with in any interval of half an hour at the station and multiply the same by the average number of passengers dealt per train at that station. The average number of passengers per train at a station shall be the average number of daily passengers dealt with at the station divided by the number of trains stopping at the station during 24 hours.

## **6. DISPLAY OF AVAILABLE AMENITIES.**

At each station, a list shall be displayed in Station Manager/Master's room showing the quantum of Minimum Essential Amenities required to be provided for that category of station, as per these guidelines, vis-a-vis the amenities actually available. The details of other amenities available at the station should also be displayed.

## **7. PREPARATION OF MASTER PLANS AND PLANNING FOR PASSENGER AMENITY WORKS.**

- 7.1 The Zonal Railways shall carry out a survey of available amenities at stations in relation to those listed in the Annexures.
- 7.2 Drawing from the results of this survey, a list of the Minimum Essential Amenities, Recommended and Desirable Amenities to be provided, should then be separately drawn up station-wise for each route. The Master Plan for each station should show the amenities required.
- 7.3 These lists shall continue to form the basis for drawing up the Divisional Action plans. Action Plans so formulated should then be amalgamated into one General Action Plan and inter-se priorities for different works assigned.
- 7.4 Minimum Essential Amenities should be provided first as per the scale at all categories of stations. Thereafter, priority should be given for augmenting amenities to recommended level at AI, A, B & C category stations.
- 7.5 Keeping the normal allocation of funds, under the Plan Heads "Passenger Amenities" in view, a time -frame be allocated to each phase of the General Action Plan. Low

cost amenities items for which funds can easily be earmarked be taken up earlier than those requiring heavy outlay even if the latter are higher in the priority. Remaining works should be prioritized in a manner such that, gaps in minimum essential amenities, recommended amenities and desirable amenities are filled up, generally in that order.

- 7.6 Minimum Essential Amenities as prescribed in Annexure shall be provided as part of the concerned Plan Head at the time of construction of new stations. Elimination of shortfall in Minimum Essential Amenities at existing stations and augmentation of any facility at a station shall, however, be charged under Plan Head "Passenger Amenities".

**8. OTHER IMPORTANT ASPECTS.**

- 8.1 Definition of Platform: Island platform should be treated as single platform for provision of Minimum Essential Amenities. (Circular No. 2000/LMB/2/ 212 dated 23.06.2000)
- 8.2 **Foot Over Bridges.** New FOBs should be at least 6 m wide at 'A-1', 'A' and 'C' category stations, wherever feasible. New FOBs at 'A1' & 'A' category stations should be compatible for installation of escalators. Foot over-bridges shall be provided at all crossing stations during doubling/gauge conversion upto 'D' category stations, wherever the same are not available.
- 8.3 **Toilets.** All toilets should be gradually converted to Pay & Use toilets as per guidelines issued under Board's letter No. 05/TGIV/ 1.0/SAN/ 32/Pay86 Use Policy Dt 7.6.06.

**At Suburban stations.**

(a) Only urinals should be provided at the end of the suburban island platforms • as the major requirement of suburban passengers is a urinal. Wash basins should invariably be provided near the urinals.

(b) The power to dispense with provision of toilets/urinals at the platforms is delegated to the General Managers.

(c) Toilets should be provided only in concourse/circulating areas of suburban stations. 'Pay & Use' toilets should be provided in the concourse/circulating area of all stations. However, at stations where the provision of 'Pay & Use' toilets is not feasible, departmentally operated toilets can be provided with the approval of Divisional Railway Manager.

**At Non-suburban stations.**

(a) The power of provision of urinals instead of full toilets at the platforms of A1, A 8r, B category stations is delegated to the General Managers.

- (b) Only urinals should be provided on island platforms at other than A1, A & B category stations. Wash basins should invariably be provided near the urinals
- 8.4 **Signage:** All the signage at the station should be standardized in terms of Railway Board's circular No. 97/TGI1/39/ 11 /signage dt. 11.3.99. For location of signage, a plan should be made for each station.
- 8.5 **Stalls & Trolleys:** The number of trolleys and catering stalls under the platform shelter should be reduced to a minimum and Automatic vending machines should be encouraged to replace existing vending stalls. The norms circulated by Tourism and Catering Directorate in this regard should be adhered to.
- 8.6 **Circulating Area:** In the circulating area, proper traffic movement flow plan should be made. Proper landscaping in the circulating area should also be developed. Wherever circulation areas are redesigned, altered, or whenever stations are congested, possibility of providing FOB landings directly into circulating area should be examined as it decongests main platforms. There should be proper segregation of incoming and outgoing passengers, wherever considered necessary (Detailed guidelines have been issued under Board's letter No. 2005/LMB/02/267 Dt 7.12.05).
- 8.7 **Entry & Exit:** Proper planning is essential to facilitate easy movement of passengers at stations. In order to decongest the entrance, separate entry/exit gates to be provided at stations, wherever feasible. All unauthorized entry points into the stations irrespective of their class should be closed excepting the specified exit and entry.
- 8.8 **Illumination & Energy saving:** The illumination at the stations should be improved. The enquiry and Booking Offices should be specially brightened up at all the stations. LED based station name boards on the station building shall be provided at A-1, A & B category stations as per RDSO specifications. Platform name-boards should be suitably illuminated so that the station name is visible at night to the passengers travelling by trains.

For ensuring energy conservation:

- (a) Platform lighting circuit shall be segregated such that during "No train" period about 30% lights are 'ON' and before train arrival all the lights are switched 'ON'. In this regard, necessary changes in electrical circuits at stations may be planned in a phased manner.
- (b) All the electrical fittings and power supply equipments with at least BEE's 3 star rating shall be used.
- (c) All important stations of historical and archeological value may be suitably illuminated.

- 8.9 **Mobile & Laptop Chargers.** 5 pin, 5 amp, 230v (Railway approved) sockets for mobile and laptop charging shall be provided in adequate numbers at refreshment rooms and Waiting Rooms.
- 8.10 **Air Cooling System.** At A-1, A & B category stations where natural ventilation is not adequate, air cooling system should be installed subject to feasibility.
- 8.11 **Floorings.** Flooring standards for platform, concourse and FOB/waiting room, etc., as per instructions issued by RDSO (accepted by Board) may be followed in new works, renovation or replacement works. (RDSO letter No.WKS/WS/05/FS dated 22.09.09).
- 8.12 **Booking counters.** Booking counters upto 'E' category stations shall be provided with UTS system.
- 8.13 **Dustbins.** Adequate number of uniformly designed standard dustbins should be provided at all categories of stations. At A-1, A, B, and D categories of stations, dustbins should be provided at regular spacing of 50 meters on each platform. At C and E category stations, adequate number of dustbins as required should be provided. It must be ensured that provision of dustbins does not impede the free flow of passengers.

## 9. AMENITIES FOR PERSONS WITH DISABILITY (PwD).

- 9.1. As per extant instructions, Short term facilities, consisting of following 7 items are to be provided at all stations:
  - i. Provision of standard ramp with railing for barrier free entry.
  - ii. Earmarking at least two parking lots for vehicles used by disabled persons.
  - iii. Provision of a non-slippery walkway from parking lot to building
  - iv. Provision of signage of appropriate visibility.
  - v. Provision of at least one drinking water tap suitable for use by a disabled person.
  - vi. Provision of at least one toilet on the ground floor.
  - vii. "May I help You" booth. (Detailed drawings/guidelines for the above were laid down in RDSO's report of Nov.1998, circulated under Board's letter No. 96/LM(B)/2/404 Dt 30.12.1998)
- 9.2 Above facilities have already been provided at all A1 & A category Stations, and are now being extended to all B category stations. Above facilities should be provided at the remaining 'B' category stations at the earliest. These facilities should also be extended to all other category of stations.
- 9.3 As per extant instructions, Long-term facility, comprising of following 2 items are to be provided:
  - (i) Provision of facility for inter-platform transfer.

(ii) Engraving on edges of platforms. Above facilities are to be provided at AI, A & B category stations.

- 9.4 Regarding inter-platform transfer, provision of 1 in 12 ramps/lifts to existing FOBs/Subways may not be feasible as a general solution. This facility has to be mainly provided through pathways at the end of platforms for disabled passengers, on wheelchairs (to be provided free of cost), duly escorted by coolies (on payment), as per present practice. Accordingly, pathways at platform ends, wherever not existing presently, should be provided in a time bound manner, beginning with AI and A & B category stations. Moreover, these should be properly provided with precast CC/paver blocks at track crossings etc and laid to accurate level, to ensure a smooth ride for handicapped persons on wheel chairs, without need for lifting at any stage. The other long-term facility, viz., engravings on platform edges may also be taken up progressively beginning with AI, A and 'B' category stations.

#### **10. MAINTENANCE OF PASSENGER AMENITIES.**

- 10.1 It is important to maintain the amenities provided at all the stations in good working order at all times. Maintenance staff shall carry out repairs needed to restore the amenity to functional order, immediately after receipt of information from the Station Master/Station Manager. Hygiene and cleanliness should be an important activity for day to day monitoring.
- 10.2 General Manager shall arrange to provide adequate imprest with Station masters of stations where Railways maintenance staff are not headquartered, to enable them organize expeditious repairs to small items of passenger amenities such as hand pumps/taps, water trolleys, clock, light/fans, urinal/latrines and furniture at the station.

#### **11. WEB BASED PASSENGER AMENITY MANAGEMENT SYSTEM.**

Additions/Modifications to the passenger amenities available at the stations should be incorporated in the data base & Passenger Amenities Management System on web based IRPSM module. For this purpose, window shall be opened periodically to update data and Railways shall be required to complete updation of passenger amenities' data by the notified date.

#### **12. MEASURES FOR IMPROVING CLEANLINESS AND HYGINE.**

Passengers coming to Railway Station should be educated through Public announcements, posters, TV/Radio Commercial spots to keep the Station clean. Punitive measures should also be put in place to penalize people found littering, spitting, defecating at inappropriate places in Railway Premises.

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## ANNEXURE-I

## CATEGORIES OF STATIONS FOR PROVISION OF PASSENGER AMENITIES

S No	Category	Criteria
1	A1	Non-Suburban stations with an annual passenger earning of more than Rs. 60 crores.
2	A	Non-suburban stations with an annual passenger earnings of Rs. 8 crores and upto Rs 60 crores.
3	B-1	I. Non suburban stations with annual passenger earnings between Rs. 4 crores to Rs. 8 crores. II. Stations of tourist importance or an important junction station (to be decided by G.M.).
4	C	All suburban stations*.
5	D	Non suburban stations with passenger earnings between Rs. 60 lakhs and Rs. 4 crores.
6	E	Non suburban stations with passenger earnings less than Rs. 60 lakhs.
7	F	Halts

\*For station dealing with both suburban / non-suburban traffic, the Railway may take a view regarding up-gradation of classification depending upon station earnings, quantum of non-suburban traffic, etc.

**Note.** Annual Passenger Earnings at the station for the purpose of the amenities shall be worked out as per Para 2.3 of the instructions.

\*\*\*\*

## ANNEXURE - II

## MINIMUM ESSENTIAL AMENITIES AT VARIOUS CATEGORIES OF STATIONS

S. No.	Amenities	Station Category						
		A1	A	B	C	D	E	F
1	Booking facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Drinking water piped / hand pump	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Waiting hall	Yes	Yes	Yes	...	Yes	Yes	Yes
4	Seating arrangement	Yes	Yes	Yes	Yes	Yes	Yes	...

5	Platform shelter shady trees	Yes ...	Yes ...	Yes ...	Yes ...	Yes ...	Yes ...	... Yes
6	Urinals	Yes	Yes	Yes	Yes	Yes	Yes	...
7	Latrines	Yes	Yes		Yes	Yes	Yes	...
8	Platforms: High level Medium level Rail level	Yes ... ...	Yes ... ...	... Yes ...	Yes ... ...	... Yes ...	... ... Yes	... ... Yes
9	Lighting #	Yes	Yes	Yes	Yes	Yes	Yes	Yes@
10	Fans	Yes	Yes	Yes	Yes	Yes	Yes	...
11	FOBs	Yes	Yes •	Yes	Yes	©	...	...
12	Time table display	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	Clock	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	Water cooler	Yes	Yes	Yes	Yes	Yes	...	...
15	PA system / computer-based announcement	Yes	Yes	Yes	...	...	...	...
16	Parking-cum- circulating area with lights	Yes	Yes	...	...	...	...	...
17	Electronic train indicator board	Yes **	Yes	...	...	...	...	...
18	Public phone booth	Yes	Yes	...	...	...	...	...
19	Signage (standardized)	Yes	Yes	Yes	...	...	...	...

• With cover.

\*\* At station entrance/ concourse, on Foot-over bridges (at landing locations) and on platforms located appropriately to guide passengers at every stage.

# Stations may be electrified as per provisions of Board's circular No. 95/Elec. (G)/109/1 dt. 1.2.95.

@ Where train stops at night.

© Foot over-bridges shall be provided at all crossing stations during doubling/gauge conversion upto 'D' category stations, wherever the same are not available.

\*\*\*

## ANNEXURE – III

## NORMS OF MINIMUM ESSENTIAL AMENITIES AT VARIOUS CATEGORIES OF STATIONS

S. No.	Amenities	Station Category						
		A1	A	B	C	D	E	F
1	Booking facility % (No. of counters)	15	10	6	4	4	2	1
2	UTS as per norms	Yes	Yes	Yes	Yes	Yes	Yes	...
3	Drinking water (No. of taps/PF) ^^ \$	20	20	20	6	8	2*	appropriate drinking water facility
4	Waiting hall @ Sq.m	250	125	75	0	30	15	10 sq.m booking office-cum-waiting hall
5	Seating arrangement (Nos. of seats / PF)	150	125	100	10	50	10	...
6	Platform shelter (on each PF)#	500 sq.m	400 sq.m	200 sq.m	200 sq.m	50 sq.m +	50 sq.m +	Shady trees
7	Urinals ##	12	10	6	4	4	1	...
8	Latrines ###	12	10	6	2	4	1	...
9	FOB ®	1 with cover	1 with cover	1	1	® ®	...	...
10	Water cooler &&	2 on each PF	2 on each PF	2 on each PF	2 on main PF	1 on main PF	...	...
11	Signage (standard)	Yes	Yes	Yes	...	...	...	...
12	Platforms ***	High	High	Medium	High	Medium	Rail level	

		level	level	level	level	level	
13	Lighting ++ (Lux level)	As per Annexure II of RB letter No. 2004/Elec (G)/109/1 dated 18.5.2017					
14	Fans ☉	As given below					
15	Time table display	To be decided by Zonal Railways					
16	clock	As per extant instructions					
17	PA system – computer-based announcement	As per extant instructions					
18	Parking-cum-circulating area, with lights	As per extant instructions					
19	Electronic train indicator board	As per extant instructions					
20	Public phone booth	As per extant instructions					

% A At Al, A, B, C & D category of stations, the booking counters to operate round the clock except at stations where there is no night working.

^ At stations falling in water scarcity zones or where water source dries up in summer, drinking water facility should be ensured at every platform by means of syntax tanks/ CANS / Matkas/Piaos etc. as decided by GM of the Railways. At less important stations, particularly those falling under category E & F, one water supply source at a location convenient to passengers may be provided. Drinking water facility would include all necessary units whether donated by private parties or provided by the Railways themselves.

\$ There should be one drinking water tap suitable for use by disabled persons on alternate water booths at every platform.

^^ Adequate number of water taps should be suitably located to serve passengers of GS coaches, i.e. at the end of platforms.

\* At 'E' category stations, wherever piped water supply is not feasible due to local conditions, separate arrangement for potable water at each platform shall be made available with the approval of General Manager of the concerned Zonal Railway.

\*\* drinking water arrangements should be made at halt stations by means of water taps/hand pumps/tube wells/sintex tanks/piaos as decided by the General manager of the concerned Zonal Railway.

@ If the variation is marginally on the lower side (upto -5 sqm), then it can be taken to be adequately provided.

#Shelter should be suitably spaced ensuring natural light and ventilation and covering areas from where passengers aboard the General Coach.

+ Preferably light weight shelters.

##1. Number of latrines/urinals includes provision in waiting room/halls. 1/3rd of the toilet may be reserved for ladies. In case of 2 toilets existing, one each should be earmarked for ladies & gents.

2. Number of latrines/urinals can be reduced in water scarcity areas by the Railway with the approval of GM.

3. Includes pay and use toilets. The policy for setting up such toilets be referred in terms of Board's letter No. 05/TGIV/10/SAN/32/Pay86 Use Policy Dt 7.6.06. ® New FOBs should be at least 6 m wide at 'A-1', 'A' and 'C' category stations wherever feasible.

® New FOBs at 'A' 86 'A' category stations should be compatible for installation of escalators.

® ® Foot over-bridges shall be provided at all crossing stations during doubling/gauge conversion upto 'D' category stations, wherever the same are not available.

&& To be provided as per Board's letter No. 69/Elec(g)/730/8 Dt. 30.03.1971.

\*\*\* (a) On all New lines, Gauge Conversion & Doubling projects, minimum level of platforms shall be medium level (Board's letter No. 2003/LMB/ 14/29 Dt. 26.4.2005). Wherever medium level of platform is to be provided as per norms, the same shall be with the foundation for high level platform. (Board's letter No. 2012/LM(PA)/03/07/Policy dated 06.07.12). (b) Wherever platform height gets reduced on account of track works, the same should be restored (Board's letter No. 2003/LMB/14/29 Dt. 03.02.2005). (c) Platform should be high level, irrespective of category, wherever EMU trains are dealt with (Board's letter No. 2006/LMB/2/121 Dt. 11.8.2006).

++ Solar energy based lighting needs to be introduced to provide emergency lighting at "D" and "E" Category stations, wherever feasible, in non-electric traction areas.

© For covered platforms having width of 6–9mts; one row of fans should be provided @one fan in the centre of supporting columns. For covered platforms with more than 9mts width, fans should be provided in 2 rows.

**Note.**

(1) At stations where only one ASM is posted, only one booking window will be provided. In respect of 'E' category stations, where the earnings is less than Rs. 20 lakh per annum, the quantum of amenities to be provided could be decided by General Managers based on actual requirements.

(2) Scale of all the amenities prescribed above are the bare minimum to be provided at the appropriate category of stations. Amenities over and above the prescribed minimum scales will continue to be provided as per norms for provision of amenities at "Recommended Level".

\*\*\*

**ANNEXURE – IV**

**NORMS FOR RECOMMENDED LEVEL OF AMENITIES AT VARIOUS CATEGORIES OF STATIONS**

**Nmax**– Maximum number of trains dealt with in any interval of half an hour at the station multiplied by the average number of passengers dealt per train at that station. The average number of passengers per train at a station shall be the average number of daily passengers dealt with at the station divided by the number of trains stopping at the station during 24 hours.

**Ndb** = Design figure for number of passenger for 'A'&'B' stations to be calculated as  $Ndb = 0.3 (Nmax)$

**Nds** = Design figure for number of passenger for 'C', 'UWE' stations to be calculated as  $Nds = 0.45 (Nmax)$

S. No.	Amenities	Recommended scale for provision	
		Category A1, A & B	Other stations
1	Booking facility (No. of counters)	1 window per 800 tickets per shift (shift with maximum number of tickets sold should be taken)	
2	Drinking water (No. of taps)	No. of taps = $Nmax/25$ . Taps should be distributed so that every alternate coach gets benefit of a tap	No. of taps = $Nmax/25$
3	Waiting hall / Shed	$1.394 Ndb \text{ Sqm}$	$1.394 Nds \text{ Sqm}$

			(excluding C)
4	Seating arrangement (No. of seats)	0.4 Ndb	0.4 Ndb
5	Platform shelter • (on each PF)	0.28 Nmax	0.4 Nds
6	Urinals #	Ndb / 200	Nds / 200
7	Latrines #	Ndb / 200	Nds / 200
8	Platform level	To be decided by Zonal Railways	
9	Lighting ®	As per RB letter No. 95/Elec (G)/138/5 dated 19.3.1996, norms indicated in note below.	
10	Fans **	As pr RB letter No. 95/Elec (G)/138/5 dated 19.3.1996	
11	FOB	To be decided by the Zonal Railways	
12	Time table display	To be decided by Zonal Railways	
13	Clock	To be decided by Zonal Railways	
14	Bathrooms \$	1 / 400 Ndb	1 / 400 Ndb at other junction and terminal stations only
15	Water coolers	To be provided if total number of passengers inward and outward is more than 1000 per day (as per RB letter No. 69/Elec (G)/730/8 dated 30.3.1971) To be decided by Zonal Railways	
16	IVRS	A-48 lines (calls 72000) B-24 lines (Calls 5000 – 20000)	A central IVRS with adequate lines should be provided to cover all suburban stations – minimum 6 lines if IVRS is otherwise justified.
17	PA System / computer- based announcement	To be decided by the Zonal Railways	
18	Parking-cum- circulating area, with lights	To be decided by the Zonal Railways	
19	Electronic train indicator board	To be decided by the Zonal Railways	
20	Public phone booth	To be decided by the Zonal Railways	
21	Signage (standard)	To be decided by the Zonal Railways	

\* At important Al, A' category and suburban stations, efforts should be to cover the entire PF.

# 1/3rd of urinals/latrines be reserved for ladies.

@ (a) Emergency light: From Auxiliary Transformer (AT) connected to traction supply, 10 light points for Al and A category stations on each platform. Emergency light from DG set/Solar supply on each platform at all stations where traction supply is not available, except E F category stations. (b) Minimum One light in ASM room, Booking Window, Waiting Hall each, one light on each FOB at every 30 meter, 03 lights on each platform and one light in circulating area shall be provided as emergency light with suitable back up power source such as Solar/wind etc.

\*\* For covered platforms having width of 6–9 m, one row of fans should be provided @one fan in the centre of supporting columns. For covered platforms with more than 9mts width, fans should be provided in 2 rows.

\$ At suburban stations, bathrooms need not be provided.

**Note.** Norms for recommended level of illumination at various categories of stations are as follows (Ref Bd's Circular No 2005/Elec(G)/150/1 Dt 28.2.06)

S. No.	Area	Proposed lux level of Category I / II / III
1	Station circulating area	50 / 30 / 20
2	Outdoor car parking	20 / 20 / 20
3	Station concourse area	100 / 100 / 100
4	Booking Office, Reservation Office, Enquiry Office	200 (localized above counter) & 100 in remaining areas for Category I, II & III
5	Parcel & Luggage Office Counter	150 / 150 / 150 150 / 150 / 150
6	Waiting halls / Rooms	50 / 30 / 20
7	Retiring Rooms	100 / 100 / 100
8	Restaurant & Kitchen in general building area. i) Restaurant area ii) Kitchen iii) Stores	150 / 150 / 150 100 / 100 / 100 100 / 100 / 100
9	FOB	50 / 30 / 20
10	Other service buildings inside Railway station area	200 for SM Office for Category I, II & III stations



Category (I) – Stations on Zonal railway HQs State capitals and all A1 & A category stations  
Category (II) – Stations on Rlys. Divisional Hq./State Distt. HQs & all B Category stations  
Category (III) – Stations in remaining Categories.

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#### ANNEXURE-V

#### NORMS OF DESIRABLE AMENITIES AT VARIOUS CATEGORIES OF STATIONS

S. No.	Amenities	Station Category						
		A1	A	B	C	D	E	F
1	Retiring Room	Yes	Yes	Yes	...	...	...	...
2	Waiting Room (with bathing facilities)							
	Upper Class	Yes <sup>1</sup>	Yes	...	...	...	...	...
	2 <sup>nd</sup> Class	Yes <sup>1</sup>	Yes	Yes	...	Yes	...	...
	Separate for ladies (combined upper and 2 <sup>nd</sup> class)	Yes <sup>1</sup>	Yes	...	...	...	...	...
3	Cloak Room	Yes	Yes	Yes	...	...	...	...
4	Enquiry Counter	Yes	Yes	Yes	...	...	...	...
5	NTES	Yes	Yes	...	...	...	...	...
6	IVRS	Yes	Yes	Yes	...	...	...	...
7	PA System / computer-based announcement	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	Yes	Yes	...	...
8	Book stalls / other stalls of essential goods	Yes	Yes	Yes	Yes	Yes	...	...
9	Refreshment Room	Yes	Yes	Yes	...	...	...	...
10	Parking / Circulatory area with lights ***	<i>Yes</i>	<i>Yes</i>	Yes	Yes	Yes	...	...
11	Washable apron with jet cleaning #	Yes	Yes	Yes	...	...	...	...

12	Electronic train indicator board	<i>Yes</i>	<i>Yes</i>	Yes	Yes	...	...	...
13	Touch screen enquiry system	Yes	Yes	Yes	...	...	...	...
14	Water vending machines	Yes	Yes **	Yes **	...	...	...	...
15	FOB	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	Yes ®	...	...
16	Escalators	Yes <sup>3</sup>	Yes <sup>3</sup>	...	Yes <sup>3</sup>	...	...	...
17	Travellator	Yes <sup>4</sup>	Yes <sup>4</sup>	...	...	...	...	...
18	Signage (standard)	Yes	Yes	Yes	Yes	Yes	...	...
19	Modular catering stalls •	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	Yes	...	...	...
20	Automatic vending machines	Yes	Yes **	Yes **	Yes **	...	...	...
21	Pay and use toilets on end platforms and circulating area	Yes	Yes	Yes	Yes	Yes	Yes	...
22	Provision of cyber café	Yes <sup>4</sup>	...	...	...	...	...	...
23	Provision of ATMs(preferably with ticketing facility)	Yes	Yes	Yes	Yes	Yes **	Yes **	...
24	Provision of atleast one AC VIP / Executive Lounge	Yes	...	...	...	...	...	...
25	Food Plaza	Yes	...	...	...	...	...	...
26	Train coach indication system	Yes	...	...	...	...	...	...
27	CCTV announcement and security	Yes	...	...	...	...	...	...

	purpose							
28	Coin-operated ticket vending machine	Yes	Yes	Yes	Yes	...	...	...
29	Pre-paid Taxi Service	Yes <sup>5</sup>	...	...	...	...	...	...
30	High level platform	<i>Yes</i>	<i>Yes</i>	Yes	<i>Yes</i>	Yes <sup>6</sup>	...	...

***Yes (in italics)***. Also prescribed as Minimum Essential Amenity under Annex. II.

\*\*\* Should include high mast lighting wherever feasible.

# Washable aprons with water hydrant/jet system should be provided at all platforms where morning train stops for longer duration to ensure cleanliness and better maintenance.

® On double line sections.

\* In end platforms, all stalls should be preferably embedded in walls.

\*\*Optional items vide Board's letter 1\16.94/LMB/2/175 dated 16.1.05.

#### **Numbered subscripts.**

- 1: Up gradation to be taken up preferably under public-private partnership schemes. Retiring Rooms need not be provided at 'D' category stations.
- 2: Should provide for minimum essential medicines.
- 3: Escalators at 'A1', 'A' & 'C' category stations and stations of Tourist importance.
- 4: Subject to availability of space& feasibility.
- 5: Subject to availability/clearance from local authorities.
- 6: With the approval of General Manager.

\*\*\*\*\*

***MOU BETWEEN  
MINISTRY OF  
RAILWAYS & RVNL  
FOR EXECUTION OF  
ZONAL RAILWAY  
PROJECTS***

This memorandum of Understanding is entered into on 10<sup>th</sup> day of January 2013 between the first part, the President of India represented by Shri. A.K. Gupta, AM (Works), Railway Board, Ministry of Railways (herein after referred to as “MOR”) which expression shall, unless repugnant to the context or meaning thereof, includes its successor and assignee of the FIRST PARTY

&

Rail Vikas Nigam Limited (RVNL), represented by Shri. S. C. Agnihotri, MD, RVNL (herein after referred to as RVNL which expression shall, unless repugnant to the context or meaning thereof, includes its successor and assignee of the SECOND PARTY.

MOU between Railway and RVNL was entered into on 16.10.2003 and Para 2.10 of MOU was subsequently amended in December 2006. Instructions were issued regarding timely and smooth execution of RVNL projects wherein Railways were directed to draw MOU for each of the projects at Zonal Level. This approach lead to different MOUs at Zonal Railways due to different practices being followed and standardize various implementation of projects entrusted to RVNL. Present MOU addresses these concerns and supersedes all previous MOUs entered between RVNL and Zonal Railways.

## **1. BACKGROUND**

- 1.1 RVNL, a PSU wholly owned by Ministry of Railways, is a Special Purpose Vehicle created to undertake project development, mobilization of financial resources and implementation of projects pertaining to strengthening of Golden Quadrilateral & Diagonals, Port Connectivity and other railway infrastructure projects.
- 1.2 RVNL is executing a number of projects on different Zonal Railways and RVNL has been entering into separate MOUs for each project with respective Zonal Railways. This approach has led to different practices being followed by different Railways which result in delays in finalization of MOU and in turn adversely effect the progress of the works. This MOU is being entered into between Ministry of Railways and RVNL to serve as a framework for facilitating proper co-ordination and smooth execution of Railway projects entrusted to RVNL by Ministry of Railways with an objective to ensure uniformity across all Zonal Railways. With signing of this MOU there will be no need to enter into any separate MOUs between RVNL and any Zonal Railway.
- 1.3 The provision of this MOU shall supersede all MOUs already entered into by RVNL at Zonal Railway level.

2. The provisions of this MOU are based on the following documents and instructions issued by Railway Board.

- i. MOU dated 16.10.2003 entered between Ministry of Railways and RVNL.
- ii. Railway Board's letter No. 2005/W-1/RVNL/5 dated 12.5.2005 on "Timely and smooth execution of RVNL projects".
- iii. Railway Board's letter No. 2005/W-1/RVNL/5 dated 27.01.2006 on the "Issue of Railway materials to RVNL".
- iv. Railway Board's letter No. 2010/LMB/7/2 dated 04.3.2011.
- v. Railway Board's letter No. 2004/W-1/RVNL/15 dated 30.01.2012.
- vi. Railway Board's letter No. 2001/W-1/RVNL/5 dated 21.8.2012.
- vii. Railway Board's letter No. 2005/W-1/RVNL/5 dated 02.11.2005 on "Mechanised Tamping of RVNL projects".
- viii. Railway Board's letter No. 2006/W-1/Gen1/Targeted works/06-07 dated 19.5.2006.
- ix. Railway Board's D.O. No. 2004/W1/RVNL/10 dated 20.5.2011 issued by ED/Works.
- x. Railway Board's letter No. 98/W-1/Gen/0/30-Pt. dated 01.11.2011 issued by Advisor (Bridges) & EDCE (G) respectively.
- xi. Railway Board's letter No. 98/W-1/Gen/0/30-Pt. dated 30.01.2012 and 21.8.2012 issued by Advisor (Bridges) and EDCE (G) respectively.

2.1 In the event of any contradiction between instructions issued by MoR and the stipulations of this MOU, the provisions of this MOU will prevail.

### **3. CO-ORDINATION & PLANNING**

- 3.1 For effective communication between the concerned Zonal Railway and RVNL, a single window concept will be followed. For new line, gauge conversion and doubling projects PCE of the Railway (or any other Officer as nominated by GM of the Railway) shall be the project co-ordinator from the Railway at Headquarters level & Sr.DEN/Co-ordination (or any other Officer as nominated by DRM of the Division) shall be the project co-ordinator at Divisional level. From RVNL side, the concerned CPM/RVNL shall be the projected co-ordinator. Normally all routine communication from RVNL to the Railway / Division and vice-versa shall be routed through the respective project co-ordinators. For Railway Electrification Projects, CEE (or any other Officer as nominated by the GM of the railway) shall be project co-ordinator from the Railway at headquarter and Sr.DEE/TRD or (G) shall be project co-ordinator at Divisional level.
- 3.2 Before commencement of works, RVNL will furnish a list of RVNL Officers and PMC Officials of the Project Management Consultant (PMC), who will be liasoning with the Railway, both at Headquarters and Divisional level, for assistance required in obtaining Traffic / Power blocks, imposing speed restrictions, permitting S&T

disconnection / reconnections, permission to enter Relay Rooms and make alterations etc.,

- 3.3 The Project Co-ordinator of RVNL (or his authorized representative) will attend all periodical review meetings called by the Project Co-ordinator of the Railway at Headquarters and Divisional level.

#### **4. SUPERVISION OF WORKS & CONTRACT MANAGEMENT**

- 4.1 All Civil Engineering, S&T and Electrical works will be executed by RVNL under supervision of PMC or directly by RVNL through contracts awarded by RVNL except for the works as mentioned in 8.2.2. Wherever supervision of works is entrusted to PMC, PMC will co-ordinate with Railway Officials on day-to-day basis. However, in the event of failure of PMC to act on the instructions of the Railway, RVNL will take prompt action to attend to the situation.
- 4.2 PMC for signaling works shall be a certified Official for carrying out signaling works who will co-ordinate with Railway Supervisor for day-to-day execution of works like taking disconnections, carrying out alteration works, permitting entry in relay / equipment rooms and carrying out correspondence checks before NI is taken.
- 4.3 Representative of RVNL will ensure that the work is executed by the agency / agencies employed by RVNL as per prescribed norms, specifications, requisite quality assurance, fully complying with the extant instruction of the Railway regarding safe running of trains and within the stipulated time schedule.
- 4.4 For execution of works, in yard and other works, requiring power / traffic blocks, DRM of the concerned Division will nominate a group of Officers and Supervisors who will co-ordinate with RVNL or its representative.

#### **5. APPROVALS**

- 5.1 Drawings & Plans:
- 5.1.1 Drawings and Plans submitted by RVNL shall be approved by the Railway expeditiously. A schedule for supply of station-wise / section-wise drawings / plans by RVNL and their clearance by the Railway shall be drawn so as to avoid bunching of documents and to ensure that the time taken for approval is minimized.
- 5.1.2 the Railway will arrange to scrutinize the drawings / plans expeditiously and offer their remarks within 15 days of submission of the same by RVNL. RVNL shall ensure compliance within the next 10 days. Thereafter, Railways shall communicate the approval in next 10 days. RVNL shall liaise with the Railway on regular basis for expeditious approvals.
- 5.1.3 The following shall be the respective Nodal Officers for approval of plans:

CBE of the Railway will be the nodal officer for approval of General Arrangement Drawings of bridges.

HOD of Engineering Department of the Railway, nominated by PCE for approval of Plans and Drawings of other than bridges, shall be the nodal officer for co-ordination for approval of plans and drawings of other than bridges i.e., L-section, ESPs, LWR plans etc.,

CSTE (Planning) / CSTE (Projects) or any other SAG Officer nominated by CSTE of the Railway shall be nodal officer for co-ordination of S&T plans, drawings etc.,

**A. Civil Engineering Works.**

- i. RVNL will prepare all plans, drawings and designs for Civil Engineering works required for execution of the projects entrusted to it. RVNL will obtain approval of Railways for the General Arrangement Drawings (GADs) for various structures and facilities such as; bridges, station and service buildings etc., yard arrangements, plan and L-sections of the projects.
- ii. The plans, drawings, station working rules etc., required for the execution of work shall be prepared by RVNL before submission to the Railway for approval.
- iii. The GADs for the bridges prepared by the consultant appointed by RVNL or by RVNL itself, duly incorporating the details of rail levels etc., based on the project report and approved 'L' sections shall be scrutinized and signed by concerned CPM of RVNL before it is submitted to Railway for approval. The GADs of the bridges shall be scrutinized by CBE's office and approved by CBE.
- iv. The Design Offices of the Railway will provide access to designs and drawings already approved on the Railway, especially for bridges and buildings, so that the same can be adopted in the project. For structures where standard RDSO drawings are not adopted. RVNL will prepare all working drawings including structural designs and drawings as per relevant railway standards and codes which will be proof checked by an independent consultant appointed by RVNL. Proof checking of bridges will be done by an IIT / NIT or by any other Institution / Consultant of repute approved by CBE. These designs will not require approval of the Zonal Railway. However, the drawings so proof checked will be approved by concerned CPM before issuing the same for execution.

**B. S&T Works.**

- i. All plans and design documents for S&T works relating to the project shall be prepared by RVNL and approved by the Headquarters / Division as detailed in



Annexure-1. Plans will be signed by the concerned S&T Officer-in-charge of RVNL; DGM/AGM (S&T) before submission of the same to the Railway.

- ii. **Testing and commissioning:** Complete installation with all the test records after full testing and certification by RVNL Officials will be offered for final testing and commissioning by the Railway. The different authorities for testing different aspects of work are summarized in Annexure-2. The test reports shall be submitted to the Railway at the time of simulation tests. OEM's certificate is to be obtained prior to commissioning for EIs, MSDACs / SSDACs, IPS and AFTCs.

### **C. Electrical Works.**

#### **(a) Composite Works**

- i. Copies of existing layout plans for the existing system will be handed over by the Railway to RVNL within 7 – 10 days on receipt of such request. All plans and design documents relating to the project shall be prepared by RVNL / PMC and submitted to the Division / Railway for approval after the same is signed by the concerned Electrical Officer in-charge of RVNL. RVNL shall prepare the OHE layout plans for the single line / double line / 3<sup>rd</sup> line for OHE in Auto-CAD, incorporating the layout plans for the existing one / two / three lines. All the drawings of TRD in one soft copy and six sets of printouts of each drawing shall be handed over to the Railway for internal distribution.
- ii. Cross-section drawings and structure erection drawings will be approved by the concerned RVNL Unit.
- iii. Proposed General Power Supply Diagram shall be incorporated in the existing General Power supply diagram of the section.
- iv. All the plans, designs and drawings required for the project shall be got prepared by RVNL through its agency and scrutinised by its PMC, before submission to Railway for approval wherever required.
- v. Any major structural modifications, if required during construction, shall jointly be inspected by RVNL and Railway and RVNL shall execute the modifications as per standard RDSO design.

#### **(b) RE Works**

- i. The general power supply diagram shall be approved by the Railway.
- ii. The various site plans shall be approved by Railway / Division.
- iii. The layout plans, design and drawings like CSD & SEDs shall be approved by RVNL.
- iv. 6 copies of as erected drawings shall be handed over along with commissioning of RE.

- 5.1.4 After approval of GADs / Plans by the Railway, normally drawings will be treated as frozen so as not to affect the planning, execution and cost of works. However,

in exceptional cases requiring alteration to the approved plans concerning additional facilities to be provided not forming a part of the sanctioned Detailed Estimate, the modifications may be considered by RVNL only if such changes do not substantially affect the cost and completion schedule and will be carried out only in consultation with Division for modification of plans and drawings and after approval of GM of the Railway. However, in case of matters of purely a technical nature, modification may be done after bringing it to the notice of the concerned PHOD of the Railway. Changes required during execution, based on the site requirement, will be done by RVNL under intimation to the Railway. These changes will be reflected in the completion plans / drawings.

In case of any dispute to include additional requirements of the Railway, not initially included in the sanctioned estimate, the matter will be referred initially to the GM and if case is not resolved, then to the Railway Board whose decision shall be final and binding on both the parties.

**5.2 Statutory Approvals.**

**5.2.1 Sanction of CRS:** RVNL will prepare and submit the documents to the nominated Officer of the respective Division for further processing and submission of papers to CRs for obtaining his sanction. All drawings, EIG application, CRS application etc., submitted by RVNL to Railway, should have signature of RVNL's field in-charge (minimum at the level of DGM).

**5.2.2 Sanction of EIG:** The documents for EIG will be prepared by RVNL (or its PMC) and the documents, complete in all respects, duly signed by RVNL and PMC, shall be submitted to Sr.DEE/TRD of respective Divisions for arranging EIG sanction. In case of Metro Rail, Kolkata, application shall be submitted by RVNL Officials, directly to EIG, since Sr.DEE/TRD is not available there.

**5.2.3 Temporary Arrangements:** RVNL will submit the details of temporary arrangements requiring sanction of CRS to the nominated Officer of the respective Division for further processing and submission of papers to CRs for obtaining his sanction.

**5.2.4 Obtaining condonation for infringement/s to SODs or any other statutory provisions of Railway Manuals.**

- i. In cases, where it is not possible to provide minimum gradients / track centres or any other dimension as per the latest SOD and any other statutory provisions of manuals, RVNL will submit necessary justification and proposals for required condonation/s to the Railway.
- ii. Required documents for obtaining condonation/s for infringement to SOD will be prepared by the RVNL / PMC and documents, complete in all respects, duly signed by RVNL Officials shall be submitted to the nominated Officer of the

respective Division for further processing and obtaining approval of competent authority as per extant practice being followed in Railways.

**5.3 Inspection of materials.**

- 5.3.1 All P. Way materials to be used by RVNL for execution of projects will be procured through RDSO approved sources with inspection certificate from the respective agencies as per practice of the Railway.
- 5.3.2 All the materials to be used for Railway Electrification will be procured from RDSO / CORE / Zonal approved suppliers and inspected as per practice of the Railway before installation of the same.
- 5.3.3 All the materials to be used for S&T will be procured from RDSO approved suppliers and inspected as per practice of the Railway before installation of the same.

**6. LAND ACQUISITION.**

- 6.1.1 The concerned Zonal Railway will carry out land acquisition and make available the land required for execution of the project based on plans submitted to the Railway be RVNL. RVNL will submit to CAO/C details of requirement of land after final location survey. RVNL will appoint an agency to assist the Railway in preparation of proposals for land acquisition and necessary follow up at different stages of acquisition. Possession of land shall be timely taken by the Railway for successful completion of the work as per target. Expenditure on acquisition of land shall be chargeable to the project.
- 6.1.2 The Railway will pursue with the concerned Revenue Authorities to expedite the land acquisition process for early publication of necessary Gazette Notifications and payment of compensation to Project Affected Persons (PAPs).
- 6.2 Land boundary posts shall be fixed / maintained by the Railway for existing land / additional land acquired for the project.
- 6.3 Permission for forest clearance (felling of trees), removal of encroachments on alignment, if any, will be obtained / arranged by the Railway.

**7. USE OF RAILWAY LAND AND RAILWAY STRUCTURE**

- 7.1 On the specific request of RVNL, Railway shall identify any land / buildings that can be spared and given to RVNL for the Office accommodation. Nominal license fee of Rs. 1,000/- per acre of land or per structure / building per annum or both shall be charged from RVNL for the same (Railway Board's letter No. 2010/LMB/7/2 dated 04.3.2011).
- 7.2 For execution of projects, Railway will permit the contractors fixed by RVNL to use the available Railway land on the same terms and conditions as applicable to

Railway's contractors depending upon availability of railway land and as per conditions laid down in RVNL contract, to;

- i. Store construction materials such as; ballast, rails, sleepers, OHE materials like masts, conductors etc.,
- ii. Erect temporary sheds, site offices, drive bore wells, string power lines etc.,
- iii. Lay temporary roads to access various sites.
- iv. Carry out any other work connected with the project.
- v. Any temporary work / works done by RVNL during the course of execution of the project shall be removed, if demanded by the Railway, and land restored to its original condition. The cost incurred for such removal shall be borne by RVNL.

7.3 The contractors, through PMC, will submit a dimensioned sketch for temporary use of available land to the concerned SSE (P.Way/Works), as the case may be, who will after verification forward the same to the concerned AEN for such removal shall be borne by RVNL.

7.4 RVNL will advise the Railway regarding any ballast stacks or any other railway material obstructing the proposed work, and RVNL shall be permitted to shift the same suitably to a location jointly identified.

## **8. EXECUTION OF WORKS:**

### **8.1 General.**

8.1.1 RVNL will procure the railway materials such as rails, sleepers, track fittings, electrical and S&T materials etc.,. However, Railway material may be given to RVNL for work within the jurisdiction of the Railway, subject to availability, to meet exigencies with the approval of PCE / CSTE / CEE. Railway materials such as rails, sleepers, track fittings, electrical and S&T materials etc., may be given to RVNL at rates as is being issued by open line to Construction Organisation of the Railway. All assistance that the open line normally extends to the Construction Organisation will also be extended to RVNL on the same terms and conditions so that the cost of the project is contained. Similarly, Construction Organisation may issue any such material to RVNL on payment basis at the normal issue rates. The Railway shall not insist on advance payment before issue of the material. However, RVNL shall ensure that the payment is made within 15 days from the date of receipt of demand notice from the railway.

8.1.2 The Railway shall provide free and unhindered access to Officers, Staff and Contractors / Consultants of RVNL to railway premises in connection with carrying out the project related activities (in terms of Railway Board's letter No. 2005/W-1/RVNL/5 dated 12.5.2005).

- 8.1.3 The works will be executed by RVNL through their nominated agencies under the supervision of Project Management Consultants (PMC) who will be responsible for day to day co-ordination with Railway Officials.
- 8.1.4 During execution of the works, RVNL (through its PMC) will take reasonable safeguards consistent with the extant instructions on safety and the practices prevailing on the Railway, to ensure safe and smooth train operations. Railway Officials, during their routine inspections, may check whether the systems for ensuring safety are in place or not and advise deficiencies, if any to RVNL / PMC.
- 8.1.5 During execution of Electrification, S&T and Civil Engineering works requiring Traffic / Power block, the detailed block planning will be submitted by RVNL / PMC to the Railway. Railway will ensure availability of power and traffic blocks as per programme. For this, a nominated 'TP' by the railways be posted at the Control Room for co-ordination with RVNL for arranging the power and traffic blocks. The Railway shall not ask for any charges to be deposited towards arranging power / traffic blocks or way leave charges. The detailed requirement of blocks shall be advised 7 days in advance to the Railways by RVNL / PMC.

For operation of traffic / power blocks during pre-NI period, a day-to-day activity chart showing duration of block requirement of Engineering, Electrical and S&T duly specifying line / area in the yard requiring block will be submitted to the Railways 15 days in advance.

- 8.1.6 All power / traffic blocks will be arranged and cancelled by the Railway Supervisor.
- 8.1.7 During execution of Railway Electrification works, the Railway will permit stabling of wiring train / Tower Car / Diesel Crane, if any procured by RVNL as per provisions of the sanctioned estimate, at any suitable stations in the section. **Drivers for such wiring train / Tower Car / Diesel Crane will be arranged by the Division. Such wiring train / Tower Car / Diesel Crane will be handed over to the Railway after completion of the project. Drivers for Tower Car will be arranged by Railway / Division where none of the sections is electrified and tower car drivers are not available.**
- 8.1.8 Shifting of existing cables for various services like signaling, communication, power etc., and infringements like HT / LT panels, track crossings and other electrical installations, LBs / Signals and rodding etc., required for progress of Civil & OHE works coming in the way of laying of the new track, building or any other services, will be jointly identified by the Inspectors of S&T and Electrical Departments of the concerned Division and RVNL. RVNL will carry out the shifting of existing cables and removal of infringements. However, divisional manpower will be made available to co-ordinate in obtaining and clearing the blocks, taking reconnection /

disconnections. Competency for drivers, arranged by RVNL for working of rolling stock has to be issued by concerned Divisional Officer (Sr. DME or Sr.DEE (OP) or Sr.DEE/TRD) as may be the case.

- 8.1.9 Subject to availability, Railways will extend power connections to the contractors of RVNL at the same charges applicable to other Railway contractors.
- 8.1.10 All arrangements for additional power, water / drainage etc., will be made by RVNL. Necessary co-ordination for making additional arrangements for power, water / drainage connections etc., required from State Government / outside agencies for additional assets created, will be done by Railways for which all required data will be supplied by RVNL / PMC. Payment, if any, required to be made in this connection will be provided by RVNL on the same terms and conditions as applicable to the Construction Organization of Railways.
- 8.1.11 RVNL will make available to the Division a list of all RVNL Officials, concerned Supervisors / Engineers from PMC and Contractor who may be contacted in case of any emergency which will be circulated to all concerned.
- 8.1.12 (a) In terms of Railway Board's letter No. 2004/W-1/RVNL/15 dated 30.01.2012, 0.25% of the cost of project being executed by RVNL will be allocated to respective Zonal Railway as D&G charges.
- (b) Out of provision of 0.25% of total project cost as D&G charges, 0.075% shall be allocated to S&T Department for carrying out works of doubling / 3<sup>rd</sup> line under doubling plan head executed by RVNL. Share of Electrical Department in D&G charges for doubling plan head shall be "NIL".
- (c) For works under Railway Electrification plan head, the distribution of D&G charges shall be 0.125% for S&T and 0.125% for Electrical Department i.e., 0.125% each for Electrical and S&T.

## **8.2 YARD REMODELING WORKS.**

- 8.2.1 RVNL, PMC, Zonal Railway and the Works Contractors shall make a detailed plan for execution of yard remodeling works. These agencies shall maintain close co-ordination among themselves as to how different agencies will work together for smooth execution of works, adopting jointly decided schedules, logistic administration and interfacing at various levels to ensure safety and operation of trains.
- 8.2.2 The following works in the yard shall be executed by an agency fixed by RVNL under the supervision of the Railway and assisted by RVNL's PMC:-
- OHE modification works
  - Insertion / dismantling of turnouts with or without traffic blocks.
  - Slewing of existing track.

- Any addition and alteration of the existing track required as per the approved plans.
  - All S&T works requiring disconnection / interference with the existing gears.
  - Launching of FOB girders requiring traffic blocks; and
  - Shifting of materials requiring track crossing and traffic block.
- 8.2.3 The following works shall be executed by RVNL, with supervision of PMC, as per approved plan:
- Construction / extension of station buildings, platforms, FOBs, staff quarters, overhead tanks.
  - Improvements to circulating area, construction of Goods Sheds and other service buildings.
  - Laying of electrical cables, yard lighting, electrification of buildings.
  - Laying of S&T cables, signal posts and junction boxes.
- 8.2.4 Execution of any other work in the yard, not covered by the above, will be decided mutually by the Railway and RVNL.
- 8.2.5 All pre-commissioning tests like cable meggering, track circuit measurements, interlocking tests as per selection table etc., shall be completed by RVNL and results submitted to the Railway. Supervisory staff of the Railway shall associate during such tests / measurements. After the station is offered for testing to Railway for issue of safety certificate, necessary arrangements shall be made by RVNL for carrying out simulation, correspondence tests and any other test required as per SEM. These tests will be carried out jointly RVNL and Railway's representative to save time of testing.
- 8.2.6 RVNL will be allowed to make changes in the running S&T installations for commissioning of any phase work under the supervision of the Railway's staff. Normally, such work will be restricted to one station at a time. It is understood that in phase working, it may not always be possible to adhere to standard arrangements as the existing installation may be quite old, obsolete and congested. In such case, approval of CSTE is to be obtained detailing plan of work.
- 8.2.7 RVNL shall be allowed to erect panels, relay racks, if required, in the existing relay room subject to availability of space, terminate the incoming cable and inter rack wiring and undertake such minor work which do not interfere with existing circuits / interlocking at a station. During this period, maintenance of the station shall continue to be done by the Railway.
- 8.3 DISMANTLING OF EXISTING STRUCTURES.**
- 8.3.1 Before start of dismantling of existing track, structures, TRD installations, S&T installations and other assets, these will be jointly surveyed by RVNL and the concerned Railways Officials who will record and sign the report of the joint survey.

- 8.3.2 All released material from dismantling will be sorted, transported and properly stacked at identified / nominated locations with approach road and shall be handed over to the Railway after due verification. All released materials will be finally disposed off by the Railway and necessary credit will be transferred to the project by transfer of such proceeds to RVNL.

#### **8.4 EMERGENCY WORKS.**

- 8.4.1 In case of works executed by the RVNL, if any petty works are required to be taken up urgently on account of failure of the main contractor or his sub-contractor, which otherwise would endanger the safety or result in detention to trains, the Railway can get such works executed by suitable means. The cost of all such works shall be borne by RVNL.
- 8.4.2 The Railway should maintain necessary records and advise RVNL about the specific failure of the contractor in all such cases, for taking suitable action in terms of contract conditions.
- 8.4.3 If the personnel of contractor or the PMC continue with conditions of unsafe working, despite instructions to the contrary, Railways will advise promptly RVNL to take immediate appropriate action against such personnel.

#### **8.5 CONSTRUCTION OF BRIDGES.**

- 8.5.1 Where construction of bridges involves working close to the existing bridges requiring issue of Caution Order, RVNL will identify such bridges and furnish the details of caution required to the Division. Railways will permit imposition of caution order / speed restriction as intimated by RVNL. Work at such locations shall only be started after imposition of caution order / speed restriction.

### **9 BREAKDOWNS AND UNSAFE SITUATIONS.**

- 9.1 In case any emergency arises during the course of execution of works requiring imposition of caution, then the station in-charge will promptly receive and acknowledge such messages submitted by PMC / RVNL or contractor's engineers and regulate the trains as per the advice received, in the interest of safety.
- 9.2 Contractor of RVNL is expected to take prompt action for attending to any emergency and to make good the damage caused due to any work undertaken by him. However, Railway reserves the right to undertake any work / works as deemed fit by them to undo the damage to ensure safe passage of train either departmentally or through any agency appointed by them. The cost of all such works will be borne by RVNL. Depending upon the exigencies of the case, Railway Officials may inspect



the site, review the arrangements and take necessary action to restore traffic to normal conditions and ensure safe and smooth train operations.

- 10.0 **TRACK MACHINES, BFR MOUNTED CRANE, WIRING TRAIN, TOWER WAGON, HOPPERS ETC.,**
- 10.1 RVNL will furnish the requirement of track machines like CSM, Duomatic, UTM, Dynamic Track Stabiliser, T-28 BFR mounted crane, Wiring train with power diesel crane and Tower Wagon etc., at least two weeks in advance of actual requirement. The exact dates will be finalized in consultation with CTE / CEDE. Tower Wagon will be arranged by RVNL for non-electrified sections.
- 10.1.1 RVNL will furnish the requirement of diesel locomotives required for the Railway Electrification works. This shall also be made part of the Zonal Railway Power Plan. Actual requirement on weekly basis shall be provided by RVNL field officials to the Divisional Officials. M&P as per sanctioned estimate shall be procured by RVNL and handed over to open line for regular use and maintenance. M&P available with Division shall be provided to RVNL on demand with operating crew.
- 10.2 The Railway will make the available the requisite machinery in good working condition along with operators. RVNL / their Contractors will provide fuel and lubricants. The Railway will attend to all routine maintenance, breakdown of machinery and major repairs. All minor repairs such as reconditioning of tamping tools etc., will be attended to by RVNL contractor. Railway will raise their demand on RVNL for payment, for sparing their machinery. Maintenance of Tower Wagon and other TRD related machine and plants will be arranged by RVNL for non-electrified railways. RVNL shall maintain only those construction machines like wiring train etc., not handed over to open line.
- 10.3 Requisite track geometry standards shall be ensured before deployment of track machines. RVNL shall certify the fitness of track for a speed of 20 KMPH before deployment of the machines. The track requiring tamping should preferably be in continuous stretches for optimum utilization of machines.
- 10.4 The Railway will provide machinery on the same terms and conditions as applicable to the Construction Organisation of Railway.
- 10.5 For the purpose of wiring trains, two general second class coaches will be nominated for use of RVNL contractor. For the purpose of diesel crane, to be purchased by RVNL, if provided in the estimate, a BFR would be spared by the Railway for installation of diesel crane. Two more BFRs would be made available by the Railway for loading / unloading of structures and catenary / contact wire.

- 10.6 USFD testing of AT weld joints will be done by USFD teams of respective Divisions. RVNL shall arrange replacement of all defective welds before opening of the section. The cost of USFD testing will be borne by RVNL.
- 10.7 To train out ballast in the new BG track, the Railway shall provide 30 BOBN wagons with dedicated power and crew for training out of ballast from the ballast depots to section. The concerned Division shall provide power and arrangement movement of the ballast DMTs upon request of RVNL, on charges applicable to the Construction Organisation.
- 11.0 **COMMISSIONING & TAKING OVER OF ASSETS.**
- 11.1 For new line, gauge conversion and doubling works CAO/C and for RE works, CEE of the Railway will be the co-ordinating authority from Railways side for submission of required documents for opening of section.
- 11.2 Safety Certificates will be signed by competency Railway Authorities after the required testing and verification of relevant details. The Railway will associate with the testing being carried out by RVNL.
- 11.3 RVNL will prepare bilingual SWRs, Traction working rules, L-Xing working rules etc., and submit the same to the Railway for approval. Railway will arrange approvals within two weeks from the date of submission.
- 11.4 All completion drawings / plans (Engineering, Electrical and S&T) including bridges, structures, land, L-sections, yard plans, SIPs etc., duly signed by RVNL Officers shall be handed over to the Railway in soft copies (in the form of CD) and hard copies (in the form of a tracing plan) of which prints in the required numbers shall be supplied. One set of SWR diagram along with booklet shall be provided at each station.
- 11.5 The deficiencies noted by CRS as a pre-condition for opening of the track pertaining to the work done by RVNL shall be promptly attended to by RVNL within an agreed time schedule.
- 11.6 All assets will be deemed to be taken over by the Railway immediately after commissioning. Deficiencies, if any, present at the time of commissioning, will be made good by the contractor fixed by RVNL within the framework of a separate MOU to be drawn between RVNL and the Railway at the time of commissioning, as per practice being followed by Railways between Open Line and Construction Organisation.
- 11.7 The Railway will create their own Organisation for maintenance of the newly created assets. RVNL will provide necessary statistics i.e., ETKM / ITKM details etc., of the assets created well in advance so as to enable the Railway to process for the

necessary sanctions for creating the maintenance Organisation of the newly created assets.

**12.0 ACCOUNTAL OF FUNDS RELEASED BY RVNL TO ZONAL RAILWAY.**

- 12.1 During course of execution of the project RVNL may release funds to the Railway for project execution on account of (i) land acquisition (ii) supply of materials to RVNL (iii) execution of specific activities of work. In all such cases, RVNL will release funds to the FA&CAO/Open Line who will transfer funds to the respective units and maintain and provide a consolidated account of all receipts and expenditure to RVNL on quarterly basis and at the time of completion of project for drawing the completion estimate / report.

This has the approval of Board (Member Engineering and Member electrical).

Sd/-  
S. C. Agnihotri  
MD  
for RVNL

Sd/-  
A. K. Gupta  
Additional Member (Works)  
on behalf of President of India

**Date:** 10.01.2013

**Place:** New Delhi

## PLAN PREPARATION

Plan	Plan preparation by	Approval
Cable Route Plan Signal	RVNL	Division
Cable Route Plan Telecom, Quad	RVNL	Division
SI Plan	RVNL	HQ
Panel diagram	RVNL	HQ
Selection Table	RVNL (Execution Contractor – SSI firm)	HQ
Outdoor Location Drawings	RVNL (Execution Contractor – SSI firm)	HQ
Indoor Circuit Diagram (Application Logic)	RVNL (Execution Contractor – SSI firm)	HQ
Cable Coverage Plan	RVNL	Division
Track Bonding Plan	RVNL	Division

## PLAN PREPARATION

Tests	To be conducted by	Remarks
Indoor Wiring Bell Test	RVNL	Report shall be submitted to the Railway duly signed by in-charge S&T Officer of the project (RVNL side)
Cable Insulation Test	RVNL	Report shall be submitted to the Railway duly signed by in-charge S&T Officer of the project (RVNL side)
Battery Capacity Test	RVNL	Report shall be submitted to the Railway duly signed by in-charge S&T Officer of the project (RVNL side)
IPS pre-commissioning checks	RVNL	Report shall be submitted to the Railway duly signed by in-charge S&T Officer of the project (RVNL side), Pre-commissioning check list issued by RDSO to be signed by firm's representative and RVNL Officer in-charge.
Simulation Test (without gear)	RVNL	Final test by the Railway, after necessary certificate signed by RVNL Officer in-charge is submitted to CSTE of the Railway.
Block Instrument Test	RVNL	Final test by the Railway after test report signed by in-charge Officer from RVNL side is submitted.
Preparation of SWR	RVNL	To be signed by DSTE & DOM
Preparation of SWR rule diagram	RVNL	To be signed by DSTE & DOM
Preparation of GWR	RVNL	To be signed by DSTE & DOM / DEN
Preparation of GWR rule diagram	RVNL	To be signed by DSTE & DOM

*GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS*

*RDSO GUIDELINES FOR CONSTRUCTION  
OF LIMITED HEIGHT SUB-WAY (LHS) BY  
CUT AND COVER METHOD*

*APRIL – 2015*

*RDSO*

*BRIDGE & STRUCTURE DIRECTORATE  
RDSO – LUCKNOW – 226011*

## FOREWORD

Indian Railways is engaged in the construction of large number of LHS. The work is mainly executed by “cut and cover” method. RDSO has issued typical drawings for LHS. However, no guidelines for execution of work have been issued.

The “cut and cover” method for construction of LHS / Box culverts is one of the most frequently used method in the field. If, properly planned the work of insertion of RCC Box segments under track can be completed in a block of approximately 5 hour, for single line track.

In order to maintain the uniformity and safe working in the field, Railway Board directed RDSO vide letter No. 2014/CE-IV/ROB/250 dated 16.01.2015 to issue guidelines on construction of LHS / Box culverts by “cut and cover” method, keeping the following issues in view:

- i. Adequate slope with berms with suitable interval for different soil conditions.
- ii. The deployment of machinery during excavation.
- iii. Backfill material with mechanized compaction.
- iv. Provision of return / wing walls so that backfill material can be retained properly.
- v. Wrapping up of box from outside by suitable Geo-Textile and water proofing arrangement from inside the box.
- vi. Adequate block.

Based on the practices and instructions issued on the subject by Zonal Railways and comments received from Railways on draft guidelines on the subject, RDSO guidelines for construction of limited Height Sub-way (LHS) by “Cut and Cover” method have been prepared. It is expected that these guidelines will serve as a technical guidance for Officials of Engineering Department of Indian Railways working in the field.

Lucknow

Dated: 06.4.2015

**(H. L. Suthar)**  
**ED/Structures**  
**B&S Directorate**  
**RDSO**

## **GUIDELINES FOR CONSTRUCTION OF LIMITED HEIGHT SUB-WAY (LHS) BY CUT AND COVER METHOD**

For executing work of construction of sub-way (limited height) by “Cut n Curve” method following guidelines shall be adopted. RDSO be advised in case any modifications in these guidelines are needed, based on Railways experience and / or any difficult is faced in adopting these guidelines in the field.

### **1.0 Site Survey and Planning**

- 1.1 Detail site survey to be carried out for each LHS work separately. Modus operandi giving details of activities to be undertaken before block, during block and after block should be outlined.
- 1.2 Detailed soil investigations shall be conducted. Extra care shall be taken while taking samples of soil so that a realistic picture of soil stratum is obtained. It will be essential to take soil samples in close proximity of the tracks. As guidance at least two bore, one on either side of outer tracks, in the middle of Cess, be done. Boring to be done from formation to 500mm below bottom of proposed precast RCC slab (below RCC box segments).
- 1.3 Machinery, tools and plants and other equipment for excavation should be arranged as per soil stratum observed in soil investigations. Follow relevant rules and regulations of concerned State / Central Government Authorities especially where blasting is envisaged.
- 1.4 Side slope for excavation or cuttings of embankment shall be decided based on the type of soil strata observed in the soil investigation indicated in Clause 1.2 above. As a guidance side slope shall be kept 1: 0.5 (V:H). In case of dominantly non-cohesive soil, a flatter slope may be provided.
- 1.5 The width at bottom shall be kept at least 1.2m more than width of RCC Box. At 3m depth from formation level or at natural ground level (whichever is less) a berm of 0.75m wide be provided, on either side. Width of cutting at formation level shall accordingly be worked out. Typical sketch for 4m x 4.5m internal box size is enclosed as Annexure – I. Alternatively, flatter single slope of cutting be adopted.
- 1.6 S&T Cable, Electrical Cable or any other cable or OHE wire coming in the way of execution of LHS should be surveyed and planning for their shifting / diversion, through concerned Department be made.
- 1.7 Approach road for movement of road crane and other heavy machineries be planned in advance.



## **2.0 Pre-block Activities**

- 2.1 RCC Box segments and base slab segments shall be casted as per approved drawing, outside the track, near proposed site. All RCC surfaces coming in contact with soil should be painted with bitumen or coal tar of approved quality @ 1.464 kg/sqm.
- 2.2 Reference lines are to be marked on the track and levels are to be fixed by using leveling instrument with reference to rail level. Centre line is to be marked on all the precast box segments. Central line of sub-way shall be transferred on ground.
- 2.3 In case of LHS is constructed on the same alignment of level crossing, existing CC paver blocks, lifting barrier etc., should be removed.
- 2.4 Arrangement of materials, manpower and machinery, as per requirement at site for single line or double line work.
  - 2.4.1 Sufficient quantity of ballast, sand, boulder and back filling material (as per clause 7.5 of foundations and sub-structure code), preferably, loaded in tractor-trolley during block.
  - 2.4.2 Sufficient empty cement bags filled with sand
  - 2.4.3 Arrangement of skilled labour, Engineering blacksmith with rail cutting and drilling machine.
  - 2.4.4 Minimum equipments to be arranged for line block are given below;
    - (a) Two road cranes of suitable capacity (based on segment weight and length from where these are to be placed) with one additional as standby crane (capacity of crane required at 8m radius will at least be 50T).
    - (b) At least two Poclain (having bucket capacity of 1.0 to 1.5 cum) and 2 JCBs.
    - (c) One Hydra of 14T capacity.
    - (d) Six dumper / tractor-trolley with hydraulic system for unloading.
    - (e) Wire ropes / slings (steel rope dia suitable as per total load to be lifted) and clips for each RCC Box segment.
    - (f) Jack rammer along with compressors and tools and plants for blasting purpose, if required as per soil investigation, also additional Poclain for Jack hammer.
    - (g) Gas cutter and other T&P for track works
    - (h) Leveling instrument with staff.
    - (i) Unserviceable rail piling and sheet piling with proper lagging be arranged to protect the slopes of proposed cutting and embankment at the time of excavation. Alternatively, safety net and protective screen be used to safeguard workmen (being used by WCR). Details enclosed as Annexure – 2.

- (j) One suitable length RH girder with all accessories.
- 2.4.5 Skilled and semi-skilled staff for crane working, excavation of earth, sand filling, placement of slab and RCC box, sand bag placement, back filling and P. Way work should be arranged for the block working.
- 2.4.6 In case, due to any unforeseen eventuality which may affect the successful execution of planned work, RH girders of suitable length along with ancillary arrangements should be kept ready to restore traffic expeditiously.
- 2.5 Caution of 20 KMPH may be imposed 24 hours before the proposed line block for a length of approximately 60m.
- 2.6 LWR track should be converted in to single rail, two gaps of 25mm width to be made at a spacing of 13m (to be decided as per width of cutting at formation level), at equal distance from centre of proposed alignment of LHS and fishplates are to be provided. LWR to be distressed as per LWR Manual.
- 2.7 Precast RCC boxes to be placed in vertical position, along the track, on both sides, at a distance of at least 8m from the proposed centre of LHS. Precast slabs should also be kept ready near the LHS site or they can be put on precast RCC boxes. Efforts to be made to keep them in such a way that from one side launching of precast slab as well as RCC boxes can be done from one single position of crane. Crane shifting during block be avoided.
- 2.8 OHE to be lowered (in case of electrified section) with the help of Tower Wagon.
- 2.9 Notice to public for traffic block and train cancellation / diversion, if any, to be given.
- 2.10 In case the LHS is required to be placed partially or fully below the ground level, excavation on both the sides of the railway bank should be done in advance with suitable ramps. This will facilitate easy access of machineries from sides and also in minimizing the requirement of excavation efforts during the block period. Stability of the side slopes must be ensured while doing this excavation.
- 2.11 Approach road for movement of road crane and other heavy machineries be made.
- 3.0 Works during block.**
- 3.1 The block shall not be planned during rainy season. Even in case of fair weather, the block work shall be avoided, if there is forecast of rain during block hours. The movement of machinery becomes difficult and work duration also gets prolonged, in case it rains.
- 3.2 Disconnect the track and track assembly including sleepers. Lift the disconnected track panel by crane and place at suitable location. Ballast is to be removed upto formation level and to be stacked away from working area.

- 3.3 Excavation of earth should be started simultaneously from both ends of formation by separate Poclain. While deploying two Poclain during excavation, care should be taken to commence excavation from diagonally opposite side (UP & DN) so that vibration effect on soil is not compounded. Slope and width be as per design as indicated in Clause 1.4 and 1.5 above. The earth arising out of the excavation should be dumped away from the working area either transported through dumper / tractor-trolley or space is created to temporary store the excavated earth. This excavated earth should not be used for backfill material unless specified otherwise.
- 3.4 Water may be sprinkled on cut slopes depending on type of soils.
- 3.5 Watchman should be posted to watch stability of cut slope and control traffic movement at site. Necessary plastic sheet to be kept at site to protect cut surface in case of unusual rain etc.,
- 3.6 No materials should be kept or men are allowed to stand within 2m from cut edge.
- 3.7 Precaution and Safety;
- 3.7.1 Concerned staff from S&T and OHE shall be available at site.
- 3.7.2 All the skilled, semi-skilled staff working at LHS location should use safety helmet.
- 3.7.3 Man should enter into trench only after stability of cut slope is ensured by SSE/Works in charge at site. Only bare minimum required persons to be allowed for entering the area between cut slopes.
- 3.7.4 One staff at each side should be vigilant and he should alert staff working inside the trench incase of any collapse of side earth etc.,
- 3.7.5 Medical personnel with first aid etc., should be available at site.
- 3.7.6 Sufficient number of RPF personnel should be deployed to protect the site from local people during block.
- 3.7.7 Sectional TI should be deputed for co-ordination with Divisional Control.
- 3.8 To check the level of bottom of cutting, bamboo or staff can be used, having pre-marked level, for quicker idea. One string to be stretched at rail level. From the same string three plum bob be fixed one on either outer ends of RCC boxes and one at centre. Thereafter, edges and centre line be transferred at bottom cutting. Track centre shall also be transferred.
- 3.9 Bottom of bed is to be prepared with sand. Sand to be unloaded directly from dumpers / tractor trolley, minimum 200mm thick layer or as designed to achieve required SBC and leveled manually or with the help of Poclain. Level of top of sand be checked with the help of leveling instrument with respect to designed level.
- 3.10 Precast base slabs should be placed in position by cranes, starting from centre of formation towards both ends. Centre line of precast slab shall be placed at the centre

of track (for single line). Hook on slabs top should be cut by disc cutter or gas cutting arrangement and epoxy material to be applied.

- 3.11 The precast segments are to be placed over base slabs, by cranes, edge of box segment be placed at centre of track (especially in case of single track) i.e., track will be supported on two segments. After that segments are placed towards both ends. The precast box segments should be at perfect alignment with centre line of LHS. The joints between base slab and segmental boxes should be staggered. Segments should perfectly flush with each other. Hook on box top should be cut by disc cutter or gas cutting arrangement and epoxy mortar to be applied. Alternatively holes can be kept in precast box segment for lifting.
- 3.12 Geo-textile to be wrapped on the entire outer surface of the box to prevent seepage and leaching of earth. All joints to be sealed with suitable sealant / waterproofing compound.
- 3.13 Insertion of RCC box for LHS should be done in presence of Sr.DEN/DEN as per instructions of Railway Board.
- 3.14 Construction of wing walls after launching of boxes requires a considerable period and also require speed restriction during this period. Hence, suitably designed U-shape or L-shape precast RCC retainers be launched along with launching of RCC boxes. In such cases suitable weep holes shall be provided in the RCC box / U or L-shaped retainers.
- 3.15 Boulders to be filled behind the RCC box. Remaining space (between out formation and boulders) should be filled with suitable back fill material and to be compacted properly, preferably by use of hand held pneumatic vibrators.
- 3.16 Backfill material may slip easily (being granular material), therefore, in outer 1.0m – 1.5m thickness (bank slope) excavated soil or cohesive soil be used.
- 3.17 Ballast should be spread and track panel to be placed over ballast and fishplates be fixed on either end. Manual packing and alignment should be done.
- 3.18 Pilot the first train with “stop dead and proceed with caution” and subsequent train at a speed of 20KMPH, till post block activities are completed.

#### **4.0 Post block works.**

- 4.1 Mark sleeper Nos. on either side of the proposed LHS for a length of 15m for monitoring track parameters i.e., cross level measurements. The cross level of track should be measured after passage of train and track should be attended as per requirement.
- 4.2 After allowing initial settlement of boxes (if any), the gaps between two segments be sealed by use of cement mortar or epoxy, by pressure grouting, to make joints water tight.

- 4.3 Making of ballast profile and through packing of track. Welding of fishplated joints to convert it to LWR and distressing.
- 4.4 Construction of Wing / Return walls, Sal Balli Pilling / Rail Pilling for the foundation of wing / return wall should be provided to facilitate construction of wing wall, as per requirement.
- 4.5 Provide height gauges on either side, as per requirement and standard specifications.
- 4.6 Repair of embankment to proper profile.
- 4.7 Temporary speed restriction should be relaxed depending onsite condition and consolidation of track.
- 4.8 Construction of approach road to LHS on either side and drainage system.
- 4.9 Commissioning of LHS.
- 4.10 Closing of Level Crossing.
- 4.11 As soon as first rainfall occurs after completion of the work, SSE/P.Way should visit the site and inspect for any unusual occurrence like settlement, loose packing, cross-level variation etc.,

## 5.0 Traffic Blocks

- 5.1 Site Engineers should carefully access the quantum of work and evaluate the execution time based on capacity of equipments and other resources deployed. Some additional time should be considered for any exigencies. As a guidance following time log are given in Table-1 for single line.

Time log for single line

S. No.	Activity	Time (in minutes)
1	Dismantling and removal of track panel from track	5
2	Excavation of earth / embankment by two Poclain (one from each side) and dumping of cut material about 30m away from embankment (approximate 400 cum)	90
3	Laying of sand below the base slab and preparation of bed including leveling	20
4	Laying of precast slab laying (about 10 slabs) leveling and aligning (cutting of books and applying epoxy) (by crane from both sides).	30
5	Placing of precast boxes (9 boxes segments) – placement in proper level and alignment and placing geo-textile / GI sheets.	60

6	Boulder back filling (started after placement of two segments) – (boulders placed at site by dumpers) and placement of sand bags in four corners in between cutting and RCC boxes. Filling of back fill material in between boulders and existing formation along with compaction (work to be done parallel with boulder filling).	60
7	Placement of track panels, linking on either side of track and manual packing	20
8	Exigencies	25
	<b>Total</b>	<b>320</b>

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CROSS SECTION



