NOTIFICATION

New Delhi, the 18th April, 2013

G.S.R.-247 (E) In exercise of the powers conferred by section 22 of the Metro Railways (Operation and Maintenance) Act, 2002 (60 of 2002), the Central Government hereby makes the following rules for opening of Metro Railways in India, except the metropolitan city of Kolkata, for Public Carriage of Passengers, namely:-

CHAPTER I

PRELIMINARY

1. Short title, commencement and application. –

(1) These rules may be called the Opening of Metro Railways for Public Carriage of Passengers Rules, 2013.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions. –

(1) In these rules, unless the context otherwise requires, –

(a) "Act" means the Metro Railways (Operation and Maintenance) Act, 2002 (No. 60 of 2002)

(b) "Approved metro railway standards" means technical specifications and standards approved by the Central Government or as specified in the relevant national and international codes;

(c) "Authorised" means authorized by the metro railway administration;

(d) "Bridge engineer" means the Chief Engineer or any other civil engineer responsible for design and/or construction of bridges or viaducts or tunnels;

(e) "Chief Executive Officer" means the chief executive of the metro railway, in-charge of working of that metro railway;

(f) "Commissioner" means the Commissioner of Metro Railway Safety appointed under section 7;

(g) "Form" means the Form appended to these rules;

(h) "General Rules" means the Metro Railways General Rules, 2013;

(i) "Passenger" means a person travelling on the metro railway with a valid ticket or pass;

(j) "Report" means the report of the Commissioner under section 15;

(k) “Schedule” means a schedule appended to these rules;

(l) “Section” means section of the Act.

(2) All other words and expressions used in these rules but not defined shall have the same meaning as assigned in the Act and the Metro Railways General Rules, 2013.

CHAPTER II

PREPARATION FOR OPENING OF THE METRO RAILWAY

3. Opening of the metro railway –

(1) The metro railway administration shall ensure that the metro railway or a portion thereof to be opened for public carriage of passengers is as per the approved metro railway standards and that all administrative formalities are complete.

(2) Where the Chief Executive Officer is of the opinion that the metro 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 on the safety of that metro railway.

4. Supply of documents to the Commissioner. –

(1) The Chief Executive Officer shall, while making reference to the Commissioner for inspection and report on the safety of the metro railway under sub-rule (2) of rule 3, furnish all relevant documents to the commissioner from the following list of documents, namely:

(a) Tabulated details;

(b) Index plan and sections;

(c) Drawings of works;

(d) Certificate by the Chief Executive Officer;

(e) Certificate/Report from the independent safety assessor/consultant in respect of the signalling and train control system that it conforms to appropriate safety integrity levels as per CENELEC or equivalent standard, for safe running of trains;

(f) Approval of the Electrical Inspector to the Government (EIG) in respect of electrical works and the energisation of the power supply and traction system;

(g) Oscillation trial and speed test report in respect of new type of rolling stock, and the joint safety certificate from the heads of disciplines involved in the project construction, and operation and maintenance of the metro railway;

(h) Track Standards, Loading Standards and the Schedule of Dimensions, as approved by the Central Government for the project;

(i) List of infringements of moving and fixed dimensions;

(j) Safety Management System approved by the Chief Executive Officer;

(k) Working orders to be enforced at the operations control centre, depot and at each station; and

(l) Administrative note giving salient features of the project.

(2) The documents referred to in sub – rule (1) shall indicate the distances from the same fixed point in kilometers and decimals up to two digits and the fixed point shall be clearly defined in a note 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 heights shall be mentioned with reference to the datum in meters and decimals up to two digits.

(4) The documents referred to in sub-rule (1) shall be signed by the heads of each technical discipline, except the certificate at (1) (d), which shall be signed by the chief Executive Officer himself.

(5) The Chief Executive Officer shall furnish such documents to the Commissioner, as far as possible, one month in advance of the stipulated date of inspection. The documents (e) and (f) listed under sub-rule (1), which may not be available one month in advance, shall be furnished at least one week before the stipulated date of inspection.

5. Contents of documents.-

(1) Tabulated details which shall consist of important characteristics of the metro railway or a portion thereof to be opened for public carriage of passengers, and in particular shall 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) Viaduct abstract as specified in Form IV;

(e) Important bridges abstract as specified in Form V;

(f) Ballast and permanent way abstract as specified in Form VI;

(g) Stations and station sites as specified in Form VII;

(h) Brief particulars of rolling stock as specified in Form VIII;

(i) Brief particulars of traction installations as specified in Form IX;

(j) Power supply installation abstract as specified in Form X;

(k) Restricted Over Head Equipment clearances abstract as specified in Form XI;

(l) Electrical crossings over metro railway tracks as specified in Form XII;

(m) Traction maintenance depot abstract as specified in Form XIII;

(n) Ventilation, smoke management and fire safety measures in viaducts/tunnels and stations as specified in Form XIV; and

(o) Signalling and train control installations as per sample in form XV.

Note: The forms I to XX given after the “Schedule”, are illustrative and are for guidance only. The contents of the forms will be for the metro railway being referred to the Commissioner for his inspection and opening.

(2) Index plan and section sheets, completion drawings, etc. shall include,

(a) Index plan and section sheets as mentioned in the Schedule;

(b) Completion drawings of bridges/viaducts showing details of structure, spans, loading standards adopted, etc.;

(c) Completion drawings of tunnels, If any, showing the location of ventilation shafts, man refuge and cross passages etc.;

(d) Diagrammatic plan of station yards showing layout of tracks and particulars of turn outs, gradients, signals and interlocking installed; and

(e) Implantation diagrams of overhead equipment masts/overhead current collection system or details of third rail arrangement, as applicable.

(3) The comments on the following matters, namely; -

(a) Moving and fixed dimensions;

(b) Strength of bridges / viaducts;

(c) Brake and communication;

(d) System of working;

(e) Electric traction equipment; and

(f) Type of rolling stock, proposed along with list of restrictions, shall be contained in the certificate of the Chief Executive Officer in Form XVI.

(4) List of infringements of moving and fixed dimensions shall be prepared as specified in Form XVII and shall contain full explanations for the infringements and restrictions or precautions to be adopted because of them and the reference to the authority of the Central Government under which the infringement is permitted or allowed.

(5) Working orders to be enforced at each station on the metro railway to be opened shall be prepared in accordance with the provisions of the Metro Railway General Rules, 2013 and shall specify any special conditions that are required to be met with and such orders shall include traction power working rules.

CHAPTER III

DUTIES OF THE CHIEF EXECUTIVE OFFICER

6. Deviations from approved standards to be notified –

(1) The Chief executive Officer shall ensure that the metro railway or a portion thereof proposed to be opened is operationally fit in every respect before inspection of Commissioner.

(2) The Chief Executive Officer shall, while making reference under sub-rule (2) of rule 3, bring to the notice of the Commissioner any deviation in design, material and construction of the civil works, electrical, signalling and train control, and telecommunication installations, rolling stock or appliances of the metro railway, instances in which moving and fixed dimensions have not been observed, or the bridges, viaduct, tunnels that are not capable of carrying the specified or standard loading without exceeding the stresses specified in relevant Indian Codes/International Codes.

7. Chief Executive Officer to make special arrangements –

(1) The Chief Executive Officer shall make such arrangements as are necessary to facilitate the inspection of the metro railway, which is to be inspected for opening by the Commissioner.

(2) The Chief Executive Officer shall be responsible to make such special arrangements as the Commissioner may reasonably require for inspection of civil structures, permanent-way, rolling stock, electrical, signalling and train control, and telecommunication and train control installations on the metro railway, which is to be opened.

8. Supply of information to the Commissioner – The Chief Executive Officer shall supply all the information and give required assistance to the Commissioner, and arrange all instruments and apparatus required for taking measurements, testing of bridges/viaducts, rolling stock, electrical, signalling and train control, telecommunication and other installations.

9. Dismantling of any work on request by Commissioner –

(1) The Chief Executive Officer shall on receipt of a request made by the Commissioner, make arrangements to dismantle any structure on the metro 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 dismantling is necessary for its proper inspection.

10. Chief Executive Officer to accompany the Commissioner during the Inspection –

(1) The Chief Executive Officer will accompany the Commissioner throughout the inspection.

(2) If, for any unavoidable reason, it is not possible for the Chief Executive Officer to accompany the Commissioner, then the Director in-charge of the project or an official of equivalent rank, authorised by special order issued by the Chief Executive Officer for the purpose, shall accompany the Commissioner along with other officials connected with the construction, operation and maintenance of the project, and shall be present during the entire period of inspection.

CHAPTER IV

DUTIES OF THE COMMISSIONER

11. Commissioner to make full and complete examination-

(1) On receipt of a reference under sub-rule (2) of rule 3 from the Chief Executive Officer, the Commissioner shall, with a view to determining whether it is fit to be so opened, inquire into all matters which appear to him relevant for the safety of public carriage of passengers on that metro railway or part thereof.

(2) The Commissioner shall satisfy himself that,-

(a) The Metro Railway General Rules, 2012 have been applied to the metro railway or part thereof proposed to be opened;

(b) The moving and fixed dimensions, as per the approved Schedule of Dimensions, have been observed; and

(c) The civil works, permanent-way, electrical, signalling and train control, telecommunication, rolling stock and other appliances belonging to or working on the metro railway are designed properly or constructed in such a manner so as to guard the system against accident and failure, which may affect the passenger safety.

12. Provisions for handling traffic at stations - The Commissioner shall satisfy himself that at every station on the part of metro railway proposed to be opened:-

(a) Adequate provision has been made for handling of passenger traffic;

(b) Arrangements have been made for easy access by road; and

(c) Adequate fire-protection and disaster management measures have been taken along with arrangements for safe evacuation of passengers.

13. Inspection of bridges or viaducts - The Commissioner shall satisfy himself that the bridges or viaducts and other elevated structures on the metro railway proposed to be opened for public carriage of passengers are so designed and constructed to conform to the approved loading standards and that the stress limits are not exceeded.

14. Procedure for inspection of bridges or viaducts –

(1) For the purpose of rule 13, the Commissioner shall examine at least one bridge or viaduct of each different pattern or type, as the case may be, and satisfy himself about the adequacy with reference to the safety of:

(a) The general design of the bridge or viaduct;

(b) Designs of different parts or portions of the bridge or viaduct;

(c) The construction and erection of the whole structure of the bridge or viaduct;

(d) Steel girder spans and their bedding at all supports; and

(e) Type and design of the pre-stressed concrete bridges or viaducts including their bearings.

(2) If the Commissioner considers it necessary, in addition to the certificate of a bridge engineer employed for the purpose, he may call for load deflection test as specified in Form XVIII and other tests under the loads for which the bridge is designed.

(3) If the Commissioner is satisfied that the girders have been properly designed for the work they are intended to perform, then the open-web and plate- girders shall not require to be tested.

(4) The Commissioner may test any number of spans and may test a span any number of times and at any speed as he considers desirable up to the maximum permissible speed of the section.

(5) The Commissioner shall satisfy himself that on both sides of the road under bridges, height gauges of suitable design are provided to ensure that no part of any road vehicle or its load shall come in contact with the road under bridge girders. “Danger” boards for electric traction are also provided on these height gauges.

15. Inspection of electrical installation –

(1) The Commissioner shall inspect the following for electrical installations on the metro railway proposed to be opened for the public carriage of passengers, keeping in view the essentiality of services and safety of passengers, namely:-

(a) Protection systems of substation;

(b) Earthing and bonding of installation;

(c) Electromagnetic interferences to ensure that these are within limits; and

(d) Essential services to ensure that these would run in case of major break downs.

(e) (i) Electrical clearances;

(ii) Implantation of masts or third rail and other structures;

(iii) Caution and danger notice boards for public;

(iv) Assurance Registers signed by various metro railway staff of their knowledge of working in electrified traction area;

(v) Maintenance facilities and manpower; and

(vi) Firefighting measures;

(vii) Measures provided to control stray current and corrosion of steel reinforcement of the structures, provision of shrouds in case of third rail DC traction system;

(f) Any other item, as he may consider fit for safety of passengers.

(2) 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 Operations, Electrical, Permanent Way, Signalling and Train Control, and Telecommunication staff are fully acquainted with the duties to be carried out after electric traction is introduced.

16. Inspection of rolling stock – The Commissioner shall inspect the following items of the rolling stock proposed to be used on the metro railway keeping in view the safety of travelling public on metro railway system proposed to be opened, namely:-

(a) Important systems like traction, braking etc.

(b) Safety items like dead-man handle or vigilance device, door operations, etc.

(c) Facilities for evacuation of passengers in case of emergencies;

(d) System of operation and train control;

(e) Fire prevention measures;

(f) Communication between Train Operator and passengers; and

(g) Any other item, as he may consider fit for safety of passengers.

17. Inspection of Signalling and telecom facilities- – The Commissioner shall inspect the following items of the signalling and telecom facilities keeping in view the safety of travelling public, proposed to be used on metro railway system proposed to be opened, namely:-

(a) Fail-safe features of the signalling system;

(b) Signal and Telecommunication installations satisfying the requirements of electric traction; and

(c) Any other item, as he may consider fit for the safety of the passengers.

18. Inspection of facilities for relief of passengers in emergencies – The Commissioner shall check the following facilities for relief of passengers in case of emergency, namely:-

(i) In-house facilities and preparedness to combat emergencies;
(ii) Communication and arrangements with outside relief agencies;
(iii) Availability of competency certificate with metro railway officials connected with the metro operations; and

(iv) Any other item, as he may consider fit for safety of passengers.

CHAPTER V

THE INSPECTION REPORT OF THE COMMISSIONER

19. Contents of report –

(1) The report of the Commissioner shall specify that:-

(a) He has made a careful inspection of the metro railway and the rolling stock that may be used there on;

(b) The moving and fixed dimensions as laid down have not been infringed, or the condonation of the infringements to the moving and fixed dimensions has been obtained from the competent authority;

(c) the track structure, strength of bridges/viaducts, tunnels, general structural character of the civil works, signalling and train control system, telecommunication , traction installations 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 metro railway can be opened for the public carriage of passengers without any danger to the public using it.

(2) The reports shall be clear and concise and shall deal with all matters which are required to be considered, particularly whether the metro railway line is designed for the specified loading and whether there are instances of deviation or infringement of moving and fixed dimensions.

20. Documents accompanying inspection report – The report shall be accompanied by the following documents, namely:-

(a) Index plan and sections of the metro railway;

(b) Results of the load test of bridges, when asked for by the Commissioner;

(c) Documents required for initiation of electric traction;

(d) Tabulated details in Forms I to XV;

(e) Certificate by the Chief Executive Officer in Form XVI; and

(f) List of infringements of moving and fixed dimension in Form XVII.

21. Submission of report to Central Government – In respect of every reference made to him under sub-rule (2) of rule 3, the Commissioner shall submit his report to the Central Government.

CHAPTER VI

SANCTION TO OPEN METRO RAILWAY FOR PUBLIC CARRIAGE OF PASSENGERS

22. Opening of a metro railway by the Commissioner –

(1) The Commissioner may sanction opening of the metro railway or a portion thereof, as the case may be, for public carriage of passengers and introduction of electric traction, subject to such conditions as he may impose in the interest of the passengers. While giving sanction to the opening of metro railway, he will forward his inspection report to the Central Government.

(2) After receiving the sanction, the Chief Executive Officer shall publish the date of opening of the metro railway or a portion thereof for public carriage of passengers in the local newspapers in English, Hindi and local languages.

23. Sanction to open metro railway - The Central Government may, after considering the inspection report submitted by the Commissioner under rule 22(1), confirm, modify or cancel the sanction given by the Commissioner, while exercising powers under section 14 of the Act.

CHAPTER VII

INTRODUCTION OF NEW TYPE OF ROLLING STOCK

24. Use of new type of rolling stock –

(1) The metro railway administration when it desires to use new type of rolling stock different from those already running on a section of the metro railway, shall apply for sanction for the same to the Central Government through the Commissioner.

(2) Any modification in the design of car or rolling stock which significantly alters the system of operation and control on 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.

(3) Any significant modification in the car or rolling stock affecting the salient dimensions or suspension system or running gears, and any other modification which affect the riding quality of the rolling stock, shall also constitute a change in the type and design of the rolling stock.

(4) For new designs of rolling stock, oscillation and or other trials are required to be conducted as per the procedure specified by Central Government from time to time to determine safe speed potential and stability of rolling stock. This provision shall also apply for increasing the speed of existing rolling stock by making improvements.

(5) The application under sub-rule (1) shall be accompanied by:-

(a) Such diagrams as necessary to give full particulars of the axle loads, wheel spacing, length over buffers/ couplers and other principal dimensions of the rolling stock as specified in Form VIII for which sanction is required.

(b) such calculations and stress sheets showing:

(i) The external forces on which the stress calculations are based;

(ii) The stresses which will be produced in the various bridges/ viaducts on which the proposed rolling stock will run;

(iii) the effects which the said rolling stock will have on various structures and track as compared with those caused by the rolling stock already in use, or allowed by the existing orders; and

(iv) The conclusions arrived at;

(c) The calculations stress sheets must show, as to what allowance has been made for any secondary or deformative stresses in

addition to the primary stresses caused by the external forces and what relief of stress, if any, has been included. The Commissioner may ask for necessary tests to be carried out on bridges as referred to in sub-rule (2) of rule 14;

(d) The modification, if any, necessary to signal and telecommunication installation to ensure electromagnetic compatibility/electromagnetic interference compatibility with rolling stock and a certificate that the same have been carried out;

(e) actual test report of electromagnetic compatibility /electromagnetic interference measurements with rolling stock and a confirmation that the results are within specified limits and standards;

(f) Report of checks on rolling stock to ensure that it withstands the electromagnetic interference from external sources;

(g) Oscillation trial report and the speed certificate based on oscillation trial results;

(h) A safety certificate jointly signed by the heads of Rolling Stock, Civil, Electrical and Signalling and Telecommunications Engineering, and the Operations disciplines of the metro railway in the Form XIX.

(6) The proposal shall be scrutinized by the Commissioner and the recommendations thereon shall be submitted to the Central Government for its orders.

(7) No new type of rolling stock which causes change in the electromagnetic compatibility/electromagnetic interference behaviour or stresses exceeding the design criteria specified and approved by the Central Government for existing structures or excessive stresses in track shall be ordered unless prior sanction of the Central Government has been received through the Commissioner for doing so.

(8) The type of rolling stock already running on a section of the metro railway after approval by the Central Government can be introduced on a new section of the metro railway with the sanction of the Commissioner.

CHAPTER VIII

ALTERATIONS OR CHANGES IN THE EXISTING METRO RAILWAY

25. Notice of alterations or changes –

(1) Where it is proposed on metro railway or a portion there of which had been opened after inspection, to construct any deviation line, stations, or to make an addition, alternation or reconstruction materially affecting the character of any work and such work forms part of, or is directly connected with the working of the metro railway, the metro railway administration 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 taken in hand, the metro railway administration shall furnish to the Commissioner drawings or particulars on work and any temporary arrangements necessary for carrying it out, and get his approval.

26. Opening of new or strengthening bridges or viaducts –

(1) No bridge or viaduct shall be reopened to traffic, after strengthening, without the approval of the Commissioner even though it is able to carry the load without exceeding the maximum permissible stresses as specified in the relevant Indian codes/International Codes.

(2) No load shall be imposed on metro railway bridge or viaduct 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.

27. Use of New Type of signalling Equipment –

(1) The metro railway administration, when it desires to use a new type of signalling equipment, shall apply for sanction to the Commissioner.

(2) The application under sub-rule (1) shall be accompanied by –

(a) a list of the requirements which the equipment fulfils together with the results of the tests conducted;

(b) a certificate from the head of Signal and Telecommunications Engineering department in the Form XX;

(c) a statement giving details of the tests, trials and verification conducted by suppliers, metro railway, etc. on the performance of the equipment;

(d) safety assessment report from an independent safety assessor/consultant, where applicable;

(e) certificate, if any, from the other metro railway where equipment is in use for passenger carrying services;

(f) the relevant system details as may be necessary to give full particulars of the principle of operations and safety features incorporated;

(g) a copy of the instructions jointly approved by the heads of Operations department and the Signal and Telecommunications Engineering department, to be issued for operation of the equipment by the operating Staff, including those instructions for working under abnormal or failure conditions; and

(h) Any changes in the Station Working Orders as a result thereof.

28. Alternation or Changes in Electric Traction Equipment and use of New Traction Equipment –

(1) The metro railway administration when it desires to alter or make changes in Electric Traction Equipment when it materially affects its design characteristics and is directly connected with the train operation, such metro railway administration shall apply for such alteration or change in electric traction equipment to the Commissioner.

(2) The application under sub-rule (1) shall be accompanied by –

(a) a list of the requirements which the equipment fulfils;

(b) a statement whether the equipment complies with the relevant Indian specification or International specifications;

(c) a statement giving details of the tests, trials and verification conducted by suppliers, metro railway, etc. on the performance of the equipment;

(d) certificate, if any, from the other metro railway where equipment is in use for passenger carrying services; and

(e) The relevant system details as may be necessary to give full particulars of the principle of operation and safety features incorporated.

CHAPTER IX

SIGNALLING AND TRAIN CONTROL INSTALLATIONS

29. Signals –

(1) The signals to be provided for controlling the movements of trains on metro railway shall be, -

(a) Cab signals;

(b) Fixed line-side signals (where provided); and

(c) Hand signals for shunting purposes.

(2) The signalling and train control system shall be Continuous Automatic Train Control type and shall permit different modes of train operation depending upon its design, namely-

(a) Automatic mode, where provided;

(b) Automatic reversal mode (if provided):

(c) coded manual mode;

(d) Run on sight mode, where provided;

(e) Restricted manual mode; and

(f) cut-out mode, where provided.

(3) Under special circumstances and during initial stages, train services on the metro railway may be run with the approval of the Commissioner under Approved Special Instructions, by any of the following systems of working; namely:-

(a) Automatic Block System;

(b) Absolute Block System.

(4) The requirements of the various modes of train operations given in sub-rule (2) above shall be in accordance with provisions laid down in Metro Railway General Rules, 2012 and the approved metro railway standards.

(5) The signalling and train control systems provided on the section shall be optimum for the planned level of safety and requirement of traffic.

(6) The design of signalling and train control system shall be such as to enable the driver to easily distinguish between various modes of train operation.

(7) The locations of trains running on the section and aspects of the signals, where provided and in use and, shall be displayed in the operations control centre and the relevant station control rooms.

(8) The fixed line-side signals, where provided but not in use, will have specific indication to that effect.

30. Points-

(1) All points on passenger lines shall be power operated.

(2) The point operating mechanism on passenger lines shall be of non-trailable designs.

(3) Spring points shall not be used.

(4) Moveable crossings and moveable diamond crossings on passenger lines shall be provided with complete facing point equipment of approved type.

31. Interlocking –

(1) The operation of signalling gears shall be automatic or from a panel or key board or any other approved means enabling operation of routes and also individual operation of points and signals.

(2) The apparatus provided for operation of points and signals shall be interlocked for all passenger running lines.

32. Track Circuits – All passenger running lines shall be equipped with means of continuous detection like track circuit, axle counters, or other suitable means, to detect the presence or absence of a vehicle.

33. Sidings –

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.

34. Provision of isolation at stations –

(1) All passenger line shall be isolated from all sidings connected thereto.

(2) Isolation may be accomplished by –

(a) Connection to a long line or siding; or

(b) Provision of a short dead end siding; or

(c) Provision of trap; or

(d) Any other authorised means of isolation.

Note: 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.

35. Emergency Communication –

Necessary means of communication, like mobile radio communication, shall be provided to enable the drivers to contact operation control centre and station control room in case of emergency.

36. General-

The standard of safety of signalling and train control system provided shall be in accordance with the Approved metro railway standards or recommendations of the European Committee for Electro technical Standardisation or its equivalent national standards/international standards, as the case may be. Necessary measures like protective devices or design features shall be adopted to safeguard signalling and train control, and telecommunication installations against the harmful effect of electromagnetic inference, stray current and earth leakage current, etc. of 25KV AC, or 750 V DC, or other traction system as adopted on the section.

CHAPTER X

DESIGN AND INSPECTION OF EQUIPMENT FOR ELECTRIC TRACTION

37. Design of Electric Installations –

1) The design of all electric installations, namely transmission and distribution lines, sub-stations, switching station, rigid overhead current collection system, regulated overhead equipment, third rail DC Traction System etc., as applicable, shall be according to approved standards laid down by the Central Government and the Central Electricity Authority Regulation, 2010, or any other law for the time being in force and wherever any departure from accepted norms becomes necessary, approval of the Central Government shall be obtained.

2) Adequate protective arrangement shall be made to ensure that the public cannot come in contact with the electric equipment on line within the metro railway premises.

3) Suitable protective screens shall be provided where live conductors pass under or over bridges. Where third rail DC traction is installed shrouds of suitable design shall be provided over the third rail.

4) The structures supporting overhead equipment or the third rail, as the case may be, shall be designed in accordance with the relevant international and Indian standards. The wind pressure to be adopted shall be generally in accordance with IS 875-1987 (latest revision). Inside Metro Corridor tunnel, complete current collection system and its supporting system shall be as per relevant international/Indian standards and shall be capable of working safely under air piston effect during train operation.

5) When the distribution system involves overhead wires carried on steel structures including bridges and roofs, or third rail on pedestals, and 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 or other conductive part of the

structure will not be dangerous to the public and the metro railway staff, or the access to such areas shall be restricted. In AC and DC traction, bonding and earthing shall be as per the approved code for bonding and earthing in respective areas. In case of elevated concrete structures and in the tunnels (except bored tunnels with precast segment lining) continuous earth bonding shall be provided by earthing the reinforcement of structures and connecting the same to over-head electrical structures or suitable structure earth cable. The steel handrails on viaducts, where provided, shall also be earthed.

6) Earthing arrangements at power supply installations shall strictly conform to the international standards or Central Electricity Authority Regulation, 2010 and accepted codes of practices for bonding and earthing for AC and DC traction. Adequate stray current control system shall be provided under DC traction System to avoid corrosion to steel reinforcement and other metallic parts of the tunnels and nearby structures. All precautions shall be taken to avoid Electro-magnetic effect in the environment as per relevant standards / approved design.

7) The earthing system for the traction shall conform to requirements of IS-3043 and EN-50122 Part 1 and Part 2, as applicable, and the maximum rail potential shall not exceed specified limits.

8) Earth wires shall be provided at appropriate locations as per EN50122 standards. In complicated areas, structures may be connected to individual earthing stations.

9) When overhead lines transmitting electric power (other than lines forming part of the railway traction equipment) have to be carried across metro railway track, the details of the equipment provided in connection with such lines shall be designed with the object of minimizing danger in the event of breakage and in accordance with stipulated regulations for electrical crossings. These details shall be approved by the Electrical Inspector to the Government of India.

10) Lightening arrestors of standard or approved types shall be provided wherever they are necessary.

11) All components of the equipment which carry live conductors shall be provided with devices approved by the Electrical Inspector to the Government to prevent unauthorised persons climbing them. Anti-climbing devices shall also be provided, wherever necessary on structures carrying high tension equipment within metro railway premises.

12) Warning notices shall be erected in conspicuous position indicating the existence of live electrical equipment.

38. Display of caution boards and notices:

The following caution boards and notices of standard size written in English, Hindi

and local language shall be displayed at the various locations indicated below:-

(a) treatment for Electric shock boards giving instructions for treatment of electric shock at all metro railway station control rooms, car depots, sub-stations, switching stations, offices of maintenance engineers for works, signals, electrical traction equipment and rolling stock etc.,

(b) general “caution notices” regarding danger of high voltage traction equipment for public at various entrances to metro railway stations and for staff at prominent places;

(c) “750 V or any other voltage DC Caution Boards” or “25 KV AC caution boards” as applicable shall be affixed at conspicuous locations on foot over and road over bridges, sub-stations, switching stations and track cabins, and caution boards or stickers on third rail shrouds;

(d) caution boards at such posts (for signal and telecommunication staff) where protective screening has not be provided;

(e) “Caution-Unwired turn-out” boards ahead of all unwired turnouts or cross over taking off from wired tracks;

(f) “Warning” boards for neutral sections;

(g) Board for “Switching on” and “Switching Off” of power at neutral sections;

(h) Restricted clearance boards at such identified locations;

(i) Power Block limit boards; and

(j) Stop boards at termination of over-head electrical equipment in the sections to be energized.

39. Protection of private property against inductive effects of AC traction

In 25 KV AC 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.

In the case of DC traction, there is possibility of corrosion of the metallic structures and conductors in the vicinity of viaduct and tunnel due to stray currents. Though the metro railway shall take protective measures against the stray current effect, wide publicity shall be given so that special precautions may be taken by the parties concerned against the possibility of corrosion effect of the stray current.

40. Approval of energisation of high tension lines-

(1) Application shall be submitted at least a fortnight before energisation of high tension lines to the Electrical Inspector of the Government for the metro railway for the following; namely -

(a) Formal approval, if not already received, to the design and layout of all high voltage equipment including traction sub-stations, transmission line, 25KV/33KV feeders, switching stations, booster stations, DC feeder and third rail etc., as applicable;

(b) Approval for energisation of high tension installations mentioned above including overhead equipment for AC and third rail equipment for DC traction;

(c) The application should be accompanied by relevant documents and certificates as specified in metro railway AC/DC traction manual, or instructions issued by the Central Government;

(2) On receipt of an application under sub-rule (1), the Electrical Inspector shall scrutinize and inspect the design and installations in respect of the following namely:-

(a) the layout and design for receiving sub-stations, traction sub stations auxiliary sub stations, 25 kV AC overhead equipment or DC traction third rail and other installations for compliance with the Indian Electricity Act, 2003 and the rules made there-under and the relevant Indian standards or International standards; and

(b) Inspection of 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 Electrical Inspector shall convey his approval for the energisation of 25kV/33 kV AC feeder lines from receiving sub stations, energisation of receiving sub stations, traction sub stations, auxiliary sub stations, traction sub-stations to feeding posts, switching stations, booster transformer stations, track cabins and auxiliary transformer stations, and 750 V or other different Voltage DC third rail system and other associated high tension equipment as applicable, subject to such conditions as he may consider necessary.

41. Procedure for energisation of traction installations –

(1)

(a) after obtaining the sanction of the Electrical Inspector to the Government of India for energisation under rule 40, the sub stations should be commissioned sufficiently in advance for the energisation of overhead electrical equipment, or third rail equipment as the case may be;

(b) before energisation of the sub stations, full communication facilities should be available and power supply authorities should be ready to give power supply;

(c) on the date on which energisation of overhead equipment or third rail equipment installations takes place, necessary clearance certificate should be obtained from the Electrical Construction Officers and others who had been hitherto working in the sub- station premises and in the section to the effect that their staff had been withdrawn, and the sub-station and the section could be energized;

(d) After measurements on the whole installation and check on the satisfactory operation of all equipment including protective relays, the traction sub-stations and other installations may be energized.

(e) Energisation of overhead electrical equipment and overhead current collection system shall be progressively undertaken starting with 33kV/25kVAC feeders from the receiving sub-stations to the traction sub-stations, track cabins, bus bars of the feeding posts followed by one sub-section after another. In case of third rail DC traction similar sequence will be followed; and

(f) Before running electric rolling stock, a confirmatory field test to check the proper operation of the protective relays in the traction sub- station shall be conducted.

(2) In addition to giving wide publicity through newspapers and other media, the Station Controller shall warn all Metro Railway Employees and other persons working adjacent to track on the station about the danger of 750V DC third rail/25kV AC overhead equipment, or any other traction system used in the metro railway, and in the case of overhead traction equipment, not allow them to ride on top of rolling stock working on the section.

(3) All relevant documents, certificates and notifications issued under the Metro railway AC/DC Traction manual, and the Act, along with the approval of Electrical Inspector for energisation shall form a part of complete documents to the Commissioner while making reference to him under sub-rule (2) of rule 3 for inspection and opening of the metro railway for public carriage of passengers.

(4) The signal and telecommunication requirements in electrified sections shall be in accordance with the provision of the approved metro railway signalling standards.

Note: A catechism dealing with the requirement of signal and telecommunication installations for DC and AC electrified section are enclosed as Appendix A and B to these rules.

SCHEDULE

[See rule 5(2) (a)]

INDEX PLAN AND SECTION SHEETS

1. A set of plans and sections for a metro railway project should consist of:-
   (i) Index plan and sections;
   (ii) Detailed plans and sections;
   (iii) Plans of station yards; and
   (iv) Detailed drawings of structures.

2. The index plan and section should be drawn to a scale of 0.5 km to a cm horizontal and 10 meters to a cm vertical, the plan being drawn above the section on the same sheet.

3. The index plan should be traced from topographic survey sheets. The centre line of the proposed metro line should be indicated by a full red line with position of each station by a red block and name of the station also in red. The radius and degree of all curves should be figured.

4. The index section should show the formation level/deck level of elevated structures by a red line; the gradients should be figured and the height of the formation / deck level above mean sea level entered at each change of the gradient. The position, of each station with its name and distance from the fixed point, position and size of the bridge/viaduct spans should be indicated.

5. Throughout each set of plans and sections, the kilometrage shall be reckoned from the same “fixed point” and datum should be mean sea level. Each sheet should be plotted in the direction of the through kilometrage so that the kilometrage may be read from left to right.

6. on each sheet should be noted the name of the metro railway, gauge and scale along with direction of the magnetic North.

7. The index plan and section and the first and the last sheets of the set of detailed plans and sections should be signed and dated by the engineer in charge.

8. Plans of only those station yards, which are having yard lines other than Up/Down lines, may be submitted.

9. Drawing of structures to be submitted should be the completion drawings.

FORM I

[See rule 5(1) (a)]

CURVE ABSTRACT

Section: Metro Railway

Length: Gauge: mm

Degree of curvature and radius	Number of each	Length in kms of primary curve
Total		

Ratio of curve length to total length of line…….

FORM II

[See rule 5(1) (b)]

GRADIENT ABSTRACT

Section: Metro Railway

Length: Gauge: mm

Gradient (compensated)	Number of each	Length in km	Percentage to total length of line
Total			

Longest continuous length of

Steepest Gradient

Followed by

For a length of …….. Km

FORM III

[See rule 5(1) (C)]

BRIDGE ABSTRACT

Section: Metro Railway

Length: Gauge: mm

Type of Bridge	Clear span in meters	Total no of spans	Waterway in lineal metres	Loading Standard for which designed	Remarks

Note: 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

FORM IV

[See rule 5(1) (d)]

VIADUCT ABSTRACT

Section: Metro Railway

Length: Gauge: mm

Type of Viaduct	Clear span in meters	Total no of spans	Opening in lineal metres	Loading standard for which designed	Remarks

FORM V

[See rule 5(1) (e)]

IMPORTANT BRIDGES ABSTRACT

(Bridges having a total waterway of 300 lineal metres or 1000 sq. metres or upwards)

Section: Metro Railway

Length: Gauge: mm

Name of River	Chain-age Km/ Metre	Drain age area Sq. km.	HFL and its rise above LWL Metre	Bed slope M/km	Mean velocity in flood M/Sec.	Section -al area in flood Sq. Metre	Disch-arge Cu.m/sec	No. of Spans Metre	Height of underside of girder above HFL in Metre	Av. Depth of foundations below LWL Metre

Note 1: HFL – Highest Flood Level

Note 2: LWL – Lowest Water Level

Note 3: M- Metre

FORM VI

[See rule 5(1) (f)]

BALLAST AND PERMANENT WAY ABSTRACT

Section: Metro Railway

Length: Gauge: mm

1. The permanent way consists of UIC 60 Kg, 900A, head hardened new rails of make ____ 18 metres long, continuously welded and laid on concrete sleepers with the density of M+ 8 (1660 sleepers per km). The track on main line, viaduct, bridges, in tunnels and on elevated section is laid on plinth type ballastless track with rails supported on base plate at spacing of 600 mm C/C with approved type of elastic fastening system. The remaining track at grade is laid with rails using approved type of elastic fastening system and 50 mm stone ballast with minimum cushion of 300 mm under the sleepers.
2. All the turnouts to be negotiated are 1 in 12 curved switches and 1 in 8.5 (or 1 in 7 and 1 in 9 as applicable) with thick web switches. Certified that tested and approved new permanent way materials have been used in this section and comply with the accepted specifications.

Note:

a. A brief description to be given of the rails, fastenings, sleepers and ballast provided. Details of dimensions of rails, fittings etc. should not be given in the case of standard section.

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

c. A certificate should be submitted by the head of the civil engineering discipline that the materials are of tested and approved quality and comply with the accepted specification.

d. This is only a sample form and may need changes according to the track structure provided.

FORM VII

[See rule 5(1) (g)]

STATION AND STATION SITES

Section: Metro Railway

Length: Gauge: mm

Name of station	Kilometrage from fixed point	Inter station distance	Type of Platforms (Island or side)	Type of Interlocking if Interlocked	Siding/loop, if provided, with length (Metres)	Remarks

FORM VIII

[See rule 5(1) (h)]

BRIEF PARTICULARS OF ROLLING STOCK

Section: Metro Railway

Length: Gauge: mm

S. No	Description	Details	Remarks
(1)	(2)	(3)	(4)
1.	Rolling Stock features		
	(a) Composition		
	(b) Train Control System		
	(c) Max ^{m} Design Speed		
	(d) Maxi^{m} Operational speed		
	(e) Jerk rate		
	(f) Maximum Tractive Effort		
2.	Physical Dimensions		
	(a) Car Weight		
	(b) Length over Body		
	(c) Maximum Width over Body		
	(d) Height of Floor from TOR		
	(e) Total Height		
3.	Bogie Details		
	(a) Bogie wheel base		
	(b) Distance between Bogie Centres		
	(c) Wheel Diameter		
	(d) Type of Suspension		
4.	Braking Details		
	(a) Type of Braking System		
	(b) Max. Braking effort		
	(c) Service braking effort* *From maximum operational speed to stand still, for fully loaded train on level tangent track.		
	(d) Parking Brake		
5.	**Electro Magnetic effect on Environment**		
	(a) Electro Magnetic interference		
6.	**Safety features**		
	(a) Communication between train operator and passengers		
	(b) Provision of Dead Man Handle		
	(c) Fire Prevention, detection and suppression system		
	(d) Other Safety Features		

Certified that the design has been checked for being within the Kinematic Envelope (KE) in all conditions.

FORM IX

[See rule 5(1) (i)]

BRIEF PARTICULARS OF TRACTION INSTALLATION

Section: Metro Railway

Length: Gauge: mm

Over Head Equipment/Third Rail DC:

1. Salient Features of the Design specially covering following aspects;
   a. Current carrying capacity of the system.
   b. Design parameters like wind speed, Tension, Temperature range.
   c. Speed potential – design and operating speed
   d. Protection arrangements.
   e. Power supply system- Distribution, and feed system, earthing and bonding, Traction SCADA system etc.
2. Certificate that all warning boards and notices as per statutory requirements have been provided at specified locations.

FORM X

[See rule 5(1) (j)]

POWER SUPPLY INSTALLATION ABSTRACT

Section: Metro Railway

Length: Gauge: mm

For 25 kv AC Overhead traction system

S. No	Type of switching	Total Nos.	Location and	Remarks
1.	Traction sub stations and Feeding Posts			
2.	Sectioning and Paralleling Posts (SP)			
3.	Sub-sectioning and Paralleling Posts			
4.	Booster Transformer stations			
5.	Auxiliary Sub-stations			
6.	LT supply Transformer stations			

For DC Third Rail traction system

S. No	Type of sub stations	Total Nos.	Location and nearest station	Remarks
1.	Receiving sub stations			
2.	Traction sub stations			
3.	Auxiliary sub stations			
4.	Track Cabins			

FORM XI

[See rule 5(1) (k)]

RESTRICTED OVER HEAD EQUIPMENT CLEARANCE ABSTRACT

Section: Metro Railway

Length: Gauge: mm

A Over line structures

S.No	Location of over line structure	Total of structure	Clearance from R.L to bottom of structure	Height 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

B Location of overhead electrical structures where specified 2m working clearance not available, and special protection measures therefor

S.No	Location	Type of nearest earthen part	Actual distance between live part and earth (Metre)	Details of protection measures	Remarks

FORM XII

[See rule 5(1) (l)]

ELECTRICAL CROSSING OVER METRO RAILWAY TRACKS ABSTRACT

Section: Metro Railway

Length: Gauge: mm

S. No	Location	Brief technical particulars including voltage	Whether with guards or w/o guards	Owned by	Whether clearance as per the regulations for electrical Xings available	Remarks

FORM XIII

[See rule 5(1) (m)]

TRACTION MAINTENANCE DEPOT ABSTRACT

Section: Metro Railway

Length: Gauge: mm

S. No	Location	Name of nearest metro station	Remarks
1			

FORM XIV

[See rule 5(1) (n)]

Ventilation, Smoke management and Fire safety measures in viaducts/tunnels and Stations

Section: Metro Railway

Length: Gauge: mm

1. Salient features of the design specially covering following aspects:-

(A) Elevated / At Grade stations and viaduct:

(a) Emergency ventilation and smoke management system in stations, if provided;

(b) Emergency Evacuation procedure from viaduct and stations;

(c) Fire detection/suppression system in stations;

(d) Fire alarm and Public address system for emergencies;

(e) Emergency Lighting and Power Supply arrangements; and

(f) Access routes for firefighting personnel and evacuation routes for passengers.

(B) Underground stations and tunnels:

(a) Emergency ventilation and smoke management system in tunnels and stations;

(b) Emergency Evacuation procedure from tunnels and stations;

(c) Fire detection/suppression system in tunnels and stations;

(d) Fire alarm and Public address system for emergencies;

(e) Emergency Lighting and Power Supply arrangements; and

(f) Access routes for firefighting personnel and evacuation routes for passengers.

2. Station designs shall provide evacuation facilities generally as per NFPA 130 or NBC or practices adopted by metro projects in India.

3. Certified that all test certificates from equipment suppliers, and testing commissioning agencies are in order and clearances from statutory authorities have been obtained.

FORM XV

[See rule 5(1) (o)]

BRIEF PARTICULARS OF SIGNALLING AND TRAIN CONTROL SYSTEMS

Section: Metro Railway

Length: Gauge: mm

Signalling and Train Control systems

1. Continuous Automatic Train Control system has been provided on section for movements of trains between stations and between the depot and running lines.
2. The continuous automatic Train control system works on the principle of target speed with cab signals by means of continuous transmission between track side and train through coded Audio Frequency Track Circuit, or through radio control, ensuring safe movement of trains by continuously generating a safe operating envelope defined by the Limit of Movement Authority and the Maximum Safe speed.
3. The Continuous Automatic Train Control system provides the following modes of train operation.

    (i) Automatic mode, where provided
    (ii) Automatic Reversal mode, where provided
    (iii) Coded Manual mode
    (iv) Run on sight mode, where provided
    (iv) Restricted Manual mode
    (v) Cut-Out mode
4. Train operation on main lines is controlled from Operation Control Centre which normally operates under Automatic Train Control system with routes being set and trains interval regulated by computer control. Facility for manual setting of routes and individual operation of point if required has also been provided. Automatic Train Supervision system at Operations Control Centre monitors and controls train operation.
5. A local Control Panel with video display unit has been provided in the station control room to enable the Traffic Controller to hand over control of the signals at specific station if required.
6. Stations on the section have been provided with Computer Based Interlocking system.
7. A digital Mobile Train Radio Communication System based on Terrestrial Trunked Radio specifications has been provided on the section to provide radio communication between traffic controller, depot controller and the train operator.
8. Optical Fibre based telephone communication system interconnecting stations, Operations Control Centre and Train maintenance Depot has also been provided.

FORM XVI

[See rule 5(3)]

CERTIFICATE OF THE CHIEF EXECUTIVE OFFICER

I do hereby certify:

(a) That the moving and fixed dimensions for the metro railway have in every case been worked to. Also that these dimensions will be observed in future and that no work or structure infringing the dimensions will hereafter be permitted without the sanction of the Central Government.

(b) That each bridge or viaduct conforms to the approved standard of loading without exceeding the maximum permissible stress on the available material in any member or portion of the structure.

(c) That every coaching vehicle constructed or procured for the use of the metro railway has been provided with electro-pneumatic/regenerative/air brake and effective means of communication between passengers and the train operator.

(d) That the metro railway shall be worked as per the system specified in the Metro Railway General Rules, 2012.

(e) that the 750 V DC/25 KV AC electric traction equipment can be used for the public carriage of passengers without danger to the public and that the Rules for the design and inspection of equipment for electric traction as per chapter X of the rules for opening of metro railway for public carriage of passengers, 2012 have been complied with.

(f) That the signalling and telecommunication equipment have been installed in accordance with the approved technical specifications and standards, and are safe for passing traffic.

(g) That adequate facilities for handicapped passengers have been made available at the stations and in the trains.

(h) *that _____ has been delegated to accompany the Commissioner of metro railway safety on his inspection in my place and all information supplied or engagements entered into by him shall bear my authority.

Signature with seal of Chief
Executive Officer Metro Railway

*This paragraph (h) should be included in this certificate only when it is not possible for the Chief Executive Officer to accompany the Commissioner due to unavoidable reason, in terms of Rule 10(2).

FORM XVII

[See rule 5(4)]

INFRINGEMENT OF MOVING AND FIXED DIMESNIONS

Section: Metro Railway

Length: Gauge: mm

S. No	Location	Name of structure which infringes	Prescribed dimensions with chapter and item No.	Existing actual dimension	Amount of infringement	Reasons of infringement	Authority under which infringement permitted	Restrictions /precautions to be adopted

FORM XVIII

[See rule 14(2)]

DEFLECTION TEST OF BRIDGES

Section: Date of Test……

Metro Railway

Length: Description of Test Load…….

Gauge: mm

Bridge No	Kilometerage	Material of girders	Clear span between bearing plates	Overall depth of girders	Speed of train	Test Load EUDL	Deflection in m. m.	Design load EUDL for B.M.	Ratio of Design load B.M. to test load B.M.	Reduced Deflection under design load (for slow speed tests) = (8x10)	Theoretical (calculated) deflection (approx) under designed load
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

FORM XIX

[See rule 24(5) (h)]

JOINT SAFETY CERTIFICATE

Based on the reports of “oscillation” trials (Copy enclosed) it is certified that it is safe to run _____ (particulars of EMU / rolling stock proposed to run) not exceeding _____ units (in case of EMUs) coupled together on the section (station) to (Station) from _____ (km) to _____ (km) of metro railway at a maximum speed of _____ (km /h) subject to the following speed restrictions and conditions.

S. No	From Km To Km	Nature of Speed restriction	Brief reason of restriction

SPECIAL CONDITIONS

To be signed by

Director incharge of Civil Engineering

Director incharge of Electrical Engineering

Director incharge of Rolling stock

Director incharge of Operations

Director incharge of Signal and Telecom Engineering

FORM XX

[See rule 27(2) (b)]

CERTIFICATE FOR SIGNALLING EQUIPMENT

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

1._____

2._____

3._____

.....

Head of Signal and Telecommunication Engineering

Appendix A

[See rule 41]

CATECHISM FOR SIGNALLING AND INTERLOCKING INSTALLATIONS

1. SIGNALLING AND TRAIN CONTROL

Have the requirements and recommendations for signalling and train control systems prescribed in Chapter IX of these rules and the technical specifications and relevant national and international standards, installed in the section, being complied with?

SIGNAL

1. Do the signals comply with the requirements as laid down in Metro Railway General Rules, 2013?
2. Have the signal posts been placed on the left side of the track of the approaching train to which they refer? If otherwise, for what reason
3. Are all running fixed signals controlling trains, placed in such a position and at such a height above rail level so that these can be clearly seen by the Train Operators in sufficient time and be readily distinguished by night or by day from subsidiary signals?
4. In case of slotted or controlled signals, can the signals be freely returned to danger by either of the controlling agencies?
5. Are fixed signals not commissioned/not in use have their aspects covered and the cover displays two crossed white bars on a black background, the bars not being less than 30 cm x 10 cm?

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. they are electrically controlled by track circuits or alternative devices?
2. Are detectors (internal/external) fitted to all facing points and do they efficiently detect with switches the signals controlling the movement of train over them?
3. Are switches adjusted to come tight against stock rails? Does the insertion of 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?

STATION CONTROL ROOM

1. Are all signals, points and track circuits electrically/ electronically repeated on the Station Control Panel/Work Station as & where provided?
2. Is the station controller provided with necessary means of stopping the train at his station?
3. Have instructions for working been issued to all staff and included in Metro

Railway Working Instructions and are they correct and efficient?

TESTS IN STATION CONTROL ROOM

It is essential that the interlocking of all signals with points is so effected as to ensure the following conditions, which may be tested from the Station Control panel or Work station

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 point locked where required?
    b) All points, giving access to the running line from sidings are set against the running line?

OPERATION CONTROL CENTRE

Are all signals, points and track circuits electrically/electronically repeated on the Operation Control or Work station as and where provided?

CAB SIGNAL

1. Are the various modes of train control clearly distinguishable on the Driver's Man machine Interface (MMI)
2. Under Cab Signalling System of working, is Automatic Train Protection system able to bring the train to a stop before an obstruction?

Appendix B

[See rule 41]

2. ADDITIONAL CATECHISM FOR SIGNALING AND TELECOMMUNICATION FOR ELECTRIFIED SECTIONS

Have the requirements and recommendations for signalling and telecommunication installation in accordance with the instructions issued for the installation of Signalling and Telecommunication equipment in 750V DC or 25 KV 50 Hz AC or other traction systems as adopted on the section, been complied with?

If not, in what respect the arrangements provided fall short of them?

STATEMENT OF DEVIATION – SIGNALING AND TELECOM SYSTEMS

Description	Existing parameters	Prescribed Parameters	Deviation/ Infringement	Remarks	Approval/ Sanction
SIGNAL					
POINTS					
TRACK CIRCUITS					
CABLES					
ELECT SIGNALING EQUIPMENT					
BATTERIES					
EARTHING					
MOBILE TRAIN RADIO COMMUNICATIONS					
GENERAL SAFETY					