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MINISTRY OF URBAN DEVELOPMENT

NOTIFICATION

New Delhi, the 30th March, 2011

G.S.R 271(E).—In exercise of the powers conferred by section 100 of the Metro Railway (Operation and Maintenance) Act, 2002 (60 of 2002), the Central Government hereby makes the following rules regulating the operations and maintenance of the Bangalore Metro Railway, namely:—

CHAPTER I

PRELIMINARY

1. Short title and commencement.— (1) These rules may be called the Bangalore Metro Railway (General) Rules, 2011.

(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) "accident" means any occurrence which causes or has the potential to cause death or injury to staff, passenger or other person or cause damage to the property of the Bangalore Metro Railway, passengers or other persons;

(b) "Act" means the Metro Railways (Operation and Maintenance) Act, 2002 (60 of 2002);

(c) "adequate distance" means the distance sufficient to ensure safety;

(d) "approved special instructions" means special instructions approved or specified by the Commissioner;

(e) "authorised electrical person" means any person who is duly authorised by an officer of the Bangalore Metro Railway administration empowered for this purpose, either by name or by designation, to perform specific work on the electrical equipment or circuitry,.

(f) "authorised employee" means an employee of the Bangalore Metro Railway to whom a certificate of competency has been issued and who is duly empowered by general or special order of the Bangalore Metro Railway administration, either by name or by virtue of his office, to work or do specific job or jobs assigned;

(g) "Authorised Officer" means an officer of the Bangalore Metro Railway administration who is duly empowered by general or special order of the Bangalore Metro Railway administration, either by name or by virtue of his office, to issue instructions ;

(h) "Authority to Proceed" means the authority given to the train operator of a train, under the system of working, to enter the block section with his train;

(i) "Automatic Fare Collection" system means automatic system for collection of fares and issuing of tickets;

(j) "Automatic mode" means the mode of operation of train under Automatic Train Operation where train is driven automatically including control of acceleration, coasting, braking and stopping of trains;

(k) "Automatic Train Operation" means a sub-system of Continuous Automatic Train Control system, which automatically controls acceleration, coasting, braking and stopping of trains;

(l) "Automatic Train Protection" means a sub-system of Continuous Automatic Train Control system which maintains safe train operation, including train direction, train separation, interlocking and speed enforcement;

(m) "Automatic Train Supervision" means a sub-system of Continuous Automatic Train Control system which automatically monitors the entire system and directs train running so as to provide scheduled service under normal circumstances;

(n) "Auxiliary Systems Controller" means an employee of the Bangalore Metro Railway competent and responsible for the control of the Auxiliary systems including tunnel ventilation system, station air conditioning and building management system of the Bangalore Metro Railway;

(o) "axle counter" means an electrical device which, when provided at two given points on the track, proves, by counting axles in and counting axles out, whether the section of the track between the said two points is clear or occupied;

(p) "backup control centre" is a backup centre to the operation control centre for controlling the movement of trains;

(q) "berth" means length of track nominated to be occupied by a train adjacent to a platform or in the depot ;

(r) "block section" means the portion of the running line between block stations as specified by special instruction on to which no running train may enter, until permission to approach has been received from the block station at the other end of the block section;

(s) "block station" means a station at which permission to approach is received or granted;

(t) "cab signal" means visual indication displayed as speed limit and target distance on the train operator's console granting him the authority to proceed under Automatic mode, or Coded Manual mode of driving;

(u) "calendar day" means the period from midnight to midnight;

(v) "Car Shed" or "Service Depot' means an area where Bangalore Metro Railway trains and coaches are berthed either for repair or for any other attention including stabling;

(w) "caution order" means an instruction given to the Train Operator to observe special precautions including speed reduction at notified locations;

(x) "certificate of competency" means the certificate issued to an employee of the Bangalore Metro Railway after he has been examined for his knowledge of rules, regulations, procedures and manuals relevant to his duties and found fit;

(y) "Chief Controller" means an Officer of the Bangalore Metro Railway in overall charge of Operations Control Centre functions;

(z) "Coded Manual Mode" means the mode of operation of train under Continuous Automatic Train Control system where train is driven manually but remains subject to maximum speed determined by Automatic Train Protection codes;

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

(zb) "connections", when used with reference to a running line, means the arrangements used to connect such line with other lines or to cross it;

(zc) "Continuous Automatic Train Control system" means an automatic system of controlling and monitoring train movements continuously by means of sub-systems, namely, Automatic Train Protection system, Automatic Train Operation system and Automatic Train Supervision system;

(zd) "cut out mode " means the mode of operation of trains under Continuous Automatic Train Control system intended for use in case of train borne train control and signaling system failure , preventing release of emergency brake, the train being operated by the train operator in accordance with line side signals ;

(ze) "DC traction" means a traction system working on 750 volts D.C(direct current) having third rail system adjacent to running rail on main line and stinger system in depot;

(zf) "Departure Order Indication" is an indication on a display panel in the train drivers cab conveying authority to the Train Operator to proceed or start his train.

(zg) "Depot controller " means an employee of the Bangalore Metro Railway responsible for movement of rakes within the depot area including interchange of rakes between the depot and the main line;

(zh) "Electrical way and works" means the traction installations including third rail equipment and other connected works provided on the electrified sections of the railway;

(zi) "Emergency" means an occurrence where there is an imminent or a continuing risk of injury and damage or major disruption to the railway service;

(zj) "Emergency Stop Plunger" means the device provided on the platform or with the Station Controller, the operation of which causes the trains, within the station limits, running on Automatic Train Protection to come to a stop;

(zk) "Engineer's Possession" means a defined section of track under the sole control of an authorised supervisor for a specific length of time;

(zl) "facing and trailing points" means points are facing or trailing in accordance with the direction a train or vehicle moves over them and the points are said to be facing points when by their operation, train approaching them can be directly diverted from the line upon which it is running;

(zm) "fixed signal" means a signal of station at a fixed location controlling the movement of trains and forming part of the signaling systems;

(zn) "fouling mark" means the mark at which the infringement of Standard Dimensions occurs where two lines cross or join one another;

(zo) "headway" means the time interval between two successive trains;

(zp) "Incident" means any occurrence which causes or has potential to cause delay or disruption to passenger services;

(zq) "Inspection car" means a self propelled vehicle , which is used for the inspection, maintenance and repairs of the equipments on viaduct and tunnel;

(zr) "insulated third rail joint" means a special joint for the purpose of sectioning the third rail being powered from different traction substations.

(zs) "interlocking" means an arrangement of signals, points and other appliances, operated from a panel or work-station, so interconnected by mechanical or electrical or electronic locking or both that their operation must take place in proper sequence to ensure safety;

(zt) "irrevocable emergency brake" means that when an emergency brake gets

applied, intentionally or otherwise the emergency brake remains applied until the train speed comes to zero and the cause of application of the emergency brake is removed or reset;

(zu) "isolation" means an arrangement secured by the setting of points, or other approved means, to protect the line so isolated from obstruction due to movement on other connected line or lines;

(zv) "jumper cable" means a cable provided with clips for use as a temporary electric connection to bridge a gap in a running rail, cable or pipe;

(zw) "local control" means the assumption of the responsibilities of the Traffic Controller for the specific station by a person who is authorised to do so for the time being;

(zx) "normal direction of traffic" means traffic moving on the left hand side of the track;

(zy) "obstruction" with its cognate expressions includes a train, vehicle or obstacle on or fouling a line or any condition which is dangerous to trains;

(zz) "Operation Control Centre" means the organization in overall charge of controlling the movement of trains on the main line;

(zza) "passenger train" means a train intended solely for the movement of passengers and their baggage;

(zzb) "permission to approach" means permission given from a block station in advance to block station in rear for a train to leave the latter and approach the former;

(zzc) "platform screen doors" means a system of automated doors synchronized with the train doors which are provided at the platform edge to isolate passengers on platform from track;

(zzd) "point and trap indicators" means appliances fitted to and working with points to indicate the position in which they are set;

(zze) "power block" means withdrawing traction current or power supply from a particular section;

(zzf) "Proceed Code" means the Automatic Train Protection code other than zero speed code on the Train driver or Train operator's console which indicate the target speed;

(zzg) "Railway Board" means the Railway Board as empowered under section 2 of the Indian Railway Board Act, 1905 (4 of 1905);

(zzh) "receiving substation" means an electric substation where 66/132/220 KV supply is received from Grid substation and transformed to 33KV AC and distributed along the line;

(zzi) "rectifier" means an apparatus for conversion of alternating current into direct current;

(zzj) stricted Manual mode" means a driving mode where train is driven manually and is subjected to Automatic Train Protection in respect of maximum speed limit only;

(zzk) rolling Stock Supervisor" means an employee of the Bangalore Metro Railway duly qualified to examine trains and certify their fitness for safe running;

(zzl) running line" means the track used for running trains through and between stations and includes connections, if any, used by a train when entering or leaving stations;

(zzm) "running train" means a train which has started but has not completed its journey;

(zzn) "Run On Sight mode" means a driving mode where the train is driven manually and is subject to Automatic Train Protection restriction; in respect of speed only until Automatic train protection track indications are recognized after which it automatically changes to Coded Manual Mode ;

(zzo) "Supervisory Control and Data Acquisition" means Supervisory Control and Data Acquisition system for the purpose of remote monitoring and control of all power supply installations rom Operational Control Centre and Backup Control Centre;

(zzp) "Short circuiting device" means such devices provided for safety reasons on each station located in Auxiliary Sub-station-Traction sub-station room to temporarily short circuit the running rails to earth in case the rise of running rail potential exceeds prescribed limits;

(zzq) "secure a train" means to make a full brake application, close down all driving positions , remove the train operator's control key and apply parking brakes wherever applicable;

(zzr) "short circuit" means a fault condition in that circuit arising from the introduction of a path of low resistance to electric current;

(zzs) "shunting" means the movement of a coach or coaches with or without traction motors or of any other self propelled vehicle, for the purpose of attaching, detaching or transfer or for any other purpose;

(zzt) "signal" means an indication given to a train operator for controlling the movement of his train;

(zzu) "signal Supervisor" means any Inspector of Signal and Telecommunication Department in charge of installation and maintenance of any signaling and, or associated telecommunication gears either on track or field or station or on train;

(zzv) "special instruction" means instruction issued from time to time by the authorised officer in respect of particular cases or special circumstances;

(zzw) "station" means any place on a line of the Bangalore Metro Railway at which passenger traffic is dealt with;

(zzx) "Station Control Room" means the room where station control panel or work-station is located;

(zzy) "Station Controller" means the person on duty who is for the time being responsible for the working of the station and traffic within station limits and includes the Assistant Station Controller or any person who is for the time being in independent charge of the working of such station and traffic;

(zzz) "station limits" means the limits or chainages as defined in the station working orders;

(zzza) "station section " means the portion of running track within station limits, which is intervening between two consecutive block sections;

(zzzb) "Supervisor Track and Structure or works" means an employee of the Bangalore Metro Railway responsible for the construction or maintenance of track, underground structure, surface structure, bridges or other works connected therewith;

(zzzc) "supply control post" means an assembly of interrupters, isolator switches, remote control equipment and other apparatus provided for controlling power supply to third rail traction equipments;

(zzzd) "system of working" means one or more of the systems specified in Chapter VIII for the time being for the working of trains;

(zzze) "target distance" means the distance within which the train must attain the target speed;

(zzzf) "target speed" means the speed displayed on the train operator's console to indicate the speed the train must not exceed at the target location;

(zzzg) "temporary earth" means an additional earthing device which is applied after the issue of a 'permit-to-work' and removed prior to the cancellation of the 'permit-to-work';

(zzzh) "terminal station" means the station at the end of a line;

(zzzi) 'test track" means the portion of the track in the depot used for testing of the coaches of a train;

(zzzj) "third rail" means a rail on insulators laid by the side of running rails for conduction of electric current to the train through current collector fitted on the train for its running on the main line and depots;

(zzzk) "track circuit" means an electrical circuit provided to detect the presence of a vehicle on a portion of track, the rails of the track forming part of the circuit;

(zzzl) "traction current" means the current drawn by an electric train for movement;

(zzzm) "traction feeder breaker" means a circuit breaker controlling the supply of 750 volts DC to the third rail equipment;

(zzzn) "Traction Power Controller" means an employee of the Bangalore Metro Railway employee on duty in the Operation Control Centre, who is responsible for the control of the traction and auxiliary power supply system of the Bangalore Metro Railway;

(zzzo) "Traction substation" means a substation where equipments are provided for converting AC to DC through rectifier transformer sets;

(zzzp) "Traffic Controller" means an employee of the Bangalore Metro Railway on duty in the Operation Control Centre who is for the time being responsible for running of trains on the Bangalore Metro Railway;

(zzzq) "traffic hours" means the period between the time of the start of the running of the first scheduled train and termination of the last scheduled train;

(zzzr) "train" means an engine with or without vehicle attached or any self propelled vehicle with or without a trailer which cannot be readily lifted off the track;

(zzzs) "Train Integrated Management system" means a system designed to provide information and exercise control on a variety of functions related to movement of metro trains, like traction, power, braking, air conditioning, etc;

(zzzt) "Train operator" means the driver of the Bangalore Metro Railway train for the time being in charge of movement and control of the Bangalore Metro Railway train;

(zzzu) "train radio" means a wireless telephone message communication system between the cab of the train, stations and the control;

(zzzv) "transformer" means a static apparatus for transforming and supplying alternating current at different voltages;

(zzzw) "tunnel ventilation section" means a minimum length of a tunnel section of an up or down line capable of being mechanically ventilated using tunnel ventilation fans;

(zzzx) "work train" means a departmental train intended solely for execution of works on the Bangalore Metro Railway network.

(2) Words and expressions used in these rules and not defined but defined in the Metro Railway (Operation and Maintenance) Act, 2002 (60 of 2002), shall have the meanings respectively assigned to them in that Act.

CHAPTER II

RULES APPLYING TO BANGALORE METRO RAILWAY EMPLOYEES GENERALLY

3. **Supply of copies of rules.**— The Bangalore Metro Railway administration shall supply a copy of these rules and amendments made therein to—

(a) (i) Operations Control Center;

(ii) each station;

(iii) each rake maintenance depot, traction depot, permanent way depot and signal depot; and

(iv) such other offices as may be specified under special instructions; and

(b) each employee of the Bangalore Metro Railway on whom any definite responsibility has been placed by these rules, or of such portions of rules as relate to his duties.

4. **Upkeep of the copy of rules.**— Every employee of the Bangalore Metro Railway who has been supplied with a copy of these rules, shall—

(a) have his copy readily available while on duty;

(b) keep it posted with all corrections;

(c) produce the same on demand by any of his superiors;

(d) obtain a new copy from his superior in case his copy is lost or defaced; and

(e) ensure that the staff working under him are supplied with all corrections or amendments and that they comply with the provisions of this rule.

5. **Knowledge of rules and issue of certificate of competency.—**

(1) **Knowledge of rules.**— Every employee of the Bangalore Metro Railway shall—

(a) be fully conversant with the rules relating to his duties;

(b) pass the specified examinations as conducted by the authorised officer of the Bangalore Metro Railway administration;

(c) satisfy himself that the staff working under him are conversant with the rules relating to their duties and obtain a written assurance.

(2) **Issue of certificate of competency.**— No employee of the Bangalore Metro Railway shall be assigned any duty under these rules unless he has passed the examination as regard to his technical ability and skills and his knowledge of rules, regulations, procedures and manuals relevant to his duties and has been issued, after being found fit, a Certificate of Competency by the Authorised Officer specifically authorised in this behalf.

6. **Assistance in observance of rules.**— Every employee of the Bangalore Metro Railway shall render assistance in carrying out these rules and report promptly any breach thereof, which may come to his notice, to his superior officer and other authority concerned.

7. **Obedience to rules and orders.**— Every employee of the Bangalore Metro Railway shall observe and obey—

(a) all rules and special instruction; and

(b) all lawful orders given by his superior officials.

8. **Prevention of trespass, damage or loss.**— (1) Every employee of the Bangalore Metro Railway shall be responsible for the security and protection of the property of Bangalore Metro Railway administration under his charge or possession.

(2) Every employee of the Bangalore Metro Railway shall endeavour to prevent—

(a) trespass on Bangalore Metro Railway premises;

(b) theft, damage or loss of Bangalore Metro Railway property;

(c) injury to passengers, others and himself; and

(d) fire and other unsafe incidents in Bangalore Metro Railway premises.

9. **Attendance for duty.**— Every employee of the Bangalore Metro Railway shall be in attendance for duty at such times and places and for such periods as may be fixed by the Bangalore Metro Railway administration and shall also attend at any other time and place at which his services may be required.

10. **Absence from duty.**— (1) No employee of the Bangalore Metro Railway shall, without prior permission of his superior officer, absent himself from duty or alter his appointed hours of attendances or exchange duty with any other employee of the Bangalore Metro Railway or leave his charges of duty unless properly relieved;

(2) If any employee of the Bangalore Metro Railway while on duty, desires to absent himself from duty on the ground of illness, he shall immediately report the matter to his superior officer and shall not leave his duty until a competent employee of the Bangalore Metro Railway has been placed in charge thereof.

11. **Taking alcoholic drink, sedative, narcotic, stimulant drug or preparation.**— (1) An employee of the Bangalore Metro Railway shall not take or use any alcoholic drink, sedative, narcotic or stimulant drug or preparation within eight hours before the commencement of his duty or take or use any such drink, drug or preparation while on duty.

(2) No employee of the Bangalore Metro Railway while on duty, shall be in a state of intoxication or in a state in which, by reason of his having taken or used any alcoholic

drink, sedative, narcotic or stimulant drug or preparation, his capacity to perform his duties is impaired.

(3) An employee of the Bangalore Metro Railway, while on duty, shall not smoke or chew tobacco.

12. **Conduct of Bangalore Metro Railway Employees.**— Every employee of the Bangalore Metro Railway shall,-

(a) wear the appropriate badge and proper uniform as specified by the Bangalore Metro Railway administration and be neat and tidy in his appearances while on duty;

(b) be prompt, civil and courteous;

(c) not solicit or accept illegal gratification;

(d) give all reasonable assistance and be careful to give correct information to the public;

(e) make complete and truthful statement at all times in all reports pertaining to his duty; and

(f) when asked, give his name and designation without hesitation.

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13. **Duty for ensuring safety.**— (1) Every employee of the Bangalore Metro Railway shall—

(a) see that every effort is made for ensuring safety of the public and of his fellow employees;

(b) promptly, report to his superior any occurrence likely to affect the safe and proper working of the Bangalore Metro Railway which may come to his notice; and

(c) render spontaneously all possible assistance when called upon to do so by the appropriate official in case of an accident or obstruction.

(2) Every employee of the Bangalore Metro Railway who observes—

(a) anything wrong with a train; or

(b) any obstruction, failure or threatened failure of any part of the way or works or trackside electric equipment including power supply installation; or

(c) any defective signal; or

(d) any unusual circumstances such as fire, smoke, flood accident or other dangerous condition on any part of the system likely to interfere with the safe running of trains, or the safety of the public,

shall take immediate steps, to prevent an accident, and promptly report the matter to the Operations Control Centre or the nearest Station Controller.

14. Standard Time.— The working of trains between stations on Bangalore Metro Railway shall be regulated by the Indian standard time as specified by the Government of India.

15. Access control.- (1) All employees of the Bangalore Metro Railway, in addition to identity cards, shall be provided with access control cards signed by their controlling officers to allow them to visit places of Bangalore Metro Railway system with restricted access in line of their duties.

(2) The following places in particular, shall have restricted access in addition to other places as notified from time to time by the order of Authorised officer, namely:-

(a) traction substation;

(b) auxiliary substation;

(c) signaling equipment room;

(d) telecommunication equipment room;

(e) uninterrupted power supply room;

(f) station control room;

(g) operation control centre;

(h) backup control centre;

(i) depot control centre;

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CHAPTER III

SIGNALS AND CONTROL

16. General.— (1) The following signals shall be used for controlling the movements of trains on the Bangalore Metro Railway, namely:-

(a) cab signals;

(b) fixed signals; and

(c) hand signals.

(2) The aspects displayed by fixed signals are the same by day and by the night, in open and in tunnels.

(3) A fixed signal be placed, where practicable, on the left hand side of the track to which it refers and shall be visible from such a distance which enable a train operator to brake a train from twenty five kilometer per hour speed to stop before reaching the fixed signal and a repeater signal shall be provided at locations where due to obstructions such visibility is not available, except in depot.

17. Description of signals.— (1) Cab Signals - (i) Train movements on running tracks shall normally be governed by the Automatic Train Protection system which displays to the Train operator in the operating console-

(a) actual speed of the train;
(b) the maximum permitted speed at each point of travel;
(c) the distance the train is currently authorised to travel (where provided);
(d) system alarms; and
(e) messages;

(ii) if the target speed indication and the target distance indications, where provided, are greater than zero, the indication is referred to as "PROCEED" indication;

(iii) if either of these indications is "0", the indication is referred to as "STOP" indication;

(iv) the train operator is authorised to drive his train up to the indicated speed as far as authority has been given for such purpose.

(2) Fixed Signals— (i) On main lines, fixed signals are color light signals capable of showing a "Red", "Violet" or "Green" aspect;

(ii) a "Red" aspect indicates that a train must be brought to STOP short of the signal;

(iii) a "Violet" aspect indicates that the route is set and locked but may not be fully clear and a train operating under cab signals may proceed under the authority of the cab signals but a train operating on the sole authority of line side signals must stop and seek instructions from the Traffic Controller;

(iv) a "Green" aspect indicates that the route is cleared to the next fixed signal and the train may proceed as far as the next fixed signal;

(v) when a fixed signal is not in use, the aspect shall be covered and the cover shall display two crossed white bars on a black background, the bars being not less than 30cm long and 10 cm wide.

(3)Depot Signals— (i) In depots, fixed signals may be both color light and position light type and the main line type fixed signals shall comply with the manner as specified in sub-rule(2); and

(ii) in position light type signaling two white lights displayed horizontally shall mean that a train should stop;

(iii) two white lights displayed at an angle shall mean that a train may proceed in restricted manual mode as far as the line is clear and the train operator must keep a lookout for an obstruction;

(iv)the Depots shall be isolated from the running line through an approved means.

(4)Hand Signals— (i) Hand signals shall normally be used only for the shunting of works train in depot, or at the site of work, or in extreme emergency;

(ii) any light other than "Green" or any object waived violently shall be interpreted as a stop signal;

(iii) "STOP" shall be indicated by—

(a) a Red lamp;

(b) raising of both arms above the head;

(c) waiving a white light rapidly from side to side

(d) a Red flag;

(iv) "PROCEED" shall be indicated by a Green lamp held steadily;

(v) Hand signals for shunting and train movements shall have the following configurations:-

	ASPECT	INDICATION
(a)	A Green lamp or flag moved slowly up and down	Move away from the signal
(b)	A Green lamp or flag waved from side to side across the body	Move towards the signal
(c)	A Red light or flag	Stop

(vi) when during cautious driving or shunting, the speed of a train is to be reduced, the hand signal for movement shall be given at a slower and slower rate and when a stop is required, a STOP signal shall be given;

(vii) each Station Control Room shall have at least one hand lamp capable of displaying Red, Green and White aspects readily accessible and in working order and each Station Controller shall be conversant with its location and its proper use;

(viii) each employee of the Bangalore Metro Railway involved in the shunting of work trains, the operation of work trains at a maintenance site and the operation of work trains within an Engineer's Possession, shall carry a hand lamp capable of displaying Red,

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Green and White aspects in working order and shall be conversant with its proper use and in addition, he shall also carry a Red flag and a Green flag.

18. Provisions of signals.— (1) Fixed signals shall be provided on running lines at the approach to all points and crossings of interlocked areas and located in such a way that trains will stop at a safe distance from any fouling movement or location.

(2) Fixed signals shall be provided at the exit from interlocked areas.

(3) Fixed signals may also to be provided at the arrival and departure ends of selected platforms.

(4) All depot tracks and any other tracks not equipped with Automatic Train Protection shall be controlled by fixed signals for both entry and exit.

(5) All single ended tracks shall be provided with at least one permanent red aspect light to indicate the point beyond which train shall not proceed.

(6) Stopping markers shall be provided at all platforms to indicate where a train of a given length will stop for the convenient detraining and entraining of passengers:

Provided that where trains of varying lengths may operate, separate markers shall be provided for trains of each potential length and for bidirectional running.

19. Working of Signals and points.— (1) Control of signals and points shall be from a route setting panel or work-station, and complete routes, points and signals, will be cleared by a single operation under normal conditions.

(2) Any failure of vital equipments shall cause the signaling system to display a more restrictive indication.

(3) Any route which has been cleared for a train shall not be cancelled until it is cleared by the train entering the route except,—

(a) in case of emergency; and

(b) in case where operating conditions require that an alternate route be cleared and in this case, the alternative route shall not be made available for clearance until the pre-set time, defined under special instructions, has elapsed from the time the original route was blocked.

(4) In conditions of failure of route setting controls, points can be set individually from Operations Control Centre, Station Control Room or locally as may be necessary.

20. Control of Signaling.— (1) (i) Main line signaling is controlled from an Operations Control Centre and operates normally under automatic control with routes being set and train intervals regulated by computer control;

(ii) the Traffic Controller shall be responsible for maintaining the services at the scheduled level as far as practicable and for restoring the train services following a delay or disruption;

(iii) the Traffic Controller at the Operations Control Centre may adjust the timetable and may intervene manually to set and clear routes if the timetable needs to be varied or in the event of a major disruption;

(iv) normally signaling system shall permit only one train at a time in one Tunnel Ventilation Section, more than one train in one Tunnel Ventilation section can be sent only in case of emergencies, and in a case the Traffic Controller decides to send additional trains in a Tunnel Ventilation section already occupied by a train, he shall set the route manually for additional trains and shall advise train operators about this before authorizing them to proceed;

(v) the Traffic Controller, if required, may hand over control of the signals at specific station to the Station Controller and a local control panel or work-station shall be provided in the station control room for this purpose;

(vi) the handover takes place automatically if there is a loss of control of individual stations from Operations Control Centre;

(vii) in case of complete failure of control from Operations Control Centre, the entire control may be transferred to a backup control centre at an alternate location, which may be at separate locations for traffic control and control of traction power;

(viii) the Traffic Controller shall have control of all routes on the main line outside of depots.

(ix) train movement shall normally be under computer control but the Traffic Controller has the capability of setting routes manually and of setting individual points, if necessary.

(2) Safety Communication—

(i) all communication between Operations Control Center and train operators, Station Controller, maintenance staff of electrical, rolling stock, signal and telecommunication and track and structures department and others pertaining to movement of trains shall be tape-recorded and preserved for 'incident, analysis and, training, and the mode of preservations and its duration shall be specified in special instructions;

(ii) the employee of the Bangalore Metro Railway shall initiate and acknowledge radio messages in a manner that ensures establishment of communication only between intended parties;

(iii) messages affecting train movements shall be addressed by the Traffic Controller to only one train at a time:

Provided that in an emergency, a blanket message may be sent by the Traffic Controller to all trains in or approaching a particular area, which must be acknowledged individually by all concerned train operators:

Provided further that in an emergency, such message may be given by the Station Controller, if authorised by the Traffic Controller in this behalf.

(3) Running Lines—

(i) the Signaling system on the running line shall be a full Automatic Train Protection system;

(ii) if the speed which permits a train running on Automatic Train Protection to stop under normal braking within a limit of safety, is exceeded, an irrevocable emergency brake application is automatically made which ensures that the train does not proceed beyond the safe limit;

(iii) normal operation of the train is monitored from indication on the train operator's console and each main running line is duly signaled for operation;

(iv) certain lines shall be equipped for automatic train operation with provision for the train operator to assume manual control of the train if required;

(v) in the event of failure of the Automatic Train Operation equipment and on lines not so equipped, train operators shall control their train up to the speed indicated on the console;

(vi) where no cab indication is available, train shall be automatically restricted to a maximum speed of twenty five kilometers per hour in "Restricted manual" mode;

(vii) fixed signals are provided at the entrance and exit to each interlocked area and certain other locations.

(4) (i) station Controller's control panel or work-station shall have the capability of setting routes within the area of control, and of setting individual points when necessary;

(ii) on each platform, there shall be an emergency stop plunger and in the Station Control Room, a switch for each platform which when operated shall cause any approaching train to stop before it enters the platform. Any train entering or leaving or stationary in the platform shall experience an irrevocable emergency brake application.

(5) (i) The depot tracks may not be equipped with full complement of Automatic Train Protection and trains shall be automatically restricted to a maximum speed of twenty five kilometers per hour and the train operator may further restrict the speed of the train in the depot lines to a lower value as provided in the special instructions;

(ii) movements within depots shall be controlled by either main line type fixed Signals or position light type;

(iii) control of movements within the depot shall be exercised by a Depot Controller from a control panel or work-station located within the depot;

(iii) the Depot Controller shall use a control panel or work-station for setting and clearing of routes within the depot;

(iv) instructions to train operators as to which siding they shall drive in or depart from may be given by train radio on a dedicated depot channel distinct from that used by Operations Control Center;

(v) in the event of the failure of the radio, a Public Address system may be used;

(vi) both a verbal instruction and a proceed indication from the fixed signals shall be received before the train may move into the depot from the main line and *vice versa*.

(6) (i) Local operation of points on running lines as and when required may only be undertaken by a Station Controller with the permission of the traffic controller;

(ii) the crank handle used to manually operate the points is interlocked through a key which, when released by Operations Control Center controller or Station Controller, shall inhibit setting of routes over the points concerned, and such transfer of control should be acknowledged by the station controller before the local control can be activated;

(iii) some points in depots are trailable, in the event of a route failure they need not be correctly set before a movement is authorised over them in the trailing direction. Non trailable points shall be protected by fixed signals.

(7) (i) All lines of the network are equipped with Automatic Train Operations in which the acceleration, braking, observance of speed restrictions and observance of signal commands are undertaken automatically;

(ii) the train operators shall close the train doors and start the train from a station and monitor its functioning;

(iii) all passenger trains shall be equipped with Automatic Train Protection equipment and can be driven manually under the control of the Automatic Train protection system;

(iv) any over speed or failure to brake at the appropriate time results in an irrevocable emergency brake application which shall be referred to as " Coded Manual Mode";

(v) if Automatic Train Protection information is not available from the track side equipment, the train can be driven with traffic controller's permission in "Run On Sight" mode in which the on board Automatic Train Protection equipment restricts the speed of the train to twenty-five kilometers per hour and when the Automatic Train Protection information is again available from the track, the mode automatically upgrades to Coded Manual;

(vi) if the Automatic Train Protection is not available from the track or loco or cab side equipment due to fault or otherwise, the train may be driven with Traffic controller's permission in 'Restricted Manual' mode and in this mode the on board Automatic Train

Protection equipment restricts the speed of the train to twenty-five Kilometers per hour, this mode shall be used in depots and exceptionally on running lines when authorised by the Traffic Controller;

(vii) if the on-board Automatic Train Protection equipment is defective, the train may be driven in "Cutout" mode as authorised by Traffic Controller and when so authorised , the Train Operator may open and operate a sealed switch and drive the train without Automatic Train Protection and in this mode, the Train Operator shall limit the speed to twenty five Kilometers per hour and be responsible for the safe movement of the train.

21. Train detained on Line.—

(1) If a train operating under Automatic Train Operation or cab signals comes to a stop on a running line and does not receive a proceed code within sixty seconds the train operator shall inform to the traffic controller by the radio and ask for instructions.

(2) The Traffic Controller shall check his indications and if he is satisfied that there is no train ahead, he may instruct the train operator to proceed in Run On Sight mode exercising utmost vigilance so that he may stop short of any obstruction.

(3) If, after traveling some distance, a proceed indication is received by the train, the train shall automatically upgrade to the Coded Manual mode of control and the train operator shall again inform the Traffic Controller. If the train is fitted with Automatic Train Operation, this mode of the control shall only be selected at the next station

(4) If the cause of the problem is confirmed as a track side equipment malfunction, the Traffic Controller may instruct subsequent trains without waiting for the train operator to seek instructions provided the preceding train has passed through the affected section and reported resumption of Coded Manual mode.

(5) If a train operating under the authority of line side signals only stops at a fixed signal at danger and it does not clear within 60 seconds, the Train Operator shall inform to the Traffic Controller by radio and ask for instructions.

(6) The traffic controller shall consult the concerned station controller in control of the signaling and decide whether or not the train may proceed.

(7) If there are no points in the route ahead, the Traffic Controller may instruct the train operator to proceed as far as the next fixed signal at a reduced speed (in any case not more than twenty five kilometers per hour speed) such that he can stop short of any obstructions and if after traveling some distance, a proceed indication is received by the train running on Restricted Manual mode, the train shall automatically upgrade to the Coded manual mode of control and the train operator shall again inform the Traffic Controller and if the train is fitted with Automated Train Operation, this mode of the control may be selected.

(8) If there are points in the route, the traffic controller and the station controller shall examine the indication of the points and if indications at the station and the Operations Control Centre agree that all points are set correctly and locked, the traffic controller may instruct the train operator to proceed as far as the next fixed signal at a reduced speed such that he can stop short of any obstruction and if after traveling some distance, a proceed indication is received by the train running on Restricted Manual mode, the train shall automatically upgrade to the Coded manual mode of control and the train operator shall again inform the Traffic Controller and if the train is fitted with Automated Train Operation, this mode of the control may be selected.

(9) If points are not indicated as set and locked, the Traffic Controller shall instruct the station controller to examine the concerned points, if they are lying in the incorrect position, he shall manually set the points with the crank handle from the station control room and the points shall be secured with a clamp and padlocked and the train instructed by hand signal to proceed.

22. Absence of cab signaling.— (1) Failure of the cab signaling shall initiate an irrevocable emergency brake application.

(2) The train operator shall report the occurrence to the Traffic Controller and seek instructions.

(3) The Traffic Controller shall verify as far as practicable from indications on his diagram that the problem is not caused by a track side fault or another train and if no cause is apparent, he shall instruct the Train Operator to select the Run On Sight mode and try to move ahead exercising utmost vigilance so that he may stop short of any obstruction.

(4) If the train does not move, the Traffic Controller shall authorize the Train Operator to select the Restricted Manual Mode and try to move.

(5) If the train still does not move, the Traffic Controller shall authorize the Train Operator to operate the "Cut Out switch" and to proceed in Cut Out mode of control to the next station exercising utmost vigilance so that he may stop short of any obstruction.

(6) At the next station, passengers shall be detrained and the train worked to depot or a suitable siding.

23. **Failure of fixed Signals.** — (1) if a train operator observes that a fixed signal is not displaying any aspect, he shall report the condition to the traffic controller.

(2) If cab signal indications are available, the train shall proceed according to these indications,

(3) If the train is operating without cab signal indications, the train operator shall stop the train at the signal and seek instructions from the traffic controller by radio.

(4) All, concerned staff shall then follow the provisions laid down in sub-rules (6) to (9) of rule 21.

24. **Failure of route setting.**— (1) If a route through an interlocked area cannot be set automatically or by manual control from the Operations Control Centre, the control of the area shall be passed to the local Station Control Room.

(2) If the route cannot be set from the Station Control Room signaling control panel or work-station, the Traffic Controller shall instruct the train operator to secure his train and wait for instructions.

(3) The Traffic Controller and the Station Controller shall examine the indications for the points and if indications at the station and at Operations Control Centre agree that all points are set correctly and locked, the Traffic Controller may instruct the train operator to select Run On Sight mode and proceed at reduced speed such that he can stop short of any obstruction. Once cab signals show a proceed indication, Coded Manual mode shall be automatically resumed and must be maintained as far as the next

station and if the train is equipped with Automatic Train Operation, then this mode may be resumed at the next station.

(4) If any point indication is missing or shows the points set for the wrong direction, or there is a discrepancy between the indications at the station and in Operations Control Centre, the Station Controller shall examine the position of the points himself, if they are lying in the wrong direction, he shall manually set the points with the handle from the station control room and the points shall be secured with a clamp and padlock and the train instructed by hand signal to proceed and the Train operator shall be instructed to resume Coded Manual Mode and normal speed once a proceed indication is shown by the cab signaling.

(5) The Station Controller, after examining the position of the points under sub-rule (4), shall, then, return to the station and report to the Traffic Controller that the route remains secured and any subsequent train may be instructed by radio to proceed.

(6) In depot, the Depot Controller may instruct the train operator by radio to proceed if—

(a) point indications for all facing points in the route show the points to be set and locked in the correct position;

(b) any points not showing an indication shall be traversed in the trailing direction.

(7) If points for which indications are not available have to be traversed in the facing direction, the Depot Controller after ensuring that the points are not damaged shall set the points manually and secure them in the correct position with the clamp and padlock before authorising the train to proceed.

CHAPTER IV

WORKING OF TRAINS

25. General.— (1) No person shall drive a train unless he is in possession of a valid certificate of competency issued by an Authorised Officer of the Bangalore Metro Railway administration.

(2) No train operator shall be booked to work a train until he has learnt the road and signed a certificate that he is fully acquainted with it and for this purpose, he shall be

booked for minimum three round trips including one trip during night before being put to work the train independently.

(3) A train operator who has not worked on a section for three months or more should be given road learning trips to refresh his knowledge as under :-

DURATION OF ABSENCE	NUMBER OF ROAD LEARNING TRIPS
3-6 months	1 round trip
Over 6 months	3 round trips

(4) No train shall be driven on a running line from the rear cab except,—

(a) a locomotive working within an Engineer's Possession under the control of hand signals;

(b) in exceptional circumstances, when authorised by an official not below the grade of Operations Control Centre Traffic Controller and a look out shall be positioned in such cases at the leading end with the capacity to apply the emergency brake and the speed of the train shall not exceed ten kilometer per hour in such cases.

(5) In depot, the train shall be always driven from the leading cab in the direction of travel or otherwise the train operator in the rear cab shall be instructed by cab to cab telephone by a second qualified Train Operator in the leading end cab.

(6) In depot, where a part consist or damaged train cannot be driven from the leading end, a look out shall be posted at the leading end and the Train Operator shall have the means of sounding an audible warning and, if practicable, the means of applying the emergency brake.

(7) Each train while manned shall show two white lights to the front and two red lights to the rear in the direction of travel.

(8) A stationary train on a running line shall be secured and shall show two red lights at each end of the train.

(9) A train stabled in a depot or siding shall show at least one red light at each end at a double ended siding and at the outermost end in the dead end siding

26. Service Regularity.— (1) Every effort shall be made by Operations Control Centre Staff, station staff and train staff to ensure that scheduled intervals between trains are maintained.

(2) Each Train Operator shall start his train from terminal station as soon as he gets the 'Departure Order Indication'.

(3) Each Train Operator shall start his train from each intermediate station at the time indicated by the 'Departure Order Indication'.

(4) Each Train Operator shall follow any instruction from the Traffic Controller which varies the scheduled timings of his train.

(5) Each Train Operator shall be supplied a copy of the current working timetable applicable to the line on which he is working and he shall be in possession of such time table while on duty.

IndiaCode

27. Speed of trains.— (1) Every train shall be run on each line of the Bangalore Metro Railway within the limits of speed as specified in the approved special instructions.

(2) The speed of the trains in Automatic Train Operation Mode shall be automatically controlled by the Continuous Automatic Train Control system.

(3) In Automatic Train Protection mode, the train operator shall regulate the speed of trains according to the cab signals, the maximum permissible speed shall not be exceeded and the speed of the train shall be such that it can be stopped within the distance indicated, as being the limit of safety, the failure to do so shall result in irrevocable application of emergency brakes which shall be viewed as a failure on the part of the Train Operator.

(4) In Restricted Manual mode, the maximum speed of the trains shall only be automatically regulated, to twenty five kilometer per hour and the train operator shall further restrict the speed as required by special instructions while operating in this mode on run on sight.

(5) In Cut out mode, the speed of train shall be manually regulated by the train operator as required up to a maximum speed of twenty five kilometer per hour

(6) The maximum speed of trains in shunting shall not exceed ten kilometer per hour.

(7) The speed of other rail borne vehicles shall be restricted as provided in special instructions.

(8) The speed of train in condition of low visibility while operating in Restricted Manual mode or Cut out mode shall be governed by special instructions.

28. Caution Order.— (1) Whenever in consequence of the track or Traction equipment being under repair, or for any other reason, special precautions are necessary, a caution order detailing the kilometers between which such precautions are necessary, the reason for taking such precautions and the speed at which the train shall travel, shall be handed over to the Train Operator at tne stopping station short of the place where such precautions are necessary or at such other stations or work place and in such a manner as specified under special instructions and in addition, the Traffic Controller and the Station Controller shall ensure that the caution order for speed restriction has been suitably incorporated in the Continuous Automatic Train Control system.

(2) The Operator of train, not in passenger service, shall reduce the speed of his train to twenty kilometer per hour when passing through station platforms during the period of revenue operations and an audible warning shall be sounded while entering or leaving the platform.

29. Train Staffing.— (1) Each train shall be manned by only one train operator

(2) No person shall be allowed to travel in the Train Operator's cab except a cab authorised trainee or apprentice train operator, a driving inspector and other authorised person as laid down in special instructions.

(3) Each train operator shall, at all times when on duty , be in possession of—

(a) a train operator's handbook containing the general rules and special instructions and the operating and trouble shooting procedures for the train;

(b) the current Working Timetable for the line;

(c) two pairs of such spectacles he is required to wear under medical advice;

(d) a hand lamp capable of showing red, green and white aspects;

(e) a watch; and

(f) a First Aid box.

(4) Each train operator when reporting for duty shall examine any notice issued for his guidance and in particular those which require his special attention on the specific day and line.

(5) The train operator shall undergo breathalyzer test at the time of sign-on and sign-off.

(6) The Train Operator shall check continuity and adequacy of brake power and air pressure or pneumatic pressure before taking the train out of depot and conduct brake power feel test at the first available opportunity.

(7) In the event of a Train Operator becoming incapacitated while driving a train, he shall, if capable, inform the Traffic Controller who shall inform the Station Controller at the next station.

(i) If the train is under Automatic Train Operation control, it shall arrive at the next station under automatic control and the train operator may be relieved at that station for medical attention.

(ii) The Station Controller (if he possesses the competency certificate) shall work as train operator till such time as another train operator is made available and the senior most booking clerk qualified in the duties of the Station Controller or Assistant Station Controller, wherever provided, shall be in-charge of the Station during the absence of the Station Controller.

(iii) If the train is under manual control, it may get stopped between stations . In this case, the Station Controller at the station in rear of the train shall board the following train, instruct the train operator to select Restricted Manual mode and proceed to the rear of the stalled train.

(iv) The Station Controller shall then instruct the train operator to close down his driving position, secure the train and leave it in that condition until further instructions from the Traffic Controller.

(v) The Station Controller shall then board the stalled train, go to the leading cab and drive the train to the next station where the train operator may be relieved for medical attention and arrival at the next station, the Traffic Controller shall be informed that the following train may now be authorised to resume the normal working.

(vi) The Station Controller shall continue to drive the train until such time when another Train Operator shall be made available. Once relieved by a Train Operator, the Station Controller shall return to his station as speedily as practicable.

(vii) In case, there is no following train, the Traffic Controller shall arrange to provide a rescue train operator from the leading direction train, if necessary, as provided in special instructions.

30. Train Defects.— (1) No train with defective safety equipments, cab signaling, leading cab controls, interior lighting, brakes or doors shall remain in passenger service and shall be removed to depot and replaced by a serviceable train at the earliest opportunity.

(2) (i) If traction power is lost on any car bogie, the train need not be withdrawn from service, if power is lost on more than one car bogie and the reduction in speed causes delay to following trains, the passengers shall be detrained at the station and the train worked empty, otherwise, the train may remain in passenger service until it can be replaced by a serviceable train;

(ii) in the event of a mechanical defect in the traction motor or drive which causes the wheels to lock, the train shall be stopped immediately and shall not be moved until clearance has been given by a Rolling Sock Supervisor;

(iii) if a Train operator finds that the train cannot be driven or braked from the leading end cab, passengers shall be detrained as per the provisions referred in clauses (iv) and (v) of this sub-rule;

(iv) such an occurrence may usually happen at a station and a terminal in which case the passengers shall be discharged at the station itself and to dispatch the train to the depot, the Station Controller shall board the train and act as look out in the leading cab while the Train Operator drives from the rear cab in Cut outmode, information on signals and cleared routes shall be passed by cab to cab telephone and train speed restricted to a maximum of ten kilometer per hour;

(v) in the unlikely event that the defect causes a train to stop between stations, the Traffic Controller shall arrange another Train Operator or if necessary a Station Controller competent to drive the train to reach the failed train and drive the train from rear cab in Cut Out mode with leading cab train operator acting as look out and the information on signals and cleared routes shall be passed by cab to cab telephone or radio and train speed restricted to a maximum of ten kilometer per hour.

(3) (i) A failure of the traction control line shall be indicated on the Train Integrated Management System panel which shall enable the fault to be isolated, in case of simultaneous failure of redundant equipment, the train shall be rendered inoperative in consultation with the traffic controller;

(ii) when such failure of the traction control happens on a running line and renders the train inoperative even by applying appropriate isolations in the Train Integrated Management system, the Train Operator shall inform the Traffic Controller that his train is stalled and requires assistance to move and in this case the train shall be dealt with in accordance with rule 49.

(4) (i) Failure of brakes to apply or to release shall be indicated on the Train Integrated Management System panel;

(ii) if brakes on any car bogie fail to apply, the brake of that bogie shall be isolated manually and the normal service to be resumed, the train shall be withdrawn from service after completion of the trip;

(iii) In case of failure of the brakes upto fifty percent of the train, the train shall be worked at speed of twenty-five Kilometers per hour upto next station and passengers must be detrained at the next station and the train worked to depot at a speed not exceeding twenty-five kilometers per hour;

(iv) if brakes fail to apply on more than fifty percent of the bogies, the train shall be brought to a stop as soon as possible by application of the emergency brake and shall not proceed until authorised by a Rolling Stock Supervisor;

(v) if brakes fail to release on any car bogie, up to a maximum of fifty percent the brakes shall be isolated on the affected cars; the brakes released by local control; passengers shall be detrained at the next station and, the train worked to depot at a speed not exceeding twenty-five kilometer per hour;

(vi) if brakes fail to release on more than fifty percent of the cars, no attempt shall be made to move the train until authorised by a Rolling Stock Supervisor.

(5) (i) If doors on a train are not indicated as closed, the train shall not start from a station;

(ii) if doors cannot be closed by hand or there is no obviously open door and the "doors closed" indication is still not received, passengers shall be detrained and the train shall be worked empty until it can receive attention from the Rolling Stock maintenance department;

(iii) if some doors of train do not open at stations but after closing the doors all doors are indicated as closed, the train may remain in passenger service;

(iv) in peak period, the extended dwell times at stations that could result from some doors not opening may make it desirable for the train to be withdrawn from service to avoid delaying the following trains.

(6) Failure of an air conditioning unit shall be indicated on the Train Integrated Management system panel, although it has no effect on the safe operation of the train, the Train Operator shall report such failure to Operations Control Centre, so that the rake receives prompt attention to relieve hardship to passengers.

(7) (i) Failure of main car lighting on one or two cars shall be reported by the Train Operator to the Operations Control Centre and the train may continue in passenger service to the end of its trip provided the emergency lighting is working satisfactorily and at the terminal it shall be withdrawn from service or replaced by a good train;

(ii) if all main train lightings fail or main lighting and emergency lighting both fail, on the same car, passengers shall be detrained at the next station and the rake withdrawn from service.

31. Examination of Trains.— (1) Each train shall be examined by a competent person from the Rolling Stock Maintenance department before being offered for passenger service.

(2) The examination shall ensure that all functions of the train are working correctly and in particular safety devices, such as-

(i) cab signaling;
(ii) safety brake circuits;
(iii) train, Depot control centre, Operations Control centre radio;
(iv) head and tail lights;
(v) Train Integrated Management system;
(vi) brake gears;
(vii) isolating cock ties intact;
(viii) miniature circuit breaker and safety switch seals intact ; and
(ix) any other item specified under special instructions.

(3) The competent staff shall sign a certificate of safety test indicating duration of its validity, which shall remain in the leading cab in the direction of departure.

(4) The train operator who runs the train from the depot shall check that the certificate is up to date and currently valid before moving the train and he shall also check the head lights, the tail lights, the marker lights and the speedometer of the train.

32. Duties of a Train operator.— (1) The train operator shall pay immediate attention , obey every signal , shall always be vigilant and cautious and keep a sharp look out.

(2) When a train operator not working under Automatic Train Protection mode, approaches a fixed signal at 'on' or 'defective' position, he shall not pass that fixed signal unless after bringing his train to a stop, he is either given a written authority by the Station Controller to proceed past such signal or is authorised by Traffic Controller on train radio in accordance with special instructions.

IndiaCode

(3) The train operator shall not operate the train at higher than the maximum authorised speed.

(4) The Train Operator shall be alert for changing rail conditions and shall exercise extra care when operating in areas which may be affected by grease, oil, water or other substance, which could cause running rails to become slippery and shall adjust their speeds accordingly.

(5) When closing the train doors, the Train Operator shall observe the platform end and as far as practicable, prevent the closing doors from striking boarding passengers.

(6) If the doors are obstructed or the 'doors closed' indication is not received, the Train Operator shall reopen the doors and close them again.

(7) In trains operating under Automatic Mode, the train operator shall start the train after closing the doors and all further progress to the next station and the opening of doors there take place automatically, unless manual opening of doors is selected.

(8) In trains not operating under Automatic Train Operation control, the train operator shall drive the train, observing and obeying cab signals, to the next station and shall stop the train at the appropriate stopping mark and the doors of the train shall not be opened until the train has come to a complete stop.

(9) If a train stops short of its proper stopping place, but, the train operator shall manually drive the train to its proper stopping place before opening the doors.

(10) If a train stops beyond its normal stopping place but with the doors still on the platform, the train operator shall contact the Traffic Controller to take his permission for reversing so as to align the train at proper stopping place and after reversing, the doors may be opened manually and passengers allowed to alight and board.

(11) If the train stops beyond the end of the platform, the train operator shall seek instruction from the Traffic Controller. If the Traffic Controller can prevent the following train from approaching the platform by using the signaling controls, he may do so and then authorise the train at the platform to reverse until all doors are at the platform and the train is correctly positioned at stopping place. Otherwise, an announcement shall

be made to the passengers and the train may proceed to the next station without opening the doors. If the train is the last train of the day and the train can not be reversed , then the passengers may be allowed to disembark from the train by opening selected doors of the train by the exterior emergency doors control.

(12) (i) if a passenger emergency alarm is operated in the train, the train operator shall try to establish voice communication with the location by intercom or public address, and he shall try to establish the reason for the operation of alarm but, unless there is a clear and immediate danger to the train and its passengers, he shall continue to the next station before taking any action;

(ii) the Train Operator shall inform on radio the traffic controller in the Operation Control Centre and Station Controller of the station at which the train stops about operation of the passenger emergency alarm.

(13) In case of low visibility, the Automatic Train Operation mode shall be suspended and the train operator while driving in the Coded Manual mode or Cut out mode or Restricted Manual mode shall not proceed unless authorised specifically by the Traffic Controller, in which case he shall proceed very cautiously and be prepared to stop short of any obstruction and when the visibility is restored to normal, he shall advise the Traffic Controller and proceed as per instructions given by him.

33. **Locomotives, works trains and maintenance vehicles.—** (1) Locomotives, works trains, and self–propelled maintenance vehicles equipped with Automatic Train Protection equipment shall be worked as per all relevant rules made under the Act for operation on main lines and in depots as for passenger trains.

(2) The Train Operator of a self-propelled maintenance vehicle which is permitted to operate on running lines shall hold a certificate of competency as a Train Operator or to be accompanied by a person holding certificate of competency, and in the later case, the person holding the certificate of competency is responsible for the observance of these rules in respect of the operation of the vehicle.

(3) Before departing from depot, or from a work site where the train has been uncoupled, the train operator of the leading locomotive shall---

(a) ensure that the train is fully coupled;
(b) carry out a continuity test of the automatic brake; and
(c) verify that all handbrakes have been released.

(4) Subject to sub-rule (2), the Train Operator of a locomotive works train or self-propelled maintenance vehicles, shall possess at all times, when on duty—
(a) a hand lamp capable of showing a red , green and white aspects ;and
(b) any special notices relating to the working of works trains.

(5) Any unpowered vehicles, stationed on a siding or on the running line, shall be secured by the application of sufficient number of handbrakes unless coupled to a locomotive.

(6) Any such vehicle or group of vehicles shall have a lamp attached to the outermost vehicle displaying a red aspect in the direction of approaching trains and on a running line such lamps shall be placed at both the ends of the vehicle or group of vehicles.

(7) Any self-propelled maintenance vehicle which is not fitted with Automatic Train Protection equipments shall be taken on running line only if—
(a) during revenue service period, it is coupled to a locomotive or other vehicle which is so equipped; or
(b) during revenue service period, it is working within the limits of Engineer's Possession; or
(c) during non-revenue service period, it is running on line of sight method at a speed not exceeding twenty five kilometers per hour.

(8) Shunting of vehicles to make or break works train consists shall only take place in designated depot areas.

(9) The maximum speed of non- Automatic Train Protection equipped vehicles shall be limited in accordance with special instructions.

(10) Fly shunting of any vehicle is expressly prohibited at any time.

Explanation: In this rule, a "fly shunt" is made when two vehicles are sent forward unattached either together or one immediately after the other and placed on different lines necessitating the points being reversed after the passage of the leading vehicle.

CHAPTER V

PLATFORM DOORS

34. Kinds of Platform doors.—Platform doors, if provided, may be of following types:—

(a) Platform Screen Door— these doors are powered glass doors located along the platform at the platform edge throughout the passenger area with door locations corresponding to the train car passenger door locations;

(b) Platform Edge Door— these are powered steel doors located along the platform at the platform edge in the baggage handling area with door locations corresponding to the train baggage car doors;

(c) Manual Secondary Door— these are manual glass doors located at one end of platform (end where Platform Edge Doors are not provided) to provide access between platform and the trackside;

(d) Emergency Escape Door— these doors are located around Platform Screen Doors of leading and trailing passenger cars and are meant for use in emergency situations;

(e) Fixed Panel— platform length sections not provided with any of Platform Screen Doors or Platform Edge Doors or Emergency Escape Doors or Manual Secondary Doors are provided with fixed glass screens called Fixed Panel.

35. Normal working of doors.— (1) Platform Screen Door—

(i) Opening or closing of the Platform Screen Doors shall be after receipt of the DOORS OPEN or DOORS CLOSE command signals from the Signaling Link;

(ii) Signaling link enables automatic operation of the Platform Screen Doors only when the train stops within ±500mm of it's normal stopping position, in the rare event of a train stopping outside this limit, the train may be driven under operator's control in Cut out mode, if necessary, to reposition it, and allow normal operation of the Platform

Screen Doors when correctly positioned in accordance with sub-rules (9), (10) and (11) of rule 31.

(2) Platform Edge Door — Opening or closing of the Platform Edge Door will be by authorised Baggage Handling operator, after receipt of indication of the DOORS OPEN or DOORS CLOSE command signals from the Station Management System to Baggage Handling Area Local Control Panel located in the Baggage Handling area.

(3) Manual Secondary Door— The Manual Secondary Door may be opened from the platform side by using a special maintenance staff key as the doors are designed to swing open and be held at an open position of 90° which shall automatically revert to closed and locked position safely if it is left open at less than 90° without the need for staff intervention.

36. Abnormal working and emergency usages of doors.— (i) Platform Screen Door— (i) In case any Platform Screen Door does not open automatically due to any failure, train passenger can go to the platform after opening the Platform Screen Door by using the Manual Release Handle located on the track side of the door,

(ii) if the Platform Screen Door doesn't open or close automatically after train doors opening or closing, then, the train driver or maintenance staff may open or close all Platform Screen Doors using Platform Screen Doors Local Control Panel located at both ends of platform with the help of staff special key,

(iii) maintenance staff can open or close each individual Platform Screen Door from platform side using staff special key from the door header box access panel located above the each such doors , if needed;

(iv) any defective Platform Screen Door may be isolated by using staff special key from the Platform Screen Door header box access panel located above each door, if needed.

(v) if it is not possible to close any platform screen door, the speed of all trains entering the station, leaving the station or passing through the station shall be restricted to a maximum speed of twenty kilometers per hour and in addition, an audible warning shall be sounded by all trains while entering the station.

(2) Platform Edge Door— (i) If platform edge door local panel does not receive indication of the doors open or doors close command signals from the signaling link, then the train driver or maintenance staff can provide this indication to Platform Edge Door local panel by using platform screen door local panel with the help of staff

special key and after receiving open or close indication on Platform edge door local panel, Baggage Handling operator can open or close Platform Edge Doors.

(ii) any defective Platform Edge Door may be isolated by using staff special key from the Platform Edge Door header box access panel located above each such door, if needed.

(iii) if it is not possible to close any platform edge door, the speed of all trains entering the station, leaving the station or passing through the station shall be restricted to a maximum speed of twenty kilometer per hour and in addition, an audible warning shall be sounded by all trains while entering the station.

(2) Manual Secondary Door— (i) In case of emergency evacuation from tunnel or trackside the Manual Secondary door may be opened from the trackside by using a push bar;

(ii) The door will be designed to swing open and be held at an open position of 90° and the door shall automatically revert to closed and locked position safely if it is left open at less than 90° without need for staff intervention.

(3) Emergency Escape Door— (i) If train does not stop at the correct position and opened train doors are not in front of Platform Screen doors or under other specified conditions provided in special instructions, the passengers from the train can detrain to the platform after opening the emergency escape door by pressing the emergency push bar located on the track side of the emergency escape door;

(ii) the door will be designed to swing open and be held at an open position of 90° and the door shall automatically revert to closed and locked position safely if it is left open at less than 90°without need for staff intervention.

(4) Any door which has been manually released from track or platform side shall then be subjected to a gentle reclosing force, against which it can be pushed or held open, which shall ensure that the door returns safely to the closed and locked position afterwards, without need for staff intervention.

37. Indications.— (1) Door open indicator— (a) when platform screen door or platform edge door is under opening and closing process, the door opening indicator flashes and chime is activated,

(b) when platform screen door or platform edge door is under fully opened position, the door opening indicator is illuminated and chime is deactivated;

(c) when platform screen door or platform edge door is under closed and locked position, the door opening indicator is extinguished and chime is deactivated.

(2) Indicators above manual secondary door or emergency escape door— One each light emitting diode indicator is provided above each manual secondary door or emergency escape door leaf to give closed and locked indications, respectively.

(3) Obstruction detection— (a) Sensors are provided to detect any person trapped between train door and Platform Screen door at station with curved platform, when all platform screen doors and platform edge doors are closed by the train operator, the sensors shall check and give following indications on Platform Screen door local panel at both headwall and tailwall:

(i) nobody trapped – Green; and

(ii) somebody trapped – Red flashing,

unless sensors detect all doors clear, Platform Screen door system will not give clearance for train departure;

(b) in case of detection of an obstruction in between two Platform Screen door leaves of a Platform Screen door resulting in non closure of such door, the door makes three attempts to close automatically, if the obstacle is removed in these attempts Platform Screen door closes again, if obstacle is still present, then the Platform Screen door stops in unlocked position and is free to be pushed back by hand and once the obstruction disappears, train driver can open and close the doors again and if the problem persists, then, station staff shall attend the affected door.

IndiaCode

CHAPTER VI

CONTROL AND WORKING OF STATIONS

38. **Responsibilities of Station Controller.**— Each Station Controller shall—

(i) open the station at least ten minutes before the advertised time of the first train;

(ii) carry out an inspection of the station premises, at the start of his duty period recording any defects or irregularities found and reporting the same to authorities concerned including the operations control centre for prompt rectification;

(iii) be responsible for the supervision of the passenger flows, and the provisions of adequate barriers and escalator services, ensuring that all staff renders prompt assistance to passengers;

(iv) be responsible for reporting any defect and failure of any equipment on the station to the appropriate maintenance department;

(v) be responsible for the training of the station staff in local rules and conditions, for monitoring of their performances, discipline and administration;

(vi) observe the departure of last train and at interchange station, shall supervise the interchange of passengers between last advertised connecting train and shall inform the Traffic Controller when all interchange has been completed;

(vii) inspect the station after departure of the last train to ensure that no unauthorised persons remain on the premises and then lock all the entrances, as required;

(viii) be responsible for keeping a log book which details occurrence on the station which shall include among other things, timings and reports of inspections, timing and location of maintenance activities, complaints or request from passengers, instruction from the Traffic Controller, periods of local control of signaling and unusual incidents etc; and

(ix) be responsible for control and Operation of local panel and work station with the approval of the Traffic Controller.

39. Responsibilities of Platform Supervisor.— The Platform Supervisor, where provided, shall—

(i) monitor the boarding and alighting of passengers and be alert to observe any accident and report each to the Station Controller;

(ii) when a dangerous situation arises, operate the emergency stop plunger to stop any train on or approaching the platform and report his action to the Station Controller;

(iii) handle any malfunctioning of Platform Screen Doors, if any;

(iv) monitor proper functioning of gate line operations;

(v) manage customer interface;

(vi) monitor platform attendance;

(vii) manage trolley circulation, if any; and

(viii) be responsible for platform cleaning.

40. Responsibilities of booking office staff— (1) The booking office staff shall—

(i) be responsible for the sale of tickets at ticket window and by self service machines where provided;

(ii) sell tickets for the prices in the current fare table and render exact change as may be required;

(iii) account for all tickets sold and all cash taken in accordance with instructions issued from time to time;

(iv) not keep large amounts of cash at their points of sales. Only such cash as is necessary for change giving may be kept and the surplus shall be kept in a locked safe or the other secure storage;

(v) be responsible for ensuring that self service ticket vending machines, if provided are adequately stocked with tickets and that cash is regularly removed from the machines to secure storage;

(vi) be responsible for reporting malfunctioning or irregularities in the operation of ticket issuing equipments to the maintenance departments; and

(vii) assist the passengers during crowd control and emergency evacuation procedures.

(2) The senior booking office staff or Assistant Station Controller, wherever provided, shall—

(a) be responsible for the accurate accounting for ticket sold and cash received; and

(b) be required to assist or depute for the Station Controller when circumstances demand.

IndiaCode

41. Security.— (1) (a) Stations shall be open for access to the public at least ten minutes before the advertised time of departure for the first train and until all the passengers have left the station after the arrival of the last train and the all other times the station shall be secured, as laid down in the special instructions, against unauthorised entry;

(b) at a location near station control room, a key to a designated emergency exit shall be provided in a glass box, this key is for use of maintenance staff in the event of emergency during non-traffic hours, the emergency key box shall be inspected each morning by Station Controller and use of the key shall be reported to the Security Controller who shall arrange for the box to be secured again;

(c) The emergency exits, where ever provided, may also be used for the passenger's evacuation in emergency, if required.

(2) All the equipment rooms shall be kept locked at all times when access is not required and when these rooms are accessed by authorised person, such person shall be responsible for ensuring that no unauthorised person is permitted access.

(3) (a) All areas not required for the passage of passengers at the station shall be secured against unauthorised access.

(b) booking offices and other places, where items of value, such, as tickets and cash are kept, shall be locked at all times, and within such areas, tickets and other items of value shall be kept in locked cupboards;

(c) cash shall be kept in locked safe and only such amounts as are to provide change for tickets sales may be retained at the point of sales;

(d) transfer of cash outside of the secure area shall only be undertaken during quiet periods.

42. Station working orders.— (1) In addition to the General rules and special instructions of the Bangalore Metro Railway, each station shall be provided with the Station Working Orders applicable to the station giving details of-

(a) the location of equipment and guidelines for their use;

(b) the emergency evacuation routes at station and with adjoining block section;

(c) the designated entrance for attendance by police, fire and ambulance vehicle;

(d) the designated entry for fire services; and

(e) list of medical facilities locally available.

(2) Copies of these Station Working Orders shall be issued to each Station Controller who is required to work at the particular station.

(3) A copy of these Working Orders shall be kept in a special marked binder in a conspicuous place in the station control room.

43. Prevention of overcrowding.— (1) If a service delay or other incident causes a build up of passengers on a platform, the Station Controller shall decide when that build up is likely to be unmanageable.

(2) When any situation referred to in sub-rule (1) arises, the Station Controller shall reduce the flow of passenger to the platform by—

(a) making a warning announcement and stopping some or all of the inwards escalators;

(b) switching out some or all of the inward Automatic Fare Collection barriers; and

(c) instructing the ticket sales staff to cease selling tickets.

(3) If despite all measures referred to in sub-rule (2), overcrowding develops in the concourse, passengers shall be advised to leave the station and the station entrances may need to be closed.

(4) When train services are restored, the restrictive measures may be progressively or completely removed depending upon the level of train services available.

44. Emergency evacuation.— (1) The Station Controller shall control the evacuation from the Station Control Room in the event of evacuation of the station becoming necessary as a result of cessation of train services , risk of fire or any other emergency----

(a) all automatic fare collection barriers shall be set to open freely in the exit direction and the station staff deployed to assist in passenger evacuation;

(b) information and instruction shall be passed to the public by public address system and where available, visual displays;

(c) all inwards escalators shall be stopped and used as fixed stairways in the outwards direction;

(d) all ticket sales shall be suspended and the staff used to assist in passenger evacuation; and

(e) all station exits shall be opened.

(2) The Station staff shall verify that each area of the station has been evacuated and when areas are verified as clear of passengers, the staff shall leave the station and secure it unless otherwise instructed by the Traffic Controller.

(3) If fire or smoke is present, passengers shall, as far as practicable, be instructed to use exit routes that avoid contaminated area.

(4) If the fire is in the station, the Traffic Controller shall be informed so that he can instruct Train Operators not to stop the train at the station.

(5) If the extent of fire is so extensive that the trains should not approach the station, the Station Controller shall inform the Traffic Controller to instruct the trains coming towards the affected station to stop at the previous stations for evacuating the passengers there and this should prevail till normalcy is restored to the affected station.

(6) If the fire is at the concourse level, the train may be stopped to allow passengers to board only, as means of evacuating the passenger's more quickly and Train Operators shall make announcements in their trains to inform passengers not to alight from the train at the affected station.

45. Supervision of train movements.— (1) When the station control is being exercised from the Operation Control Centre, the Station Controller shall observe the passage of trains and be alert to take action if the train service is in any way disrupted.

(2) Any failure of any indication on the panel or work station shall be reported immediately to the Traffic Controller.

(3) Control of the panel and workstation may only be taken with the permission of the Traffic Controller and the operation of individual routes and points shall be carried out as per the Traffic Controller's instructions.

IndiaCode

46. Class of station.— The stations in Bangalore Metro Railway shall be classified as---

(a) terminal stations; or

(b) inter–locked stations having points and crossings, fixed signals, and siding , or

(c) other intermediate stations not having points and crossings (with or without fixed signals); or

(d) any other class as specified in special instructions.

CHAPTER VII

ACCIDENT AND UNUSUAL OCCURRENCES

47. Report of the accident and unusual occurrences.— (1) The accident and incident shall be reported by the concerned employees of the Bangalore Metro Railway or any other person who notices it with utmost expediency to the Traffic Controller or the nearest Station Controller as soon as practicable.

(2) On receipt of a report under sub-rule (1), the Station Controller shall inform the Traffic Controller and *vice versa.*

48. Duties of the station staff.— (1) On receipt of a report of an incident or accident or emergency, as the case may be, under sub-rule (1) of rule 47, the Traffic Controller shall first ascertain the extent of injury to passengers and others and take prompt action to prevent further injuries. He shall also assess the potential effect on the train services and then take all reasonable measure to maintain the train services, prevent delay or damage to property and equipment.

(2) (i) if the incidence is of a death of a person on track, train services are to be interrupted for a while, the Station Controller shall request the Traffic Controller for suspension of train services in the required direction after personally assessing the situation, and shall, then, inform Police and Fire Services about it the incident;

(ii)the body should be extracted by the Fire Service people after a preliminary examination by Police;

(iii) the Traffic Controller shall, in the meantime, alert the coach maintenance staff to be in readiness to render necessary help in extricating the body;

(iv) he shall arrange for the replacement of the driver of the affected Train;

(v) the train shall be evacuated and taken to the nearest depot after extrication of the body, if desired by the Police for further examination, otherwise normal services shall be resumed.

(3) If the incident is an emergency, the Traffic Controller shall report it to the Chief Controller and the Chief Controller shall arrange for the assistance of the Bangalore Metro Railway emergency response staff and where necessary, the assistance of the Police, fire and the Ambulance services.

(4) The Traffic Controller shall keep a log of all reports and requests received, action taken and other relevant information obtained or distributed.

(5) A Station Controller, in the event of an accident at his station, shall take measures to prevent the situation becoming worse, renders First Aid if possible, arranges for the injured to be hospitalized and inform the Traffic Controller for outside help.

(6) If the accident is an emergency, the Station Controller shall evacuate the area concerned and take measures to prevent access to the area other than by the emergency services, and in extreme cases, the station may be closed and the Traffic Controller requested to arrange for trains to pass the station without stopping.

(7) A full record of events and actions shall be entered in the Station Log.

(8) All employees of the Bangalore Metro Railway shall deal with the accidents and emergencies expeditiously and with the following priorities—

(a) save life, prevent further injury, and alleviate suffering;

(b) protect the Bangalore Metro Railway property and equipment;

(c) take steps for preservation of clues;

(d) inform the public of the effect on train services and the availability of alternative transport facilities;

(e) restore the safe operation of the train services as quickly as practicable; and

(f) restore normal services.

49. Train stopped between stations.— (1) (i) If a train operator cannot isolate a defect on his train and is unable to move it under its own power, he shall stop the train and request the Traffic Controller for assistance;

(ii) the Traffic Controller shall, if possible, instruct the Train Operator of the following train to drive as close to the stalled train as possible under Coded Manual mode. until the limit of authority under cab signaling;

(iii) the Traffic Controller shall then instruct the Train Operator of the assisting train to change to Restricted Manual mode, to proceed at reduced speed and stop about ten meters short of the stalled train;

(iv) in case it is more convenient to provide assisting train from the leading end direction, the Traffic Controller shall instruct the Train Operator of the assisting train to change the cab and proceed in the direction of the stalled train under Coded manual mode until the limit of authority under cab signaling and thereafter change to Restricted manual mode and stop short of about ten meters of stalled train;

(v) the Traffic Controller shall instruct the train operator of defective train to secure his train and instruct the Train Operator of the assisting train to couple to the defective train by mechanical means only and to isolate all electrical connections to the defective train.

(vi) Once the trains are confirmed as coupled, the Traffic Controller shall instruct the Train Operator of the defective train to release the brake of his train.

(vii) The Traffic Controller shall then authorise the Train Operator of the assisting train, if in front, to once again change the cab and to drive forward in Restricted Manual mode at slow speed while exchanging communication with the Train Operator of the defective train in the cab until the assisting train has completely reached on platform of the next station;

(viii) all passengers of the assisting train shall be detrained at the station and the combined consist shall then be moved forward until the defective train has completely reached on platform and then, the passengers of the defective train shall be detrained at the station and the combined consist shall be moved to the depot;

(ix) the train operator of the assisting train, if in the rear, will drive the combined consist in Restricted Manual mode at a speed not exceeding ten kilometer per hour, while exchanging communication with the Train Operator of the defective train in the lead cab until the defective train is at the platform of the next station;

(x) all passengers shall be detrained from the defective train, and the combined consist shall then be moved further until the assisting train is completely on the platform;

(xi) all passengers of assisting train shall then be detrained at the station and the combined consist worked to the depot in Restricted Manual mode at a speed not exceeding ten kilometer per hour, with leading and intermediate train operators exchanging communication on cab to cab telephone particularly if being assisted from rear.

(2) (i) if traction power is lost, all trains shall coast as far as the momentum of the train and the signaling system permit, after ascertaining from Traffic Controller that there is no defect in the third rail system, the objective is to get every train to a platform or as close to the platform as possible where passengers can be detrained if the incident is likely to be prolonged;

(ii) if the traction power has not been restored within fifteen minutes, passengers shall be detrained from all trains at stations, and the process of detraining passengers from any trains stopped between stations shall be initiated after 'Switching OFF' third rail power supply, the Train Operator shall also take suitable measures of securing his train;

(iii) the traffic Controller shall advise the Station Controllers of the adjoining station to which evacuation of passengers from any trains stopped between stations is planned, who shall in turn make suitable arrangement for assisting the evacuation process;

(iv) the Traffic Controller after evacuation of passengers, shall take appropriate action of working the stranded trains to nearest station siding or depot using other suitable shunting vehicles.

(3) (i) If a train cannot be moved as a result of derailment or other mechanical failure, passengers shall be evacuated as soon as practicable;

(ii) the train operator of the stalled train shall secure the train, switch on the flasher lights and immediately inform the Traffic Controller advising him of infringement on other track (if any) and possibility of injuries to passengers among other things, and also inform him that he is unable to move his train;

(iii) the traffic controller in consultation with the Train Operator shall decide the most appropriate method of evacuation, assistance needed and working of failed train cars taking into account proximity of stations, availability of trains and other local conditions and, advise the Train Operator the direction from which assistance is to be provided and inform the Station Controller at the station to which passengers shall be evacuated.

(iv) The following methods of evacuation of passengers via raised walkway shall be followed, namely: -

(A) evacuation to a train on the same track (in tunnel or viaduct);or

(B) evacuation to train on adjacent track (in twin tunnels); or

(C) evacuation on foot to the nearest station; or

(A) Evacuation to a train on the same track (in tunnel or viaduct):

(a) (i) if being assisted by an assisting train from the rear, passengers shall, if possible, be first detrained from the assisting train at station and the Traffic Controller shall instruct the Train Operator to drive in Coded Manual mode until the limit of authority under cab signaling;

(ii) the Traffic Controller shall, thereafter, instruct the train operator to change to Restricted Manual mode, and drive at not more than twenty - five kilometer per hour to stop at least ten meter from the stalled train;

(ii) if assistance from the rear is not possible, assistance may be provided from the front end direction, following similar procedure once the train operator has changed the cab for driving in the other direction as provided in the special instructions;

(b) the train operator of the assisting train shall report to the Operation Control Centre when he has reached this location and the Traffic Controller shall then instruct him to move his train slowly and stop it ten meters short of the stalled train;

(c) the train operator of the assisting train shall secure his train and open the side doors at the leading end towards the raised walkway and the train operator of the stalled train shall open the corresponding side doors on his train and the two train operators shall assist passenger to shift from the stalled train to the assisting train via raised walkway;

(d) when all passengers have been transferred, the side doors of both the trains shall be closed and secured;

(e) the Train Operator of the stalled train shall remain with his train and the Train Operator of the assisting train shall move to the other cab and report to the Traffic Controller that all passengers have been transferred and that his train is ready to move;

(f) only after receiving the instructions from the Traffic Controller, the train operator of the assisting train shall select Restricted Manual mode and drive the train to the station from which he came, where passengers can be detrained.

(B) Evacuation to train on an adjacent track (in twin tunnels):

(a) In twin tunnel sections, if assistance cannot easily be given by a train on the same track, a train on the adjacent track may be used;

(b) on receipt of request for assistance, the traffic controller shall inform the station controllers at the station on the either side of the location of the incident;

(c) passengers may be detrained from the assisting train at a station;

(d) the Traffic Controller shall instruct the train operator of the assisting train to select Coded Manual mode and proceed toward the direction of stalled train as near as permissible to an appropriate cross passage as advised by traffic controller and then change to Restricted manual mode in consultation with Traffic Controller to drive his train to a point, near a cross passage as advised by the Traffic Controller;

(e) the train operator of the assisting train shall secure his train and open the appropriate side doors of his train and report completion to the traffic controller;

(f) the Traffic Controller shall then instruct the train operator of the stalled train to open its appropriate side doors which are nearest to this cross passage;

(g) the two train operators shall then supervise the transfer of passengers via the cross passage from the stalled train to the assisting train taking particular care

to inform passengers of the hazards of walking through the cross passage and the two train operators shall ensure that all passengers have been safely transferred and accounted for;

(h) once all passengers have been transferred, the side doors of assisting train shall be secured and completion reported to the Traffic Controller by the train operator of the assisting train;

(i) the train operator of the stalled train shall close the side doors and return to his train cab;

(j) the Traffic Controller shall then authorise the assisting train to select appropriate mode and proceed to the next station, where passengers can be detrained.

(C) Evacuation on foot to the nearest station:

(a) in case of evacuation on foot, the Traffic Controller shall decide as to which station passengers are to be evacuated which shall normally be the nearest station subject to other factors, such as the location of the trains, ventilation consideration in tunnel sections and any damage to track, train or structures which may make it desirable to use an alternative station;

(b) the Traffic Controller shall inform the Station Controller at the station designated to receive the passengers and the Station Controller shall clear the concerned platform of waiting passengers and, if necessary, stop incoming passengers, and if a tunnel section is involved, he shall switch on tunnel lighting, open all emergency doors, manual secondary doors and he shall position himself and his security staff on the platform to receive the arriving passengers;

(c) the Station Controller shall prepare to render assistance or first aid to any passenger who may have had difficulty or met an accident during the evacuation;

(d) on open sections and in double track tunnels, the Traffic Controller may arrange for traffic to be suspended on the adjacent track for the duration of the evacuation. and instruct the Traction Power Controller to 'Switch OFF' the third rail power supply;

(e) the Traffic Controller shall verify with the Train Operator that the train has been secured and then instruct him to initiate evacuation procedure of the passengers from the leading side doors of the train to the designated station;

(f) passengers shall be informed of the procedures to be followed and given explicit warning on hazards of walking on the raised walkway and what to expect at the station;

(g) passengers shall be detrained on the raised walkway from the leading side doors of the train by the Train Operator and directed to the station and the Train Operator shall count passengers as they leave the train;

(h) the Station Controller shall count the passengers as they arrive at the platform;

(i) the Train Operator shall ensure that the last passenger has left the stalled train and also check that all passengers have left the walkway;

(j) the Train Operator and Station Controller shall check their respective count of passenger's numbers and satisfy themselves that all passengers have reached the platform and thereafter the Train Operator shall return to his train and secure the side doors;

(k) the Station Controller shall record in the station log the details of the incident, in particular, the number of passengers detrained, and then report the statistics to the Traffic Controller.

(5) If a train can not be moved as a result of tripping of traction power or failure of third rail system, the Train Operator shall consult the Traffic Controller and Traction Power Controller, who after ensuring that it is not possible to restore traction power shall arrange to cut off traction power in the affected section and take any further measures for safety of passengers, then action in accordance with sub-rule (4), shall be taken to evacuate the passengers from the stalled train.

(6) Notwithstanding, anything contained in sub-rules (1) to (5), the third rail power supply shall be 'Switched OFF' in all cases of evacuation in which passengers are required to come on the raised walkway and the track.

50. Train divided.— (1) If a train is stopped by an irrevocable emergency brake application and cab signaling indications are normal, the Train Operator shall examine the Train Integrated Management System panel to ascertain the cause, if indication of faults in multiple circuits affecting the whole train or rear cars of the train are present, the train shall not be moved until, it has been verified that the train is complete and coupled.

(2) After the verification about the integrity of the train is completed under sub rule (1), the Traffic Controller may authorise the Train Operator to make appropriate isolations and proceed.

(3) If the train is found to have divided, the Train Operator shall first satisfy himself that no passenger has been injured or has fallen from the train.

(4) The Passengers shall be cleared of the open ends of the train and train re-coupled as per approved special instructions, if possible, in consultation with Traffic Controller and Rolling Stock Supervisor.

(5) Once the Train Operator has successfully re-coupled the train, he shall return to the leading cab, report the circumstances to the Traffic Controller and seek permission to proceed to the next station following instructions given by the Traffic Controller.

(6) The train shall be withdrawn from passenger service at the next station and worked to depot for investigation of the incident.

(7) If train cannot be re-coupled, the Train Operator shall inform the Traffic Controller and the Traffic Controller shall then inform the Station Controller at the previous station to detrain passengers from the following train if possible, and use it to go to the site and take at least two members of the security staff with him.

(8) The Train Operator of the following train shall drive his train in Coded Manual mode as far as the signaling permits, thereafter, the traffic controller shall instruct the train operator to drive the train under Restricted manual mode and proceed at reduced speed as near to the divided train as possible and stop and the Station Controller and the security staff shall then leave the train from the side and board the divided train.

(9) The security staff shall be positioned at the rear of the front portion of the train and the Train Operator of the divided train shall return to the leading cab, make the necessary isolation and seek permission from the Traffic Controller to proceed.

(10) The Traffic Controller shall instruct the Train Operator to proceed at a speed not exceeding ten kilometer per hour as far as the next station and to stop at the far end of the platform.

(11) The other security staff shall be positioned at the front end of the rear divided train portion and the assisting Station Controller shall, then, drive the rear portion of the train from the shunting position of the assisting train with utmost caution and with the security staff keeping a look out at the front, maintaining continuous communication

IndiaCode

with the Traffic Controller and the train shall be driven to the next station at a speed not exceeding ten kilometer per hour in any case.

(12) On arrival of the train at the station, passengers shall be detrained.

(13) The two portions of the train shall then be worked under the supervision of Rolling Stock Supervisor in Restricted Manual mode, if possible to the nearest depot or siding at a slow speed, if depot is in normal direction of traffic.

(14) The assisting train shall proceed once the cab signaling displays a proceed code and shall entrain passengers at the next station and resume normal working.

(15) In case of depot being in the direction opposite to the direction of working of the divided train, the rear portion of the divided train shall first be worked toward the nearest station in the direction of depot after positioning a security staff at the divided train portion in the rear, after the train operator has changed his cab in the leading direction of movement, in consultation with the Traffic Controller.

(16) The other parted portion of the train shall then be worked cautiously in the shunting mode after appropriate isolation, at a very slow speed after positioning the other security staff at the divided end keeping a close look out at the front and maintaining continuous communication with the Traffic Controller.

(17) After reaching the station, the assisting train can resume normal operation.

(18) The parted portions of the divided train shall be worked to depot under supervision of rolling stock supervisor in Restricted Manual mode, if possible.

(19) In case it is not possible to move any parted portion of the divided train on it's own power, it shall be worked to the depot using another suitable train under instructions of the Traffic Controller.

51. Unusual occurrences.— (1) All employee of the Bangalore Metro Railway shall be made conversant with the location and use of fire alarms and fire fighting equipment at their place of work.

(2) All employees of the Bangalore Metro Railway observing the smoke or fire shall raise the alarm by means of the equipment provided or by informing the Station Controller and Traffic Controller as may be most appropriate and expeditious.

(3) If smoke or fire is reported on a train between stations, the Train Operator shall inform the Traffic Controller, drive his train to the next station and detrain passengers. Traction power shall then be switched off, and the current collection devices of the affected train retracted before traction power is restored to other trains.

(4) If the fire on a train or on the track causes a train to stop between the stations, passengers shall be evacuated as per the provisions specified in clause iii of sub-rule (3) of rule 49, as applicable.

(5) If the incident occurs in a tunnel, the traffic controller shall arrange with the Auxiliary Systems Controller for the ventilation system to supply fresh air to the chosen route for evacuation before authorizing detrainment of passengers.

(6) If the fire alarm on a station is actuated or a verbal report is received of smoke or fire on the station, the Station Controller shall inform the Traffic Controller and then verify for himself by closed circuit television or actual inspection whether or not the alarm is genuine.

(7) If smoke or fire is present, the Station Controller shall inform the Traffic Controller and arrange for passengers to be evacuated from the area concerned preventing further access. If necessary, the station may be completely evacuated and the Traffic Controller may be requested to arrange for trains not to stop.

(8) The Traffic Controller shall inform the Chief Controller who shall arrange for the attendance and assistance of the Fire Fighting Services and if necessary the Ambulance Services.

(9) If a Train Operator or Station Controller observes a fire in adjacent premises that could affect the property of the Bangalore Metro Railway, he shall report the circumstances

to the Traffic Controller and the Traffic Controller shall inform the Chief Controller and the Security Controller and maintain normal services unless or until a local inspection confirms that a potential danger exists.

52. Flooding.— (1) Any train operator or Station Controller or the other member of the staff, who observes water accumulating on the track, shall report to the Traffic Controller giving as much detail as possible with respect to location, distance of track affected, and level of water with respect to the rail.

(2) The Traffic Controller shall inform all trains required to pass through the area and request reports of the state of the water level and if the water level is below the level of rail fastenings, the Traffic controller shall instruct the train operator to reduce the speed of their trains to twenty five kilometer per hour when passing through the affected area.

(3) If the water level rises above rail fastenings, passenger train service shall only be permitted under special instructions.

53. Other unsafe conditions.— (1) All employees of the Bangalore Metro Railway and, in particular, Train Operators and Station Controllers shall keep a look out for unsafe conditions on or in the vicinity of the railway track which are as follows:---

(a) damaged or dislodged fixed equipment within the railway right of way;

(b) broken or buckled rails;

(c) displaced or damaged third rail power conductors;

(d) construction activities adjacent to the track including use of cranes which can swing within 6m of the track;

(e) road accidents which might cause or have caused damage to bridges and viaducts;

(f) road accidents which might cause or have caused vehicles or their loads to encroach on the railway right of way; and

(g) any other obstruction on the track.

(2) If the Train Operator observes any unsafe condition, he shall report to the Traffic Controller immediately so that action can be taken to minimize the effect and remove the cause.

(3) In the event of an earthquake, the Traffic Controller shall instruct all trains to stop immediately and after such earthquake has subsided, the Traffic Controller may instruct each stranded Train Operator to proceed in Restricted Manual mode at walking speed after examining that the track is safe for train movement and free from obstruction up to the next station:

Provided, that in such event, the normal operation of trains may be resumed if all the track and structures are examined and found to be in safe condition.

54. Accidents.— (1) In case of accidents, arrangements for medical aid, evacuation of sick, injured passengers and access for ambulance, staff and vehicles shall be made and included as per the provisions specified in special instructions.

(2) In the event of serious accident, the Chief Controller may, in consultation with senior management declare the situation an emergency, as per the provision specified in special instructions.

(3) A senior member of the management shall be appointed as an emergency officer and shall set up an emergency control either at Operation Control Centre or at the site depending on the nature of the occurrence.

(4) The emergency officer shall be in over all charge of all the Bangalore Metro Railway resources of staff and materials for the handling of the emergency and the coordination between the Bangalore Metro Railway and external emergency agencies, such, as fire, ambulance and police and utility services.

CHAPTER VIII

SYSTEMS OF WORKING

55. Continuous Automatic Train Control System.— (1) The Continuous Automatic Train Control system of working shall be adopted on Bangalore Metro Railway for movement of trains between stations and between depot and the main line.

(2) The Continuous Automatic Train Control system works on the principle of target speed and target distance with cab signaling by means of continuous transmission from track to train through track circuits, ensuring safe movement of all trains under all operating conditions by continuously generating a safe operating envelope defined by the limit of movement authority and the maximum safe speed.

(3) The limit of movement authority shall be the farthest point to which the train may safely proceed taking into account margins for error in speed and distance measurement, calculating braking distances and the equipment reaction times.

(4) The maximum safe speed shall be maximum speed at which the train is permitted to travel without intervention by the train control and signaling system and it shall be continuously calculated in such a manner that permanent speed restrictions, the speed limits for the type of train and temporary speed restrictions shall not be exceeded and the train shall always stop without passing the limit of movement authority.

(5) The Continuous Automatic Train Control system shall provide the following modes of train operation, namely:—

(a) Automatic mode ;
(b) Coded Manual mode
(c) Run on Sight mode;
(d) Restricted Manual mode; and
(e) Cut out mode.

56. Automatic mode.— (1) In the Automatic mode, the train shall operate without intervention by the Train Operator except closing of train doors and starting from a

station. The Automatic mode shall operate under the supervision and control of Automatic Train Protection functions.

(2) In Automatic mode, the train control and the signalling system shall—

(a) accelerate and decelerate the train by applying traction power, coasting and applying and releasing brakes;

(b) automatically control speed, acceleration, stopping and starting the train at stations;

(c) provide all indications necessary to operate the train;

(d) determine continuously the maximum safe speed and limit of movement authority;

(e) prevent movement of the train in excess of the maximum safe speed and limit of movement authority

(f) open train doors on the correct side when the train is docked if permitted by the Automatic Train Protection door release and the platform screen doors on the correct side open automatically, if provided;

(g) prevent the train from starting if the train doors are not detected closed;

(h) train re-starting from a signal stop shall be automatic; and

(i) train starting or re-starting from a station stop shall be initiated by the train operator.

57. Coded Manual mode.— (1) In Coded manual mode the train shall be driven by the Train Operator, obeying cab signals.

(2) In Coded Manual mode, the Train Control and Signaling system shall-

(a) provide cab signals and all other indications necessary to operate the train including current speed;

(b) determine continuously the maximum safe speed and limit of movement authority;

(c) prevent train operation in excess of maximum safe speed or limit of movement authority;

(d) provide audible and visible warning if the train speed exceeds the maximum safe speed;

(e) enable train doors when the train is docked, enabling only the doors on the platform side of the train to be open; and

(f) prevent the train from starting, if the train doors are not detected closed.

58. Run on Sight mode.— In Run on Sight mode, which only operates in the absence of Automatic Train Protection signals from the track, the train is driven manually on line of sight and the speed is limited by Automatic Train Protection system to a maximum of 25km/hr.

When Automatic Train Protection signals from track are received, this mode automatically changes to Coded Manual mode.

59. **Restricted Manual mode.—** (1) The Restricted manual mode is the default mode of operation and is automatically initiated, when the automatic train control train borne equipment is first powered. It remains in operation until sufficient conditions have been met to allow for a transfer to Coded Manual mode.

(2) The Restricted Manual mode shall be used---

(a) to operate trains in depots;

(b) following an emergency brake application on main line, and absence of cab signals;

(c) for entry to the depot; and

(d) On instructions from Traffic Controller.

(3) In Restricted Manual mode, the train speed shall be limited to a maximum of twenty five kilometer per hour enforced by on board Automatic Train Protection equipment.

(4) The Train doors on the correct side will also have to be operated manually by the train operator.

60. **Cut-Out Mode.—** (1) The "Cut out" mode, is intended for use in case of complete train borne train control and signaling system failure and in such mode the train speed shall be restricted to 25 km/hr enforced by on board rolling stock equipment.

(2) In Cut Out mode, the train shall be operated by the Train Operator in accordance with line side signals and on Radio verbal instructions from the Traffic Controller.

(3) Running of trains on mainline in Cut Out mode is permitted only under instructions of the Traffic Controller.

(4) The train doors on the correct side shall also have to be operated manually by the train operator.

CHAPTER IX

SINGLE LINE WORKING

61. Objective of single line working.— In case of an obstruction on a portion of line between any two stations on one of the running lines, train service may be continued in the affected section on the adjacent line in both directions using single line working on the unaffected track and such single line working shall be achieved by 'fleeting' of trains in groups in one direction at intervals decided by the traffic controller followed by an equivalent group of trains in the other direction.

62. Implementation.— (1) The Traffic Controller, shall after consultation with the Chief Controller, decide to implement the single line working.

(2) The Traffic Controller, shall before the train passes in the reverse direction, inform to the Station Controller at each of the stations in the single line section.

(3) The Station Controllers shall also closely monitor crowding on the platform in use and prepare to close entrances to the station if overcrowding becomes dangerous.

(4) The Station Controllers at these stations shall inform passengers by visual and audible announcements and take any other measures necessary to direct passengers on the correct platform.

(5) The Traffic Controller shall inform the Train Operators of all trains of the location and direction of the single line working.

(6) Trains shall work under normal signaling including Automatic Train Operation, but on lines equipped with Automatic Train Operation, Automatic Train Operation control shall be available in the normal direction of travel only, in the reverse direction, the train shall be driven under Manual Cab Signal mode.

(7) When normal working is to be restored, the Traffic Controller shall inform the Station Controller of each station at the single line section of the last train to pass the section in the reverse direction after which normal station operation shall be restored.

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63. Signaling Failures.— In the event of a failure of a track side signaling equipment which makes Restricted Manual operation necessary on all trains, single line working shall be suspended immediately and if necessary, train may still pass through the section in the normal direction of travel and after defect is repaired; single line working may be resumed.

CHAPTER X

PERMANENT WAY AND WORKS

64. General.– (1) All running tracks shall be inspected at the time intervals as laid down in special instructions.

(2) All employees of the Bangalore Metro Railway whose duties require them to go on the tracks shall be properly trained and certified as authorised employee for the purpose of sub rule (1).

(3) All employees of the Bangalore Metro Railway who go on the tracks shall wear appropriate high visibility clothing.

(4) No rail mounted vehicle, which is not capable of operating track circuits, shall be placed on the track other than within an Engineer's Possession.

65. Track work and track side work in non-traffic hours.– (1) No maintenance staff shall enter onto the track of any running line without the permission of the Traffic Controller.

(2) Non-traffic hours are defined as the hours between the passage of the last train, including any work train, and a published time before start of traffic again in the morning and the normal time shall be published in the relevant handbooks which may be varied from time to time by the Bangalore Metro Railway.

(3) The maintenance staff requiring to carry out inspection or repair of equipment ,which does not affect the integrity of the track nor require the use of ladders or scaffolding and not involving danger to trains or traffic, may enter on the track under the following conditions, namely:-

(a) the Traffic Controller shall give permission, specifying the location and area for which permission is given and the time by which staff shall have to leave the track;

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(b) the Traffic Controller shall log the time, location and the name of the person to whom permission under clause (a) has been given;

(c) on completion of the work, the person to whom permission has been given under clause (a) shall report to the Traffic Controller, identify himself and affirm that he and his equipment are clear of the track and that it is safe for service to resume;

(d) if the work cannot be completed within the allotted time, the person to whom permission has been given under clause (a), shall inform the Traffic Controller before the expiry of the time he has been allotted and agree with the Traffic Controller for an extension of time and the institution of an Engineer's Possession; and

(e) the Traffic Controller shall not permit the start of normal service until all permissions to work have been properly given up and rescinded.

(4) All other works carried on in non traffic hours shall be protected by an Engineer's Possession.

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66. Track work and track side work which extends into traffic hours.– (1) All work which are planned to extend beyond non traffic hours into the hours when train services normally operate shall be notified at least one month before.

(2) All such works shall take place within an Engineer's Possession.

(3) Works which are planned to be carried out within non traffic hours without an Engineer's Possession, but which are delayed by unforeseen circumstances, shall be protected by an Engineer's Possession.

(4) No train services on adjacent sections of the line shall be operated until appropriate protection of an Engineer's Possession has been put in place.

67. Emergency track work or track side work in traffic hours.– (1) No routine maintenance shall be undertaken during the hours in which train services normally run except as provided for in sub-rule (2).

(2) If emergency repair work is required to be carried out to prevent accidents or to maintain or restore train services, such emergency work shall be done under the Engineer's Possession which shall be granted by the Traffic Controller without delay taking the exigencies of trains services into account and making adjustments in train schedules.

68. Engineer's Possession.– (1) Engineer's Possession on running lines is granted by the traffic controller who has final responsibility on whether or not the Engineers may take possession.

(2) All work on tracks in depot shall be undertaken within an Engineer's Possession which shall be granted by the Depot Controller but in other matter the provisions hereinafter provided shall apply.

(3) An area under the Engineer's Possession is the sole responsibility of engineering official in charge and all issues of safe working within that area including the movement of trains is his responsibility.

(4) The person in charge of Engineer's Possession shall be trained in the duties and responsibility of the role and certified so by the Authorised Official.

(5) If more than one maintenance unit is working within the same Possession, one person shall be nominated by the Traffic Controller as the person responsible for the coordination for the work of all the units, as per special instructions.

(6) When possession is granted under sub rules (1) and (2), the engineering official in charges shall protect the area of the Possession from access by trains in one of the following ways, namely:-

(a) securing a vehicle at the limit of the possessing;

(b) securing points for a route which diverts trains away from the area of Possession;

(c) using a track circuits short circuiting cable at the limit of the Possession, and

(d) any other means as per special instructions.

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(7) For running line signaled for operation in either direction, protection shall be implemented at all points of potential access and different methods may be used at each location in accordance with the sub-rule (6) .

(8) If a works train or self propelled maintenance vehicle is to be used within the Possession area, it shall arrive at site before possession is taken and the lamps displaying red aspects restricting movement towards the Possession area shall be placed at the limits of the Possession or on the secured vehicles where these are used to protect the Possession area.

(9) Where work on one track is likely to affect the passage of trains on an adjacent track, Possession shall be taken of all tracks likely to be affected.

(10) If trains are required to pass on an adjacent track, the person in charges of the Possession shall be responsible for ensuring that the track is safe to use before giving permission by hand signal.

(11) Unless essential for the movement of trains, traction power shall be switched off from the area of the Possession by the Traction Power Controller and shall only be reenergized on receipt of clearance.

(12) All switching ON or switching OFF operations of traction power required for maintenance work or Engineer's Possession or for any other purpose shall be approved by Traction Power Controller.

(13) The person in charge shall be responsible for confirming to the Traffic Controller on completion of the work that the track is safe for traction power to be switched on, all protection measures have been removed and the track is safe for trains to run.

69. Works at Stations.– (1) No maintenance work, affecting safety of train operation, shall be carried out at any station without Engineer's Possession and until permission has been granted by the Station Controller.

(2) All works in public areas shall be securely fenced to prevent access by the public.

(3) The maintenance staff, as per special instructions, shall report to the Station Controller before starting work and again before leaving the station and the Station Controller

shall record the time and location of their work so that they be warned of any emergency arising on the station.

(4) Any maintenance work on a station, which requires fire alarm or fire suppression equipment to be isolated, shall be done only with the permission of the Station Controller.

(5) The maintenance staff shall be responsible for their own protection and for raising the alarm in case of fire in the area which has been isolated and shall also be responsible for restoring normal function to the isolated equipment informing the Station Controller on completion of their work.

(6) No maintenance work, which required the complete shut down of the fire alarm or fire suppression systems of public areas, shall take place during the hours in which the station is open to the public.

(7) No maintenance work, which requires the use of ladders or scaffolding, shall take place within the fixed structure dimensions laid down in the schedule of dimensions from the platform edge during traffic hours.

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CHAPTER XI

POWER SUPPLY AND TRACTION ARRANGEMENTS

70. Switching on, and off, of traction and power supply distribution .--(1) All traction and power distribution systems shall remain live at all times and shall only be switched off when necessary for maintenance of the equipment or protection of other maintenance activities.

(2) Traction supplies shall be switched on and off as per instructions of the traffic controller:

Provided that in case of emergency after giving information to the traffic controller, traction power controller shall be authorised to switch off the power.

(3) All traction and power distribution systems which have been switched off shall be adequately earthed before any maintenance or repair work is under taken.

(4) All maintenance work on high tension distribution network shall be undertaken with the permission of the traction power controller who shall ensure maintaining adequate power supplies for the operation of the Bangalore Metro Railway network under the condition prevailing at that time.

(5) **Emergency Trip System** – (a) The Emergency Trip Switches will be used for switching off the DC traction power supply on the line of the particular sections near the Emergency Trip Switch in case of any emergency;

(b) The Emergency Trip System switches are installed at each end of platform in stations, at station control rooms and at cross passages in tunnels. After activating an Emergency Trip System an individual signal is sent to Supervisory Control And Data Acquisition system, and according to a tripping scheme and logic provided, the Supervisory Control And Data Acquisition system shall switch off relevant DC circuit breakers and send signals to indicate that the track section is de-energized.

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71. Access.--(1) All points of potential access to high voltage equipment shall be kept locked and suitable warning notice displayed on them.

(2) All switchgear and other high voltage equipment shall be fenced off and shall be accessible only to the authorised staff and access to the live equipment shall only be permitted when the equipment has been switched off and earthed as laid down under special instructions.

(3) No person shall work on high voltage or 750 V DC equipment, or switch such equipment by local control unless he is properly trained and certified to perform such duties by the Authorised Officer and possess a valid certificate of competency and he shall also obtain the permission of Traction Power Controller before undertaking such work and the procedure for obtaining, granting and cancelling of such permission shall be laid down in special instructions.

72. Arcing and Fire.--- (1) No person shall work closer than meters to a live conductor.

(2) If any member of staff observes fire, smoke, arcing or fusing in the vicinity of the third rail equipment, he shall inform the Traffic Controller as quickly as possible and request power to be switched off from section or the line.

(3) The Traffic Controller shall instruct the Traction Power Controller to switch off the power to that section of the line before taking any further action to investigate the occurrence.

(4) The Traffic Controller shall also instruct the Station Controller at the nearest Station to check if the fire and arcing has been extinguished.

(5) On the basis of report and investigation and confirming rectification of the fault, Traction Power controller shall reenergize the section and may advise traffic Controller to resume train services.

73. Inspection and Maintenance of Electrical Way and Works.---The Electrical Way and Works shall be regularly inspected and maintained in accordance with provisions of Bangalore Metro Railway Traction manual & special instructions.

74. Issue of Caution order.---In case of breakdown of third rail equipment, when it is necessary for a train to proceed cautiously, the traction power controller shall arrange for issue of Caution order in accordance with procedure in force.

75. Protection of Trains in case of Third rail equipment failure or breakdown.---Wherever a Train Operator finds that his train cannot proceed further on account of third rail equipment failure or breakdown of third rail equipment, the Train Operator shall secure his train and inform the Traffic Controller and the Traction Power Controller and follow the instructions laid down in sub rule (2)of rule 50.

76. Permit to work adjacent to or involving electrical equipment.--- (1) Works shall be carried out adjacent to electrical equipment or involving any parts thereof only by authorised employee of Bangalore Metro Railway.

(2) No works under sub rule (1) shall be undertaken unless an authorised electrical person has given a permit to work and in addition, nominated a qualified representative of the electrical branch, where necessary, in accordance with the special instructions, which shall lay down the detailed procedure of obtaining, granting and cancelling of the permit to work ensuring utmost safety.

(3) The authorised electrical person shall not issue such permit to work without the consent of the Traction Power Controller who in turn, shall keep the Traffic Controller informed when train movements are affected. Whenever such work is likely to affect any other installations, the work will be carried out as per special instructions.

(4) Before commencing any work on third rail or its associated cables and equipment, or any other inspection or maintenance work within two meters of third rail, a permit to work shall be obtained from an authorised electrical person.

(5) The maintenance and operation of Electrical Traction Installations in emergency conditions shall be carried out after obtaining permit to work as per procedure contained in special instructions.

77. **Warning to staff and public.**---(1) All electrical equipment shall be regarded as being live at all times and consequently dangerous to human life, save and except in cases, where the electrical equipment has been specially made dead, isolated and earthed as per instructions contained in Traction Manual of Bangalore Metro Railway .

(2) caution notices as specified in Schedule appended to these rules shall be permanently fixed near all the vulnerable places to warn staff and public to exercise due caution.

(3) No person shall go under the rolling stock when these vehicles are located adjacent to third rail except when the third rail is made dead and earthed in accordance with special instructions and the person required to go under the passenger cars has obtained a permit to work.

78. **Alterations to track.** — Before any alteration to alignment or level of tracks is commenced, due notice shall be given to those responsible for the maintenance of third rail, so that the third rail may be adjusted using specified gauge to conform to the new conditions of track.

79. **Additional rules for electrified sections.**--- Special instructions, if any, for working of trains in electrified sections shall be issued by the Authorised Officer.

80. **Switching 'OFF' and 'ON' of traction current.**—(1) Traction current shall ordinarily remain 'ON' and shall be switched 'OFF' during traffic hours for a specified third rail section by the Traction Power Controller or through his authorised employee immediately after informing the Traffic Controller in emergency, like:--

(a) to stop serious arcing or fusing;

(b) to stop train in unusual circumstances; and

(c) when flood water overflows the central drain.

(2) When the cause of 'Switching OFF' is over, the employee who has taken emergency power block will inform Traction Power Controller to that effect and cancel the emergency power block.

(3) Before switching 'ON' the current, the Traction Power Controller shall obtain the permission of Traffic Controller who shall confirm from the Engineering and Signaling officials that the track is safe and free from any obstructions before permitting energization of third rail. Thereafter, traffic controller will resume the traffic.

81. **Procedure for preventing admission of electric rolling stock into or over sections of track with dead or earthed third rail.**--(1) In order to prevent electric rolling stock from being admitted into a track or a crossover for which third rail equipment is made dead or for

which a permit-to-work is to be issued, suitable measures shall be enforced to block setting of such routes.

(2) The levers or slide or push-buttons of signals and points governing movement of electric rolling stock shall be suitably protected and if the points and signals are locally operated they shall be clamped and pad locked in their normal position and keys shall be kept with the station controller or depot controller as the case may be.

(3) These protective measures shall not be withdrawn until the Station Controller or the Depot Controller, as the case may be, receives a message from the Traffic controller and acknowledges the same, and the Traffic Controller shall not issue such a message unless he has received a message from the Traction Power Controller cancelling the Power Block.

CHAPTER XII

OTHER SYSTEMS OF BLOCK WORKING

82. **Application of special instructions.**– Notwithstanding anything in these rules, special procedures framed under approved special instructions , shall apply to the initial stage of operation or whenever such a condition arises on any section of the Bangalore Metro Railway.

Explanation: For the purposes of this rule, the expression "initial stage" means the period in which any section of the Bangalore Metro Railway shall be opened without Automatic Train Protection, or signaling and Train Control being available from the Operation Control Centre.

SCHEDULE

[See rule 77(2)]

होशियार

CAUTION

750 VOLTS

[F. No.K-14011/45/2010-Metro]

S. K. LOHIA, OSD (Urban Transport) & E. O. Jt. Secy.

NOTIFICATION

New Delhi, the 30th March, 2011

G.S.R 272(E).—In exercise of the powers conferred by section 22 of Metro Railway (Operation and Maintenance) Act, 2002 (60 of 2002), the Central Government hereby makes the following rules, namely:–

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CHAPTER I

PRELIMINARY

1. **Short title and commencement.**– (1) These rules may be called the Bangalore Metro Railway (Opening of Public Carriage for Passengers) Rules, 2011.

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

2. **Definitions –** (1)In these rules , unless the context otherwise requires,

(a) "absolute block system" means a system of train working wherein a line is divided into sections or blocks and only one train is allowed to enter a block section at a time only after ensuring that the last train ahead has cleared the block section and the movement to the block section is protected by a stop signal;

(b) "Act" means the Metro Railway (Operation and Maintenance) Act, 2002 (No. 60 of 2002);

(c) "authorised" means authorised by the Bangalore metro railway administration;

(d) "automatic block system" means a system of train working wherein section between two stop signals is divided into several sub-sections or blocks by providing series of signals, the aspect of which is automatically activated by the conditions of the block beyond the signal and the movement in automatic signaling territory is governed by the aspect of signals and train is allowed to enter automatic block section at authorised speed for various aspects of automatic signals;

(e) "bridge engineer" means the Chief Engineer or any other engineer responsible for design and construction of bridges or viaducts or tunnels;

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

(g) "Electrical Inspector to Government of India" means a person appointed as such by the Appropriate Government under sub-section (1) of section 162 of the Electricity Act, 2003 (36 of 2003) and includes the Chief Electrical Inspector;

(h) "Form" means a Form appended to these rules;

(i) "General Rules" means the Bangalore Metro Railway (General) Rules, 2011; published in the Gazette of India Extraordinary vide notification number G.S.R 271(E) of dated the 30th March, 2011;

(j) "passenger" means a person travelling on the Bangalore metro railway with a valid ticket or pass;

(k) "report" means the report of the Commissioner made under section 15 of the Act;

(l) "Schedule" means a Schedule appended to these rules.

(2) The words and expressions used in these rules and not defined but defined in the Metro Railway (Operation & Maintenance) Act, 2002 (60 of 2002) shall have the meanings, respectively assigned to them in that Act.

CHAPTER II
PREPARATION FOR OPENING OF BANGALORE METRO RAILWAY

3. Opening of Bangalore Metro railway.- (1) The Bangalore metro railway administration shall ensure that the metro railway in the metropolitan city of Bangalore (hereinafter referred as the Bangalore Metro railway) or a portion thereof to be opened for public carriage of passengers is complete in all respects as per the manuals of practice of the Bangalore Metro Railway and for such opening all the administrative formalities are complete and that the working of the Bangalore metro Railway is regulated by the Bangalore Metro Railway (General) Rules, 2011.

(2) Where the Bangalore Metro Railway Administration is of the opinion that the Bangalore metro railway or part thereof is required to be opened for public carriage of passengers, it shall refer the matter to the Commissioner for inspection and report on the safety of that metro railway.

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4. Supply of documents to Commissioner. – (1) The Bangalore Metro Railway Administration 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;

(e) list of infringements of moving and fixed dimensions;

(f) working orders to be enforced at the operation control centre and at each station; and

(g) 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 concerned Director-in-charge except the certificate which shall be signed by the Officer-in-charge of the Bangalore Metro Railway Administration himself.

(5) The Metro Railway Administration shall furnish such documents to the Commissioner, as far as possible, at least one month in advance of the stipulated date of inspection.

5. **Contents of documents.**– (1) Tabulated details which shall consist of important characteristics of the Bangalore metro railway or a portion thereof to be opened for public carriage of passengers, and in particular shall include –

(a) curve abstract in Form I;

(b) gradient abstract in Form II;

(c) bridge abstract in Form III;

(d) viaduct abstract in Form IV;

(e) important bridges abstract in Form V;

(f) ballast and permanent way abstract in Form VI;

(g) stations and station sites in Form VII;

(h) brief particulars of rolling stock in Form VII;

(i) brief particulars of traction installations in Form IX;

(j) power supply installation abstract in Form X;

(k) electrical crossings over metro railway tracks in Form XI;

(l) traction maintenance depot abstract in Form XII;

(m) ventilation, smoke management, fire safety and other measures in tunnels and stations in Form XIII; and

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(n) signalling and train control and tele-communication systems in form XIV.

(2) The index plan and section sheets, completion drawings, etc., shall include, –

(a) index plan and section sheets as specified in the Schedule;

(b)completion drawings of bridges or viaducts showing details of structure, loading standards adopted, etc;

(c) completion drawings of tunnels, if any;

(d) diagrammatic plan of station yards showing layout of tracks and particulars of turn outs, gradients, of any signals and interlocking installed.

(3) The comments on the following matters shall be included in the certificate in Form XV, namely:–

(a) Moving and fixed dimensions;

(b) Strength of bridges or 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.

(4) The list of infringements of moving and fixed dimensions shall be prepared in Form XVI 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) The working orders to be enforced at each station on the Bangalore metro railway to be opened shall be prepared in accordance with the provisions of the Bangalore Metro Railway (General) Rules, 2011 and

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shall specify any special conditions that are required to be met with and such orders shall include traction working rules.

CHPTER III

DUTIES OF BANGALORE METRO RAILWAY ADMINISTRATION

6. Deviations from manuals of practice to be notified – (1) The Bangalore Metro Railway Administration shall ensure that Bangalore metro railway or a portion thereof proposed to be opened to be is operationally fit in every respect before inspection.

(2) The Bangalore Metro Railway Administration 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, signaling, telecommunication and train control 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 or, as the case may be, the International Codes.

7. Metro Railway Administration to make special arrangements – (1) The Bangalore Metro Railway Administration shall make such arrangements which are necessary to facilitate the inspection of the metro railway, which is to be opened by the Commissioner.

(2) The Bangalore Metro Railway Administration shall be responsible to make such special arrangements as the Commissioner may require for inspection of civil structures, permanent –way, rolling stock, electrical, signal, telecommunication ad train control installations on the metro railway, which is to be opened.

8. Supply of information to Commissioner – (1) The Bangalore Metro Railway Administration shall supply all the information and give all the assistance to the Commissioner and supply or provide all instruments

and apparatus required for taking measurements, testing of bridges or viaducts, rolling stock, electrical, signal, telecommunication and other installations.

9. **Dismantling of any work on request by Commissioner** – (1) The Bangalore Metro Railway Administration 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. **Officer in-charge to accompany Commissioner at inspection.**– (1) The officer in-charge of the Bangalore Metro Railway Administration shall accompany the Commissioner throughout the inspection.

(2) If, for any unavoidable reason, it is not possible for the officer in-charge of the Bangalore Metro Railway Administration to accompany the commissioner, then, concerned Director, authorised by general or special order issued by the officer in-charge of the Bangalore Metro Railway Administration, shall accompany the Commissioner and shall be present during the entire period of inspection.

(3) During such inspection of each portion of the Bangalore metro railway, the engineer or officer who is or was in immediate charge or his representative of that portion of the metro railway during its construction may also be present.

CHAPTER IV

DUTIES OF COMMISSIONER

11. **Commissioner to make full and complete examination.**– **(1)** On receipt of a reference under sub-rule (2) of rule 3 from the Bangalore Metro

Railway Administration, 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.

(2) The Commissioner shall satisfy himself that,-

(a) the Bangalore Metro Railway (General) rules, 2011 have been applied to the metro railway or part thereof proposed to be opened;

(b) the moving and fixed dimensions have been observed; and

(c) the civil works, permanent-way, electrical, signal, 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.

12. Provisions for handling traffic at stations.– **(1)** The Commissioner shall satisfy himself that at every station on the part of Bangalore 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 Bangalore metro railway proposed to be opened for public carriage of passengers are so designed and constructed to conform to the loading standards as specified in the Bangalore Metro Railway Works Manual 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 it, certificate of a bridge engineer employed for the purpose, he may call for load deflection test as specified in Form XVII and other test 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 span 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.

15. **Inspection of electrical installation** – (1) The Commissioner shall inspect the following for electrical installations on the Bangalore 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) caution and danger notice boards for public;

(iii) assurance Registers signed by various metro railway staff of their knowledge of working in electrified area;

(iv) maintenance facilities and manpower; and

(v) fire fighting measures; and

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

16. Inspection of rolling stock.– The Commissioner shall inspect the following items of the rolling stock proposed to be used on the Bangalore 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 deadman handle, door operations, etc;
(c) facilities for evacuation of passengers in case of emergencies;
(d) system of operation;
(e) fire prevention measures; and
(f) any other item, as he may consider fit for safety of passengers.

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

(a) fail-safe features of the signaling system;
(b) communication between train operator and passengers; 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:–

(a) (i) in-house facilities and preparedness to combat emergencies;
(ii) communication and arrangements with outside relief agencies;
(iii) any other item, as he may consider fit for safety of passengers; and

(b) competency of metro railway official connected with train working.

CHAPTER V

THE INSPECTION REPORT

19. Contents of report – (1) The Commissioner, in his report, 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;

(c) the track structure, strength of bridges or viaducts, tunnels, general structural character of the civil works, signal 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 the instances of deviation or infringement of moving and fixed dimensions.

20. Documents accompanying inspection report – The report referred to in rule 19 shall be accompanied by the following documents, namely:-

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

(b) results of the bridge test, when asked for by the Commissioner;

(c) documents required for initiation of eclectic traction;

(d) tabulated details in Forms I to XIV;

(e) certificate by the Officer in-charge of the Bangalore Metro Railway Administration in Form XV; and

(f) list of infringements of moving and fixed dimension in Form XVI.

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. Sanction to open metro railway – (1) The central Government may, after considering the report of the Commissioner submitted under rule 21, sanction the opening of the Bangalore metro railway or a portion thereof, as the case may be, under section 14 of the Act as such or subject to such conditions as may be considered necessary by it for the safety of the public.

(2) The Bangalore Metro Railway Administration shall publish the date of opening of Bangalore metro railway or a portion thereof for public carriage of passengers in the leading local newspapers in Hindi, English and Kannada languages.

23. Opening of a metro railway by Commissioner – (1) The Commissioner may sanction the opening of the Bangalore metro railway for public carriage of passengers, subject to such conditions as he may impose in the interest of the passengers.

(2) The Commissioner shall, while giving sanction to the opening of a metro railway, forward his inspection report to the Central Government.

(3) 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, alternations or relaxation as may be considered necessary.

CHAPTER VII

INTRODUCTION OF NEW TYPE OF ROLLING STOCK

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

(2) Any modification in the design of car which 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 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) The rolling stock of new type different from those already running on a section or increasing the speed of existing rolling stock by making improvements, shall require oscillation and other trials to be conducted as specified by the Central Government from time to time to determine safe speed potential and stability or rolling stock.

(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 or 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 or 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 showing, 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 and the necessary tests 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 or electromagnetic interference compatibility with rolling stock and a certificate that the same have been carried out;

(e) actual test report of electromagnetic compatibility or 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) speed certificate base on oscillation trail results; and

(h) a safety certificate jointly signed by the concerned Directors of the metro railway in the Form XVIII.

(6) The Commissioner shall scrutinize the proposal and make recommendations to the Central Government for orders.

(7) No new type of rolling stock which causes change in the electromagnetic compatibility or electromagnetic interference behavior or stresses exceeding the design criteria specified and approved by the Central Government for existing structures or excessive stresses in track shall be planned unless the prior sanction of the Central Government to the specification of new Rolling stock has been obtained.

CHAPTER VIII

ALTERATIONS OR CHANGES IN THE EXISTING METRO RAILWAY

25. Notice of alterations or changes – (1) Where it is proposed on the Bangalore 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 Bangalore metro railway administration shall give notice to that effect to the Commissioner.

(2) The Bangalore Metro Railway Administration shall, before carrying out any work, which may affect the running of trains carrying passengers, furnish to the Commissioner for his approval drawings or particulars of work and any temporary arrangements necessary for carrying it out.

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 and the International Codes.

(2) No load shall be imposed on the Bangalore metro railway bridge or viaduct which would cause in any member thereof stresses greater than those specified in sub-rule (1) without the prior sanction of the Commissioner.

(3) Closure of an existing bridge shall require the sanction of the Commissioner.

27. Use of new type of signaling equipment. – (1) The Bangalore metro railway administration shall, in case where it desires to use a new type of signaling equipment which is not of approved type, 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 fulfil together with the results of the tests conducted;

(b) a certificate from the Director-in-charge of signal and telecommunication in the Form XIX;

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

(d) safety assessment report from an independent safety assessor, 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 many be necessary to give full particulars of the principle of operations and safety features incorporated;

(g) a copy of the instructions jointly approved by Director-in-charge of Operation and Director-in-charge of Signal and Telecommunication, to be issued for operation of the equipment by the Operating Staff, including those instructions for working under abnormal or failure conditions;

(h) any changes in the station working order.

28.Alteration or changes in electric traction equipment and use of new traction equipment. – (1) The Bangalore Metro Railway Administration shall, in the case where it desires to alter or make changes in electric traction equipments when it materially affects its design characteristics and is directly connected with the train operation, such metro railway administration, apply for such alternation 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, trails and verification conducted by suppliers, metro railway, 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 many be necessary to give full particulars of the principle of operation and safety features incorporated.

CHAPTER IX

SIGNALING AND TRAIN CONTROL INSTALLATIONS

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

(a) Cab Signals;

(b) Fixed Signals (where provided);

(c) Hand signals.

(2) The signaling and train control systems shall permit different modes of train operation depending upon its design, namely:–

(a) automatic mode;

(b) coded manual mode ;

(c) run on sight mode;

(d) restricted manual mode; and

(e) cut-out mode.

(3) The train services on Bangalore metro railway may, under special circumstances or during initial stages, be run in accordance with the 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 referred in sub-rule (3) shall be in accordance with provisions laid down in the Bangalore Metro Railway (General) Rules, 2011 and the Bangalore Metro Signal Engineering Manual.

(5) The signaling 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 signaling 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 shall be displayed in the operation control center and station control rooms.

(8) The cab signal and fixed signals where provided but not in use shall have specific indication to that effect.

(9) The standard of safety of signaling and train control system provided shall generally be in accordance with the recommendations of the European Committee for Electro technical Standardisation or its equivalent national standards or international standards.

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.

(5) The requirements of points as stipulated in the Bangalore Metro Signal Engineering Manual shall be followed.

31.Interlocking – (1) The operation of signaling gears shall be from a panel or Video Display Unit 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.

(3) The standard and requirements of interlocking shall be as per Bangalore Metro Signal Engineering Manual.

32.Track Circuits – (1) All passenger running lines shall be equipped with means of continuous detection like track circuit, axle counters, 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, obstruction to, running lines.

34.Provision of isolation at stations. – (1) All passenger line shall be isolated from all sidings connected thereto.

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(2) The isolation referred to in sub-rule (1) 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 :

Provided that when a trap is provided, the trap switch shall be located with the heel of the switch in rear of the fouling mark and preferably on the straight and the switch be in the rail away from the line to be protected.

35. Emergency communication.- Necessary means of communication, as 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.- Necessary measures as protective devices or design features shall be adopted to safeguard the signaling, train control and tele-communication installations against the harmful effect of electromagnetic inference, stray currents and earth leakage currents, from the 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 network, sub-stations and third rail Dc traction system shall be according to international standards or approved standards laid down by the Central Government and the Indian Electricity Rules, 1956, or any other law for the time being in force and wherever any departure from accepted norms becomes necessary, prior 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 or shroud shall be provided over the third rail.

(4) The structures supporting third rail equipment shall be designed in accordance with the relevant international and Indian standards for the viaduct and the tunnel.

(5) When the distribution system involves third rail carried on pedestals and return circuit via running rails or earth, all such structures and associated tracks shall be effectively earthed and bonded or other precautions taken to ensure that contact with any part of the structure will not be dangerous to the public and the metro railway staff.

(6) In the electric traction system, bonding and earthing shall be as per the approved code for bonding and earthing in respective areas and in case of elevated and tunnel concrete structures, continuous earth bonding shall be provided by earthing the reinforcement of structures and connecting the same to structure earth cable.

(7) The earthing arrangements at power supply installations shall strictly conform to the international standards or the Indian Electricity Rules, 1956 and accepted codes of practices for bonding and earthing for traction.

(8) 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.

(9) All precautions shall be taken to avoid Electro-magnetic effect in the environment as per relevant standards.

(10) The earthing system for DC traction, shall conform to requirements of IS-3043 and EN-50122 Part – 1 and the maximum rail

potential shall not exceed 120V for main lines and 60V for depot area in accordance with EN-50122 Part-I.

(11) No earth wire shall cross any track and 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 and in complicated areas, structures may be connected to individual earthing stations.

(12) 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 minimising danger in the event of breakage and in accordance with Regulations for Electrical Crossings, 1997.

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

(14) All 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.

(15) On both sides of the road–under–bridges, height gauges of suitable design shall be provided to ensure that no part of any road vehicle or its load shall come in contact with the road-under-bridge girders.

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

(17) The details under this rule shall be approved by the Electrical Inspector to the Government of India.

(18) The Central Government may direct that the Chief Electrical Engineer of Bangalore Metro Rail Corporation shall, for the purpose of works under the Bangalore Metro Rail Corporation, function as the Electrical Inspector to the Government of India.

(19) The Central Government may also direct that an officer with Electrical Engineering background and Senior to Chief Electrical Engineer of Bangalore Metro Rail Corporation shall, for the purpose of works under the Bangalore Metro Rail Corporation, function as the Chief Electrical Inspector to the Government of India.

38.Display of caution boards and notices.– The following caution boards and notices of standard size written in Kannada, English and Hindi shall be displayed at the various locations indicated below, namely:–

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

(b)general "caution notices" regarding danger of high voltage traction for public at metro railway stations and for staff at prominent places;

(c) "750 V Caution Boards" shall be affixed on foot over and road over bridges, sub-stations.

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39.Protection of private property against corrosion effects of DC traction.– Under DC traction, there is a possibility of corrosion due to stray currents on the metallic structures and conductors in the vicinity of viaduct and tunnel and even though, the stray current protection measures have been taken by the Bangalore metro railway, yet wide publicity may be given so that special precautions may be taken by parties concerned against the possibility of corrosion effect of stray current.

40.Approval of energization of high tension lines.– (1) The Bangalore Metro Rail Corporation, shall submit the application at least fifteen days before energization of high tension lines to the Electrical Inspector of the Government for the following purpose, namely:–

(a) formal approval to the design and layout of all high voltage equipment including sub-stations, transmission line, power distribution system, DC feeders and third rail equipment;

(b) approval for energization of high tension installations mentioned above including third rail equipment for DC traction;

(2) The application referred to in sub-rule (1) shall be accompanied with documents specified in traction manual of the Bangalore Metro Railway ;

(3) 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, 750 V DC third rail equipment and other installations for compliance with the Indian Electricity rules, 1956 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.

The Electrical Inspector shall after conducting the inspection under sub-rule(3), convey his approval for the energization of receiving sub-stations, traction sub stations, auxiliary sub stations, 750 V DC third rail system and others associated high tension equipments subject to such conditions as he may consider necessary.

41.Procedure for energization of traction installations.– (1) (a) after obtaining the sanction of the Electrical Inspector to the Government of India for energization under rule 40, the sub stations should be commissioned sufficiently in advance for the energization of third rail equipment;

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(b) before energization 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 energization of third rail equipments take place, necessary clearance certificate should be obtained from all the Construction Officers of Electrical, Civil, Signaling and Tele-communication and others who had been hitherto working in the sub-station premises and on the section to the effect that their staff had been withdrawn and the sub-station including the section could be energized;

(d) 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 energized.

(e) energization of electrical equipments and third rail system shall be progressively undertaken starting with High Tension equipments at the receiving sub-stations, 33 KV feeders from the receiving sub-stations to the traction and auxiliary sub –stations and 750V DC feeders from the traction sub-station to the third rail followed by one sub-sector after another; and

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

(2) The station manager shall, in addition to giving wide publicity through newspapers and other media, warn all passengers about the danger of 750V DC third rail equipment on the section.

(3) All relevant documents and certificates as mentioned in, and notifications issued under, the Traction manual along with the approval of Electrical Inspector for energisation shall form a part of complete documents to the Commissioner while making reference to the

Commissioner under sub-rule (2) of rule 3 for opening of the Bangalore metro railway or a part there of for public carriage of passengers.

(4) (a) The Commissioner shall carry out the inspection of the entire section;

(b) the Director-in-charge of Electrical Department nominated by the Officer in-charge of the Bangalore Metro Railway Administration shall accompany the Commissioner throughout the inspection;

(c) the engineer- in-charge of the section during the construction shall also be present;

(d) during the 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, and the transportation, electrical, permanent- way and signal and telecommunication staff are fully acquainted with the duties to be carried out after electric traction is introduced.

(5) The signalling and train control and telecommunication requirements in electrified sections shall be in accordance with international standards or approved standards laid down by the Central Government.

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

(7) A catechism dealing with the requirement of signal and telecommunication installations for 750V DC electrified section shall be in accordance with Appendix A and Appendix B to these rules.

SCHEDULE

[See rule 5(2) (a)]

INDEX PLAN AND SECTION SHEETS

1. A set of plans and sections for Bangalore Metro Rail 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 al 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 i.e. Bangalore 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 if the set of detailed plans and sections should be signed by the engineer in charge.

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

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

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FORM I
[See rule 5(1) (a)]

CURVE ABSTRACT

Section: Bangalore Metro Railway
Length: Gauge: 1435mm

Degree of curvature and radius	Number of each	Length in kms of primary curve
(1)	(2)	(3)
Total		

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

FORM II
[See rule 5(1) (b)]

GRADIENT ABSTRACT

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

Gradient (compensated)	Number of each	Length in km	Percentage to total length of line
(1)	(2)	(3)	(4)
Total			

Longest continuous length of Steepest Gradient Followed by
For a length of ..... Km

FORM III
[See rule 5(1) (C)]

BRIDGE ABSTRACT

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

Type of Bridge	Clear span in meters	Total no of spans	Waterway in lineal metres	Loading standard for which designed	Remarks
(1)	(2)	(3)	(4)	(5)	(6)

FORM IV
[See rule 5(1) (d)]

VIADUCT ABSTRACT

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

Type of Viaduct	Clear span in meters	Total no of spans	Opening in lineal metres	Loading standard for which designed	Remarks
(1)	(2)	(3)	(4)	(5)	(6)

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FORM V
[See rule 5(1) (e)]

IMPORTANT BRIDGES ABSTRACT

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

Type of Bridge	Clear span in meters	Total no of spans	Waterway in lineal metres	Loading standard for which designed	Remarks
(1)	(2)	(3)	(4)	(5)	(6)

FORM VI
[See rule 5(1) (f)]

BALLAST AND PERMANENT WAY ABSTRACT

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

1. The permanent way consists of UIC __ Kg, ___ grade, head hardened ____ rails to _____ specification, of make _____, __ meters long, _____welded and laid on _____ sleepers with the density of _____sleepers per km on main lines at grade. The track in tunnels and on elevated section (viaducts) is laid on _____ type _____ track with rails supported on _____ at spacing of _____ mm C/C on curves of radius less than 400m and _____ mm C/C on straight and curves of radius equal to or greater than 400m with _____ fastening system from _____. The track in yards/depots at grade is laid with UIC __ Kg., ___ grade to _____ specification, of make _____, ___m long, _____ welded, using _____ fastening system of _____ make laid on _____ sleepers to a density of _____sleepers per Km. on _____ mm graded stone ballast with minimum cushion of ____mm under the sleepers. Ballast cushion on main lines is ____ mm.

2. The turnouts to be negotiated are _____, and consist of _____ switches and _____ crossings.

3. 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 Director-in-charge of Civil that the materials are of tested and approved quality and comply with the accepted specification.

FORM VII
[See rule 5(1) (g)]

STATION AND STATION SITES

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Section: Bangalore Metro Railway
Length: Gauge : 1435mm

Name of station	Kilometrage from fixed point	Inter station distance	Remarks
(1)	(2)	(3)	(4)

FORM VIII
[See rule 5(1) (h)]

BRIEF PARTICULARS OF ROLLING STOCK

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

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		

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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		

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

FORM IX

[See rule 5(1) (i)]

BRIEF PARTICULARS OF TRACTION INSTALLATION

Section: Bangalore Metro Railway

Length: Gauge : 1435mm

Third Rail Equipment:

1. Salient Features of the Design specially covering following aspects;
   (a) Current carrying capacity of the system
   (b) Boundaries like Temperature range
   (c) Speed potential
   (d) Protection arrangements
   (e) Power supply from Grid sub-station (GSS) to Receiving sub-station (RSS)
   (f) Power distribution from Receiving sub-station (RSS) to Traction sub-station (TSS)
   (g) DC power feed from Traction sub-station (TSS) to conductor rail
   (h) Power distribution system from Receiving sub-station (RSS) to Auxiliary sub-station (ASS)
   (i) Traction SCADA system
   (j) Earthing and Bonding system

2. Certificate that all warning boards and notices as per statutory requirements have been provided at specified locations.

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FORM X
[See rule 5(1) (j)]

POWER SUPPLY INSTALLATION ABSTRACT

Section: Bangalore Metro Railway
Length: Gauge : 1435mm

S.No	Type of sub stations	Total Nos.	Location and nearest station	Remarks
(1)	(2)	(3)	(4)	(5)
1.	Receiving sub stations			
2.	Traction sub stations			
3.	Auxiliary sub stations			

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FORM XI
[See rule 5(1) (k)]

ELECTRICAL CROSSING OVER METRO RAILWAY TRACKS ABSTRACT

Section: Bangalore Metro Railway
Length: Gauge : 1435mm

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
(1)	(2)	(3)	(4)	(5)	(6)	(7)

FORM XII
[See rule 5(1) (l)]

TRACTION MAINTENANCE DEPOT ABSTRACT

Section: Bangalore Metro Railway
Length: Gauge : 1435mm

S. No	Location	Name of nearest metro station	Remarks
(1)	(2)	(3)	(4)

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FORM XIII

[See rule 5(1) (m)]

Ventilation, Smoke management, Fire safety and other measures in tunnels and Stations

Section: Bangalore Metro Railway
Length: Gauge : 1435mm

1. Salient features of the design specially covering following aspects:-
   (a) Emergency ventilation and smoke management system in tunnels and stations;
   (b) Emergency Evacuation procedure from tunnels or stations;
   (c) Fire detection/suppression system in tunnels or stations;
   (d) Fire alarm and Public address system in emergencies;
   (e) Emergency lighting and Power supply; and
   (f) Access routes for firefighting personnel.
   (g) Any other protective measures against flooding

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

FORM XIV
[See rule 5(1) (n)]

BRIEF PARTICULARS OF SIGNALLING/ TRAIN CONTROL AND TELE-COMMUNICATION SYSTEMS

Section: Bangalore Metro Railway

Length: Gauge : 1435mm

Signaling 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 from track to train through coded Audio Frequency Track Circuit, 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
   (ii) Coded Manual mode
   (iii) Run on sight mode
   (iv) Restricted Manual mode
   (v) Cut –Out mode

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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 by means of Video Display Unit workstation 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, dept controller and the train operator.

8. A telephone system interconnecting stations, Operation Control Centre and depots has been provided

FORM XV

[See rule 5(3)]

CERTIFICATE

I do hereby certify:

(a) that the moving and fixed dimensions for Bangalore 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 Bangalore Metro Railway General Rules, 2011.

(e) that the 750 v DC 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, 2011 have been complied with.

(f) that the signaling and telecommunication equipment have been installed in accordance with the approved instructions and they 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 for metro railway safety on his inspection and all information supplied or engagements entered into by him shall bear my authority

Signature with seal of
Officer in-charge of Bangalore Metro Railway Administration

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FORM XVI
[See rule 5(4)]

INFRINGEMENT OF MOVING AND FIXED DIMENSIONS

Section: Bangalore Metro
Railway
Length: Gauge : 1435mm

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
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

FORM XVII
[See rule 14(2)]

DEFLECTION TEST OF BRIDGES

Section: Date of Test..... Bangalore Metro
Railway
Length: Description of Test Load..... Gauge : 1435mm

Bridge No	Kilometer-age	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)

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FORM XVIII
[See rule 24(5)(h)]

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
(1)	(2)	(3)	(4)

SPECIAL CONDITIONS

To be signed by

Director-in-charge of Civil **Director-in-charge of Electrical**

Director-in-charge of Signal and Telecom **Director-in-charge of Operations**

FORM XIX
[See rule 27(2)(b)]

CERTIFICATE

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._____ etc.

Director-in-charge of Signal and Telecommunication

Note: The application should be scrutinized by the Commissioner who, if satisfied, will communicate his sanction to the metro railway administration, in case he is not fully satisfied, he will give his comments and recommendation for suitable further action.

Appendix A

[See rule 41 (7)]

CATECHISM FOR SIGNALING AND INTERLOCKING INSTALLATIONS
SIGNALING AND TRAIN CONTROL

Have the requirements and recommendations for signaling and train control systems vide Chapter IX these rules and appendix thereto pertaining to Signaling and Train Control systems installed on the section being complied with?

A. SIGNAL

1. Do the signals comply with the requirements as laid down in Bangalore Metro Railway General Rules, 2011.

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 signals controlling placed in such a position and at such a height above rail level so they can be clearly seen by the drivers 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 signals not commissioned have their aspects covered and the cover displaying two crossed white bars on a black background, the bars not being less than 30 cms x 10cms?

B. POINTS

1. Are the locking of facing points such that the points cannot be or become unlocked while a train is passing over them i.e 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 being taken 'OFF', the giving of which is preceded by the locking of the points?

C. 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?

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D. TEST IN STATION CONTROL ROOM

It is essential that the interlocking of all signals with points must be 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 point locked where required?
(b) All points, giving access to the running line from sidings are set against the running line?

E. OPERATION CONTROL CENTRE

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

F. CAB SIGNAL

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

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Appendix B
[See rule 41 (7)]

A. ADDITIONAL CATECHISM FOR SIGNALING AND TELECOMMUNICATION

1. Have the requirements and recommendations for signaling and telecommunication installation in accordance with the instructions issued for the installation of Signaling and Telecommunication equipment in 750V DC 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

Items	Existing parameters	Prescribed Parameters	Deviation/Infringement	Remarks	Approval/ Sanction
(1)	(2)	(3)	(4)	(5)	(6)
SIGNAL					
POINTS					
TRACK CIRCUITS					
CABLES					
ELECT SIGNALING EQUIPMENT					
BATTERIES					
EARTHING					
MOBILE TRAIN RADIO COMMUNICATIONS					
GENERAL SAFETY					

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