CHAPTER - XXI

PASSENGER INFORMATION SYSTEM:

21.1 SECTION A - D E F I N I T I O N S

A method or technological gadget to give information to public about status of Train running / rescheduling / accident etc. to the passenger in Person or remotely. Status of Reservation either on Public Telephone lines or on Internet

21.1.1 Interactive Voice Response System (IVRS):

Interactive Voice Response System, the technical system giving the information of Train Running, Passenger PNR etc. on a PSTN / Mobile Network through a centralized data base, which is at present maintained at Divisions / HQ./ CRIS or through NTES servers.

21.1.2 Prerecorded Announcement and Auto Announcement System:

It is an IVRS System, generally provided as stand alone system, to give the information to public on PSTN Telephone either for Train Running Information or to work as Announcement System in Platform with suitable interface to PA System.

21.1.3 Train Indicator:

It is a display device which gives the information regarding running of Train Arrival / Departure timing and Platform No. etc.   The system is either operated locally at a particular station or can be fed from Central location. They are mainly provided at Platform and Public utility location.

21.1.4. Coach Guidance System:

It is a display device, which indicates the position of each coach from engine with description of train number and Coach position.

21.1.5. Master Slave Clock:

(a).   Master Clock is a Controlling Clock in Railway premises, which drives the other Slave Clocks in the same or remote premises to keep uniform timing.

(b).   Slave Clocks are the clocks in the Railway premises driven by the Master Clock.

(c).   Global Positioning System (GPS) can be followed in Railway to have GPS Clock in control office to work as Master Clock. This can drive all slave clocks either in same premises or through separate networking to distant location. Slave clocks can also have independent GPS module, in that case no master clock is required.

21.2 SECTION B - STATUS OF PASSENGER AMENITIES (TELECOM)

21.2.1. The initial and ultimate requirement of Passenger Amenities System at Stations should be ascertained in keeping with the guidelines issued by the Commercial Directorate from time to time. The provision of Passenger Amenities at various categories of Railway Stations shall be provided in lines with recommendations laid down by commercial directorate/consultative committee and shall be ascertained accordingly.

As per Railway Board's letter No. 2004/Tele/TCM/2 dt. 21.12.2005 Passenger Amenities to be provided shall be as given below:

Sr. No.	Telecom Items	Station categories on which these Amenities to be provided as per norms		
		Minimum Essential	Recommended	Desirable
1.	PA System			A, B, C
2	IVRS		A = 48 lines (Calls 72000) B = 24 lines (Calls 5000 – 20000) Others – A central IVRS with adequate lines should be provided to cover all suburban stations – Minimum 6 lines of IVRS is other wise justified.	
3.	Clocks	A, B, C, D, E, F		
4.	Coach Guidance System			At Model Stations
5.	Train Display Board			At Model Stations
6.	Enquiry & Computer Announcement System			At Model Stations.

SECTION - C - I V R S

21.3. ON LINE TRAIN RUNNING INFORMATION SYSTEM

21.3.1. I N T R O D U C T I O N:

Passenger / Public can access this system through PSTN network or through Web Site www.indianrail.gov.in & http://www.trainenquiry.com.

Through PSTN network, Passenger / Public can get On Line Train Running Information in three languages i.e. Hindi, English & Local Language, through voice guidance to select languages and train No.

All over Indian Railways the system has been provided through NTES (National Train Enquiry System) for getting running position of Trains.

On Line Train Information System : The status of the train data, for giving the On Line Information System can be fed through any of the ways:

i. Manual Input data by taking the position from the Control office and feeding to NTES terminal.
ii. Manual feeding of the data on the respective location at the Control office where the input terminals are provided for periodically up dating the Train information by obtaining the data from the Control office.
iii. By taking the input automatically from the "Control Charting System".

On Line Train Information System can be located at the following locations:

i. **On Line Train Information System at Station**.
At the individual station, where the system input is fed by the Stationmaster/ Supervisory Staff at stations "as stand alone system". The information is up dated periodically. When any predefined number is dialed the caller get the information of the train for fixed duration.

ii. **On Line Train information System at the Divisional HQs**.:

The On Line Train Information System can be at the Divisional level only where the data is fed from Control charting server. The data is up dated at predefined interval.

iii. **Zonal level On Line Train Information System:**

On Line Train Information System can be at the Zonal level, where the data input is fed from the various control locations periodically after the predefined interval. On Line Train Information is available either on the web or by dialing predefined number within the Zonal Railway.

iv. **On Line Train Information System and other Information BSNL Circle wise.**
For giving the information to the public total integrated system like Call Centre can be provided. By dialing pre-specified number, the information is available from one source only for the complete BSNL circle for various queries related to Railways.

v. **On Line Train Information System through WEB:**

By logging on the Internet on the site http://www.trainenquiry.com, the running of the status of the Train can be known. In the same link the following additional information can also be obtained.

    a.   Train Time Table.
    b.   PNR Enquiry etc,

From the site http://www.indianrail.gov.in the following information are made available.

    a.   PNR Status.
    b.   Trains between important Stations.
    c.   Train / Fare accommodation.
    d.   Train enquiry
    e.   Other information related to Railway i.e. All India Railway Network Map, Zonal Railway Map, Booking locations, Layout of the berth, Internet Reservation etc.

21.3.2. IVRS System Functionality:

The IVRS shall function as under:

a. On dialing IVRS number (which may be of 3 digit or 4 to 7 digits), the System shall play back a WELCOME Message. The user has to select the language in which he desires to have information as guided by IVRS. Welcome message shall be in English only. The welcome message shall be as under:
"Namaskar, Welcome to _____ Railway's On-line train Running Information System".

b. IVRS shall then ask the User to enter the Train number by playing the following Voice Message.:

"For information in English dial 1, <similar script in Hindi and local language with dial 2 and 3>".

c. IVRS shall then ask the User to enter the Train Number by playing the following Voice Message:

"Please dial the Train Number for which you need the information".

d. After the User has dialed the Train No., the IVRS shall respond in prescribed format. The script shall be in English and the Railways will give scripts in other languages.

21.3.3. Other Requirements:

(i)   The IVRS shall respond to an incoming call within one ring. However, this can be varied by Railways if so required.

(ii)   The system should work with all types of Exchanges in use on the PSTN and Railway Communication Network.

(iii)   If after the Welcome Message, the USER does not dial the Train no., the system should automatically disconnect the call after 10 seconds.

(iv)   In case, the user dials the wrong train number, it will repeat the digit and announce "the information for this train is not available on the system, please dial the correct train number" and will give one more chance to enter train number. If still he dials wrong train number, it will repeat the dialed digits and announce "Please find the correct train number from the time table or dial train enquiry at 131, Thank you for using the system".

(v)   The system should be capable of generating hourly and daily reports for various individual ports indicating total no. of calls received, calls successful, etc..

(vi)   The IVRS system shall be capable of playing back Messages in case of unforeseen circumstances such as :

    1.   Train is running indefinitely late.

    2.   All Train Traffic has been suspended due to flooding of tracks, accident etc.

    3.   The train has met with an accident. This is a train specific message and played back only when information of train no. is sought. All such messages shall be pre-recorded and can be played back by giving appropriate STATUS field. It shall also be possible to record any message directly onto the IVRS from a Telephone Line in case of any Emergency. This shall be permitted at supervisor level with password protection.

(vii)   In case of any break down of Communication Channel or break down of data terminal, the IVRS position shall not get updated. In such cases, it shall be possible to prefix all messages being played back by IVRS to the public by the following pre-recorded message:

"Due to technical reasons, the Train Running Position could not be updated since HH.MM. The last status available for the train is as follows".

This shall be followed by the normal message regarding train status
"Train No. – Train Name " e.g. "2904 Golden Temple Express ……….."

It should be possible to select playing or barring of the above message by the Control Office operator from a user friendly menu on IVRS system.

(viii)   Due to any unforeseen circumstances, trains may be running abnormally late. It is possible that two trains having same Train no. may be running on a given day. In such a case, the IVRS shall give information for both the trains as indicated below:

"2904 Golden Temple Mail which departed on <date> has passed Virar Station at HH.MM and is running HH.MM hours late and is expected to arrive at Mumbai Central at HH.MM. Please note that 2904 Golden Temple Mail which departed on <date> is running Right time and has passed Kota at HH.MM hours".

For achieving the above, for every Train a unique file shall be required to be maintained in the IVRS systems.

(ix)   On arrival of the Train at its final destination IVRS shall play the arrival status of the trains up to 2 hours after the actual arrival of the train. Thereafter, it shall

provide the information of the scheduled arrival of the train at the destination as per the time table until the actual status of next train is obtained from the control offices.

(x) Certain Trains run on specific days of the week only. For such trains, if a User enquires on IVRS about a train that does not run on that day, IVRS shall provide the user following voice message :

"The train XXXX (name) runs only on (days of the week). After this, it shall provide running position of train if any. Thanks for making use of this service".

(xi) It should be possible to record by the operator train specific messages for train running late / diverted / met with accident.

21.3.4. Technical Specifications of IVRS Systems:

1. The system should have TEC approval and should comply with all Generic Requirements as per TEC Specification No. G.R. No: Q/CTI-01/01 DEC 96 or later for computer telephonic integration and for IVRS Specn. No: GR No. G/VRS – 01/03.

2. The IVRS should make use of proven Hardware preferably from reputed IVRS Manufacturers. These should be PCI or EISA bus compatible.

3. The system shall allow user interaction in pulse and tone signalling.

a. The IVRS must have a Graphical User Interface for ease of operation such that graphical icons or modules be placed and interconnected to form the required application instead of coding or programming of the system. No knowledge of any Software Languages shall be required for modification in IVRS Application.

b. The IVR System is expected to be placed at various sites and should preferably execute on 'Windows' or suitable operating system.

c. The system should allow recording/re-recording of voice prompts at site via a telephone or via a remote site. The voice files should be stored on the hard drive and should be editable using appropriate software so as to allow mixing with background music, editing silence patterns etc.

d. The IVRS system should have fax-on-demand and fax transmission facilities.

e. It should be possible to make changes to the IVR system at a remote site. This facility is to be utilized in upgrading special train information during holidays and in special circumstances.

f. The IVRS should have a real – time `Line Activity' report allowing the systems operator to monitor the `STATE' of each telephone line, usage of the system, call handled, etc and should be equipped with alarm, in the event of failure..

g. The system should be flexible enough to customize the application at site.

h. The system should support multiple languages on the same system. It should be possible to reconfigure the ports for any language at site so as to allow the

user to allocate the limited telephone line resources for specific languages, functionality depending on the traffic for that particular language / function.

i.   It should be possible to set the number of rings after which the system will answer the calls.

j.   During the period IVRS data is updated by the Control Office Computer, there shall be no mismatch/clash in the Voice Message played by the IVRS on to the Telephone lines.

k.   Voice shall be recorded in studio environment by a professional. The sample of voice shall be approved by the Railways before recording is done.

21.3.5. MAINTENANCE SCHEDULE

(a)   **Daily maintenance:**
1.   Checking of activeness of all the ports of IVRS cards.
2.   Checking of all the telephone lines.
3.   Checking of link between data entry terminals to IVRS console units.
4.   Reading of number of calls landed and number of calls replied by each channel.

(b)   **Monthly maintenance:**
Thorough cleaning of all the associated equipments like PC based console unit, Modem etc.

(c)   **Requirement of man power.**
One TCM Gr. III per location for looking after the IVRS terminals.

21.4. PNR ENQUIRY AND ACCOMODATION AVAILABILITY SYSTEM (AT INDIVIDUAL STATIONS)

21.4.1. General:

IVRS based PNR enquiry system and accommodation availability enquiry systems are widely used passenger information system provided through out the Indian Railways. Passenger/Public can access the system through PSTN network and they can get current status of reservation as well as availability of accommodation in various classes of a specific train in three languages i.e. Hindi, English & Local Language. The system prompts through voice guidance to select languages, train No., PNR No. and date. The same facility is extended through CRIS Server on Internet site www.indianrail.gov.in & http://www.trainenquiry.com.

21.4.2. Technical:

The IVRS based PNR enquiry system and train accommodation availability enquiry system consists of the PC based console unit equipped with dialogic card / one E-1 Interface card and software for IVRS based PNR enquiry system and train

accommodation availability system. This console unit is connected with the one port of Mux of the nearest PRS centre.   The dialogic cards are available in various configurations like 4 port, 8 port, 16 port or 2 MB interface card. The PSTN lines are directly terminated on the dialogic card. Depending on the number of calls per day in peak season, the system should be capable of up gradation just by inserting additional dialogic cards or 2 MB interface card.

22.4.3. Requirement Of Material For Installation Of IVRS Based PNR Enquiry System.

The minimum requirements of equipment / modules for installation of IVRS based PNR enquiry is given below:

(1) Industrial PC Pentium-IV or higher version – However Railway can decide based on availability and latest specifications.

(2) Dialogic card 4 port / 8 port / 16 port or 2 MB interface card (As per requirement of the calls traffic of a particular location).

(3) Software for the functioning of IVRS based PNR enquiry system and train accommodation availability system.

(4) One pair of HDSL modem if system is required to be commissioned on 2 MB stream leased from MTNL / BSNL.

   (Now a days MPLS system is available, depending on location, Railway can provide the same through BSNL/MTNL.)

(5) Rack for installation of entire system.

(6) One port of PRS MUX earmarked for commissioning of IVRS based PNR enquiry system. This port is required to be activated from main PRS. This facilitates for retrieving information of PNR enquiry and train accommodation availability enquiry from the main server of the PRS.

21.4.4. Report Generation:

The software of the system shall be so designed that continuous monitory of the all channels can be observed on the screen of the console unit. At any time it can be seen that how many channels are busy, which channel is hanged and how many calls have been received and answered on a particular channel / time slot. This enable monitoring of individual channels / time slot. If any abnormality is noticed on any particular channel, it can be set right by resetting the system. A printed report can also be obtained indicating the number of calls received and number of calls answered by a particular channel / time slot in a specific period or within 24 hours.

21.4.5. Maintenance Schedule
(a)   **Daily maintenance:**
  i.   Checking of activeness of all the ports of IVRS cards.
 ii.   Checking of all the telephone lines.
iii.   Checking of link between PRS MUX to IVRS console units.

iv.   Reading of number of calls landed and number of calls replied by each channel.

(b)   **Monthly maintenance:**

Thorough cleaning of all the associated equipments like PC based console unit, MUX, Modem etc.

SECTION - D

21.5. Prerecorded Announcement System

In order to give the information to the public for the status of Train running condition and other information through the public network, this system is provided at major stations / wayside stations. By providing this system, Public can access through public telephone network with predefined number. When this number is dialled, the system will give the running status of the Train based on the information fed to the system. The system is available in integrated way in which the announcement at the Platform with the suitable interface with the existing PA System can be made available which is known as Auto Announcing System. Coach Guidance Announcement System can also be integrated with this.

21.5.1 <u>Procedure</u>

i.   On dialing the assigned number the system will initiate Welcome message, and system prompts for selecting the language (i.e. 1 for English , 2 for Hindi & 3 for Local language).

ii.   The system then checks that whether the number dialled is valid or not.

iii.   If the number is valid the system fetches data from the database available.

iv.   Recorded massages are then heard by the Passenger/Public on Telephone.

v.   System application supports E1 or required number of Channels. Each channel can be viewed on the main screen individually. According to the channel number we can get data like number of calls landed in the system, Language type of that particular channel, the voice files being used and the status of the calls.

vi.   The supervisor / Station Master can record any type of message that can be played.

vii.   Recording can be done by
    a. <u>Manual recording</u>: Messages are recorded through particular channel.
    b. <u>Scratch Pad</u>: Messages are recorded from the scratch pad.

SECTION - E

21.6 AUTO ANNOUNCEMENT SYSTEM (PC Based Announcement System)

1. It is an integrated system to work as Auto Announcement PA System, Display system & Coach Guidance announcing system. The system shall be capable of automatic announcement with pre-recorded voice prompt, which shall be stored in the hard disk of the system.
2. The Data is entered by the data entry operator / Station Master by entering Train number, arrival / departure time and status of the train in the screen format.
3. The selected massage is scrolled on the monitor so that the operator can know the announcement / Display being made on platform PA system and display boards.
4. PA Systems are to be provided at the Stations covering Concourse, Platform area and different locations. The type of Speakers, Mikes, Acoustical environment, Type of Loudspeaker, Wiring and Cabling, Earthing and other Safety precaution should of standard make and be as per RDSO specification.

21.6.1. Features

1. It shall be possible to choose any of the system to keep on or any of the system remaining idle.
2. Messages announced on the Platform PA system shall synchronize with the information shown on the display board.
3. It shall be possible to add, modify and delete timings of the trains in the master database, which is password, protected.
4. Hot key shall be used for transferring data from PC to various systems.

21.6.2 System Configuration

System mainly consists of Standard PC in which the Operational software is loaded to run the systems i.e. PA System on platforms, Display system, Coach Guidance Announcing System.

SECTION - F

21.7 TRAIN INDICATION BOARD

21.7.1 General

It is a display device which gives the information regarding running of Train Arrival / Departure timing and Platform No. etc. The system is either operated locally at a particular station or can be fed from Central location. They are mainly provided at Platform and Public utility location.

1.1 Train Indicator system for trains should comprise of

a) Multiple line, Multiple row Single/Double face train indicators at the entrance of platforms as per the need of the stations and number of platforms at concourse / lobby.

b) Single line Double face train indicators at platforms at various locations along with platform length with clear visibility.

1.2 All Display Boards should be given unique identification code/address and their status is to be reflected and made available on screen of the operating console as a health monitoring system.

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1.3 The software should be suitable for operation of Train indicators and should be capable to display approximately 200 Trains departing /arriving from the Railway Station with the capability for further up gradation to 500 Trains.

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1.4 The Display Board should be capable to display fixed slogans/ messages at the time of accidents/derailments in rolling, flashing & steady mode.

1.5 The Indicator system should be designed in such a way that operator has to do minimum number of operations for initiating and completing the entire process of a data entry.

1.6 The display boards should contain microprocessor based control unit, peripheral interface adopter, asynchronous serial communication port, efficient address decoding and memory mapping technique using resident program for multiplexed display to driver up to 256 unique addresses.

1.7 Surge and lightening protection arrangement should be provided at 230V AC mains end and output of power supply, so as to protect the electronic modules from damage. The arrangement may include GD tubes, MOVs and fuses etc.

1.8 The system should be designed to suit the 25 KV AC traction areas. Proper earthing arrangement should be provided for grounding the shield of the data cable to prevent the EMI & RFI interference. However earthing for 230 volt AC power supply should be made separate.

1.9 Electrical power supply for all advance indicators of one location will be provided from a centralized place, similarly for all platform indicators electrical power supply will be provided from a centralized place. Separate wiring of power cable from a centralized power point to individual display boards should be planned in separate conduits.

1.10 Ease of maintenance and immunity to failures should be the primary consideration in the designing of the system.

21.7.2. Configuration Of Indicator System For Trains:

The Train Indicator System comprise of operating console unit (PC Based) along with Single line single /Double face LED display boards at the platform and multiple line single or double face indicators on Concourse.

21.7.3. Operating Console (Control Console Unit):

The operating console should be installed in the announcer's cabin or at remote locations at Station. It should have required software and provision of data entry for train no. time table of Trains, PF. No. & Expected Arrival / Departure time etc. The software should be menu driven and users friendly.

0   It should be possible to change the Time Table of Trains and introduce new Trains.

21.7.4. <u>Indicator Boards:</u>

21.7.4.1.Multiple Line Single or Double Face Train Indicator for Trains at the entrance of the Platforms / lobby etc.

Train indicators should be made up of LED modules having total display area as per need, capable of displaying Train Number, Train Name, expected Departure / Arrival time etc.

21.7.4.2 Single Line Double Face Train Indicator Display Board Trains at Platforms:

The single line Double Face Train Indicator Board at platforms should be made up of suitable size LED matrix of 5mm LEDs having total display area according to need capable of displaying Train Number, Train Name, expected Departure / Arrival time etc. and colour of display as per choice of Railways.

21.7.4.3 Multiple Lines Single or Double Face Train Indicator Display Board for Trains at Platforms:

Multiple lines Single or Double Face Train Indicator Board on Concourse should be made up of suitable size LED matrix of 5mm LEDs having total display area according to need. The display board should be capable of displaying Train Number, Train Name, expected Departure / Arrival time and Platform No. for five trains in Hindi & English (One at a time).

Suitable Software for giving scrolling information for Coach Guidance.

21.7.5 <u>Details of different Hardware for Train Indicator System.</u> This shall be as per RDSO specification of Integrated Passenger Information System.

21.7.6.   <u>Software for operation of Train Indicator System:</u>

i. The software should be developed in windows platform and should be menu driven type. The Front end can be any standard higher-level language like visual basic, C++, JAVA etc.

ii. The software should support bilingual characters (English & Devnagari) and enable displaying of information in English & Hindi both and regional language.

iii. The software for operation of train indicator system should be developed for displaying Train number, Train name, and expected departure/arrival time of Trains, platform no. etc.. The Software should be upgradable to give Coach Guidance facility.

     iv. Provision should be made in software for alteration in Time Table of Train. It should be possible for Railway to change/ add the details of trains to be displayed by the system at the time of change of timetable.

     v. Licensed copy of software on CD, Norton antivirus of latest version or superior & software for operation of the train indicator system should be available, minimum of two sets.

21.7.7 Single Face & Double Face LED Based Train Indication Boards should as per RDSO specification of Integrated Passenger Information System. Similarly multiple Line Single or Double Face Train Arrival / Departure Display Boards on Concourse or lobby or suitable location shall be as per RDSO specification.

21.7.8. Details of Four Pair PVC Insulated Twin Twisted Screened Copper Cable.

i.   The four pair PVC insulated multi-strand-screened data cable should conform the following specification.

a	Core structure	:	Each core should be made up of seven strands of tinned copper conductor of 0.2mm diameter each.
b	Nominal thickness of insulation	:	0.6mm
c	Nominal thickness of sheath	:	0.9mm
d	Screening %age	:	90% of the inner surface area of the sheath

ii.   The 4 pair PVC insulated twin tested screened copper cable to be supplied should be of reputed make.

21.7.9 Details of three Core PVC insulated flexible Power Cable.

i.   The three-core PVC insulated flexible power cable should confirm IS specification No. IS 694: 1990 (Reaffirmed – 1995) or latest and should comply the following specifications.

a.	Nominal cross section area of conductor	:	2.5 Sq. mm copper conductor
b.	Nominal thickness of insulation	:	0.7mm
c.	Nominal thickness of sheet	:	1 mm
d.	Overall dimensions	:	11.0 mm

ii.   Power Cable should be of reputed make.

21.7.10.   Laying of Data and Power Cable over Steel Bridges / Platform Roofs:

i.   The laying of data and power cable over metallic structure of the roofs of platform and FOBs should be carried out in separate DWC or PVC pipe suitably fixing the same along the route.

ii.   The data cable should be laid along with the metallic structure of the roof of the platforms and FOB's. Suitable metallic clamps should be fixed at regular intervals (not more than 5 mtrs) to hold the cable along with the metallic structures/ girders to avoid any sagging of the Data & power cable.

21.7.11 The Standard Personal Computer, keyboard, monitor, UPS & other accessories should be preferably housed in standard 19" cabinet.

21.7.12 General Requirement of Installation / Mounting and Wiring of the Display Boards:

a   The display board should generally be hanged from the metallic structure of the roof of the platform & FOBs.

b   The metallic hanging arrangement should be capable enough to bear the full mechanical load of the display boards and should be able to prevent any accidental dislocation of the display board which may be hazardous for the safety of the passengers and should be designed to prevent swinging of the display boards due to strong wind or movement of the trains or vibration.

c   In general the display boards should be hanged from the platform/FOBs roof by using G.I. pipes. One end of this G.I. pipe should be fixed with the metallic structure of the platform by using suitable metallic clamps, other end of the G.I. pipes should be rigidially fixed with the inner side walls of the display boards. The length of the down rod (G.I. pipe of 25mm dia) for individual display boards may vary as per site requirement.

d   Wiring of the data cable and power cable should be done through the PVC or DWC pipe separately. The PVC or DWC pipe should be properly fitted with the wall / roof / floor of the platform. Standard fixing material like clamps, elbows, T. joints, Straight joints, four way & three way junction boxes.

e   Termination of the data cable should be done by using proper terminal strips or by using proper connector of standard size of branded/reputed make.

f   The data cable & power cable from roof to the display unit should be taken inside the hanging GI pipe to improve the aesthetics. No loose wire/exposed terminations, wires etc. should be visible outside of the display board.

SECTION - G

21.8. COACH GUIDANCE SYSTEM

21.8.1 <u>General</u>

The Coach Guidance System enables the passengers to locate their coach for the Train on which they wish to travel.

It is essential that at entry or at lobby a display board is provided to guide the passenger the Train No., Platform No., to which Train is arriving / standing, the position of coach with respect to engine. On the platform at various locations suitable indicator with respective coach location board may be provided giving the details of Trains No. and Coach No.

a.   The system consists of coach guidance boards at Station and platform operated through PC workstation at remote location / control offices or at Stations.

b.   The workstation and associated equipment should be installed in a secure manner so that only required equipments are accessible to the operator.

c.   Adequate arrangement for housing the wires e.g. cable duct etc. should be made in the 19" housing cabinet. (All the wires, termination arrangement etc. required for interfacing should be provided. Any casing, capping, conduit, guide ladder etc. if required should be provided as per site requirement).

d.   The display system shall comprise coach guidance display board at lobby or entry and at platform.

e.   All the display boards should be given unique identification code/address & their status is to be reflected and made available on screen of the operating console as a health monitoring indication.

f.   Surge and lightening protection arrangement should be provided at 230V AC mains end and output of power supply, so as to protect the electronic modules from damage. The arrangement may include GD tubes, MOVs and fuses etc.

g.   The system should be designed to suit the 25 KV AC traction areas. Proper earthing arrangement should be provided for grounding the shield of the data cable to prevent the EMI & RFI interference.

h.   Ease of maintenance and immunity to failures should be the primary consideration in the design of the system. The system should employ tin-electroplated glass epoxy printed circuit boards and the PCBs should be secured firmly to ensure that the no loose connection results from vibration. As this display should work round the clock, it is desirable that component used should be of industrial grade & standard.

i.   All the ICs should be fitted preferably on proper base so that replacement of faulty ICs can be done at site immediately without using soldering iron.

j.   Protection Arrangement: The equipment should be mounted in metallic housing of industrial grade to avoid entry of dust and rise of temperature with necessary earthing etc. to provide complete EMI & RFI protection.

21.8.2 Configuration of Coach Guidance System.

Coach guidance display boards for individual coaches should be hanged from the metallic structure of the platform roof or by suitable arrangement. The display board should be double face & shall be as per RDSO specification.

21.8.3. Operating Console shall be as per RDSO specification of Integrated Passenger Information System.

21.8.4. Specification of Coach Guidance Display Board.

(a).   At a Glance Coach Guidance Display Board at Entry to station lobby.

1.   A suitable Display board indicating the Train No. Platform No. arrival / departure time along with position of the coach with respect to engine should be provided as per RDSO specification.

2.   Coach Guidance Display Board should conform to the typical layout and should be approved by Railways depending on location and need.

3.   The double face coach guidance display board should be provided on platforms and shall be as per RDSO specification.

4.   The power supply should have short circuit, overload, over & under voltage protection also with out put and input power indication (LED).

5.   The CPU should have data available indication and power ON indication.

6.   There should be provision for blanking the complete display board to ensure that no stray dots lights up and should offer total contrast when   there is no data signal from the operating console.

7.   The information's displayed on the display boards should be clearly visible from 70 to 75 mtrs. under normal ambient conditions. Proper weather protection and glare protection (hood) as per site requirement should be provided to achieve the optimum visibility of the display boards.

8.   Three/Four electrical power points (230volts/15Amp.) for energisation of coach guidance display board should be provided along the length of each platform. Distribution of power and wiring of power cable from nearest power point to display boards should be properly protected.

9.   All boards should have input power ON indication outside the board.

21.8.5. Four Pair PVC Insulated Twin Twisted Screened Copper Cable, three Core PVC Insulated Flexible Power Cable for wiring shall be as per specification mentioned in clauses 21.7.8 & 21.7.9 of Section -G.

21.8.6. Laying of Data and Power Cable Over Steel Bridges / Platform Roofs:

1 The laying of data cable with metallic structure of the roofs of platform and FOBs should be carried out with proper Protection either in PVC pipes separately or any any other suitable means.

2 Separate DWC / PVC conduit pipe shall be used for laying of data cable and power cable.

3 The data cable should be laid along with the metallic structure of the roof of the platforms and FOB's with suitable metallic clamps shall be fixed at regular intervals (not more than 5 mtrs) to hold the cable along with the metallic structures/ girders to avoid any sagging of the Data & power cable.

4 The metallic clamp shall be made up of MS flat of preferably of size 48mm x 6mm or as per need.

21.8.7. Installation Arrangements of Coach Guidance System:

1. The coach guidance LED display boards for individual coaches should be hanged from the metallic structure of the platform roof or by suitable fixing arrangement. The Display Board should be hanged through metallic G.I. pipe of minimum 25mm dia, One end of this GI pipe should be fixed with the metallic structure of the platform by using suitable metallic clamps, other end of the GI pipe should be fitted with the coach guidance display board. Length of the down rod (GI pipe of 25mm dia) for individual display units should vary as per site requirements.

2. Mechanical fixing arrangement for installation of double face LED display board should be either designed to prevent swinging of LED display boards due to strong wind / vibration due to movement of the trains or on separate pole with protection against rain.

2 Wherever platform rooftop is not available the coach guidance display board should be fitted in staggering form at end of the platform shade to the extent possible to display coach position of such coaches.

3 The Console (PC based) should be installed at the control tower / station master room or Enquiry Room. It should have required software and provision of data entry for coach positions of trains from remote site also like control office, RRI etc.

SECTION - H

21.9   MASTER SLAVE CLOCKS

21.9.1 G E N E R A L

Master Slave Clocks are utilized in Control Office / Stations to maintain uniform timing for Train operation. The present system is of either mechanical clock or Quartz Clock. Digital Clocks are used in lieu of old Clocks.

21.9.2. Requirements of Master Clock:

i. The Master Clock shall be capable to drive number of Slave Clocks as per requirement either in one location or distributed in various other locations.

ii. The Master Clock shall be based on microprocessor based technology and the clock shall have modular design concept.

iii. It should be controlled either by crystal oscillator or digital circuits or GPS base as per present technology as time base. The accuracy of the Clock should be better than $\pm$ 5 Sec. per week over the expected temperature range, which can generally be achieved only through a GPS based system.

iv. The design construction and reliability of equipment should be based on modern technology and standards using commercially available solid-state components. The modules and components should be plug in type.

v. The Master Clock should work on main power supply of 230 V AC $\pm$ 20% single phase 50 Hz., with D. C. standby in build supply per Master as well as Slave.

vi. The Master Clock shall have a battery back-up arrangement with in built chargeable Ni-Cd battery along with battery charger to ensure that the Master Clock always reflects the real time.

vii. The Master Clock should be equipped with LED based or 7 segment numeric display in 12 Hrs. mode to show the real time of the Master Clock even in case of mains power supply failure in Hours, Minutes & Seconds.

viii. Adjustment switches shall be provided on the Master Clock to set the time. These switches should be located at the rear of the unit so that any accidental operation of the switches does not change the Master Clock time.

ix. The Master Clock should be immune to EMI noise / Power transients, spikes etc. It should display time in both sides.

x. The Master Clock should transmit data through a pair of conductor to the Slave Clocks.

xi. Railways can have GPS Clock in control office to work as Master Clock. This can drive all slave clocks either in same premises or through separate networking to distant location. To avoid wiring, each slave clock can also have independent GPS module.

xii. The Master Clock shall meet the Technical Specification RDSO.

21.9.3. Requirement of Digital Slave Clock:

i. Digital Slave Clock operated by Master Clock should be capable to receive continuous serial data through a pair of conductors.

ii. Digital slave clock can have its independent GPS module. In such cases, there is no need of master clock.

iii. In case of AC main power supply failure the display of Slave Clock shall be automatically synchronized with the Master Clock whenever main power supply restores.

iv. The Slave Clock shall be capable to work on 230 V AC ± 20% 50 Hz.

v. Suitable mechanical fixing arrangement as per site requirement shall be provided for hanging at adequate level for better visibility on both the sides.

vi. Technical requirement of Digital Slave clock should be as per RDSO specification.