

**Special achievement done by S&T dept. during the 2014-15 is furnished hereunder:**

**1. Global System for Mobile Communications (GSM-R) in Metro Railway Kolkata:**



Metro Railway Kolkata recently introduced GSM-R Based train radio communication system which is designed to provide a highly reliable shadow free radio network and operating successfully. GSM-R system is similar to the GSM communication available for the public mobile networks but on a earmarked frequency for the Railways with some special features like Emergency Call, Broadcast Call, Group Call, etc. The total section is approximately 27 Km. Coverage plan is in line with the EIRENE Specification as provided. The coverage plan is based on a radio propagation model appropriately tuned to be used for railways.



Site configuration of BTS is 2 TRX per site for most of the stations except for Metro Bhawan where BSC has been taken as 3 TRX per site. GSM-R system covered all the 15 tunnel stations & 9 via duct/surface stations and Metro Bhawan. Two Core Dispatcher are installed, one in Metro Bhawan for Traction Loco Control and another one in Noapara Car shed for PPO. Cab Radio is installed in Rake for the Cab Drivers.

The GSM-R System is used for the communication in between the Cab Motormen and Traction Loco Control at the time of train movement in tunnel as well as in surface area. Cab Driver can directly call Traction Loco Control by Point to Point call or Emergency Call and vice-versa. Traction Loco Control also can use Broadcast call to broadcast any message to Cab Drivers and also can enable the group call.

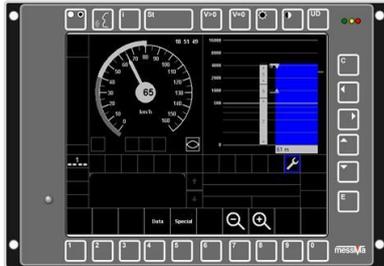


Leaky cable laid in tunnel section is used to provide network coverage in tunnels. For coverage in via-duct portion, antenna has been fixed on Tower. All equipments have been installed and are working. GSM-R Construction work started in February 2013 and completed in 15<sup>th</sup> August 2014.

The GSM-R system in Metro Railway has been provided to replace the existing unreliable VHF based train radio communication which had become outdated.

## 2. Train Protection and Warning System (TPWS) in Metro Railway, Kolkata

### Driver Machine Interface(DMI)



Train Protection and Warning System is a system which supervises the activities done by a motorman during running of train to ensure safety of the train. Generally the trains are moving according to the aspect of the signal. If the motorman passes the signal at DANGER or raises the speed of the train than the permitted speed or if the train rolls back beyond 2 Meters, the TPWS will warn the motorman and will apply brake subsequently.

The system can be broadly divided into two groups i.e. Track side equipments and on-board equipments. In the track side arrangement, LEU (line side electronic unit) kept at station/Loc Box is connected to the signals and balises, kept over the track. Information flow from track side equipment is done through the balise to the on-board equipment via antenna kept underneath the loco. This wireless communication is done in high frequency range. All the information like signal aspect, Kms, Gradient, Speed Restriction etc. are stored in Balises,

On-board equipment consists of broadly TCC (Train Control Computer), DCC (Diagnostic Communication Computer) & DMI (Driver Machine Interface). When the balise antenna fitted under the loco comes over the balise fitted on track, it retrieves the data from the track balise. According to the data received, the on board computer shall generate movement authority and display it on the Drivers panel (DMI). Now the driver can see the movement authority ahead and target speed of the train. Accordingly, driver shall maintain the speed/movement of the train.

The system is an additional aid to enhance safety of the passenger. TPWS has been commissioned in entire Metro Railway on 30.8.14. All AC and Non-AC rakes in service have been equipped with TPWS system and introduced in commercial service.

### 3. Integrated Security System (ISS) in Metro Railway, Kolkata

In Metro Railway, 5.2 lakhs of passengers avail Metro train every week day. For policing response to a crime problem, monitor traffic flow and to catch people violating traffic laws, a video surveillance system as a part of Integrated Security System (ISS) has been commissioned over entire Metro Railway. Under this all the stations both in tunnel & via-duct section have been provided with IP cameras to cover all areas/zones of the station.



Apart from monitoring arrangement provided to the Station Masters to view feed from cameras fitted in their respective station, a centralized monitoring arrangement has been commissioned in Metro Bhavan where feed from the entire 662 cameras can be monitored and recorded round the clock for improved security surveillance and investigation on the Metro system. Pan,

tilt, and zoom cameras are provided at important locations to view details.



An intelligent video analytic software has been programmed and installed at Park Street station and put on operation. Such system can detect unidentified luggage, increased passenger density, passengers crossing yellow demarcation lines at platform, etc. and provide audio-visual alarm at the SM's office as well as Central Security Control. This arrangement has made Metro stations more safe & secure to the passengers.