

MMCT DIVISION

Welcomes

Shri Alok Kansal

General Manager

Western Railway

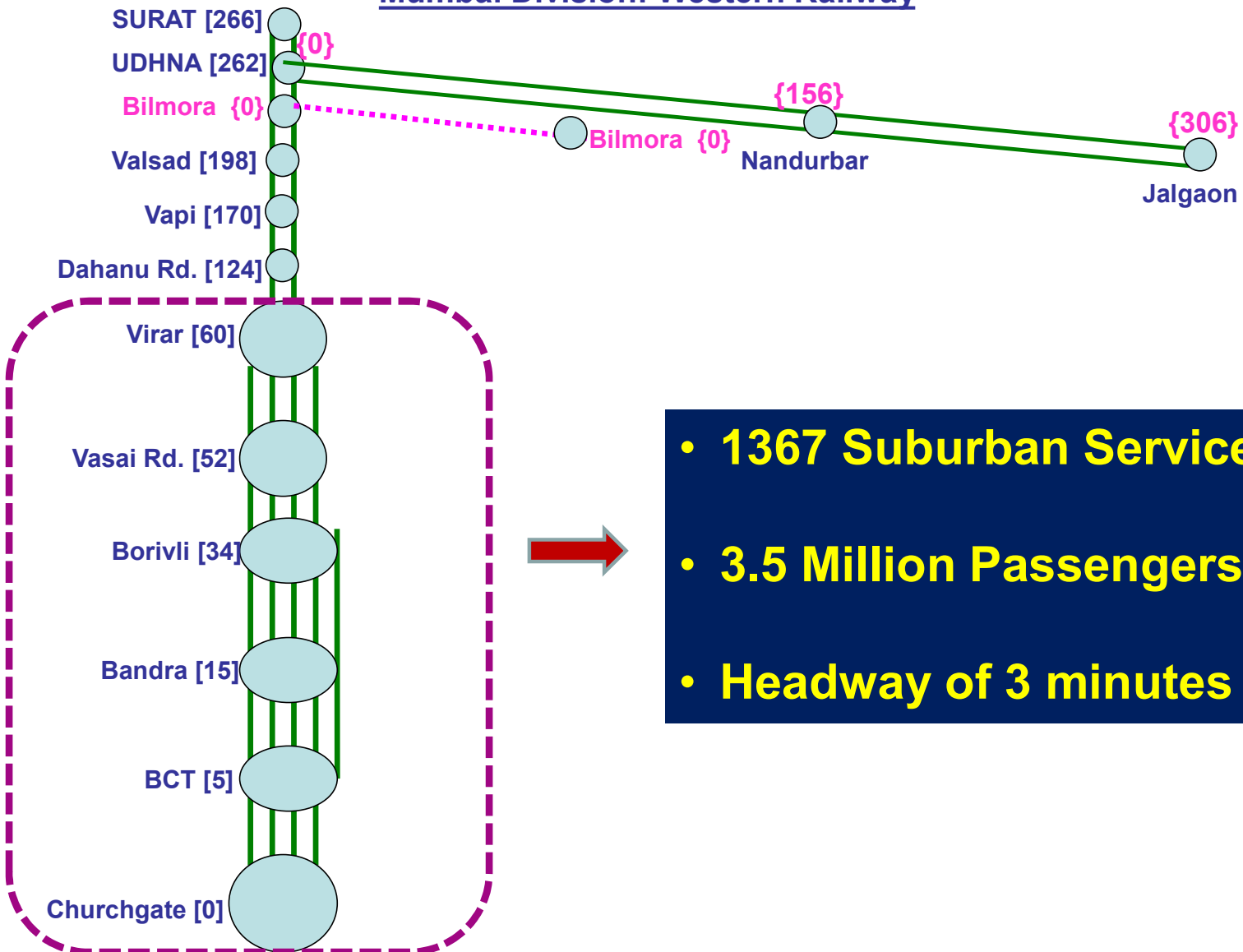


MOBILE TRAIN RADIO COMMUNICATION

CHURCHGATE - VIRAR

1st March 2021
Mumbai Division
Western Railway

Mumbai Division: Western Railway



- 1367 Suburban Services Per day
- 3.5 Million Passengers per day
- Headway of 3 minutes in Peak

CONVENTIONAL MEANS OF COMMUNICATION

- **Existing VHF based Communication, Mobile & CUG** does not give Facility for communication between Crew of Running train and Controllers of Control Office.
- It is not Practical to establish **Socket based Emergency Communication**, it requires much time to reach EC and contacting Control can result into detention of trains.

MTRC SYSTEM

- Project sanction in 2012-13 at cost of **Rs. 5.98 Cr.** with two years warranty and five years AMC.
- The Newly commissioned system is an integrated system with the ongoing Train Management System, so that controller can communicate with Driver and Guard by using train number as well as cab number code.

FUNCTIONING OF MTRC

- When Motorman/Guard wants to Call Section Controllers, Dy. Train Controller, and EMU Controller, pre-defined one touch key on the MMI provided in the CAB.
- When Section Controller wants to call Motorman/Guard of a particular train, he will select train number from the GUI of the dispatcher, Mobile unit of the CAB will be Auto Answered, Voice of Section Controller will be audible from the Speaker.
- When Motorman/Guard has to call Motorman/Guard of any Train he has to Dial the Rake unit no. corresponding to the cab.

- In case of any unusual, Section controller can initiate Broadcast call to all Motormen/Guards of trains and same announcement can be extended for passengers of the train through PA system
- Auto Call Answer for Cab Radios for Motorman and Guards to receive only Audio.(Only from Controllers and call from another cab of same rake).
- Contact numbers of three controllers (TPC, SIG and TMS) are fed into the phonebook for easy access while dialing.

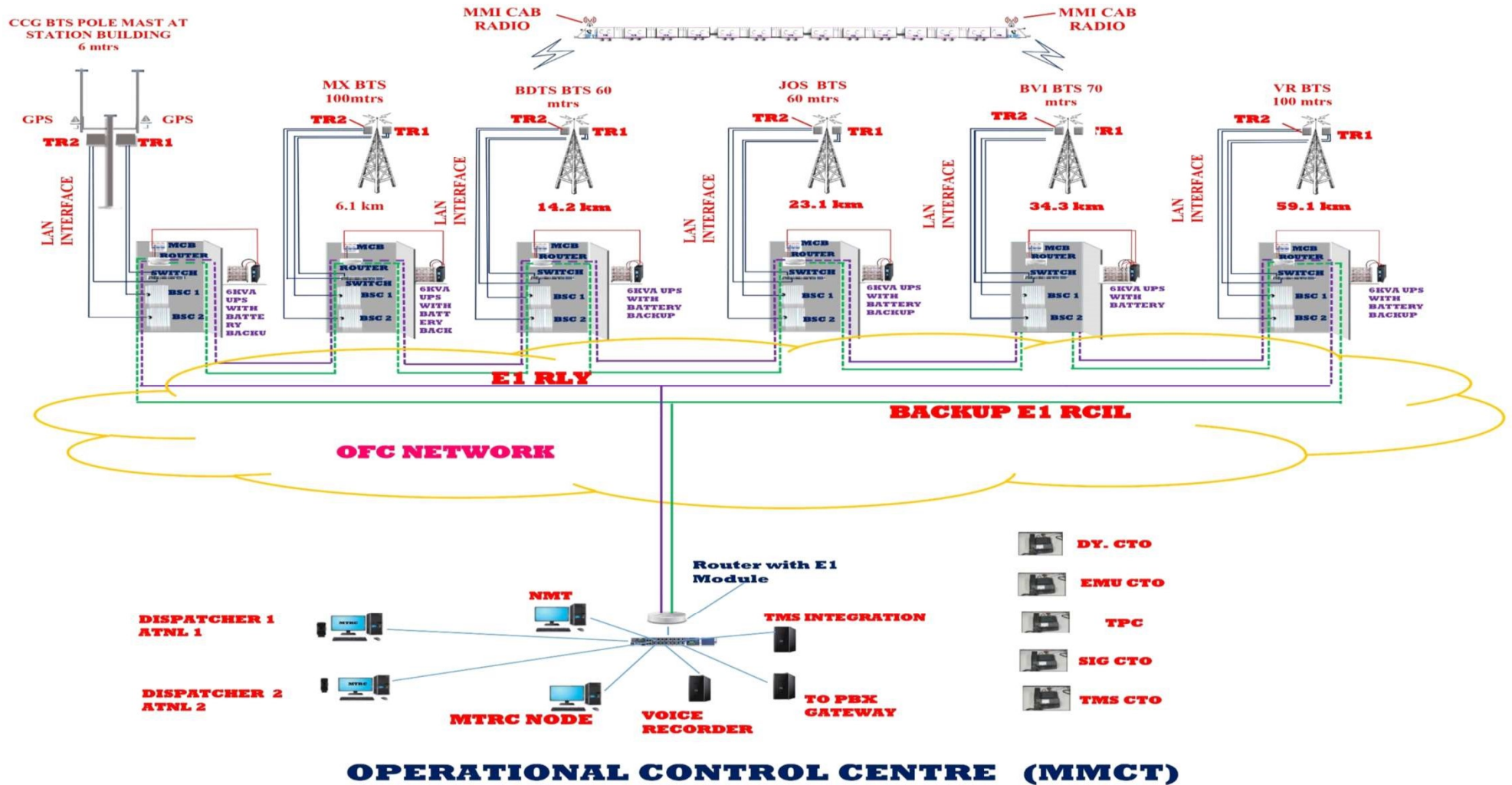
ADVANTAGES OF MTRC

- Numbering Scheme Employed : Mobile Unit assigned same number as Rake Number of EMU and Integration with TMS facilitates calling crew of any train by Train Number as shown on the TMS Indication Display Screens.
- Internet Protocol Based network Architecture, enables monitoring up to the end device.
- Inter connectivity of BTS and Control Center in Daisy Chain, giving advantage of protection in case of OFC cut.
- Quality of Voice is Superior due to Digital Working.
- Call set-up time in MTRC is lowest in the order of 300ms

BENEFITS OF MTRC

- Motorman can directly communicate the defect in CAB to EMU Controller which reduces detention of other trains.
- In Emergency Situations, Emergency call has over-riding feature to connect Dy.CTNL in case phone/channel is busy.
- Its cost effective and having longer coverage compared to GSM system.
- Analog MTRC had proved its Remarkable worthiness by enabling Control to make calls to inform motormen and guards of trains held up due to flooding during the 25th, 26th July 2005 deluge, during Mumbai bomb blasts & during many other cases.

NETWORK SCHEMATIC OF MTRC SYSTEM



CORE – TECHNICALS of MTRC SYSTEM

The MTRC System is TETRA (**T**errestrial **T**runk **R**adio) based Digital technology, employing TDMA on Air Interface and Internet Protocol based Network Architecture with Distributed Switching Architecture.

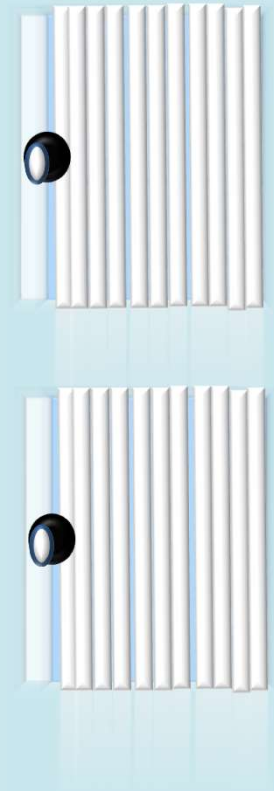
Various licenses obtained viz. **CMRTS** License, **WPC** License for Frequencies, **Import** License, **SACFA** License for Towers.

MTRC SYSTEM COMPONENTS

	Item description	Quantity and other details
1	Base stations (BTS+BSC)	06 Nos. DAMM cellular make Churchgate, Mahalaxmi, Bandra, Jogeshwari, Borivali & Virar
2	Omni Directional Antennas	12 Nos. Kathrein Make for BTS
3	Existing Tower utilized	03 Nos. @ Mahalaxmi(100m), Borivali (70m), Virar(100m)
4	New Towers and Pole Mast	01 Pole Mast (6M) on Churchgate Station Building 02 Towers (60M each) at Bandra and Jogeshwari
5	Mobile Radios	205 Nos. SEPURA, UK make. 200 for Cabs of 100 Rakes and 5 for Controllers.
6	Man Machine Interface (MMI)	200 Nos. Consort make. For 200 Cabs of 100 Rakes.
7	Low-Profile Antenna	205 Nos. Kathrein Make for Mobile Cab Radios
8	Dispatchers	Dell Win PCs, with DAMM Cellular GUI Software 02 Nos. for Two Section Controllers
9	Voice and Data Logger	1 (Dell Win PC, with DAMM Cellular GUI Software) To record Call voice and Call Details.
10	Network Management Terminal	1 (Dell Win PC, with DAMM Cellular GUI Software)

BASE STATION

- Base Switching Centre(BSC) is connected through BTS Mounted on tower. Installed at 6 locations-CCG,MX,BA,JOS,BVI,VR.
- This system Working on a Frequency of 5 pair of Frequency Band-380 to 400MHz
 - TX** (380.25, 380.75, 381.25, 381.75, 382.25)
 - RX** (390.25, 390.75, 391.25, 391.75, 392.25)
- These BSC connected to Operational Control Centre(OCC) through Switch and Router via OFC Network Provided with Redundant Path.
- These BTS have Overlapped Signal Coverage



STATIC RADIO

- 10W RF Power
- Performance monitoring
- Multiple data ports
- Common user interface with handhelds
- Intelligent call routing in gateway mode
- Tamper-proof end-to-end encryption
- Line in/out audio
- Installed at five allied control ie
Dy.CTNL,SIGNAL,TPC,EMU,TMS



SEPURA SRG 3000 Series Radios

CAB RADIO MAN MACHINE INTERFACE (MMI)

- Splash proof
- Membrane keypads
- 5" TFT Screen
- Dedicated Emergency Key
- Specially designed for Indian Railways
- Temp -40 Degrees to +85 Degrees
- Installed in 200 CAB



MMI

ANTENNA MOUNTED ON POLE MAST AT CCG



- Location- CCG Station Building
- Height-6Mtrs Pole Mast
- Antenna-Omni Directional
- Make - Katherine

ANTENNA MOUNTED AT MX



- Location- MX Microwave Tower
- Height-100 Mtrs
- Antenna-Omni Directional
- Make - Katherine

ANTENNA MOUNTED AT BA



- Location- BA OFC Building
- Height-6 Mtrs Pole Mast
- Antenna-Omni Directional
- Make - Katherine

ANTENNA MOUNTED ON POLE MAST AT JOS



- Location- JOS Station Building
- Height-6 Mtrs Pole Mast
- Antenna-Omni Directional
- Make - Katherine

ANTENNA MOUNTED AT BVI



- Location- BVI Microwave Tower Building
- Height- 70 Mtrs
- Antenna-Omni Directional
- Make - Katherine

ANTENNA MOUNTED AT VR



- Location- VR Microwave Tower Building
- Height- 100 Mtrs
- Antenna-Omni Directional
- Make - Katherine



Subscriber Register

Connected to: 001 [BSC1] CHURCHGATE BSC-1
 Register mode: Master
 Networks: 0 Org.: 1 Profiles: 5 SSIs: 238

001 [BSC1] CHURCHGATE BSC-1

Network Organization Profile SSI Security Key

SSI Register

User no.: 237 IP addresses: 0 TSI: 0

Find

SSI	SSI Type	Trust	Description	Org.	Profile	User N...	IP Address	TSI
105	Mobile		DY CONTROLLER	0	1	105		
115	Mobile		SIGNAL CONTROLL...	0	1	115		
116	Mobile		EMU CONTROLLER	0	1	116		
124	Mobile		TPC	0	1	124		
125	Mobile		TMS	0	1	125		
2041	Mobile		VR92030 Driver	0	2	2041		
2042	Mobile		VR92030 Guard	0	2	2042		
2065	Mobile		BO90583 Guard	0	2	2065		
2066	Mobile		BO90583 Driver	0	2	2066		

Add/Copy Change Delete Registration

CONTROLLER DISPATCHER

TetraFlex®
DAMM

Phone Book

Voice Calls

Call History
Missed call: 3

SDS
Unread SDSs: 7

File Transfer

Map

DGNA

Nodes
Nodes: 6

Config

User: 4001: ATNL 1
Gateway: CHURCHGATE BSC-1

Software Updates



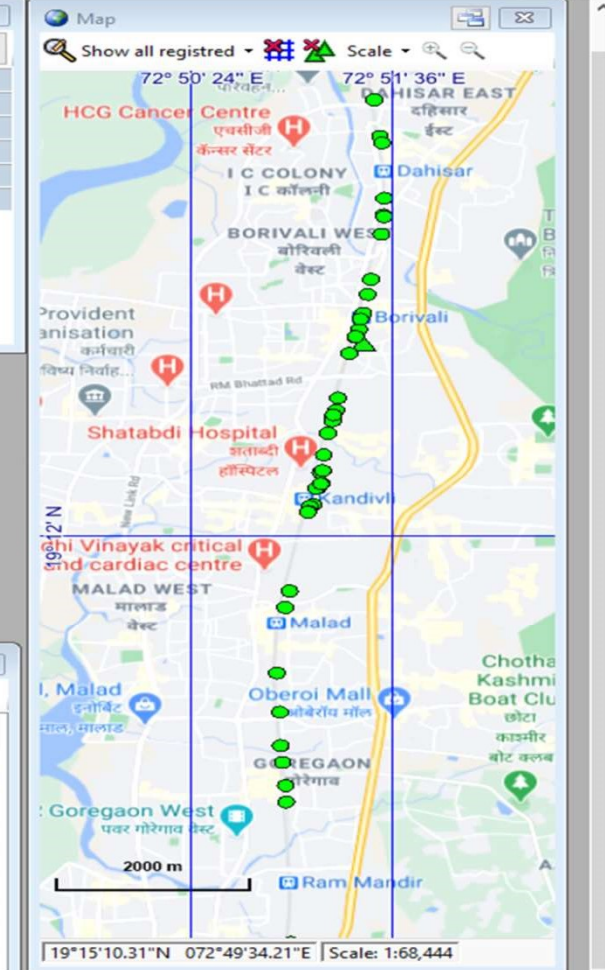
Home Associate Favorites

Number	Description
2074	
2121	
2297	
2298	
5013	
5014	
5077	
5078	
5113	
5114	
5117	
5118	
5153	
5154	
5225	
5226	
5229	
5230	

Voice Call

Master PTT

VR76
115
125
7005
gn90208 made up
90274



Voice Call History

Individual Calls

Date/Ti...	From	From (D...	To	To (Desc)	Duration	Discon...
2021-0...	105	DY CO...	4001	ATNL 1		User re...
2021-0...	105	DY CO...	4001	ATNL 1		User re...
2021-0...	105	DY CO...	4001	ATNL 1		User re...
2021-02...	105	DY CON...	4001	ATNL 1		User req...
2021-02...	105	DY CON...	4001	ATNL 1		User req...
2021-02...	105	DY CON...	4001	ATNL 1		User req...
2021-02...	105	DY CON...	4001	ATNL 1		User req...
2021-02...	105	DY CON...	4001	ATNL 1		User req...

VOICE AND DATA LOGGING SYSTEM



Netw Alarm



Node Stat



Call Stat



CDR



MS Reg.



Status



Settings

Log Server Version: 7.78 2017-01-13
Started: 2021-02-16 13:06:49 Uptime: 10 day(s) 02:29



Additional Individual Call Information



Call Information

Call Id: 0 From SSI: 125 To SSI: 7500 Disc. SSI: Circuit Mode Type: TCH/S
Call Begin: 2021-02-20 12:30:03 From MCC: 404 To MCC: 404 Disc. MCC: Slots pr Frame: Tetra
Call End: 2021-02-20 12:30:03 From MNC: 10080 To MNC: 10080 Disc. MNC: Call Type: Duplex
Call Duration: 00:00:00 From User No: To User No: Disc. User No: E2E Encryption: Clear mode
Seq Numbers: 0 - 0 From Descr.: To Descr.: Disc. Descr.: AI Encr Requested: No
Call Priority: 0 From Org.: To Org.: Disc. Org.: AI Encr Enabled: No
CLIR: Presentation not restricted SS-CAD: No SS-AL: No Hook: Hook on/off signalling CMoIP: 0.0.0.0
Voice logging: No voice, immediate call termination!
Disconnect Cause: Unknown TETRA identity.

Detailed Information

Type	Start time	End time	Duration	Seq No	Node	Initiating organization	Initiating Party	Initiating Party Description	PTT priority	RSSI(dBm)	Transceiver	Timeslot i...	Distance(m)	Call ID
Call Initiated	2021-02-20 12:30:03		00:00:00.000	0	N003		404:10080:125			-82	TR11	0	3130	0
Call through conn...	2021-02-20 12:30:03		00:00:00.000	0	N003		404:10080:7500							0
Call End		2021-02-20 12:30:03	00:00:00.000	0	N003									0

Control Panel

[Previous CDR](#) [Next CDR](#)

☒ Error Correction

[Stop](#)

[Play/Pause](#)

[Previous PTT](#)

[Next PTT](#)

Status: No Recording Loaded

00:00:00.000



Thank You





THANK YOU

Daily Number of Sub. Passengers (In Lakhs)

20.00

(Since 15th June 2020) - Cumm. Pass :- 1351 Lakhs

15.00

10.00

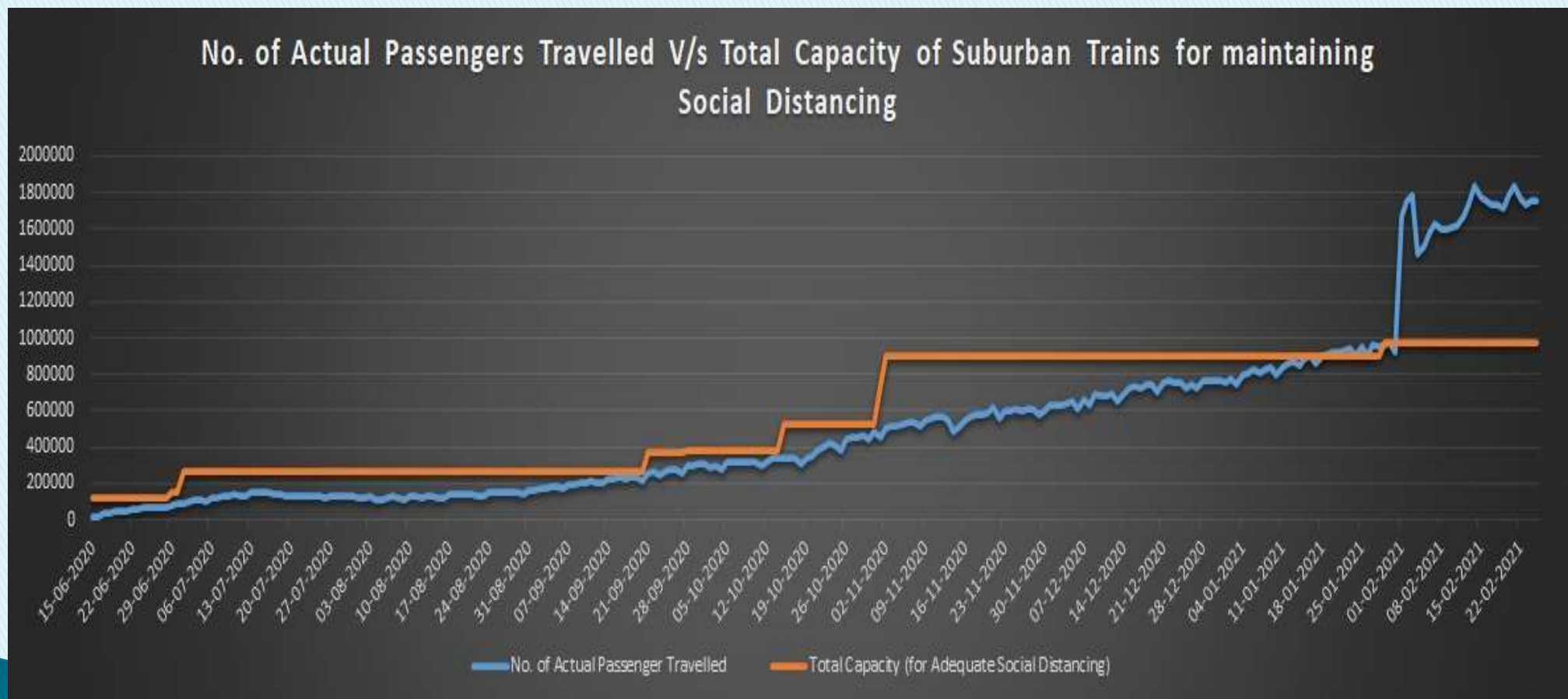
5.00

0.00

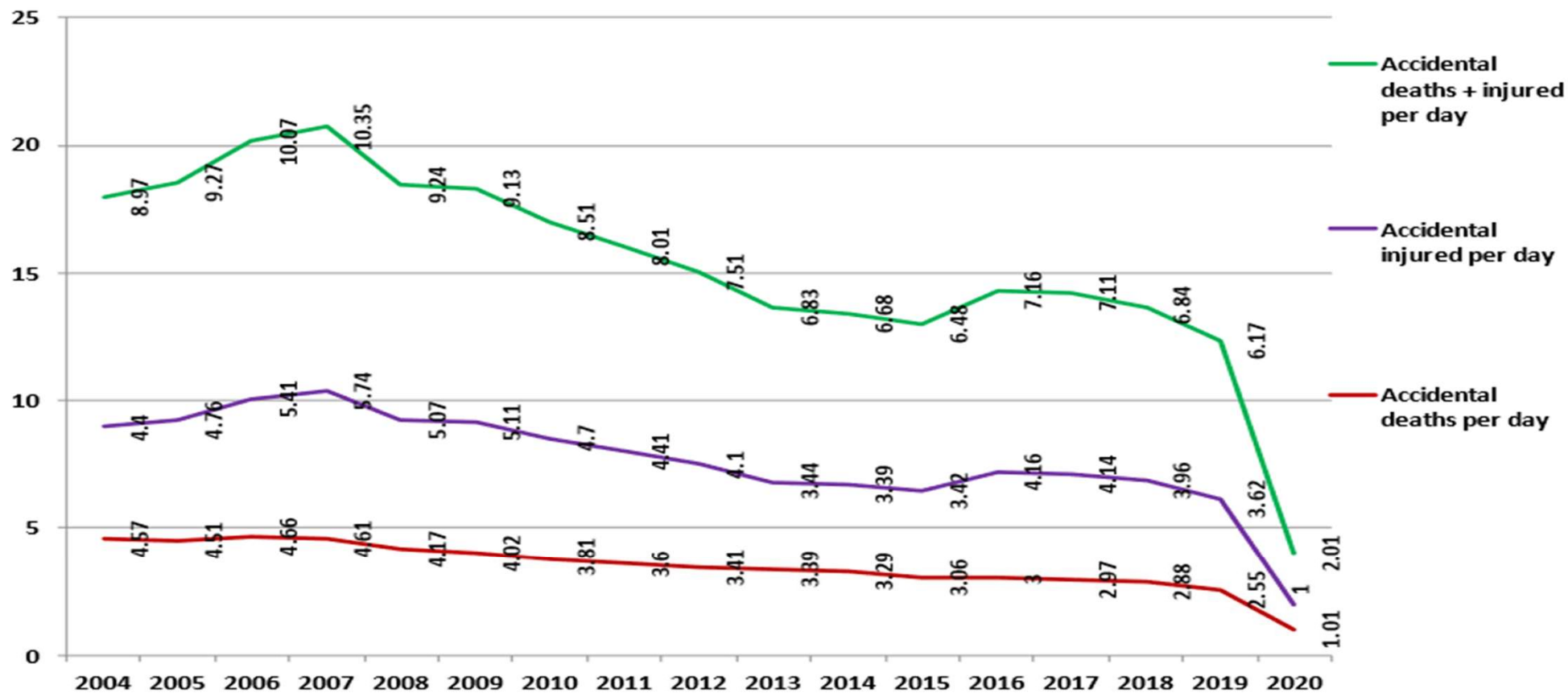
15-Jun-2020 20-Jun-2020 25-Jun-2020 30-Jun-2020 05-Jul-2020 10-Jul-2020 15-Jul-2020 20-Jul-2020 25-Jul-2020 30-Jul-2020 04-Aug-2020 09-Aug-2020 14-Aug-2020 19-Aug-2020 24-Aug-2020 29-Aug-2020 03-Sep-2020 08-Sep-2020 13-Sep-2020 18-Sep-2020 23-Sep-2020 28-Sep-2020 03-Oct-2020 08-Oct-2020 13-Oct-2020 18-Oct-2020 23-Oct-2020 28-Oct-2020 02-Nov-2020 07-Nov-2020 12-Nov-2020 17-Nov-2020 22-Nov-2020 27-Nov-2020 02-Dec-2020 07-Dec-2020 12-Dec-2020 17-Dec-2020 22-Dec-2020 27-Dec-2020 01-Jan-2021 06-Jan-2021 11-Jan-2021 16-Jan-2021 21-Jan-2021 26-Jan-2021 31-Jan-2021 05-Feb-2021 10-Feb-2021 15-Feb-2021 20-Feb-2021 25-Feb-2021

25-Feb-2021

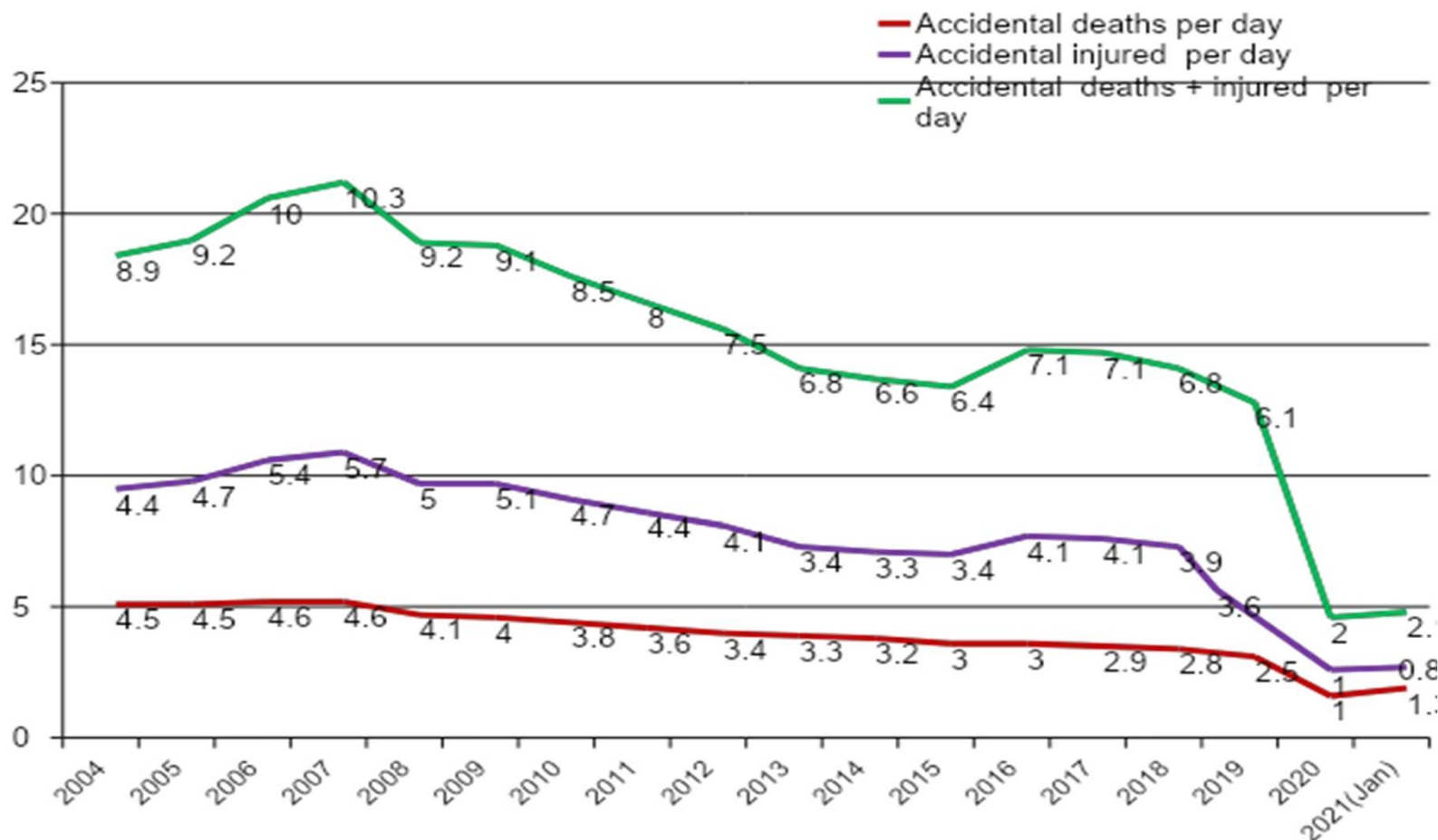
OPENING OF SUBURBAN TRAINS POST COVID LOCKDOWN



Comparative statistics of deaths/Injury cases in suburban section of last 15 year



Comparative statistics of UTI cases in suburban section of last 15 years and Action Taken in 2020



- 145 nos. suburban platform height raised.
- Provided track divider between tracks .
- 29 nos. boundary wall gaps plugged.
- 283 soft encroachment removed from railway land.
- Construction of Boundary wall.
- 633 Intensive awareness campaigns .
- Display of banners.
- Announcements.
- Regular drives against trespassing and 16062 persons prosecuted.
- Operation 'Yamraj' A unique anti trespassing drive.

Safety audit of FOB by IIT Bombay

