

TRESPASS PREVENTION ON MUMBAI SUBURBAN RAILWAY

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SUMMARY

About 6,000 deaths occur, every year, only on the Mumbai Suburban Railway System, due to unlawful trespassing. Although, publicity, exhibiting of warning signs and instilling of awareness, through media, educational institutions, NGOs etc. are necessary measures taken, yet, it is felt, that the situation needs to be tackled on a war footing. The Western Railway suburban system of the Indian Railways has taken up the issue of trespassing, seriously and is putting in sincere efforts to curb this menace. Apart from various infrastructural measures, viz. provision of boundary walls, track dividers, foot over bridges and escalators, the behavioural pattern of persons, crossing the tracks was studied. The paper brings out various measures undertaken by the railway to reduce the number of accidents.

INTRODUCTION

A large number of accidents take place on the entire system of the Indian Railways (IR), due to unlawful trespassing. Though, the exact figures have not been compiled by the railways, the estimate is, that about 15,000 persons get killed in this manner, every year, on the entire railway system; of which, about 6,000 deaths occur, only on the Mumbai Suburban System. The trespassing takes place, mainly on account of lack of barricading and fencing, absence of adequate number of foot over bridges at stations and reluctance to replace pedestrian level crossings with foot over bridges. It has also been observed, that shortcuts undertaken to save time or avoid inconvenience of climbing the bridges, are equally responsible.

Mumbai Suburban Railway is a suburban rail system serving the Mumbai Metropolitan Region. It is operated by IR's two zonal railways, Western Railway (WR) and Central Railway (CR). The entire network caters to 7.5 million commuters every day, the highest passenger density on any urban railway system in the world. Unfortunately, Mumbai's Suburban Trains have witnessed the highest number of accidental deaths, among suburban railway networks in the world.

Over the past 10 years (2002–2012), more than 36,152 lives have been lost on tracks and 36,688 people have been injured. A record 17 people died every weekday on the city's suburban railway network in the year 2008. Of the 36,152 deaths, 15,053 occurred on WR and 21,099 on CR. One of the reasons for accidents and deaths is overcrowding. Another cause of death is the passengers, crossing the tracks to avoid foot over bridges (FOBs). Some passengers die when they sit on train roofs to avoid the crowds and are electrocuted by the overhead electric wires or fall while hanging from doors and window bars. However, the fatality rate has declined recently.

The WR has taken up the issue of trespassing, seriously and is putting in sincere efforts to curb this menace. It has necessitated the provision of boundary walls along the entire length, provision of more than 26 kms of dividers between tracks at major stations, inspections leading to plugging of breaches in boundary walls, construction of new FOBs and escalators and also, hurdles at platform ends, awareness campaigns at stations and through media and also by associating with celebrities, NGOs, etc. Another important effort made, was to study the behavioural pattern of persons, crossing the tracks and initiate necessary measures, accordingly. The study revealed, that trespassing was basically a matter of habit with people, as they felt, that they were alert enough, to see an approaching train, although, they misjudged the speed of the train. Security personnel have been posted at ten locations, prone to severe trespassing accidents, in order to stop people from crossing the tracks. Yellow colour bands have been marked on the tracks, at suitable intervals, in specific regions in order to facilitate the perception of speed, of the approaching train, to avoid misjudgement. Whistle boards have been installed ahead of chronic trespassing spots and a new horn pattern has been introduced to alert the trespassers, which is more effective. In addition, sound beepers have been provided at level crossings to alert the trespassers of an approaching train and scary posters of a person being run over have been put up at level crossings and trespass points.

The above efforts on WR have resulted in a 20% reduction in accidents, due to trespassing, which is expected to rise gradually to 75%, with the implementation of all the measures at identified locations.

WESTERN RAILWAY SUBURBAN SYSTEM

Mumbai and its suburbs are served by two railway zones of the Indian Railways, Central Railway and Western Railway. Daily more than 7.5 million people use the suburban system. The dependency of the city on this system is so much, that even a few hours of disruption in the system, brings the city to a standstill. WR carries around 3.6 million commuters daily, through its 1305 services per day, the highest passenger density in the world. In the past few years, the railway has increased its services from 1007 in 2005 to 1305 today.

The Western Line follows the WR northwards from Churchgate, parallel to the west coast. Local services by Electrical Multiple Units (EMUs) ply between Churchgate and Virar (60 kms), on exclusive multiple tracks; while Mainline Electrical Multiple Units (MEMUs), service the section beyond Virar to Dahanu Road (60 kms). On 16th April 2013, EMU services were extended up to Dahanu Road.

WR's EMU fleet consists of EMUs completely powered by alternating current (25 kV). EMUs are 9 car, 12 car or 15 car formations and are differentiated as slow and fast locals. Slow trains halt at all stations, while fast ones halt at important stations only and are preferred for longer distances.

Due to the extensive reach and the intensive use by the local urban population, the Mumbai Suburban Railway is subject to the most severe overcrowding, in the world. Over 4,500 passengers are packed into a 9 car rake during peak hours, as against the rated carrying capacity of 1,700. This has resulted in what is known as Super Dense Crush Load of 14 to 16 standing passengers per square metre of floor space.

REASONS FOR TRESPASSING

According to a study conducted by the railways, the main reasons for trespassing are:-

- Inadequate width of the platforms.
- Uncomfortable height of the FOBs.
- Inadequate number and width of FOBs.
- Lack of facilities for physically-challenged and senior citizens.
- Ramps at platform ends.
- Last minute change in the platform schedule.
- Human settlement along the tracks.
- Small time vendors and rag pickers along the railway tracks.
- Medical emergency and passengers with heavy luggage.
- Inadequate height of fencing between the tracks.
- Poor connectivity between east and west habitation.
- Ticketless travellers.
- Boarding the train from non-platform side.
- Trespassing, a default behavioural tendency.
- Lack of signages and information boards.

PREVENTIVE MEASURES

The study conducted also identified three major areas where frequent trespassing takes place:-

- Station premises.
- Level crossing gates.
- Slum clusters.

Based on the study, the following measures were taken to prevent trespassing at identified locations:-

- Infrastructural upgradation: New FOBs have been sanctioned at the locations where frequent trespassing takes place. Construction of FOBs has been speeded up. Another initiative taken has been the provision of escalators. In all, 25 nos. of escalators have been planned and the work is in progress.
- Restricting people from trespassing: The following measures have been taken-

- The complete stretch from Churchgate to Virar has been provided with boundary walls on both sides except where it is not required. Regular inspections are done to check any breaches in the boundary walls, which are then plugged.
- Track dividers have been provided at stations to stop people from jumping from one platform to the other. More than 26 kms of track dividers have been provided.
- Ramps at platform ends have been cut to make it difficult to climb up or down.
- Awareness: Advertising campaigns through print media with emotional appeal, radio spots on FM channels, short skits at stations, posters, cinema slides, appeals through celebrities etc. are continuously being undertaken to bring about behavioural change in people.
- Other measures: In addition to the above, further measures were taken after a detailed study-
 - Posting security men: As an immediate measure, a kilometre-wise study was carried out and locations, prone to maximum accidents, have been identified and marked on the kilometre posts. Ten such locations have been identified. Railway Protection Force (RPF) constables have been deployed at these locations to stop people from crossing tracks. The rationale is to not just save lives, but also save the money being paid towards compensation to accident victims. WR pays approximately US \$ 2,50,000 in compensation to accident victims annually, including sums given to the next of kin of deceased individuals and the injured victims. The railway is now planning to engage private security personnel.
 - Painting sleepers yellow: A person crossing railway tracks misjudges the speed of the approaching train. The train moves faster than what is perceived by a person. Using behavioural science study, an innovative concept has been adopted. The concrete sleepers of the railway tracks have been painted bright yellow in groups of four or five, within a distance of a few metres, in a stretch of about 100 m, at locations where frequent trespassing takes place. This helps trespassers judge the speed of an oncoming train, by the rate at which the yellow sleepers disappear below it. Though this measure does not help in reducing the number of trespassers, it helps in reducing the number of accidents. At one of the stations, this measure helped in reducing the number of fatalities from 40 in the year 2009 to 10 in the year 2010. Awareness is also being created, regarding these yellow bands.



Figure 1: Sleepers painted yellow

- Staccato horns and whistle boards: A study conducted revealed, that people react much faster to a staccato horn than to a long, continuous whistle. When two trains are running on parallel tracks, a “cocktail party effect” sets in and whistles of two oncoming trains, which would be at the same pitch, fuse to become one. The trespasser cannot distinguish between two similar sounds. But intermittent honking, a few metres before the vulnerable locations, is able to warn the trespassers about the lurking danger. Accordingly, the boards have been installed 120 m before chronic track-crossing spots and the motormen are required to give two short, rapid honks, instead of a lengthy toot, when they approach these signs.
- Sound beepers: At level crossings, sound beepers have been provided to deter people from stepping on tracks, when a train is approaching.

- o Scary posters: Three-image scary posters of a person being run over by a train have been put up at all level crossing gates and trespass points, to warn people.



Figure 2: Scary poster

CONCLUSION

The implementation efforts of the Western Railway have begun to pay dividends and about 20% reduction in cases of accidents, due to trespassing, was witnessed in the year 2012-13, as compared to the year 2011-12. These efforts are still in process and as and when all of these get implemented, at all the identified locations, the effectiveness of these measures is expected to increase to about 75%.

REFERENCES

[1] Report of High Level Safety Review Committee, Ministry of Railways, Govt. of India, 2012.