Chapter 1
Introduction

Indian Railways is one of the world's largest railway networks comprising 121,407 km of track over a route of 67,368 km and 7,349 stations. In 2016-17, Indian Railways carried 22.24 million passengers per day and ran 13329 passenger trains every day. Many of the Railway stations have been built over 100 years ago, and have a limited and aging infrastructure which is required to handle an ever increasing passenger traffic. With a view to handle the growing demand for Passengers and Goods traffic, the existing level of traffic facilities at Stations/Terminals are subject to continued process of up-gradation and augmentation. Adequate handling capacity of stations, terminals, lines and yards, interlocking (RRI) of the track *en route*, are some of the key ingredients for timely and efficient train operations over Indian Railways. Adequate investment and timely completion of works relating to augmentation of station line capacity and efficient management of operations would result in timely running of trains, increase in efficiency of operations and containing loss due detention of train/engines.

Decongested station line at a station is largely dependent on factors like adequate number and length of platforms and tracks, proper interlinking of tracks, adequate lines for stabling and maintenance of passenger trains and obstacle free movement of trains without any permanent speed restrictions. By ensuring congestion free station lines for smooth operation of trains, railways can provide efficient and punctual services to its passengers. The first step towards decongestion is to conduct proper survey to flag the constraints attributable to unusual/unnecessary detention of trains followed by formulation of plan to remove the bottlenecks in a time bound manner.

Line congestion results not only delay in train operations and loss of punctuality, but also results in detention of trains and sub-optimal use of rolling stock. Detention of trains ultimately results in poor quality service to the passengers, by starting from the originating stations/ reaching the destination stations later than the time fixed in the Time Tables. Laid down provisions[1] state that 'As stations and their surroundings are the first point of contact between Railways and their passengers, special importance is required to be given to the facilities provided to passengers in regard to their adequacy, quality and maintenance. While planning for provision/augmentation of stations, due consideration needs to be given to the importance of the station from point of view of passenger traffic.'

1.1 Infrastructure at stations

a. Platforms

Adequacy in number of ***platforms/lines*** with respect to frequency/movement of the train at any station is key to timely operation of traffic. Adequate numbers of tracks and platforms

[1] Para 401 of Indian Railway Works Manual

and availability of platform with sufficient length to accommodate trains with higher number of coaches etc. are essential components for smooth handling of traffic.

For the period 2012-17, keeping in view the projected originating passengers more than 11,700 million in 2016-17, railways envisaged to make strategies for decongesting major passenger terminals through development of alternative terminals in suburban areas of major cities. Indian Railways' Vision 2020 also envisaged augmenting terminal capacity to match the demand of increasing passenger services. Accordingly, adjoining/ nearby stations are identified to develop as new terminals/stations to decongest the existing terminals/stations.

b. Washing pit lines and stabling lines

Adequate facilities for train maintenance are required at the originating and destination stations such as washing pit lines and stabling lines, which also form an important part of the infrastructure requirement at stations.

Fig 1.1: Washing pit line

Pit Lines are washing lines with open dumping pit at base, throughout the track. It is used for all type of cleaning and maintenance to make the compartment, for next journey. These pit lines are utilized to drain out sewage water (Washroom & Coach Interior Cleaning) and Thorough Checking & Repairing Coach Base parts. Every train is required to be cleaned prior to start its next journey. Availability of Pit lines at/nearby the stations would minimize the empty haulage of trains which occurs due to non-availability of these line at stations and the rakes have to be dispatched to yard for maintenance.

Stabling Lines are running lines, where empty trains are stabled on arrival awaiting their turn to be shunted away to the 'washing lines' and from there to the 'carriage and wagon examination pit lines. A ***stabling yard*** is one where rakes are stored (usually without any maintenance) away from the home yard, before they are assigned to the next train service. The purpose is to free the main line for operation of trains.

c. Signalling system - Interlocking of tracks (Panel Interlocking/Route Relay Interlocking)

Route Relay Interlocking (RRI) is the system used in large and busy stations that handle large number of trains. In this system, an entire route through the station can be selected and all the associated points and signals along the route can be set at once

Fig 1.2: Signalling system

by a switch for receiving, holding, blocking, or dispatching trains. It is designed to ensure safety. The system is so designed that the signal will be turned on only after the route including the points set for the train is established and closure of LC Gate etc., are properly completed. Besides, it ensures obstacle free movement of trains. Automatic signalling system is one of the most effective measures to minimise congestion and to ensure smooth movement of trains.

d. Railway Yards

A ***railway yard*** is a complex series of rail track for storing, sorting or loading/ unloading of trains. Rail yards have many tracks in parallel for keeping rolling stock stored off the mainline, so that they do not obstruct the flow of traffic. Yard remodelling work may include the works of interlocking of tracks with latest technology, capacity enhancement etc. This place can also be used for washing, repairs and maintenance of coaches.

Fig 1.3: Railway Yard

1.2 Organizational Structure

Operating department is responsible for movement of trains and locos and monitor all the line capacity augmentation works.; Engineering Department is responsible for all open line civil engineering works, development of infrastructure and maintenance of tracks; Electrical department is responsible for generation, purchase and distribution of power, maintenance of electric equipment and electric rolling stock and Signal and Telecom department of Railway provides signal and telecommunication facilities required for movement of trains.

1.3 Audit Objectives

The study was undertaken with an audit objective to assess whether the available infrastructures at selected stations is adequate for handling the present and expected traffic load, what is the impact of deficiencies in the available infrastructure on smooth and efficient running of trains and whether adequate and effective steps have been taken for identifying and addressing the bottlenecks in handling traffic load on these stations.

1.4 Audit criteria

The sources of Audit criteria included rules/provisions/instructions laid down in

- Indian Railway Code for Engineering Department
- Operating Manual for Indian Railways
- Indian Railway Finance code Vol. I
- Guidelines/ instructions issued by Railway Board/Zonal Railways regarding augmentation of station line capacity/ traffic facilities at stations/ development of world class stations.

1.5 Audit methodology, scope and sample

The Audit methodology included examination of records at Zonal Headquarters Office, in Divisional Offices and at the stations selected for detailed audit. The review covered issues relating to identification of deficiencies/constraints in handling traffic on stations, impact of these deficiencies/constraints obetweenn smooth running of trains and steps taken to address these deficiencies/constraints.

A total of 15 stations under 12 divisions of 10 Zonal Railways falling on the routes with heavy passenger traffic were selected in the sample for audit. Information, record and data pertaining a period of three years from 2014-15 to 2016-17 was studied in respect of these selected stations, which handle a significant quantum of passenger traffic. A large number of trains originate/terminate as well as pass thorough these stations. Audit analyzed one month data (March 2017) for detailed study of impact of deficiencies on train services. The details of the sample are given below:

Table 1.1 – Details of sample selected

S. no.	Zonal Railway	Division	Station	Number of trains originating/ terminating per day	Number of trains passing through per day	Adjoining / preceding stations
1	East Central	Danapur	Patna	100	59	Danapur, Phulwari Sharif, Sachiwalay Halt, Parsa Bazar, Rajendranagar Terminal
2		Mughalsarai	Mughalsarai	28	112	Kuchman, East Outer Cabin Mughalsarai, Ganjkhawaja, Chandauli Majhwar
3	Northern	Delhi	New Delhi	166	76	Tilak Bridge, Delhi, Delhi Sarai Rohilla
4			Delhi	186	77	Subzi Mandi, Delhi Kishan Ganj, Delhi Sarai Rohilla, Delhi Shahadara Junction
5	North Central	Allahabad	Kanpur	25	303	Panki, Kanpur Anwarganj, Kanpur Bridge, Chandari
6			Allahabad	18	172	Naini, Dubrfsthsnj, Subedarganj, Allahabad City
7		Agra	Mathura	10	180	Bhainsa, Bhuteshwar, Mathura Cantt., Murheshi Rampur, Baad
8	Eastern	Howrah	Howrah	104	03	Sorting Yard Cabin, Liluah, Belur
9	North Western	Jaipur	Jaipur	43	54	Outer signal Jaipur, Durgapura, Ghandhinagar, Kanakpura
10	West Central	Bhopal	Bhopal	26	132	Habibganj, Vidisha, Nishatpura, Bairagarh
11			Itarsi	14	146	Pipariya, Hoshangabad, Dulariya, Ghoradongri
12	Western	Ahmedabad	Ahmedabad	84	58	Vatva, Sabarmati, Kankariya South Cabin, Sabarmati A Cabin
13	South Central	Vijayawada	Vijayawada	72	122	Rayanapadu, Krishna Canal Jn., Ramavarappadu, Gunadala
14	Southern	Chennai	Chennai Central	138	19	Basin Bridge Junction
15	Central	Nagpur	Nagpur	20	102	Ajni, Godhani, Itwari, Kalumna
				1034	**1615**	

Entry and Exit Conferences were held at Zonal level and station specific audit findings were discussed with Zonal Railway administrations. The audit findings and recommendations were also discussed at Railway Board on 23 March 2018. Their replies have been suitably incorporated in the Report.

Audit findings in the report are based on observations of selected 15 stations over ten Zonal Railways. The basic purpose of this audit was to identify the infrastructure constraints on the selected stations, which leads to congestion in lines and impacts efficiency of train operations. Similar deficiencies and constraints may be prevalent in other stations over various Zonal Railways as well. These are required to be addressed by Indian Railways, giving due priority to stations where the extent of problem is severe.

1.6 Acknowledgement

Audit acknowledges the co-operation extended by the Railway Board and the Zonal Railway Administrations during the conduct of field audit.