

Chapter – III

Working of Trains



A train consists of a locomotive (driving unit) usually attached to haul a trailing load / formation of coaches or wagons. Based on the type of vehicles in the formation, trains are classified as coaching trains (made for carrying passengers), goods trains (made for carrying goods and animals) and mixed trains which consist of both coaches & wagons. In some trains like VandeBharat, the driving unit is integrated in the formation itself. As per GR 1.02 (58) “train” means an engine with or without vehicles attached, or any self-propelled vehicle with or without a trailer, which cannot be readily lifted off the track. Trains are worked between stations by competent crew according to a laid down system of working.

Components of a train

Locomotive

A locomotive or engine provides the motive power for hauling a train. It is normally attached in front of the train for hauling for the formation behind. In few cases, it is attached in the rear of the train for pushing the formation like in ghat section working or for banking. Railway transport system in initial days was conceived with steam engines. With improvements in technology, locomotives have become better in terms of horse power, reliability and energy efficiency. Steam locomotives were gradually replaced by diesel locomotives. With electrification, diesel locomotives have largely been replaced by electric locomotives.

Formation

Coaches and wagons form the basic unit of passenger and goods trains respectively. These units are attached to each other through coupling and usually piped through for enabling the braking system. The sequence in which the units are coupled in a formation is called Marshaling order, which is designed duly keeping in mind safety and convenience. Normally a formation is complete with a brake van or SLR at the rear most. However in exceptional cases, two more additional vehicles can be attached behind the brake van or SLR. An LV board or tail lamp is attached to the last vehicle that signifies the intactness of the formation as complete. Each formation is certified its fitness through a Brake Power Certificate. The particulars of the formation and the destination to which it is booked to are provided in a document called Vehicle Guidance which is prepared by the station staff and handed over to the crew.

Train sets

Train sets are the latest technology where the engines are integrated in the formation. Such train sets like Vande Bharat / DEMU / MEMU / EMU are provided with driving cabs at both ends for the loco pilot to work. As the tractive power is distributed in such trains, they accelerate / decelerate faster. Similarly self-propelled vehicles like Track machines, Tower cars also have inbuilt driving units.

Crew

Train Crew are competent railway staff who are authorized to operate, or support the operation of a locomotive / train. Loco pilots, Assistant Loco Pilots, Guards, Motorman and operators of tower wagons, track machines etc. form train crew. They run trains duly observing signals, speed restrictions in force. In order to ensure they're working train in a safe and proper manner at all times, train crew are selected based on eyesight, psycho test and are rigorously trained for handling locomotives; learning routes and to respond in emergency situations. There are designated crews for working Mail/express, passenger trains and goods trains based on their service and experience. Some crews posted at major stations for performing shunting only are designated as shunters.

Path

Path is the time and space consumed by a train while running between two stations. As trains are run through many stations which form a section, paths are visualized and charted out in such sections. The number of paths that can be charted out in a section represents the line capacity of the section. In saturated sections, giving the train a clear path is very essential for achieving the best utilization of all the assets - locomotive, formation and crew. It also improves the average speed of the train.



Freight train



Vande Bharat Train set



Crew

Train ordering

A train is ordered to run when all the requirements for running it - locomotive, formation, crew and path are ready or expected to be ready. Coaching trains are run to a schedule on the basis of time table / notification and do not require ordering separately. Goods trains and other trains are usually ordered individually by Section controllers through train advice/notice. In some major yards, SMs may also order goods trains duly receiving inputs from control. On receipt of the train advice/notice, the crew booking point in charge will serve call book to the Loco Pilot, Assistant Loco Pilot and Guard as per turn. An efficient train order will result in low pre departure detention and less transit time in the section.

System of working

A Train is run between stations through a system of working. There are different systems of working viz. Absolute Block, Automatic Block, One train only, Following train, Pilot guard and Train staff & ticket system. In Absolute Block System, at any point of time, only one train can run in the block section. While in Automatic Block System the block section is divided into small auto signaling sections controlled by automatic signals which assume off aspects automatically depending on the movement of trains. In some metro systems, intelligent trains work on concept of moving block sections. When very less number of train/trains is/are required to be run in a section, One Train Only System is adopted. In all systems of working, a train requires an authority to proceed to leave a block station and enter the block section. As per GR 1.02 (10) "block section" means that portion of the running line between two block stations on to which no running train may enter until Line Clear has been received from the block station at the other end of the block section. Apart from the authority to proceed, the station also issues a Caution Order which lists out the various temporary speed restrictions to be followed by the crew in the section till the next Caution order notice station.

Coaching Train Operations

Coaching train operations are planned, run and maintained to cater to the travel needs of the public so as to provide maximum level of satisfaction. Different passengers have different needs and consequently different criteria for satisfaction. While freight services are mainly end to end oriented services, the coaching services cater to enroute passengers also. Therefore, coaching train operations are planned to a reasonably predictable, systematic and regular pattern. Time tabling and punctual running are the two corner stones of coaching train operations.

Types of coaching services

Indian Railways have evolved various types of services keeping in view of the public demand, such as...

Vande Bharat: These are the latest train services using train sets that can run up to 160kmph. Named as Train-18 in the design stage, these semi high speed train sets currently manufactured by Integral Coach Factory Chennai are provided with latest passenger friendly features. At present they have only seating facility, while sleeper berth facilities are under development.