

## Chapter – V

# Traffic Blocks



All material assets being used in operations require maintenance. In an ideal scenario, maintenance and operations should not interfere with each other. However, there are works of maintenance, failure restoration and new projects that require train operations to be stopped. Such works are carried out under traffic blocks. For accommodating such works to the extent possible, coaching trains are charted in such a way that time slots are available in a section to provide traffic blocks without affecting punctuality. Such time slots called as 'corridor blocks' are incorporated in the Working Time Table.

In some cases like suburban, since the need for transportation is almost nil in night time, corridor blocks are slotted at night time. In branch line and sections with less traffic, providing slots for traffic blocks are easily done. In sections where there is congestion due to growth in traffic disproportionate to the line capacity, path becomes critical. Also, the fixed assets are most utilized in the congested lines and hence the issue of maintenance in such lines becomes important. Thus sections with heavy traffic often become the focus of both operations as well as maintenance. In these sections, every path is precious and should be utilized to the maximum by obtaining maximum output both in terms of train running as well as maintenance. Long haul trains and Integrated Blocks are two such measures in this direction. Many such measures are required to ensure that such congestion do not result in loss of loading/earning or a backlog in maintenance.

### Types of Blocks

Based on the purpose for which traffic blocks are taken, they are classified as...

**Emergency Blocks** – These are taken to rectify failures that result in unsafe condition for train running. Since such blocks are not planned per se, staff of various departments are trained to do such works in shortest possible time with the primary goal of restoring the traffic. Complete restoration is then planned subsequently.

**Maintenance Blocks** – These are planned blocks to ensure that the current assets are kept in proper shape so that failures are prevented. When machines are used for such blocks they are termed as Machine Blocks. As the output of machine is dependent on the effective block hours, longer blocks are preferred to the extent possible.

**Mega Blocks** – These are of longer duration and are taken for major works involving bridges, subways etc. As these works are well known, they need to be planned in advance and programmed to have the least impact on train operations. A temporary change in the pattern of train working like rescheduling, diversion, partial and full cancellations is planned for one or two days with adequate advance intimation to traveling public.

**Pre NI / NI Blocks** – These are blocks required for carrying out yard modifications needed for commissioning new projects. As every yard is different from other and works are also different from each other, there needs to be meticulous planning of such works. The primary goal of such blocks is to keep the duration of “Non-interlocked working” to the barest minimum. The blocks should be planned to have the least impact on train running. As in mega blocks, a temporary change in pattern of train running and maintenance are also planned to tide over the block period.

In all the above type of blocks, advance planning is very vital in improving the block utilization. When blocks are better utilized, block hours become optimum and train operations are least affected. In sections where block availability is not an issue, works can be planned for execution at an economically optimum method. However, in congested sections, works need to be planned for execution at the most time efficient manner. Block time should be minimized by doing additional preparatory works and choosing the fastest method of execution etc.

**Power Block** – When only OHE power supply is disconnected, the block is termed as power block. In some cases, such blocks allow movement of diesel locomotive hauled trains. This must be specifically mentioned while seeking the block.

Power blocks are generally taken for OHE maintenance. Emergency power blocks are imposed during abnormalities like hot axle, fire in train etc. where power supply is switched off immediately on receipt of such information. As electrification has reached almost 100% in the railway, it is imperative to have an understanding of the basic features of the OHE and power supply arrangements.

**OHE** – Over Head equipment comprises of a catenary wire and contact wire. The contact wire is a grooved copper wire that carries the 25KV current and feeds it to the locomotive when the loco's pantograph touches it. The contact wire is supported by the catenary wire through dropper wires. The catenary wire is a stranded cadmium copper or aluminum alloy wire that runs above the contact wire throughout its length. Both these wires are supported by masts or portals in a span of 72 meters in straight alignment. On curves, the mast span reduces up to 27 meters depending on the radius of the curve. The wires are connected to the mast through an insulated cantilever bracket assembly. For some less important lines, the catenary wire is not provided and only contact wire is provided. Such OHE is called tramway OHE.

The 25KV power supply is derived from the power grids through traction substations. The number of such substations in a section depends on the intensity of traffic and load of the trains. The lines which supply power from the grid to the substations are called feeder lines. They are supported by feeder posts (FP). At locations where supply from two different sub stations converges, a sectioning and paralleling post (SP) is provided with a neutral section. These posts keep the supplies of two substations isolated from each other. If a supply from one substation fails, the SP has provision for bridging and providing the supply from the adjacent substation. Also additional sub sectioning and paralleling posts (SSP) are provided between each FP and adjacent SP depending upon the distance between them, which can do similar functions like SP.

When there is a fault or there is a requirement of maintenance, the power supply can be isolated between any two SSPs/SPs by using the power interrupters. The shortest section of OHE which can be isolated by opening interrupters is called a 'sub sector'. Each sub sector is further sub divided into 'elementary sections' by providing manually operated isolator switches. These isolators are provided with earthing arrangements.

Power blocks are usually planned elementary section wise to limit its impact on train operations. The impact of a power block will depend on the number and positioning of elementary sections that are to be switched off.



*Tamping Machine*



*Ladder working*



*Tower Car working*

**Disconnection / Reconnection** – Some of the S&T works should only be done duly disconnecting the gear required and making the corresponding signal inoperative. Such works are done on disconnection. These gears are then taken for normal working only after issue of reconnection memo by the authorized S&T staff. Train operations if required to be done during this period, has to be done duly intimating the S&T staff working and by ensuring the proper setting of points manually by cranking and clamping. All conditions that are needed for train movements have to be ensured and proper authority has to be issued to the Loco Pilot. A prolonged disconnection leads to “Non-interlocked working” where Temporary working instructions need to be issued.

## Integrated Blocks

When more than one works which are required to be carried out under block, are executed in a single block, it is termed as Integrated Block. In most cases, works of different departments are integrated in a single block. For example, a machine block of BCM is integrated with OHE maintenance in the same block section. In congested sections, ideally all blocks should be integrated blocks. At present, blocks are planned for integration only after reaching the execution level. With this strategy, it is not always possible to have more number of integrated blocks. Hence an inter departmental exercise has to be done to align all the maintenance schedules of different assets thereby leading to integration at sanction stage, which will favor an increase in the number of integrated blocks.

**Shadow block** – These are blocks that are planned in the shadow of the main block. They are usually planned in adjacent block sections so that the additional impacts of the shadow blocks to train running are very minimal. Depending upon the sectional characteristics like single line / multiple lines, number of loading / unloading / examination terminals, the pattern of traffic flow, shadow blocks may or may not be possible to be availed. However in most cases, they can and should be planned to reduce the overall detention to traffic.

## Rolling Block Programme

In order to streamline the activity of planning, executing and reviewing the activities of traffic blocks, guidelines were issued by the Railway Board in 2017-18 to implement the system of multi asset maintenance through formulation of annual traffic block plans. In June 2023, Railway board has given guidelines and instructions to formulate a 26 week rolling block programme by the divisions which should be continuously extended after each week, so that all the departments are aware of the blocks in advance for the next 26 weeks. After formulating 26 week programme, a 12 days programme for integrated blocks to be finalized at the divisional level and circulated among the various departments involved in safety. The basic idea behind advance planning is to increase information flow across departments.

There are three steps to this planning process, first is the listing and identifying of all the activities that need to be carried out in the next 26 weeks (renewals as well as maintenance), second is the sequencing of the activities for the next 12 days in such a manner that there is maximum co-ordination between all the stakeholders, and the third is to create a schedule of supplementary activities that are required to make the plan succeed.