



# Railway Operation

- It is a system to
  - direct railway traffic
  - keep trains clear of each other at all times.
- Trains move
  - on fixed rails- susceptible to collision.
  - It is exacerbated by enormous weight and inertia of a train.
  - Which makes it difficult to quickly stop when encountering an obstacle. Breaking Distance 500 to 600 meters (Min)

# History

- ▶ Video\Brief History of signaling.mp4 (4.26)
- ▶ <https://www.youtube.com/watch?v=H6e54xDE1ew>

# History

- Earliest rail cars- hauled by horses or mules.
- Hand and arm signals were used to direct the “train drivers”.
- Foggy and poor-visibility conditions later gave rise to flags and lanterns.
- Wayside signalling dates back as far as 1832, and used elevated flags or balls that could be seen from afar.

# Time Table Operation

- The simplest form of operation, .
- Every train crew understands and adheres to a fixed schedule.
  - Trains may only run on each track section at a scheduled time, during which they have 'possession' and no other train may use the same section.

# Disadvantage of Time Table System

- There is no positive confirmation that the track ahead is clear
- The system does not allow flexibility
  - For engine failures and other such problems,
    - but there should be sufficient time between trains for delayed train to walk far enough to set warning flags, flares,

# Disadvantage of Time Table System

- System's inflexibility. Trains cannot be added, delayed, or rescheduled without advance notice.
- Ineffecient system To provide flexibility, the timetable must give trains a broad allocation of time to allow for delays.

# Timetable and train order

- With the advent of the telegraph in 1841, messages could be transmitted ahead of the trains.
- The telegraph allows the dissemination of any timetable changes, known as train orders.
- *These allow the cancellation, rescheduling and addition of train services.*



# Movement with Authority to Proceed

- On arrival of train at station, Station Master use to give a memo called Authority to Proceed to Loco Driver.
- On ensuring clearance of track, Station Master gives in writing to proceed.
- Cautions etc are also being mentioned on this document.

# Disadvantage of Authority to Proceed

- Series of head-on collisions resulted from authority to proceed being wrongly given or misunderstood by the train crew.
- The system was phased out in favour of token systems.
  - This eliminated the danger of ambiguous or conflicting instructions
- Whereas it is very difficult to completely prevent conflicting orders being given, it is relatively simple to prevent conflicting tokens being handed out.

# Miscommunication

- THE GAME OF



# Miscommunication

- THE GAME OF



- Video
- [Video\Comunication Gap Game.mp4](#) (2.54)

# Block signalling

- Trains cannot collide with each other if they are not permitted to occupy the same section of track at the same time, so railway lines are divided into sections known as *blocks*. [Word files and Formats\Block Section.docx](#)
- In normal circumstances, only one train is permitted in each block at a time.
- This principle forms the basis of most railway safety systems.
  - 1) Fixed Blocks - Block limits are fixed along the line
  - 2) Moving blocks - Ends of blocks defined relative to moving trains

# Absolute Block signalling

- ▶ **Absolute block signaling** is a British signaling scheme designed to ensure the safe operation of a railway by allowing only one train to occupy a defined section of track (block) at a time. This system is used on double or multiple lines where use of each line is assigned a direction of travel.

# Absolute Block signalling

- ▶ A train approaching a section is *offered* by a signalman to his counterpart at the next signal box. If the section is clear, the latter *accepts* the train, and the first signalman may clear his signals to give permission for the train to enter the section. This communication traditionally takes place by bell codes and status indications transmitted over a simple wire circuit between signalmen using a device called a *block instrument*,

# Block Instrument

## Block Instrument

- ▶ Video\Tocken Machine.mp4 (4.01)
- ▶ <https://www.youtube.com/watch?v=vfSO8niDqog>
- ▶ **Block Bell**
- ▶ Video\Block Bell.mp4 (6.08)
- ▶ <https://www.youtube.com/watch?v=RSM3nDKRNNs&t=301s>



# Movement with Permissive in Absolute

- Even with an absolute block system, multiple trains **blocks** may enter a block with authorization.
- This may be necessary,
  - In order to split or join trains together,
  - To rescue failed trains. In giving authorization, the signalman also ensures that the driver knows precisely what to expect ahead. The driver must operate the train in a safe manner taking this information into account. Generally, the signal remains at danger, and the driver is given verbal authority, usually by a yellow flag, to pass a signal at

# Movement with Permissive in Absolute

## blocks

- Where trains regularly enter occupied blocks, such as stations where coupling takes place, a subsidiary signal, sometimes known as a "calling on" signal, is provided for these movements, otherwise they are accomplished through train orders.

# Safety Signs- Used in Railway

- ▶ Railway Signs
- ▶ Word files and Formats\Safety Sign boards.odt
- ▶ Video\Cauton Sign Boards.mp4 (8.24)
- ▶ <https://www.youtube.com/watch?v=BTDI1GgZ6gU>

# Types of Signals in Railway

1. Home Signal
2. Shunt Signal
3. Calling on Signal
4. Distance Signal
5. Starter Signal
6. Advance Starter Signal
7. Route Indicator

# Aspect of Signals

- ▶ Different aspects of Signal
  - ▶ Red
  - ▶ Single Yellow
  - ▶ Double Yellow
  - ▶ Green

# Station Working

- ▶ Different signals at B class station
- ▶ Video\Station Working B class station.mp4 (9.29)
- ▶ <https://www.youtube.com/watch?v=nacr0O6flvA&t=51s>

# Signals in Railway

## ▶ Flag Exchange

## ▶ Video\Flag Exchange.mp4 (1.03)

▶ <https://www.youtube.com/watch?v=66luJYW-ehU&t=3s>

# Automatic Signalling

- ▶ Automatic Signal
- ▶ Word files and Formats\Auto Signalling.odt
- ▶ Video\Automatic Signal.mp4 (4.3)
- ▶ <https://www.youtube.com/watch?v=X0pJL3LrP64>



# Train Detection

## ▶ Track Circuit

▶ Video\Track circuit working.mp4 (6.03)

▶ <https://www.youtube.com/watch?v=kdUAgWMP9NY&t=72s>

## ▶ Axle Counter

▶ Video\Axle counter\_ how does it work\_ .mp4 (7.02)

▶ Word files and Formats\Axle Counter.docx

# Inter Locking

## ▶ Interlocking

- ▶ [Video\Inter locking and cross over.mp4](#) (12.15)
- ▶ <https://www.youtube.com/watch?v=oeAac0ZOfA4&t=14s>

## ▶ Auto Gate Locking

- ▶ [Video\Auto Gate locking.mp4](#) (3.06)

# Gate Man on Duty

- ▶ Video\If LC Gate is open.mp4 (9.19)
- ▶ <https://www.youtube.com/watch?v=rn-ea5PGApw&t=9s>

# How Train Change Track

- ▶ [Video\How train change track.mp4](#)
- ▶ [\(5281\) How train track change? – YouTube](#)

# How Train stays on Track

- ▶ [Video\How train stays on track.mp4](#)
- ▶ <https://www.youtube.com/watch?v=RxxrkVWSpSw>

# How Train turn on Curve

- ▶ [Video\How train turn on curve\\_.mp4](#)
- ▶ <https://www.youtube.com/watch?v=4YovaG12ugU>

# VIGILANCE CONTROL DEVICE

▶ [Video\VCD.mp4](#)

# HORN TYPES AND MEANING

- ▶ [Video\Horn types and meaning.mp4](#)



# Distributed Power Wireless Control System

- ▶ Video\What are distributed power wireless control system in locomotive DPWCS.mp4 (3.50)

# Private Number

- ▶ Format of Private Number Exchange:
- ▶ ..\desktop\Signaling\Rh Formats\Private No.-Rh.PDF



Thanks

Any Question