



Chapter 14: STANDARDS OF INTERLOCKING

**Trains
&
Speeds**

Chapter 14

- Standards of Interlocking

Standards of Interlocking



INDIAN RAILWAY SIGNAL ENGINEERING MANUAL, PART - I (1988 EDITION)					
Addendum and Corrigendum Slip No. 6 (RB's Letter No. 2003/SIG/SEM/3 Dt. 19.05.2004)					
Chapter VII, Para 7.131, Section M		Important Minimum Signalling features.			
Sl.No	ITEM	As per New Revised Para 7.131			
		Std I®	Std II®	Std III®	Std IV®
	Allowable Speed (Kmph)	Upto 50	Upto 110	Upto 140	Upto 160
1	Isolation	Y*	Y	Y	Y
2	2A Semaphore/ MAS	2A/MA	2A/MA	MA	MA
3	Double Distant	N	Y**	Y	Y
4	Point Operation	Mech	Mech/Elec	Mech/Elec	Elec
5	Point Locking	Key/FPL/HPL	FPL/Pt M/c	FPL/Pt M/c	Clamp type direct %
6	Point Detection	Mech/Elec	Mech/Elec	Mech/Elec	Elec
7	Lock Detection	N	Y	Y	Y
8	Interlocking	Key/Mech	Mech/Elec/Electronic	Mech/Elec/Electronic	Elec/Electronic
9	Track Circuiting	N	Mech: Run thro lines Elec/Electronic: All RLs	All Running Lines	All Running Lines
10	Block Working	Token	Token / SGE	# SGE / TC	# SGE / TC
11	Preventing SPAD	N	N	N	Y %
*	speed not exceeding 50 kmph, if permitted all shunting to be stopped, no vehicle unattached to an engine or not properly secured may be kept standing on a connected line which is not isolated				
**	Double Distant on sections where goods trains have a breaking distance of more than 1 Km				
%	Desirable				

The Requirement of High-Speed Train Control System

- Speed range for high-speed trains varies from country to country
- Ministry of Railways in India defines a higher speed or semi-high speed rail line as trains operating between 160 and 200 km/h (99 and 124 mph)
- Ministry of Railways in India defines conventional rail lines as trains operating at less than 160 km/h (99 mph)
- Department of Transportation in the United States defines high-speed rail as rail service with top speeds ranging from 110 to 150 miles per hour (180 to 240 km/h) or higher
- No single worldwide standard for high-speed rail, The speed range for high-speed trains is typically 200-350 km/h (124-217 mph).
- Lines built to handle speeds above 250 km/h (155 mph) are widely considered high-speed
- Upgraded lines in excess of 200 km/h (124 mph) are widely considered high-speed

The Requirement of High-Speed Train Control System

❑ **High Speed System operation requires ATC in compliance to UIC mandated requirements as well as to meet the following:**

1. Safe train operations
2. Prevention of overspeed, derailments, and collisions
3. Fail safe train detection
4. Interlocking enforcement
5. Hazard protection
6. Work zone protection
7. Headway requirements
8. Quality of Service

The Requirement of High-Speed Train Control System

- Safe train operations: The train control system must ensure that trains are operated safely, even in the event of a failure. This includes features such as automatic braking, speed control, and collision avoidance.
- Prevention of overspeed, derailments, and collisions: The train control system must prevent trains from exceeding the speed limit, derailling, or colliding with other trains or objects. This includes features such as speed limit enforcement, trackside signals, and automatic braking.
- Fail safe train detection: The train control system must be able to detect a train that has stopped or derailed, and take appropriate action to prevent a collision. This includes features such as wayside detectors and automatic braking.
- Interlocking enforcement: The train control system must enforce the interlocking rules, which are the rules that govern how trains can move through a section of track. This includes features such as track circuits and signal control.

The Requirement of High-Speed Train Control System

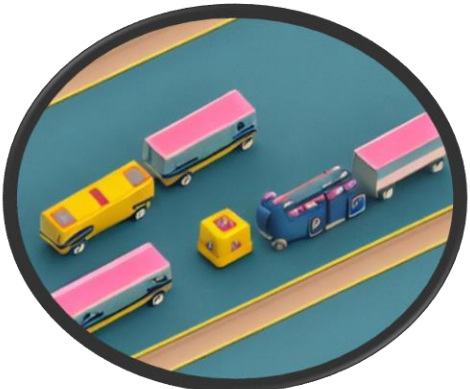
- Hazard protection: The train control system must protect trains from hazards such as fallen objects, derailments, and fires. This includes features such as wayside detectors and automatic braking.
- Work zone protection: The train control system must protect trains from work zones, which are areas where track maintenance is being performed. This includes features such as speed limit enforcement and automatic braking.
- Headway requirements: The train control system must ensure that trains maintain a safe distance between each other. This is important for preventing collisions.
- Quality of Service: The train control system must provide a high level of service, such as on-time arrivals and departures. This is important for passenger satisfaction.

1. Safe train operations



- Train signaling: This is the system used to communicate with trains and ensure that they are operating safely. It includes features such as trackside signals, automatic train control (ATC), and train protection systems (TPS).

- Train speed control: This is the system used to regulate the speed of trains. It includes features such as speed limiters, automatic braking, and train protection systems.



- Train crew training: This is essential for ensuring that train crews are properly trained to operate trains safely. It should include training on all aspects of train operations, including signaling, speed control, and emergency procedures.

1. Safe train operations



- Track maintenance: This is essential for ensuring that the track is safe for train operations. It should include regular inspections and repairs to identify and fix any defects.



- Hazard identification and mitigation: This is the process of identifying and mitigating hazards that could pose a risk to train operations. It should include regular inspections of the track and surrounding area to identify potential hazards, such as fallen objects, debris, and trespassers.



- Emergency procedures: This is the plan that is put in place in the event of an emergency, such as a derailment or collision. It should include procedures for evacuating passengers, providing first aid, and notifying the authorities.



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