

## Rail Safety in India

### Why in news?

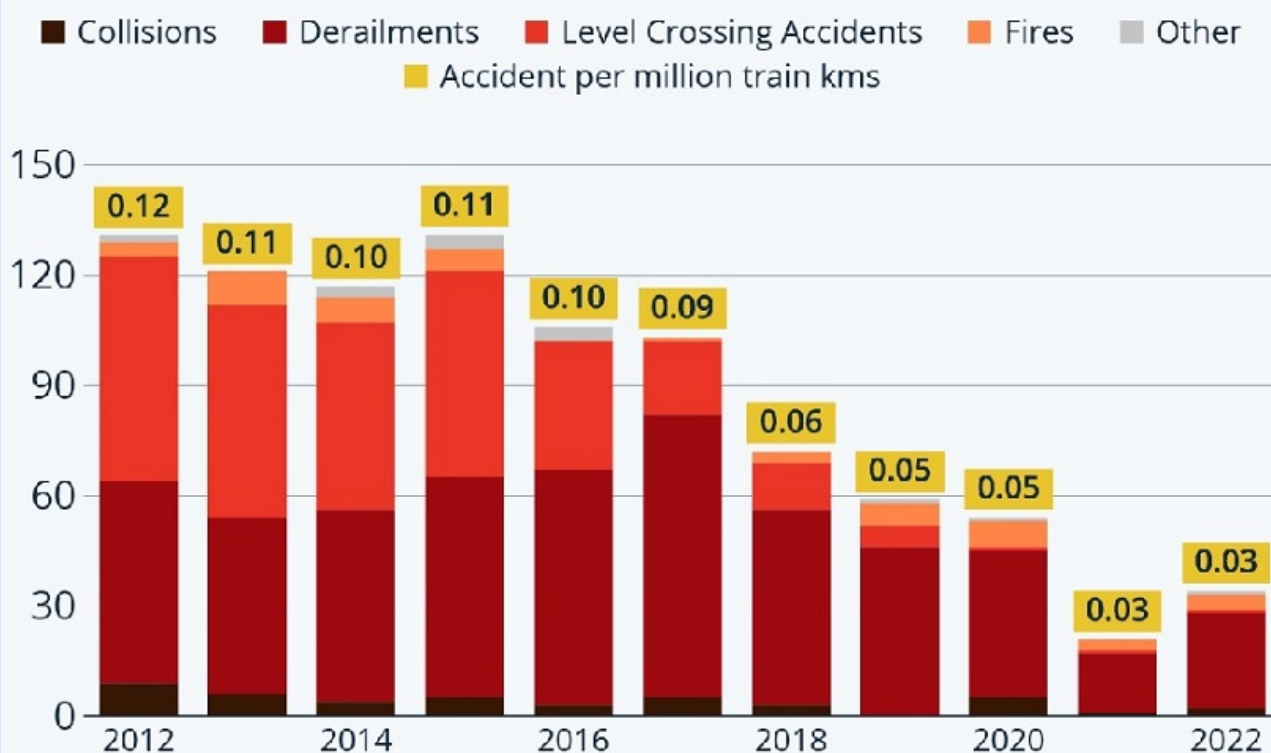
The government has taken steps to enhance the level of passenger safety in Railways.

#### Status of train accidents

- According to data from the National Crime Records Bureau of India, 2021 saw a total of 16,431 deaths and 1,852 cases of injuries from railway accidents.
- The majority (67.7%) of these were from people falling from trains or from collisions with people on the tracks.

## Indian Railways Are Improving, But Safety Issues Remain

Number of train related accidents in India\*



- Of the 14,769 train accidents that occurred between 1960-61 and 1970-71, 11,312 were incidents of *derailments*.
- The 2<sup>nd</sup> most common cause is *level crossing accidents*.
- *Fire and collisions* are the 3<sup>rd</sup> and 4<sup>th</sup> most common categories of train accidents, respectively.
- **Balasore triple train collision, 2023**- The accident claimed the lives of 288 passengers in Odisha, it happened due to a change in electronic interlocking.
- This crash is the worst of its kind in India in two decades.

## What are the steps taken by government for passenger safety in Railways?

Steps	About
<b>Rashtriya Rail Sanraksha Kosh</b>	<ul style="list-style-type: none"> <li>• Launch year- 2017-18</li> <li>• Aim- To reduce accidents at railway crossings, derailments, and collisions by investing in <i>track renewals</i>, telecommunications, signalling, and rolling stock.</li> </ul>
<b>Kavach system</b>	<ul style="list-style-type: none"> <li>• It is an <i>automatic train protection system</i> that was developed by Indian Railways to enhance the safety and efficiency of train operations.</li> <li>• It uses radio frequency identification, GPS, and electronic devices to monitor and control the speed, signals, and movements of trains.</li> </ul>
<b>Electrical/ Electronic Interlocking Systems</b>	<ul style="list-style-type: none"> <li>• These are systems that use electrical circuits and relays to <i>control train movements</i> and ensure safety.</li> <li>• These systems use electrically operated switches and signals to manage the routing of trains, offering a more automated and streamlined approach compared to purely mechanical systems<sup>1</sup>.</li> </ul>
<b>Modern track structure</b>	<ul style="list-style-type: none"> <li>• It consists of <i>stronger and more durable tracks and bridges</i>, using Prestressed Concrete Sleeper (PSC), higher Ultimate Tensile Strength (UTS) rails, fan shaped layout turnout on PSC sleepers, Steel Channel Sleepers on girder bridges etc.,</li> <li>• Modern track structure also uses long welded rails and switch expansion joints to provide a smooth and fast rail travel</li> </ul>
<b>Interlocking of Level Crossing (LC) Gates</b>	<ul style="list-style-type: none"> <li>• It is a method of ensuring the safety of <i>both road and rail traffic</i> at level crossings.</li> <li>• It involves the use of electrical or electronic devices to control the movement of trains and gates, such that a train cannot approach or pass through a level crossing unless the gates are closed and locked, and the gates cannot be opened unless the signals are at stop and the tracks are clear</li> </ul>
<b>Complete Track Circuiting of stations</b>	<ul style="list-style-type: none"> <li>• To enhance safety for <i>verification of track occupancy</i> by electrical means.</li> <li>• As of 2023, 6558 stations has been provided with complete track circuiting of stations.</li> </ul>
<b>Vigilance Control Devices</b>	<ul style="list-style-type: none"> <li>• It is a safety devices that <i>monitor the alertness of the loco pilot</i> and prevent accidents due to human error or incapacitation.</li> <li>• They work by requiring the loco pilot to perform certain actions or acknowledge certain signals at regular intervals, otherwise they trigger an emergency brake application.</li> </ul>
<b>Retro-reflective sigma boards</b>	<ul style="list-style-type: none"> <li>• They are provided in electrified territories to warn the crew about the signal ahead when visibility is low due to foggy weather.</li> <li>• They are mandatory for all signals in electrified territories.</li> </ul>
<b>GPS based Fog Safety Device (FSD)</b>	<ul style="list-style-type: none"> <li>• It is a device that helps train drivers to navigate safely in foggy weather.</li> <li>• It uses GPS technology to provide <i>real-time information</i> about the location and distance of the next three signals, level crossing gates and other landmarks on the route.</li> </ul>

<b>Detailed instructions on issues related with safety of Signalling</b>	<ul style="list-style-type: none"> <li>• Mandatory correspondence check, alteration work protocol, preparation of completion drawing, etc. have been issued.</li> </ul>
<b>Use of Linke Hofmann Busch (LHB) coaches</b>	<ul style="list-style-type: none"> <li>• It is a type of <i>passenger coach</i> used by Indian Railways in collaboration with German company that is designed for higher speed, safety, and comfort.</li> <li>• LHB coaches have many features such as stainless steel body, FIAT bogies, air suspension, disc brakes, anti-climbing couplers, and fire and smoke detection systems.</li> <li>• They are being manufactured by Rail Coach Factory in Kapurthala, Integral Coach Factory in Chennai, and Modern Coach Factory in Raebareli.</li> </ul>
<b>Web based online monitoring system of track assets</b>	<ul style="list-style-type: none"> <li>• Track database and decision support system has been adopted to decide rationalized maintenance requirement and optimize inputs.</li> </ul>
<b>Fire notices</b>	<ul style="list-style-type: none"> <li>• Indian Railways has displayed Statutory “Fire Notices”, they are provided in every coach so as to inform and alert passengers regarding various do’s and don’ts to prevent fire.</li> <li>• These include messages regarding not carrying any inflammable material, explosives, prohibition of smoking inside the coaches, penalties etc.,</li> <li>• Production Units are providing <i>Fire detection and suppression system</i> in newly manufactured Power Cars and Pantry Cars, Fire and Smoke detection system in newly manufactured coaches.</li> </ul>
<b>Inspection</b>	<ul style="list-style-type: none"> <li>• Patrolling of railway tracks to look out for weld/rail fractures.</li> <li>• Inspections at <i>regular intervals</i> are carried out to monitor and educate staff for observance of safe practices.</li> <li>• Safety of <i>railway bridges</i> is ensured through regular inspection of Bridges.</li> </ul>

### **What are the other measures implemented to ensure passenger safety?**

- Maximizing supply of 130 m/260 m long rail panels for increasing progress of rail renewal and avoiding welding of joints, thereby ensuring safety.
- Laying of longer rails, minimizing the use of Alumino Thermic Welding and adoption of better welding technology for rails i.e. Flash Butt Welding.
- Monitoring of track geometry by OMS (Oscillation Monitoring System) and TRC (Track Recording Cars).
- All unmanned level crossings (UMLCs) on Broad Gauge (BG) route have been eliminated by January 2019.
- Regular counselling and training of staff is undertaken.

### **Reference**

1. [PIB- Steps taken by India for passengers safety](#)
2. [Statista- NCRB data on railway accident](#)



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