

4. Recurring Rail Tragedies in India - Economy

India has witnessed a worrying recurrence of train accidents caused by technical failures & human error in the recent

Major Causes of Railway Accidents in India — Expanded Analysis

1. Staffing Shortages in Safety-Critical Roles

Massive vacancy burden – Out of nearly 1 million sanctioned posts in operations and maintenance, over 1.5 lakh (15%) positions remain vacant, especially in safety-sensitive roles such as gangmen, loco pilots, signal maintainers, track inspectors, and pointsmen.

Direct impact on safety – Shortages lead to overworked staff, long shifts, fatigue-driven error, delayed inspections, and insufficient night patrolling.

Resulting risk – Track defects, signalling failures, and maintenance delays go unnoticed, increasing derailment and collision risks.

2. Infrastructure Constraints

Delayed Track Renewal – Many sections, especially on High-Density Routes (HDRs), have exceeded the permissible life cycle, but renewal is delayed due to budget gaps and operational load.

Outdated Signalling Systems – Many sections still rely on older panel interlocking, non-digitised relays, and mechanical systems. Adoption of Automatic Block Signalling (ABS) is slow.

Cable Damage & Sabotage – Frequent damage to signal/communication cables during construction (roads, pipelines, utilities). The Railway Board has warned that repeated failures in critical block sections could lead to “catastrophic consequences.”

3. Inadequate Safety Systems

Slow KAVACH Deployment – India’s indigenous Automatic Train Protection (ATP) system, KAVACH, is deployed in less than 5–7% of the total network. Most high-speed and congested routes still lack ATP protection.

Implication – Risk of rear-end collisions, overshooting signals (SPAD cases), and human-error-induced crashes remains high.

4. Human Error

Errors in Signal Setting & Point Switching – Mistakes in assigning routes, resetting points, or interlocking procedures.

Loco Pilot Overload – Extended working hours, inadequate rest, lack of crew reserve pools. Increased fatigue leading to slower reaction times or missed signals.

Communication Failures – Misinterpretation of caution orders, track block messages, or temporary speed restrictions (TSRs).

Systemic issue – Human error is a symptom of systemic fatigue, not individual negligence.

5. Resource Allocation Imbalance

Rashtriya Rail Sanraksha Kosh (RRSK) – Created as a ₹1 lakh crore safety fund (2017–2022). Intended for track renewal, signalling upgrades, and bridge repairs.

Problems – Underutilisation by some zones. Funds often diverted for non-core projects. Delays in tendering and project execution reduce impact.

6. Organisational & Accountability Deficit

Fragmented chain of command – Multiple departments (Engineering, Electrical, Traffic, Mechanical, S&T) operate in silos with overlapping responsibilities.

Post-Accident Culture – Investigations often lead to suspension of lower-level staff, ignoring systemic weaknesses. Rarely result in structural reforms such as staffing fixes or process redesign.

Weak enforcement – Many safety recommendations from CRS or internal audits remain unimplemented.

Implications of Accidents

1. Economic Impact

Massive direct costs – Damage to locomotives, coaches, tracks, signalling equipment. Compensation payouts to victims.

Service Disruptions – Halted operations cause cascading delays, freight losses, and logistics backlog. Impacts the economy as 70% of India's freight moves on railways.

2. Public Confidence Erosion – Repeated accidents undermine trust in the Railways' safety framework. Affects passenger behaviour—shift towards road/air travel, reducing rail revenues.

3. Governance Credibility – Highlights weak oversight, bureaucratic inertia, and a lack of timely safety audits. Raises concerns over prioritisation of speed and new trains over core safety upgrades.

4. Technological Lag – Advanced countries use –

1. ETCS Level 2/3 (Europe)
2. Positive Train Control (US)
3. Automatic Train Control (Japan's Shinkansen)

India's pace of ATP adoption (KAVACH) remains slow, widening the gap.

Government Measures & Ongoing Initiatives

1. KAVACH (ATP System) – Automatically halts trains to prevent collisions, overspeeding, and SPAD incidents. Enables –

1. Automatic braking
2. Real-time train location
3. Collision avoidance logic

Next step – Network-wide rollout on all high-density routes.

2. Introduction of Modern Trains

Vande Bharat Express – Enhanced safety features (anti-climbing, fire-retardant materials, CCTV).

Amrit Bharat Trains – Upgrade existing rakes with modern passenger-friendly features.

Namo Bharat Rapid Rail – Advanced signalling and platform safety systems.

3. Elimination of Unmanned Level Crossings – All unmanned level crossings on broad gauge eliminated, reducing collision risks with road vehicles.

4. Amrit Bharat Station Scheme – Modernisation of stations focusing on –

1. Passenger amenities, elevators, concourses, waiting areas.
2. Better security and crowd management.

5. Rashtriya Rail Sanraksha Kosh (RRSK) – Dedicated safety fund to strengthen –

1. Track renewal
2. Bridge rehabilitation
3. Signalling upgrades
4. Road overbridges/underbridges

Implementation challenges persist in some zones.

Way Forward

1. Accelerated KAVACH Deployment – Prioritise high-density and high-speed routes. Expand vendor base to avoid monopolistic delays. Integrate with ABS and centralised traffic control systems.

2. Strengthen Basic Track & Signalling Maintenance – Regular ultrasonic flaw detection on tracks. Better cable protection ducting to prevent inadvertent damage. Increase night patrolling and surprise inspections.

3. Install "Black Box" – Type Devices on Locomotives – Voice and video recording improves accident reconstruction. Enhances transparency and accountability.

4. Reform Organisational Structure – Introduce Unified Safety Command with cross-department authority. Simplify chain of responsibility during operations. Shift from punitive to preventive safety culture.

5. Workforce Strengthening – Fill critical vacancies on priority. Implement fatigue management systems for loco pilots. More training simulators and refresher courses.

Do You Know?

1. Scale of Operations – Indian Railways spans ~1,15,000 km, the world's fourth-largest rail network. Carries

2.3 crore passengers daily and 1.4 billion tonnes of freight annually.

2. Largest Employers - With 12 lakh employees, it is the 8th largest commercial employer globally.

3. Accident Investigation Authority - The Commissioner of Railway Safety (CRS) functions under the Ministry of Civil Aviation, ensuring independence. CRS reports are advisory, not binding—major limitation in enforcing systemic reforms.

Source - <https://www.thehindu.com/news/national/chhattisgarh/chhattisgarh-bilaspur-train-accident-deaths-injuries-updates/article70240039.ece>

