

Chapter 6 – Disaster Management in Indian Railways

6.1 Introduction

Indian Railways run about 22,300 trains (passenger and goods) daily throughout its network of 66,030 track kilometres across the length and breadth of our country as on 31 March 2015. In addition to higher operational speed, increasing rail network and traffic density has been posing challenges to Indian Railways to honour its commitment of providing safe and dependable services to train passengers.

The Government of India *vide* gazette notification dated 26 December 2005 defined “**Disaster**” as a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to and destruction of property or damage to degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.

Based on the definition of the ‘Disaster’ in the Disaster Management Act 2005, Ministry of Railways adopted the following definition of ‘Railway Disaster’ in the Disaster Management Plan of Indian Railways 2009 and 2014.

“Railway Disaster is a serious train accident or an untoward event of grave nature, either on railway premises or arising out of railway activity, due to natural or man-made causes, that may lead to loss of many lives and/or grievous injuries to a large number of people, and/or severe disruption of traffic etc, necessitating large scale help from other Government/Non-government and Private Organizations.” Different types of disasters as described by Indian Railway Disaster Management Plan 2009 are as follows:-

- **Natural disaster**- Earthquake, Floods, Cyclones, Landslides, Tsunami;
- **Train accident related disaster**- Collision, Train Marooned, Derailment, Tunnel Collapse, Fire Explosion in train etc. and
- **Man-made disaster** - Act of Terrorism and Sabotage

Disasters can cause injuries, fatalities and widespread infrastructure and property destruction. The associated economic and environmental costs can be devastating but it can be contained if the management systems in place to plan for, respond to or recover from them fail.

The present review *inter-alia* focused on the follow up action taken by the Ministry of Railways (MoR) on the recommendations of the Public Accounts

Committee on Report No. 8 of 2008 (Disaster Management in Indian Railways).

6.2 Organisation Structure

At Railway Board Level:

- Implementation of the Disaster Management Plan is the collective responsibility of various Directorates of Railway Board such as Civil Engineering, Works, Finance, Signalling, Electrical and Security etc and Safety department of the Railway Board being the nodal department.
- The Disaster Management Plans (DMP) of Indian Railways (IR) is prepared by the Safety Directorate at Railway Board level.
- Railway Board has also nominated General Managers, Additional General Managers or Chief Safety Officers (when General Manager/Additional General Manager is not available) for declaring an untoward incident as Railway Disaster.



At Zonal and Divisional Railway Level:

- At the Zonal level, there is Safety department headed by Chief Safety Officer and assisted by Senior Divisional Safety Officer posted at respective Divisions of the Zonal Railways.
- The Disaster Management Plan of Zonal Railway is prepared by the Safety Department of the concerned railway.

- In respect of hospitals and security arrangements, Disaster Management Plan is prepared and coordinated by the Medical and Security department respectively.
- The management of floods, cyclones, earthquakes, landslides etc. is coordinated by the Civil Engineering Department.
- Procurement of specialized equipment and rescue centric training of personnel is co-ordinated by the Mechanical Department at the Zonal Headquarters and Divisional level.

6.3 Audit Objectives

The objectives of the review were to assess:

- Whether Disaster Management Plan of the Indian Railways addresses its preparedness in handling disaster and also takes into consideration the recommendations of the Public Accounts Committee;
- Whether post-disaster response of Indian Railways was effective; and
- Whether an effective system of capacity building existed to face disasters.

6.4 Scope of Audit and Methodology

The review covered the issues related to action taken by the Indian Railways during 2010-15 for effectively managing disasters. The review, *inter-alia*, covered the issues relating to Implementation of Disaster Management Plan (2009) in Indian Railways and the follow up audit of recommendations of Public Accounts Committee (December 2011).

The audit methodology included examination of records at the Railway Board, Zonal /Divisional Headquarters and field offices relating to plans/policies framed by the IR and their implementation. In addition, Joint Inspections were undertaken with Railway Authorities at selected sample units such as Stations, Trains, Accident Relief Trains/Accident Relief Medical Vans, etc.

6.5 Sample Size

At the macro level, the data were collected for all the Divisions and all Zonal Headquarters. However, for review of specific issues, a sample of two important Divisions of the Zonal Railways, along with Central Hospitals and Divisional Hospitals of selected divisions were taken up during review. In the present review, 32 divisions, 48 Railway Hospitals, 16 Self Propelled Accident Relief Trains, 62 Accident Relief Trains, 56 Accident Relief Medical Vans, 202 Vulnerable Stations, 279 crowded Stations and 92 Trains were selected.

The reports of the Commissioner of Railway Safety (CRS) and Joint Committee of Railway Officers in respect of accidents during the review period were also studied to highlight shortcomings and also improvement in the efficiency and effectiveness in Disaster Management.

6.6 Sources of Audit Criteria

The sources of audit criteria were:

- Disaster Management Act, 2005 and Indian Railways Disaster Management Plan 2009 and 2014
- Disaster Management Plans of Zonal Railways and Divisions.
- Action taken Report of the Ministry on the Recommendation made by Public Accounts Committee (December 2011) in its Sixteenth Report (Fifteenth Lok Sabha)
- Instructions/ Guidelines issued by the Railway Board.
- Indian Railways Accident Manuals and Corporate Safety Plan 2003-2013

6.7 Acknowledgement

The audit objectives, scope of study and methodology were discussed with Advisor (Finance) at Railway Board as well as the General Managers/concerned departmental heads in the zones by the Principal Directors of Audit during entry conferences. The inputs provided on various aspects and the co-operation extended by railways is acknowledged with thanks. The audit findings and recommendations were discussed with Advisor (Finance) in an exit conference held on 12 April 2016 in Railway Board. Similar exit conferences were also held by the Principal Directors of Audit in the zones, with concerned zonal authorities. The draft report was issued to the Ministry of Railways in January 2016. Reply of the Ministry was received on 8 April 2016. Their views have been incorporated in the report.

6.8 Preparedness to face disasters

6.8.1 Institutional Framework

The primary document that serves the purpose of institutionalising disaster management is the Disaster Management Plan issued by Railway Board in 2009 (later updated in 2014). Disaster Management Plans of the Zonal Headquarters, Divisions and other units provide the framework at the field level for prevention, mitigation, preparedness, rescue, relief and rehabilitation. Apart from this, Indian Railways also addressed its safety concerns in Corporate Safety Plan (2003-13).

Under the provisions of the Act, the National Disaster Management Authority (NDMA) has been established under the chairmanship of the Prime Minister and a National Executive Committee (NEC) of Secretaries has been created to assist the National Disaster Management Authority in the performance of its functions. At the State level, a State Disaster Management Authority has been created under the chairmanship of Chief Minister, and assisted by a State Executive Committee. At the District level, District Disaster Management Authorities have been created.

The Disaster Management Act 2005 also introduced a new concept of pooling of resources of all agencies viz. local administration, community, defence, hospitals and other government organisations. National Disaster Management Authority has also issued guidelines from time to time on handling different types of disasters like cyclones, floods, etc. Sections 35, 36 and 37 of the Disaster Management Act, 2005 assigned the responsibilities of Ministries and Departments of Central Govt. to initiate measures/actions to be taken either on their own or in Consultation with National Disaster Management Authority for drawing up mitigation, preparedness and response plans, capacity building, data collection and identification and training of personnel in relation to Disaster Management.

6.8.2 Shortcomings to handle Disaster in Indian Railways

Indian Railways prepared Disaster Management Plans at Zonal Headquarter and Divisional level. These plans encompassed all types of disaster that can occur on the Railway system. The Disaster Management Plan of Zonal Railways also detailed the definition of different types of disasters, the preventive, mitigation and preparedness measures being taken by the Railway and also the rescue, relief and restoration system in place to meet with them.

Review of the Disaster Management Plans of Zonal Railways and their Divisions revealed the following:-

- Disaster Management Plans (DMP) were prepared by all Zones and Divisions except Metro Railway, Kolkata where Disaster Manual was prepared but not dovetailed with Railway Board level plan as desired *vide* Para 6.1 of Indian Railway Disaster Management Plan 2009.
- All the Zonal Railways had incorporated three types of disasters except South East Central Railway where Natural Disasters were not mentioned.

- Natural disasters and Man-made disasters were not recognised in the Disaster Management Plans of 10 Divisions¹⁹³ and nine Divisions¹⁹⁴ respectively (Out of 68 Divisions of Indian Railways). Disaster Management Plans of 10 Divisions¹⁹⁵ did not categorise any type of disasters.
- In 13 Divisions¹⁹⁶ of four Zonal Railways Disaster Management Plans were not dovetailed with their Zonal Disaster Management Plans.
- High Level Committee (HLC) Recommendation No. 15 stipulated review and updation of the DMPs in the month of January every year. Out of 17, in 10 Zonal Railways¹⁹⁷ DMPs were not reviewed and updated annually.
- In 18 Divisions¹⁹⁸ out of 68 Divisions pertaining to East Coast Railway, Northern Railway, North Central Railway, Southern Railway and South Eastern Railway, annual updating of Disaster Management Plans was not carried out.
- Only six Zonal Disaster Management Plans¹⁹⁹ and 19 Divisional Disaster Management Plans²⁰⁰ were International Organisation for Standardization (ISO) certified as stipulated in HLC's Recommendation No. 16.
- Cyclones affected Railway operations for two to three days in each case paralysing the train services in ECoR. The incidents were, however, not declared as Disasters by Railways, though in view of the magnitude of the calamity, the Government machinery of Odisha and Andhra Pradesh states, NDRF teams, and several NGO teams swung into relief mode immediately, co-ordinated with Railway authorities in relief and rescue operations and helped in bringing normalcy.
- Inventory of non-Railway resources which can be accessed during disaster situations was not available in 11 Divisions²⁰¹ of three Zonal Railways

¹⁹³ Mughalsarai, Sonapur, Samastipur of ECR; Lucknow, Ferozpur of NR; Bilaspur, Raipur, Nagpur of SECR, Umbala, Bangalore of SWR

¹⁹⁴ Mughalsarai, Sonapur, Samastipur of ECR; Lucknow, Ferozpur of NR; Umbala, Bangalore of SWR; Chakradharpur, Ranchi of SER

¹⁹⁵ Sambalpur-ECoR; Jhansi-NCR; Varanasi-NER; Moradabad, Umbala of NR; Ajmer, Jaipur of NWR; Chennai, Madurai, Palghat of SR

¹⁹⁶ Dhanbad, Danapur, Mughalsarai, Samastipur of ECR; Allahabad, Jhansi of NCR, Hubli, Bangalore of SWR; Ahmedabad, Mumbai Central, Vadodara, Rajkot, Ratlam of WR

¹⁹⁷ ECoR, NCR, NER, NFR, NWR, NR, SCR, SER, SR and MR/Kolkata

¹⁹⁸ Waltair, Khurda Road of ECoR; Jhansi, Agra Cantt. of NCR, Ferozpur, Umbala, Lucknow, Delhi, Moradabad of NR; Chennai, Madurai, Salem, Palakkad, Tiruvananthapuram of SR, Adra, Chakradharpur, Kharagpur, Ranchi of SER

¹⁹⁹ ECoR, NCR, NER, NWR, SECR and WR

²⁰⁰ Asansol-ER; Allahabad-NCR; Lucknow, Varanasi, Izzatnagar of NER; Bikaner, Jaipur, Jodhpur of NWR; Delhi, Moradabad of NR; Bilaspur, Raipur, Nagpur of SECR; Ahmedabad, Mumbai Central, Vadodara, Bhavnagar, Rajkot, Ratlam of WR

namely Eastern Railway, North Western Railway and South Western Railway.

- Methodology for seeking co-ordination from State Government was also not laid down in the Disaster Management Plans of Zonal Railways and Divisions.
- Measures to be taken for prevention of disasters were not spelt out in Zonal Disaster Management Plans of East Central Railway & North Eastern Railway and 15 Divisional²⁰² Disaster Management Plans of five Zonal Railways.
- Measures to be taken for mitigation of disaster were not specified in the Divisional Disaster Management Plan of Southern Railway & South Western Railway.
- The roles to be played by the different stakeholders, department of Railways and other co-ordinators at different levels of hierarchy had been defined and institutionalised in the Disaster Management Plans of nine Zonal Railways²⁰³.
- National Executive Committee (NEC)²⁰⁴ is to coordinate the response in the event of any threatening disaster situation or disaster. It was, however, observed that the Ministry of Railways was not represented in NEC at the National and State Level.
- Despite specific provisions in the Corporate Safety Plan (CSP), DM Act 2005 and National Disaster Management Authority guidelines that the rescue and relief arrangements are to be undertaken in association with the State Government, neither standard operating procedure nor the institutionalisation of arrangements had been included in the Disaster Management Plan of 10 Zonal Railways²⁰⁵ and 38 Divisional Disaster Management Plans²⁰⁶ out of 68 Divisions over Indian Railways.

²⁰¹ Howrah, Sealdah, Asansol, Malda Town of ER; Ajmer, Bikaner, Jaipur, Jodhpur of NWR; Hubli, Bangalore, Mysore of SWR

²⁰² Dhanbad, Danapur of ECR; Moradabad-NR; Ajmer, Jaipur, Jodhpur of NWR; Chennai, Tiruchchirappalli, Madurai, Salem, Palakkad, Tiruvananthapuram of SR; Hubli, Bangalore, Mysore of SWR

²⁰³ CR, ECoR, NR, NFR, NWR, SR, SECR, WR and WCR

²⁰⁴ The National Executive Committee (NEC) is the executive committee of the National Disaster Management Authority (NDMA) and is mandated to assist the NDMA in the discharge of its functions and also ensure compliance of the directions issued by the Central Government

²⁰⁵ ER, ECR, ECoR, NCR, NER, NWR, SR, SCR, SECR & SWR

²⁰⁶ Howrah, Sealdah, Asansol, Malda Town of ER; Dhanbad, Danapur, Mugalsarai, Samastipur of ECR; Waltair, Sambalpur, Khurda Road of ECoR; Delhi-NR; Allahabad, Jhansi, Agra Cantt. of NCR; Ajmer, Bikaner, Jaipur, Jodhpur of NWR; Chennai, Tiruchchirappalli, Madurai, Salem, Palakkad,

- Vulnerability of natural hazard such as cyclone, flood, earthquake, landslide etc. have been identified in the Indian Railway Disaster Management Plan, but vulnerability profile of natural hazard incorporating the likely situation of disaster as envisaged by Railway Board had not been prepared by six Zonal Railways²⁰⁷ and Metro Railway, Kolkata.

Indian Railway's Disaster Management Plan 2009 also pointed out similar shortcomings to handle disaster with Railways' own resources. This indicated that follow up action taken by Railway Board for overcoming these shortcomings was not effective.

Thus, the Disaster Management Plans, though broadly framed in Zonal Railways and in Divisions, were not comprehensive, lacked uniformity and also did not adhere to the provisions of the Disaster Management Act 2005 and recommendations of Public Accounts Committee that the Disaster Management Plans should be integrated, comprehensive and uniform to effectively deal with the challenges which emerge in the event of train accidents or other disasters.

Railway Board in their reply (April 2016) stated that Disaster management plans are prepared based on specific requirements of particular railway which cannot be uniform for all the zones and added that the National Disaster Management Act (NDMA) itself specifically described man made and natural disasters. Railway Board added that DM plans at Zones are comprehensive and can effectively deal with the challenges which emerge in the event of train accidents or other disasters.

Detailed instructions issued to Zonal Railways vide Railway Board letter No. 2009/Safety (DM)/6/14 dated 27 January 2016 is indicative of the fact that IR accepted the audit observations. The instructions issued covered the aspects like updating Zonal and Divisional Disaster Management Plans, crowd management, incorporating the vulnerability profile of different disasters and action plan to avert such disasters in the Zonal Disaster Management Plan and safety measures for handling hazardous chemical and inflammable materials.

RB in their reply (April 2016) accepted the shortfall in the updations of Zonal Disaster Management Plan during the period prior to 2014 and had issued instructions (June 2015) to General Managers of ECoR, SWR, NCR, SR, ECR and NR asking them to ensure immediate updation of the Zonal Disaster Management Plans.

Trivananthpuram of SR' Secunderabad, Hyderabad, Guntakal, Nanded, Guntur, Vijayawada of SCR; Bilaspur, Raipur, Nagpur of SECR; Hubli, Bangalore, Mysore of SWR
²⁰⁷ NCR, NER, NWR, SECR, SWR and WCR

6.8.3 Safety Audit

Safety Audit is conducted to identify system failures and generic shortcomings. Corporate Safety Plan (CSP) proposed that periodic Safety Audit be undertaken at various levels for an in depth assessment of Safety Systems. The Safety Audits were to be conducted by a Multi-Disciplinary team from Railway Board, Inter-Railway, Multidisciplinary Headquarters Team, Inter Divisional etc. In February 2009, Railway Board directed all Zonal Railways to constitute a team of five Senior Administrative Grade Officers from various departments along with similar numbers of Inspectors to audit/inspect at-least one unit for two consecutive days bi-monthly.

The review of the status of Safety Audit during 2010-15 by Audit revealed the following:

A. Nomination of five Senior Administrative Grade officers for Safety Audit

- Team of five Senior Administrative Grade officers and five inspectors were formed in all Zonal Railways except in South Central Railway and Metro Railway, Kolkata.
- Bi-monthly inspection schedule was not adhered to in any of the Zonal Railways.
- Shortfall in the number of inspections by Senior Administrative Grade teams over IRs during 2010-15 were as under:

Table 6.1-Details of shortfall in safety inspections

| Year | No. of Inspection due | No. of Inspection Conducted | Short fall in nos. | Short fall in Percentage |
|---------|-----------------------|-----------------------------|--------------------|--------------------------|
| 2010-11 | 96 | 50 | 46 | 48 |
| 2011-12 | 96 | 57 | 39 | 40 |
| 2012-13 | 96 | 59 | 37 | 38 |
| 2013-14 | 96 | 71 | 25 | 26 |
| 2014-15 | 96 | 81 | 15 | 15 |

(Source: Records of Zonal Railway Safety Department)

B. Safety Audit by Multi-disciplinary team from Railway Board

Multi-disciplinary team from Railway Board had not conducted safety audit in 14 Zonal Railways²⁰⁸.

²⁰⁸ ECoR, ER, NCR, NER, NFR, NR, SCR, SER, SECR, SR, SWR, WCR, WR and MR, Kolkata

C. Inter Railway Safety Audit

Inter Railway Safety Audit was conducted in all the Zonal Railways except South Western Railway. However, the prescribed periodicity of bi-monthly safety audit was not maintained in 13 Zonal Railways²⁰⁹.

D. Safety Audit by Multi-disciplinary Headquarter Team

Safety audit by multi-disciplinary headquarter team was conducted in all the Zonal Railways except East Coast Railway, South Eastern Railway & Metro Railway, Kolkata. The prescribed periodicity of bi-monthly safety audit by multi-disciplinary headquarter team was, however, not maintained in 11 Zonal Railways²¹⁰.

E. Inter Divisional Safety Audit

Inter divisional safety audit was not conducted in 11 Zonal Railways²¹¹ during 2010-11 to 2014-15. Bi-monthly Inter divisional safety audit was, however, not conducted in five Zonal Railways²¹².

Thus, safety inspections were not conducted on regular basis. There were no definite schedules of inspection and all divisions were not equally covered in the inspection. Many of the shortcomings noticed during the previous safety audits remained unattended.

On the issue of Safety Audit, Railway Board replied (April 2016) that compliance level during 2014 and 2015 has been to the extent of 88 and 95 per cent. Further, added that safety audit by the Multi-Disciplinary team of Railway Board was a onetime measure. RB is constantly monitoring safety audit inspection being carried out by Zonal Railways and wherever shortfall is noticed concerned railway is advised for corrective action.

Shortfall in the number of safety inspections which ranged between 38 to 48 per cent during 2010-13 is indicative of the inadequate monitoring. Further, though conducting inter-divisional safety audit was an important measure included in the Corporate Safety Plan 2003-13, Railway Board did not issue any guidelines in this regard but few Zonal Railways issued local instructions for inter-divisional safety. Railway Board though stated to have achieved 20 per cent reduction in the consequential train accidents in the year 2015-16 but has not brought out the position during the review period.

²⁰⁹ CR, ECoR, ECR, ER, NER, NFR, NR, NWR, SECR, SR, WCR, WR & MR, Kolkata

²¹⁰ CR, ECR, ER, NCR, NER, NFR, NR, NWR, SECR, SR & WCR

²¹¹ CR, ECR, ER, NCR, NER, NFR, NR, NWR, SECR, SWR & WCR

²¹² ECoR, SCR, SER, SR & WR

6.8.4 Safety Drive

As per Para 7.12 of Corporate Safety Plan 2003-13 of Indian Railway regarding Periodical Safety Drives, certain activities, which are seasonal in nature, are neither required to be performed by staff nor required to be checked by supervisors during the course of normal working for most of the part of the year. For such activities, Safety Drives are launched in order to correct a system failure, whenever detected.

Scrutiny of records relating to periodic safety drive revealed the following:

- Safety Drive on Train passing signal at danger and also at unmanned level crossings was conducted in all the Zonal Railways.
- Safety drive on adequacy of Guard Driver Report (GDR) check before starting trains was not conducted in nine Zonal Railways²¹³.
- Safety Drive on securing disabled trains was not conducted in five Zonal Railways.²¹⁴
- Safety Drive to Prevent Fire in Trains was conducted in all the Zonal Railways except South East Central Railway.
- Safety Drive on monitoring sensitive and vulnerable aspects of safety was not conducted by North Western Railway, North Central Railway and Metro Railway/Kolkata.



6.8.5 Rescue and Relief Equipments

The Public Accounts Committee in its Sixteenth report (15th Lok Sabha) pointed out (2010) grave inadequacies in the provision and persisting deficiencies in the maintenance of the aforesaid essential relief and rescue equipment such as Self-Propelled Accident Relief Trains (SPARTs), Accident

²¹³ CR, ECR, NWR, NCR, NR, SR, SECR, WR and MR/Kolkata

²¹⁴ NCR, NWR, SR, SECR and MR/Kolkata.

Relief Trains (ARTs), Accident Relief Medical Vans (ARMVs) in addition to breakdown cranes, etc. The SPARTs were also required to be upgraded to run at a speed of 140 Kilometre per hour. Provision of various tools/equipments relevant for rescue and relief operations therein was also recommended by PAC. Adequate maintenance schedules of all Relief/Rescue equipment including in Accident Relief Trains/cranes were laid down to ensure operational readiness at all the times.

Review of records and joint inspection of 16 Self Propelled Accident Relief Trains (SPARTs), 62 Accident Relief Trains (ARTs) and 56 Accident Relief Medical Vans (ARMVs) of 32 Divisions of 16 Zonal Railways revealed that:-

- As against the target for provision of 32 three coaches Self Propelled Accident Relief Trains in 32 selected Divisions, 14 SPARTs were available at Khurda Road, Waltair, Mughalsarai, Izzatnagar, Rangiya, Lucknow NR, Jaipur, Chakradharpur, Chennai, Mysore, Bhopal, Mumbai Central and Secunderabad (2 Self Propelled Accident Relief Trains).
- Two coach Self Propelled Accident Relief Trains available in two divisions (Howrah and Jhansi) were not converted into three coaches SPARTs.
- None of the existing SPARTs was fit to run with operational speed of 140 Km/hour.
- A test check of essential equipments in 16 SPARTs and 62 ARTs over Indian Railways revealed that :-
 - Self-contained breathing apparatus were not available in 04 SPARTs and 15 ARTs.
 - Inflatable tents were not available in 02 SPARTs and 33 ARTs.
 - Oxy fuel cutting equipments were not available in 02 SPARTs and 22 ARTs.
 - Inflatable air bags were not available in 01 SPART and 25 ARTs.
 - WLL exchange was not available in 10 SPARTs and 34 ARTs.
 - PC with high speed satellite modem was not available in 13 SPARTs and 40 ARTs.
- Trainings was not imparted to nominated ARMV and ART staff of Mechanical and Medical department in Howrah, Sealdah, Asansol, Malda Town Divisions and Metro Railway, Kolkata and Medical staff of ARMV in Bilaspur, Raipur and Nagpur divisions.

- Portable rail trolley was provided in 20²¹⁵ out of 55 ARMVs test checked.

6.8.6 Provision of other Rescue and Relief Equipments

The other rescue and relief equipment required to be provided for management of disasters include one 140 tonnes break down cranes in each Broad Gauge Division, emergency rail cum road vehicles and concrete pathway for ART/SPART/ARMV/SPARMV and availability of video transmission facility. A review of the provision of these rescue and relief equipment across IR revealed that:

- 12 breakdown cranes having 140T capacity were not procured in six Zonal Railways²¹⁶.
- Feasibility of introducing rail cum road vehicle (RCRV) after trial was not explored by the Zonal Railways except South Eastern Railway, Southern Railway and West Central Railway. The RCRV of Jabalpur division of West Central Railway remained idle for 13 months due to non-commissioning (March 2015).
- Provision of video transmission facility as directed by Railway Board (September 2006) were not available in nine Zonal Railways²¹⁷.

Thus, the disaster preparedness of Indian Railways was not satisfactory. Deficiencies in provision of SPARTs/ARTs/ARMVs and equipment provided therein were noticed in all the Zonal Railways. The ART/ ARMVs were located in the yard which was not easily accessible and it was difficult to reach the location within stipulated period in the absence of proper concrete pathway.

In their reply, Railway Board stated that provision of rescue and relief equipments is an ongoing process and concerned Zonal Railways are being advised to rectify the deficiencies noticed in availability of equipment in test check of their Railway's ART/ARMVs.

6.8.7 Risk Analysis and Vulnerability Profiles

The Sixteenth Report (Fifteenth Lok Sabha) of Public Account Committee (PAC) on Disaster Management in Indian Railways recommended that the Ministry of Railways should get a proper security evaluation done for analyzing different threat perceptions relating to train stations, tracks, bridges etc. so that a comprehensive security plan is formulated and adequate preventive and anti-sabotage security system is put in place.

²¹⁵ CR(2), ECoR (3), NER (4), NFR (1) SCR (2), SER (1), SECR (1), SWR (2), WCR (4)

²¹⁶ NER(2), NFR(2), SCR(1) , SECR(2), SER(1), WR(4)

²¹⁷ CR, ECoR, ECR, NER, NR, SECR, SR, WCR and WR

In the Action taken report the Railway stated that 202 vulnerable railway stations were identified for implementing 'Integrated Security System' (ISS), consisting of four broad areas such as Internet Protocol (IP) based Closed Circuit Television (CCTV) surveillance system, Access control, Personal and baggage screening system and Bomb detection/ disposal system were proposed to be installed to strengthen surveillance mechanism.

Review of the status of implementation of ISS at 202 vulnerable railway stations through joint inspection with the railway officials revealed the following:-

- IP based CCTV surveillance system was not provided at 94 vulnerable stations of 9 Zonal Railways²¹⁸.
- Access control was not provided at 112 vulnerable stations of 14 Zonal Railways²¹⁹.
- Personal and baggage screening system was not provided at 85 vulnerable stations of 12 Zonal Railways²²⁰.
- Bomb detection and disposal system was not provided at 123 vulnerable stations of 12 Zonal Railways²²¹.
- Unauthorized entry/exits were noticed at 111 vulnerable stations in 14 Zonal Railways²²².
- Public Address System was not available in Murtizapur station of Central Railway.
- Door Frame Metal Detectors were not provided at every entry points in vulnerable stations of nine Zonal Railways²²³.
- Security gadgets/mechanism like Bomb Basket, Water Canon, Car remote, Drilling Machines were not available in vulnerable stations of seven Zonal Railways²²⁴.
- Camera was fitted near tree at Tiruvananthapuram which affected the 360° vision.

²¹⁸ CR-11, ER-11, ECR-7, ECoR-4, NR-29, NCR-5, NER-3, NFR-8, SR-16

²¹⁹ CR-17, ER-11, ECR-7, ECoR-3, NR-18, NCR-5, NER-3, NFR-16, SCR-1, SR-14, SER-10, SECR-2, SWR-3, WCR-2

²²⁰ CR-10, ER-8, ECR-7, NR-26, NCR-5, NER-3, NFR-5, SR-4, SCR-1, SER-11, SECR-2, SWR - 3

²²¹ CR-15, ECR-7, ER-7, ECoR-4, NR-38, NCR-5, NER-1, NFR-16 SR-14, SER-11, SWR-3, WCR-2

²²² CR-15, ECoR-3, ECR-3, ER-3, SECR-2, WCR-2, SER-10, NWR-1 SCR-2, NER-3, NFR-12, NR-38, SR - 14, SWR-3

²²³ CR, ECR, ECoR, NR, NCR, NER, SR, SCR, and MR/Kolkata.

²²⁴ ECoR, NR, NCR, NER, SCR, SWR and MR/Kolkata.

- Vulnerable stations of East Coast Railway, East Central Railway, North Eastern Railway, North Central Railway, North East Frontier Railway & Southern Railway were not adequately fenced to guard unauthorised entry to the stations.

Thus, the Integrated Security System consisting of four broad areas of IP based Closed Circuit Television (CCTV) surveillance systems, access control, personal and baggage screening system and Bomb detection and disposal system was not fully implemented over 202 vulnerable stations identified. Many of the CCTV and Personal and baggage screening system were not in working condition for long periods. Unauthorised entries to the stations remained unchecked.

On the issue of Integrated Security System (ISS), Railway Board stated (April 2016) that it is an ongoing process and IR is in process of implementing ISS on priority. ISS has already become functional at nominated stations of Southern Railway, North Western Railway and South Central Railway. Components of ISS viz. CCTV cameras have already been installed at nominated stations of NR and Metro Railway Kolkata. In addition, execution of ISS work is in various stages of implementation at other zonal railways viz. NFR, WCR, NCR, ECoR, NER, CR, etc. Above reply is indicative of the fact that Railway Board accepted the deficiencies pointed out by Audit.

6.8.8 Crowd Management

Crowd management assumes importance in view of casualties due to stampedes at mass gatherings. Disaster caused due to stampede during Maha Kumbh Mela in Allahabad/North Central Railway in February 2013, which led to death of 37 passengers and injury to 45 passengers, was indicative of lack of disaster management plan for crowd management. Disaster Management Plan 2009 of Indian Railway provides that there should be preventive protocols when laid down footfalls defined for important stations become extraordinarily high, as during melas or other exceptional situations. National Disaster Management Authority issued guidelines (2014) on crowd management. These guidelines prescribe specific instructions on information, signage, safety and security measures and typical functions of security at venues of mass gatherings.

Joint Inspection of 279 crowded Stations as identified by 17 Zonal Railways and 68 Divisions revealed the following:-

- Only five Zonal Railways²²⁵ and 20 Divisions²²⁶ had included specific plans for crowd management in their DMPs.
- Though Disaster Management manual of Metro Railway recorded measures on crowd management but Video analytic system relating to signal for crowd density within station premises was not implemented as per recommendation made in National Disaster Management Authority (NDMA) guidelines to get timely information about the heavy crowd within the station premises.
- Station in charge of 117 stations of nine Zonal Railways²²⁷ were not aware of the guidelines of NDMA on managing crowd in the events of mass gathering.
- Copies of Divisional Disaster Management Plans were not available at 77 stations of six Zonal Railways²²⁸.
- Foot over Bridge (FOB) is a critical element of crowd management and is prone to stampede. It was observed that FOBs were not strong enough to sustain crowd pressure at 25 stations of seven Zonal Railways²²⁹.
- No emergency exit points were available at 23 stations of Northern Railway, North Eastern Railway and Western Railway.
- Standard operating procedure was developed for crowd management at disaster site with well-defined role of Railway Protection Force in the Disaster Management Plans of nine Zonal Railways²³⁰.

Indian Railways had not formulated an integrated disaster management plan to facilitate a cohesive approach to comprehensively address all aspects of disaster management and had not entered into formal co-ordination arrangements with the State Governments/District authorities, civil/private hospitals and other agencies to effectively leverage their infrastructure while responding to disasters. Apart from shortfall in conducting safety audit/drives, infrastructure of relief equipment especially the Self Propelled Accident Relief Trains (SPARTs), Accident Relief Trains (ARTs), Accident Relief Medical Vans (ARMVs) etc. was not only insufficient but were not also strategically placed. The surveillance mechanism was inadequate at the vulnerable and crowded stations. An effective mechanism to prevent unauthorized entry into station premises was not in place. IRs thus, could not achieve the desired level of

²²⁵ NFR, SCR, SECR, WCR and MR/Kolkata

²²⁶ NFR(5), SCR(6), SECR(3), WCR(3) and Lucknow, Delhi and Ferozpur of NR

²²⁷ CR, ECR, NCR, NER, NR, NWR, SCR, SWR and WR

²²⁸ CR, ECR, NR, NCR, NER and NWR.

²²⁹ CR, ECR, ECoR, NR, NER, SCR and SECR.

²³⁰ ECR, ECoR, NER, NFR, NR, NWR, SR, SER and SECR

preparedness to tackle the disasters.

RB in their reply (April 2016) stated that guidelines on the crowd management as mentioned in NDMA are being followed. RB added that IR's DMP contained provisions for managing crowd of mass gathering and not day to day working at stations. RB added that there are no event specific DMPs in IR.

Detailed instructions issued to Zonal Railways vide Railway Board's letter No. 2009/Safety (DM)/6/14 dated 27 January 2016 for inclusion of NDMA guidelines regarding crowd management in Zonal and divisional DMP amply supports the audit contention on the deficient crowd management mechanism. Further, event of mass gathering have also not been specified in Disaster Management Plan of Zonal Railways.

6.9 Post-Disaster response

6.9.1 Response during Golden Hour

The first hour after the accident is termed as 'The Golden Hour'. The issue was examined by the Public Accounts Committee (PAC). In reply to the PAC's observations in the Sixteenth Report (15th Lok Sabha), Ministry of Railways (MoR) stated (February 2011 that depending on the location of the accident, Railway Accident Relief Medical Vans (ARMVs) were seldom able to reach the accident site within the 'Golden Hour' for a variety of reasons including failure in timely dispatch of Rescue/Relief equipment at accident site etc.

Scrutiny of enquiry reports of Joint Committee of Railway officers/Commissioner Railway Safety in respect of test check of 126 serious train accidents which occurred during 2010-15 revealed the following:-

- Accident Relief Train (ART) and Accident Relief Medical Van (ARMV) were called in 57 and 83 accidents respectively and in none of the cases, ART reached the site within the Golden Hour.
- Barring three accidents (out of 83), ARMVs reached the site beyond Golden Hour. The range of delay was as under:

Table 6.2-Response of ARTs/ARMVs in the Golden Hour

| Relief Train | No. of accidents when ART/ARMV called for | ART/ARMV reached within one hour (Nos.) | ART/ARMV reached within two hours (Nos.) | ART/ARMV reached within three hours (Nos.) | ART/ARMV reached after three hours (Nos.) | ART/ARMV returned/ cancelled after call |
|--------------|---|---|--|--|---|---|
| ART | 57 | 00 | 10 | 12 | 33 | 02 |
| ARMV | 83 | 03 | 40 | 12 | 18 | 10 |

(Source: Accident review reports/CRS reports)

- Out of 126 accidents, 74 occurred on level crossings, 23 were due to derailment, 17 due to collision and the remaining 12 were attributed to other reasons.
- In a number of accident cases, Chief Safety Officer/Senior Divisional Safety Officer was not aware of the status of implementation of the recommendations of Joint Committee of Railway officers/Commissioner of Railways.

It was also observed that the contact no. of station masters of all stations *en-route* where train halts were not displayed in the coaches of the selected trains.

Thus, IR could not access the disaster sites on time and effectively provide rescue and relief to the accident victims. The performance of ART/ARMV showed that provision for recovery and relief during golden hour required improvement in response. Follow up action on the recommendations made by the Joint Enquiry Committee of Railways and Commissioner of Railway Safety on the Rail accidents enquiries was broadly followed. However, Safety Department was not aware whether the recommendations of the enquiry committee had been complied with by the departments concerned.

Railway Board replied (April 2016) that with enactment of DM Act local resources are being deployed in case of an accident for rescue and immediate relief. On-board staff and other railway officials travelling in the train are the first responders to provide rescue and relief to the effected passengers. Subsequent to the DM Act, relief and recovery during golden hour by means of ARMV is seldom required as injured people are rushed to the nearest hospitals through local ambulances.

Railway Board, however, did not offer any remarks on the audit comment on arrival of Accident Relief trains (ART) beyond the Golden Hour, drawn on the basis of accident enquiry reports of Joint Committee of Railway officers/Commissioner Railway Safety.

6.9.2 Preparedness of Railway Hospitals

Disaster Management Plan 2009 of IR provides for a Hospital Disaster Plan for prompt and effective medical care to affected peoples. The plan should be based on National disaster Management Authority (NDMA) Guidelines on Medical Preparedness and Mass Casualty Management. Hospital Disaster Management plan should also address a situation where the hospital itself has been affected by a disaster due to fire, explosion, flooding or earthquake. Hospital Disaster Management Plan should be tested once a year by mock drills for updating.

Tests check of records of 17 Central Hospital and 31 Divisional Hospitals related to preparation of Disaster Management Plan and availability of requisite infrastructure to effectively deal with the impact of disaster revealed the following:

- Hospital Disaster Management Plan (DMP) was not available in nine Central Hospitals²³¹.
- DMPs were not available in 15 Divisional hospitals²³².
- 10 Central Hospitals²³³ and 20 Divisional Hospitals²³⁴ out of 40 Divisions of Indian Railway had conducted mock drills once a year.
- There were shortages of 149 Doctors and 1564 other medical staff.
- 526 Doctors (47 per cent) and 4517 Para Medical Staff (37 per cent) were trained in Disaster Management.
- Casualty beds were not available in Central Hospitals of North Central Railway and South East Central Railway and divisional hospitals of Secunderabad (South Central Railway), Bilaspur (South East Central Railway), Jabalpur (West Central Railway), Mumbai (Central Railway), New Bongaigaon Junction, Rangiya (Northeast Frontier Railway) and Delhi (Northern Railway).
- Blood Banks were available only in six Central Hospitals²³⁵ out of 17 Central Hospitals and in six Divisional Hospitals²³⁶ out of 31 Divisional Hospitals.
- Ambulances were not available in Varanasi (North Eastern Railway), Secunderabad (South Central Railway), Kharagpur and Chakradharpur (South Eastern Railway), Thiruvananthapuram (Southern Railway) and Metro Railway/Kolkata.

Thus, most of Central and Divisional Hospitals did not prepare their Disaster Management Plans and did not address action plan in a situation like fire, explosion, flooding or earthquake. Annual mock drills were also not conducted as prescribed in Indian Railway Disaster Management Plan 2009.

²³¹ ER, ECoR, ECR, NCR, NER, NFR, SR, SWR & MR/Kolkata

²³² Waltair, Khurda Road of ECoR; Mughalsarai, Samastipur of ECR; Jhansi, Allahabad of NCR; New Bonaigaon (Rangia); Katihar (NFR); Hubli, Mysore of SWR; Izzatnagar-NER; Sealdah-ER; Bikaner-NWR; Chennai, Tiruvananthapuram of WR

²³³ WR, WCR, SWR, SECR, SCR, NWR, NR, NCR, SR & MR/Kolkata

²³⁴ Varanasi-NER; Secunderabad, Vijayawada, Hyderabad, Guntur, Guntakal, Nanded of SCR; Hubli (SWR); Jabalpur, Bhopal of WCR; Dhanbad, Samastipur of ECR; Ahmedabad, Mumbai Central, Vadodara, Bhavnagar, Rajkot, Ratlam of WR; Bilaspur, Nagpur of SECR

²³⁵ ER, NFR, NR, SCR, SER and SR

²³⁶ Kharagpur-SER; Asansol, Howrah of ER; Guntakal-SCR; Nagpur-CR; Mysore-SWR

Railway Board in reply (April 2016) stated that Instructions to Zonal Railways have been issued vide Board's letter No. 2012/H/7/1/Misc. dated 11.03.2016 to ensure necessary corrective step in respect of above audit findings. Thus, the instructions issued by the Railway Board vindicates the audit stand that majority of Central and Divisional Hospitals had not prepared their Disaster Management Plans.

6.9.3 Modernisation and Strengthening of Railway Protection Force

Public Accounts Committee *inter-alia* recommended (April 2010) that RPF be reformed, modernized and expanded to provide the required level of manpower and security. In their ATN, the Ministry stated that the following measures were proposed to be taken to modernise/strengthen Railway Protection Force (RPF):-

- `67.09 crore have been allocated for procurement of modern security related equipment for RPF and procurement process is underway.
- RPF personnel are being equipped with modern fire arms like AK-47 rifles.
- Proposal for legal empowerment of RPF to deal with passenger related offences is under examination of the Board.
- 973 non-gazetted posts in RPF were sanctioned in the year 2008 and recruitment process had already been completed. To further augment the strength of RPF, 5134 posts have been created with the approval of Ministry of Finance for which recruitment process had been initiated.
- To strengthen railway security in vulnerable sections, creation of infrastructure for three new Railway Protection Special Force (RPSF) battalions had been sanctioned under Works Programme 2010-2011. Headquarter's of above Battallion will be at Manwal (Northern Railway), Cooch Behar (Northeast Frontier Railway) and Asansol (Mahila Battalion) (Eastern Railway).
- A Commando training Centre to impart Commando Training to RPF/RPSF personnel has been approved to be set up at Canning/Eastern Railway.
- An All-India RPF Help line, sanctioned at an estimated cost of ` 5 crore is being set up.
- Networking of security control Rooms and posts of RPF at Divisions, Zones and Railway Board has also been approved to improve response to passenger and ensure better crime control.

- 12 Commando companies are being raised by giving commando training to RPSF personnel in institutes of repute.
- A National Dog Training centre has been approved at Podanur, Southern Railway with a capacity of training 50 dogs at a time.

However, review of records revealed that the measures to modernise and strengthen RPF are still at various stages of implementation, except proposed empowerment of RPF to deal with passenger related offences and establishment of commando training centre. The Railway administration intimated (January 2016) that a comprehensive bill was drafted to empower RPF to deal with passenger related offences. However, Ministry of Home Affairs recently conveyed their opposition to the proposed amendment in the RPF Act.

The Railway added that in view of availability of adequate land and other factors, it has been proposed to set up Commando training centre at Jagadhari (Northern Railway) and Live-Bullet-Tactical exercise facility at Chink Hill/Central Railway

6.10 Capacity building to face disasters

Indian Railway formulated Corporate Safety Plan (2003-13) in August 2003 which envisaged a Safety Action Plan directed towards continuous reduction in risk level to its customer, implementation of suggested system reforms, imbibing better safety culture, enhancement of asset reliability etc. The National Policy on Disaster Management provides that all Central Ministries and Departments of the Central Government and of the States will build capacity to handle different types of Disasters based on the guidelines issued by the National Disaster Management Authority. The necessary budgetary allocations will be made as part of the Five Years and Annual Plans.

6.10.1 Implementation of Corporate Safety Plan

Corporate Safety Plan (CSP) had envisaged a broad action plan for all the works to be carried out for the entire plan period (2003 to 2013). CSP *inter-alia* envisaged renewal and replacement of over-aged assets, tracks, rolling stocks and bridges. In the previous Audit Report²³⁷, it was observed that specific action plan for implementation of CSP (Phase I/2003-08) was prepared by only nine Zonal Railways²³⁸. In their Action Taken Note, Ministry of Railways stated (2008) that there had been overall 62.2 *per cent* of financial progress, which is more than pro rata and considered satisfactory. Zonal Railways were, however, advised to prepare an action plan for Phase II of CSP covering the

²³⁷ Comptroller and Auditor General of India's Report NO. PA 8 of 2008 (Union Government –Railways)

²³⁸ SR, CR, ER, WR, NER, NCR, ECR and NFR

period 2008-13 with revised targets for all those works where the progress was not satisfactory.

Scrutiny of records relating to implementation of Phase II of CSP revealed that eight Zonal Railways ²³⁹ out of 17 had framed Phase II action plan of CSP. While in four Zonal Railways (Northeast Frontier Railway, South Western Railway and Southern Railway and Metro Railway/Kolkata) action plan was not drawn and in the remaining four Zonal Railways (East Cost Railway, North Central Railway, South Eastern Railway and South East Central Railway), information regarding preparation of action plan was not made available to Audit.

Review of the performance of Indian Railway (IR) in replacement of over-aged locomotives and induction of new technology for welding of rail joints revealed the following:

A. Status of Over-aged Rolling Stock

Status of over aged coaches, wagons, electric locos and diesel locos as on 31 March 2015 over IR was as under:

Table 6.3-Over-aged rolling stock as on 31 March 2015

| Rolling Stock | Total (No.) | Over-aged (No.) |
|----------------|-------------|-----------------|
| Coaches | 56155 | 635 |
| Wagons | 226974 | 3858 |
| Electric locos | 5023 | 32 |
| Diesel locos | 5535 | 243 |

(Source: PCDO/MCDO of Zonal Mechanical & Electrical Department)

Review of records revealed that:

- In Central Railway, there was an accident which was attributed to overage of rolling stock. Commissioner of Railway Safety (CRS) recommended that EMU coaches which had completed codal life of 25 years plus rehabilitation period should be withdrawn from service and 2nd life rehabilitation of EMU coaches should not be done. However, no action was taken by the Railway Administration in this regard.
- In Metro Railway, Kolkata, the codal life of 47 coaches was extended by the Railway Board for one POH cycle for 3 years in May 2013. In February 2015, Commissioner of Railway Safety (CRS) stressed the need of replacement of over-aged coaches.

²³⁹ CR, NER, NR, ECR, WR, SCR, WCR and ER

B. Induction of new technology - Mobile Flash Butt Welding

Corporate Safety Plan (CSP) emphasised (2003) that the Alumino-Thermit welds²⁴⁰ were to be gradually phased out with the introduction of Flash Butt welds. It was, however, observed that Alumina- Thermit welds were used extensively. It was also observed that flash butt welding was not inducted in open line in seven Zonal Railways²⁴¹.

C. Integrated maintenance blocks

For implementing the concept of preventive maintenance for the safety of operations, granting of adequate time for maintenance of tracks is essential. Since granting of maintenance blocks²⁴² particularly for the saturated sections is an expensive proposition, CSP emphasised that each maintenance block granted needs to be simultaneously utilized by all the concerned departments such as Engineering, Signal & Telecommunication, Electrical etc. It was, however, observed that the integrated maintenance block (simultaneous involvement of all the departments concerned) was not adopted in 11 Zonal Railways²⁴³.

D. Control Office Application

Control Office Application (COA) is comprehensive software for the automation of Control Charting at Divisional Control Office. It provides real time information on train operation which, in turn, assists in planning maintenance block. COA has provision for capturing the block given details section-wise which can be retained at any time. It was, however, observed that COA was not introduced in three Zonal Railways (Eastern Railway, East Coast Railway and South Central Railway).

Thus, the implementation of second phase Corporate Safety Plan relating to over-aged rolling stock, introduction of new technology and progress in respect of elimination of Unmanned Level Crossing was lagging behind schedule affecting the capacity building of the Indian Railways to face disasters.

In reply, Railway Board stated that CSP 2003-13 was implemented and targets for reduction in accidents were achieved with certain shortfalls in respect of eliminating unmanned level crossings and replacement of over-aged rolling stock.

Contention of Railway Board on achieving the targets is not acceptable as Railway Board had earlier advised Zonal Railways to prepare an action plan

▪ ²⁴⁰ Welding is a process that causes fusion of metals by heating them with superheated molten metal from an alumino thermic reaction between a metal oxide and aluminium. On Indian Railways Alumino thermic welding with short pre-heating process called SKV welding is used for welding of rails of different chemistry and sections.

²⁴¹ ER, NER, WR, SER, ECR, SECR and SWR

²⁴² suspension of traffic in a specified period for maintenance purposes

²⁴³ ER, NWR, NER, NCR, ECR, SECR, ECoR, SWR, WCR, NFR and SR

with revised targets (CSP Phase II) for all those works where the progress was not satisfactory. Thus, Railway Board's reply is contradictory and lacked details as to how the left over targets were achieved.

6.10.2 Management of Chemical Disasters

The growth of chemical industries has led to an increase in the risk of occurrence of incidents associated with hazardous chemicals (HAZCHEM). With their proliferation, the demands for their transportation by rail have gone up significantly. Chemical accidents result in fire, explosion and/or toxic release. Railways have their own safety manual²⁴⁴ for the transportation of hazardous goods.

Disaster Management Plan 2009 of Indian Railways recognised that the Railways' expertise in dealing with the mishaps like spillage, catching fire etc. of these dangerous goods is very limited. It was therefore felt imperative that the respective Zonal Railways develop and nurture coordination with those agencies and organisations on their system which have expertise in dealing with the hazardous material. Disaster Management Plans of Zonal Railways as well as Divisions should contain information of such agencies so that these agencies can be called for without any delay during any untoward incident. DM Plan 2009 of IR outlined a dedicated communication system which was to be established for Rail Transportation to monitor movement of Toxic Chemical Agents. A mechanism was to be developed like a Geographic Information system (GIS) for continuous monitoring of such Transport Vehicles along their route. The plan further required that an Action plan should be worked out by Railways to prevent Chemical Disaster at crowded railway stations and yards.

Scrutiny of Disaster Management Plans (DMPs) of 68 divisions of Indian Railways and records relating to co-ordination with agencies having expertise in handling chemical disaster revealed that:-

- DMPs of only 24 Divisions²⁴⁵ contain preventive measures for handling any disaster arising during handling and transportation of hazardous Chemical and Inflammable material.
- GIS system was not implemented in Zonal Railways.

²⁴⁴ Red Tariff No. 20 prepared by the Indian Railways Conference Associations .

²⁴⁵ Waltair-ECOR; Allahabad, Agra Cantt., Jhansi of NCR; Delhi-NR; Bikaner, Jaipur, Jodhpur of NWR; Secunderabad, Hyderabad, Guntur, Nanded, Vijayawada, Guntakal of SCR; Adra, Chakradharpur, Kharagpur, Ranchi of SER; Mysore, Bangalore, Hubli of SWR; Jabalpur-WCR, Ahemadabad, Mumbai Central of WR;

- Contact details of agencies and organisations that had expertise in dealing with the hazardous material were available in the Divisional Disaster Management Plan of 22 Divisions²⁴⁶.
- The Commercial Department of 19 Divisions²⁴⁷ had kept the Railway Protection Force official updated on the developments in stations and Train services so that adequate security systems could be strengthened.
- Action plan to prevent Chemical (Terrorism) Disaster at crowded railway stations was available only at Lucknow (Northern Railway) and Jabalpur (West Central Railway).

Thus, Indian Railways could not initiate adequate measures to tackle chemical disaster.

Railway Board replied (April 2016) that Indian Railways initiated adequate measures to tackle chemical disaster. Zonal Railways were advised to incorporate suitable provisions in their respective DM Plans vide Railway Board letter No. 2008/Safety (DM)/Che/6/3 dated 21 January 2009. Zonal Railways handling the hazardous material confirmed for the inclusion of these provision in their respective DM Plans. Contact details of agencies and organisations having expertise in handling hazardous chemicals were included in the DM plan.

Reply is not tenable as National Disaster Management Authority had suggested strengthening the system of safety in transportation of hazardous goods. In this backdrop, the Railway Board must take in all seriousness, the audit finding that DMPs of only 23 divisions contain preventive measures for handling any disaster arising during handling and transportation of hazardous Chemical and Inflammable material. It is also a matter of concern that Action plan to prevent Chemical (Terrorism) Disaster at crowded railway stations was available only at Lucknow (NR) and Jabalpur (WCR).

Further, the Zonal DM Plan of East Coast Railway acknowledged that Railway's expertise in dealing with the mis-happenings like spillage, explosion, catching fire, release of toxic etc. of the dangerous chemicals was limited warranting help from agencies and organizations such as National Disaster Response Force (NDRF), Orissa Disaster Rapid Action Force (ODRAF), Indian Oil Corporation, Bharat Petroleum Corporation Limited who have expert in

²⁴⁶ Mumbai, Bhuwawal, Nagpur, Solapur of CR; Waltair-ECOR; Allahabad, Agra Cantt., Jhansi of NCR; Ajmer, Bikaner, Jaipur, Jodhpur of NWR; Chennai, Tiruchchirappalli, Madurai, Salem, Palakkad, Tiruvananthapuram of SR; Mysore, Hubli of SWR; Jabalpur-WCR

²⁴⁷ Allahabad, Agra Cantt., Jhansi of NCR; Lucknow, Delhi of NR; Ajmer, Bikaner, Jaipur, Jodhpur of NWR; Mysore, Hubli of SWR; Jabalpur, Kota of WCR; Ahemadabad, Mumbai Central, Vadodara, Bhavnagar, Rajkot, Ratlam of WR;

dealing with the hazardous goods were asked for relief and rescue operation during a chemical disaster. Though it was mentioned that the agencies and their contact numbers were given in the Annexure, contact details of Indian Oil Corporation and Bharat Petroleum Corporation Limited were not given in the Disaster Management Plan.

6.10.3 Availability and Utilisation of Funds for Disaster Management

According to Section 36(e) of the Disaster Management Act, 2005, every Ministry/Department of the Government of India must allocate funds for measures such as prevention of disaster, mitigation, capacity-building and preparedness. It was, however, observed that specific funds were not earmarked and no Head of Accounts was created to allocate the expenditure related to disaster management.

6.10.4 Allocation and utilisation of funds under Railway Safety Fund

The works relating to Level crossing (LCs) and Road Over Bridge/Road Under Bridge (ROB/RUB) are being financed mainly from Railway Safety Fund (RSF) and Capital. 1252 LCs with more than one lakh Train Vehicle Units (TVUs) were targeted to be replaced with ROB/RUB in the Corporate Safety Plan (CSP) 2003-2013. Achievement as of March 2008 was 158 ROB/RUB only. In the budget speech of 2010-11, the Minister of Railways had assured that a special drive was being launched for manning of all the unmanned LCs in the next five years. In the budget speech of 2011-12, the Ministry of Railways (MoR) lowered the eligibility criteria for manning level crossings from 6000 TVUs to 3000 TVUs and assured that efforts would be made in the coming years to eliminate the remaining eligible 2500 unmanned level crossings. As per Vision 2020 documents of Indian Railways (December 2009), all Zonal Railways were to eliminate all eligible unmanned level crossings by March 2015.

Review of records relating to allocation and utilisation of funds under Railway Safety Fund (RSF) and elimination of Unmanned Level Crossing revealed the following:-

- Allocation and utilisation of funds under RSF showed that against allocation of ` 5167 crore, the expenditure incurred was ` 4413 crore (85 *per cent*) during 2010-15.
- Shortfalls in achieving the target were noticed in construction of Road Over Bridge/Road Under Bridge in West Central Railway during 2010-11, North Eastern Railway & Western Railway during 2011-12, Central Railway, North Western Railway, South Central Railway, West Central

Railway & Western Railway during 2012-13, West Central Railway during 2013-14 and South East Central Railway, south Eastern Railway & Western Railway during 2014-15.

- Out of 14464 Unmanned Level Crossings (UMLC) as on 1 April 2010, 4938 Level Crossings (LCs) were targeted for manning during 2010-15. Till March 2015, 2329 LCs (47 per cent) were manned.

6.10.5 Training on Disaster Management

National Disaster Management Policy 2009 emphasised the need of training on various aspects of disaster management for officials of the Government Departments. Railway Board decided to revamp training on disaster management and issued instructions (January 2009) to all Railway Training Institutes and the Zonal Railways. As per Railway Board instructions, training was to be imparted to different categories of officials from top management to on-board staff in different frequencies. The Public Accounts Committee in its 16th report (15th Lok Sabha) observed that about 83- 86 per cent of the train accidents were caused by human errors, especially due to the failure of Railway staff. Railway Board in their Action Taken Note stated that training modules of staff were revamped by incorporating practical aspects.

Scrutiny of records relating to disaster management training revealed that:

- Training modules were revamped including practical aspects for running staff in four Zonal Railways²⁴⁸.
- Shortfall in imparting trainings to frontline staff was noticed as detailed below:-

Table 6.4-Training to the frontline staff

| Year | Total strength of Front line Staff (Nos.) | No. of staff trained | Percentage of shortfall |
|---------|---|----------------------|-------------------------|
| 2010-11 | 110463 | 31151 | 71 |
| 2011-12 | 114397 | 30483 | 73 |
| 2012-13 | 120473 | 29985 | 75 |
| 2013-14 | 123597 | 32655 | 73 |
| 2014-15 | 128956 | 32127 | 75 |

(Source: Records of Zonal Railway Training Institutes, Zonal Personal & Safety Department)

²⁴⁸ NCR, NFR, NWR and WCR

6.10.6 Mock Drills

In terms of instructions issued by Railway Board vide letter No. No. 2008/Safety (A&R)/14/4 New Delhi, dated 18 February 2009, conducting mock drills is very important for checking the preparedness of ARMVs/ARTs as well as concerned staff. The mock drills have to be organized regular in coordination with the Sr. DOMs in the Division, and the COMs in Headquarters. Examination of the records relating to conduct of Mock Drills over 68 Divisions of Indian Railways during 2010-15 revealed that:-

- There was no shortfall in full scale mock drill over Southern Railway, South East Central Railway and Metro Railway, Kolkata.
- Full scale mock drill was not conducted in 15 Divisions²⁴⁹ of seven Zonal Railways and in any of the Divisions of South Central Railway.
- As against the requirement of 245, 175 full scale mock drills were conducted in 49 divisions of 16 Zonal Railways²⁵⁰.

Thus, the nodal organization i.e. Safety Department both at the divisional and Zonal level failed to monitor the training needs of the staff with reference to the disaster preparedness. The status of progress of training imparted to frontline staff indicated that Indian Railways were not serious in developing skills of staff to deal with emergency during disasters.

6.10.7 Status of implementation of High Level Committee (HLC) and Recommendations of Disaster Management Review Committee (DMRC)

A High Level Committee (HLC) was constituted in September 2002 to review Disaster Management in Indian Railways. Out of 111 recommendations (April 2003) of the Committee, 102 recommendations were implemented till March 2014 and the remaining nine related with the following issues were under various stages of implementation across the Zonal Railways:

- Converting two coach Self Propelled Accident Relief train (SPART) to three coach SPART;
- Feasibility of introducing Rail Cum Road Vehicle (RCRV);
- Emergency Automatic lights in coaches;
- Air conditioned mortuaries;

²⁴⁹ Varanasi-NER; Secunderabad, Vijayawada, Hyderabad, Guntakal, Guntur, nanded of SCR; Adra-SER; Hubli-SWR, Jabalpur, Bhopal of WCR; Dhanbad, Samastipur of ECR; Bilaspur, Nagpur of SECR

²⁵⁰ ER, SER, NER, NEFR, WCR, SECR, SR, SWR, NR, MR/Kolkata, WR, CR, NCR, NWR, ECoR and ECR

- Specialised tunnel rescue equipments;
- Provision of Computer in Accident Relief Trains with high speed satellite modem for video conferencing facility from the accident site with Railway Board and the Zonal Railway Headquarters;
- Disaster Management Institute with special focus on rescue operations.

Subsequent to formation of High Level Committee (HLC), another Disaster Management Review Committee was constituted in February 2007 under the Chairmanship of Shri G. Narain, with Terms of Reference to audit the current preparedness of all types of disasters/hazards for prevention, mitigation, rescue, relief and rehabilitation; integration of disaster reduction concept into development planning; and to recommend areas of multi-stakeholder partnership and citizen participation to establish a coordinated mechanism for disaster reduction, response and rehabilitation etc. The Report was submitted in December 2008. The Committee made 108 recommendations and of them, 41 recommendations were accepted by the Ministry of Railways.

Audit observed that out of 41 recommendations accepted by the Railways, five recommendations (mainly pertaining to (i) Disaster Management Plan for Railways falling in Seismic Zones, equipping ARTs with all weather under water cutting and provision of pathways in tunnels and bridges) were under various stages of implementation across Zonal Railways

On the issue of implementing the recommendation of DMRC, RB admitted (April 2016) that IR is in process of implementing the same. Railway Board further stated that Rail cum Road Vehicle is undergoing trials and procurement of telescopic boom Crane is under consideration. Emergency automatic lights have also been provided in 75 per cent of the identified coaches.

Contention of Railway Board is not acceptable as recommendations made by HLC and DMRC in April 2003 and December 2008 respectively still remained to be implemented even after a lapse of 12/7 years.

6.10.8 Disaster Management Awareness

In their Action Taken Note, Ministry of Railways stated (February 2010) that most of the accidents at unmanned level crossings occurred due to lack of awareness on the part of road users. Indian Railway (IR), therefore, started comprehensive social awareness programmes and publicity campaigns through electronic and print media to educate the road users about the precautions to be observed while negotiating the unmanned Level Crossings.

Scrutiny of records relating to initiatives of IR in creating awareness among the general public revealed that the Zonal Railways had taken initiative through advertisement, SMS, posters etc. to create awareness in general public about

disaster. It was, however, observed that out of 126 serious accidents occurred during 2010-15, 76 accidents took place at level crossings which indicated lack of awareness among the general public while negotiating level crossings.

6.10.9 Role of RDSO in Capacity Building

The primary quality policy of Research Designs and Standards Organisation (RDSO) is to develop safe, modern and cost effective railway technology complying with statutory and regulatory requirements. The Corporate Safety Plan (2003-13) envisaged development and implementation of certain new technologies in improving the safety in train operations which were entrusted with RDSO to develop them in a time bound manner. In the Comptroller and Auditor General of India's Report No.8 of 2010-11 (Union Government-Railways), the performance of RDSO in introduction of new technologies covering Phase I of CSP (2003-08) was highlighted. In the present review, Audit examined the status of progress of all ongoing projects in Phase I of CSP as well as new projects taken up during Phase II of CSP (2008-13). The status of different RDSO projects is discussed below:

A. Development of trackside bogie monitoring system:

Derailment of goods train due to defects in bogie of wagons is a major hindrance to the safe and smooth operation of freight trains. Track Side Bogie Monitoring System gives advance warning relating to wagons which develop defects in bogies. It was observed that the proposal submitted by RDSO to the Railway Board in December 2005 was sanctioned in 2006 at a cost of `4.61 crore. A Purchase Order was placed in June 2008 on an Australian firm at a cost of US \$ 9,14,852 for supply, installation and commissioning of Track Side Bogie Monitoring System. The system was supplied in March 2009 and commissioned in January 2010 at Bakkas Railway station in Lucknow – Sultanpur section at a cost of ` 5.34 crore. The system was, however, not implemented till March 2015.

B. Test track facility

Railway Board approved (July 1987) the provision of a test track facility at Mughalsarai station of East Central Railway at a cost of ` 5.98 crore which was frozen by the Director General RDSO in 1993 due to fund constraint after incurring an infructuous expenditure of ` 3.16 crore. The work was again sanctioned (April 2002) at an estimated cost of ` 87.30 crore, which did not materialise due to non finalization of site.

The plan was further reviewed in the Governing Council Meeting in November 2006 and the estimate was revised to ` 133.19 crore. An abstract estimate for the consultancy work was approved by the Railway Board in February 2007 for ` 6.82 crore. The Railway Board approved entering into consultancy with Transportation Technology Centre Inc/Rail India Technical and Economic Service but the same could not be finalized. The work was dropped in March 2012 with the directives to engage a consultant to prepare the Detailed Project Report. In October 2014, RDSO advised the Railway Board that no consultancy work was required as RDSO had gained considerable experience on this matter. Railway Board in February 2015 directed RDSO to prepare a proposal for the test track which should be useful to carry out research work. Accordingly, a work of “Infrastructure facilities for test track on newly constructed Lonard-Phaltan section of Central Railway was proposed by RDSO in preliminary work programme (PWP) 2015-16 at a cost of ` 101.50 crore. The approval of the Railway Board was awaited (March 2015).

Thus, even after a lapse of 13 years, RDSO could not implement the project due to delay in finalization of site.

C. Three Coach High Speed Self Propelled Accident Relief Train

In February 2003, Railway Board directed RDSO to develop a suitable design to combine the existing self-propelled ARMV's and ART's into a three-coach design of Self-Propelled Accident Relief Train (SPART). Accordingly, RDSO (March 2005) issued a specification for SPART. RDSO advised (January 2008) Railway Board that the maximum speed potential of SPARTs with adequate acceleration reserve is 105 Km/h for 2- coach SPART and 130 Km/h for 3 coach SPART. RDSO, therefore, revised (March 2009) and upgraded the specification of 3-coach high speed SPART with two power cars.

During 2010 to 2014 various issues relating to schedule of dimension (SOD), condonation of infringement, sanction of CRS and oscillation trials were finalized. RDSO issued (December 2014) and circulated the Final Speed Certificate for operation of SPART up to maximum speed of 105 Km/hr and 115 Km/hr.

Detailed oscillation trials of high speed SPARTs were conducted by RDSO in Bina - Bhopal section and a satisfactory speed potential of 130 km/hr was established. No further development to attain the maximum speed of 130 Km/hr. was available on the records of RDSO.

In addition to adoption of new technologies on the above areas, RDSO were also assigned the task of identifying vulnerable buildings, locations, rail infrastructure including bridges, sensitive locations etc and issue suitable

guidelines to the Railway and action plan of all Zonal Railways was to be submitted by RDSO to Railway Board by 25 January 2008. It was, however, observed that RDSO has neither identified vulnerable buildings, locations, rail infrastructure including bridges, sensitive locations etc nor issued any guidelines till March 2015.

Thus, contrary to provision of Indian Railway Disaster Management Plan 2009, RDSO had not identified vulnerable buildings, locations, rail infrastructure including bridges, sensitive location, water ways embankments etc. of Zonal Railways.

6.11 Conclusion

Disaster Management Plan of Indian Railways was formulated in line with the National Disaster Management Policy and the provisions contained in the Disaster Management Act 2005. The Public Accounts Committee in their sixteenth Report recommended that the Disaster Management Plan (DMP) should be integrated, comprehensive and uniform to effectively deal with the challenges which emerge in the event of train accidents or other disasters. DMPs of Zonal Railways and their Divisions were not comprehensive and also lacked uniformity. DMPs did not provide for mechanism for establishing co-ordination with the various civil authorities. Disaster Management Plans of many Zonal Railways and Divisions were silent on the action plan for efficient crowd management.

Safety Audit to identify system failures and generic shortcomings was not conducted as per prescribed periodicity, besides there was lack of proper follow up action. Availability of required number of rescue and relief equipments was not ensured at many locations. Integrated Security System' which *inter-alia* includes Closed Circuit Television surveillance system, access control, personal and baggage screening etc. were not implemented in many of the 202 vulnerable stations identified by the Indian Railways.

Apart from the lack of requisite infrastructure to effectively provide medical assistance to disaster affected masses, Comprehensive Hospital Disaster Management Plan was not available in many hospitals of Indian Railways.

Implementation of different safety measures as envisaged in the Corporate Safety Plan and also safety related projects assigned to Research Design & Standards Organisation (RDSO) were lagging behind schedule. Manning of unmanned level crossing and replacement of over-aged rolling stock, which have direct bearing on safety of passengers, were not accorded due priority.

6.12 Recommendations

Following recommendations are suggested for ensuring implementation by Railway Board:-

- Ensure updating of Zonal and Divisional Disaster Management Plans. Vulnerability profile of different types of disasters and action plan to avert and mitigate such disasters needs to be included in Disaster Management Plan of Zonal Railways.
- Strengthen monitoring mechanism to ensure compliance of its instructions for conducting safety audit as per prescribed periodicity and also to ensure follow up action on the Safety Audit Reports.
- Ensure installation of Integrated Security System at all the identified vulnerable stations on priority and needs to ensure effective functioning of the Integrated Security Surveillance System.
- Ensure availability of Accident Relief Trains (ARTs), Self-Propelled Accident Relief Train (SPART), Accident Relief Medical Vans (ARMVs) in adequate numbers, besides ensuring their placement in strategic locations and their preparedness with availability of equipment and essential medicines having enough shelf life at all times so that relief to passenger is available in Golden Hour.
- Formulate a Hospital Disaster Management Plan and develop requisite infrastructure to ensure emergency preparedness for providing necessary medical care to the disaster affected population.

New Delhi
Dated:

(Balvinder Singh)
Deputy Comptroller and Auditor General

Countersigned

New Delhi
Date:

(Shashi Kant Sharma)
Comptroller and Auditor General of India

