

### DISASTER MANAGEMENT PLAN FOR RAILWAY HAZARDS EXCEPT ACCIDENTS

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## DISASTER stands for:

# Damaging Influential Situations Affecting System Task's Expected Reliability







## Stress Factors caused by Disaster





Causes for Disaster except Railway Accidents





## **Classification of Natural causes of Disasters**





## **Disaster Management Activities**





## **Railway Interactions for Disaster Management**



#### **State Governments**

- Police
- Fire Service
- Disaster Reponse force
- Civil Defence
- Home Guards

#### **Government of India**

- Cabinet Committee on natural calamities
- Ministry of Home Affairs
- Planning commission
- National Institute of Disaster Management

- National Disaster Mngt. Forum
- National Disaster Mitigation Agency
- Armed forces
- Central Para military forces

Railways and

Disaster Management

#### Community

• NGOs

- Corporate sectors
- Metrological bodies
- Academic institutions
- Scientific organisations
- Technical institutions

International organisations



## **Preparedness for Disaster Management**



- Well defined Roles and Responsibilities help in focused planning,
- Coordination and implementation of Programs and Activities.
- Mapping of Country Hazard and Vulnerability Maps and identifying Risk Zones and populations at risk.
- Identification of locations of Shelters and Critical Infrastructure.
- Access to Telecommunication and Electricity.
- Equipment, Emergency personnel and Volunteers for disaster response.
- Mitigation of Panic, Misguiding, Misallocation of resources and uncertainties, preventing Huge Costs in the Rescue process.



## **Disaster Management for Floods**





## **Disaster Management for Earthquakes**





## **Disaster Management for Cyclones**





## Disaster Management for Landslides and Snow Avalanche



#### Global Warming & Climate Change I and slides due to Earthquakes. Debris Flow (A mixture of Water and Clay, Silt, Sand and Rock) Low Internal Cohesion between Snow Crystals causing Loose Snow Avalanches. LANDSLIDES & Snow Layer / SNOW AVALANCHE Layers, with sufficient Internal cohesion causes

Slab Avalanche

#### LANDSLIDE RISK MANAGEMENT

- Monitoring & Forecasting
- Early Warning Systems
- Treating Vulnerable Slopes and existing Hazardous Landslides
- Restricting further development in Landslideprone areas.
- Strict codes for Excavation, Construction and Grading.

#### **REMEDIAL PRACTICES**

- Slope Geometry correction,
- Protection to the Toe of Slope by retaining Structures,
- Management of the Surface and Sub-surface water,
- development of Pore Pressures, Nailing, Bolting, Anchoring, Micro piling, Application of Geo-grids and Geo-textiles and Afforestation,

## **Causes for Industrial Hazards**





## Railways disaster Management Activities during Pandemics like COVID 19



Boosting the Supply Chain by Swift and Efficient Transport of Utilities (SETU)

Manufacture essential items utilized for the Treatment of affected people by this pandemic

Modified Coaches with Medical equipment and Oxygen Cylinders, used as Isolation Wards

Manufacturing PPE Coveralls for Medical and Health-care personnel **ACTIONS BY RAILWAYS** 

PANDEMIC

Running Food grain loaded
 trains for timely transportation of essential goods

Railways Hospital beds are converted to Isolation Wards

Transportation of Immigrant Workers and Students to Home States

Using Roll-on Roll-off facilities to carry Loaded Trucks.

## **Disaster Management for Terrorist Attacks**





## Medical Facilities needed for Disaster Management



## Use of Innovative Technologies

**IRSC** 2020



## Use of Remote Sensing Satellites for Disaster Management









## Applications of Robotics in Disaster Management





## Applications of Artificial Intelligence with Machine Learning in Disaster Management





## Applications of Block chain & Big Data Analysis in Disaster Management



Identifies Social Media platforms Data Mining uses the Machine Learning based Text / Image / Video Mining Algorithms Blockchain Data Analytics stage handles Descriptive, Predictive and Prescriptive Analytics to produce VIEW MORE inputs for Scenario Generation and Optimization phases. **I N.B**: Data Analysis must consider Volume,

Variety, Veracity, Value, Validity, Velocity, Vagueness and Human Interface Virtual experiment based Tools generate different types of scenarios and simulates them in shapes of different Combinations of Disasters

web based optimization tool provides 3D Maps of Smoke, Fire or Flood spreading, to identify the best Evacuation Plan.

Block chain technology shares techniques and simplified instructions like Plan, Photo, Video and Comments for trapped people



Indian Railways has introduced the following initiatives during the lockdown period:

- Constitution of a 'COVID-19 Rapid Response Team' comprising six Executive Directors from Railway Board to coordinate the efforts of Indian Railways across all the 17 zones. An Online Dashboard monitors the activities
- Railways Production Units, Workshops and Field Units have started manufacturing PPE Coveralls for Medical and Health-care personnel.
- Railway Workshops developed **Robots** for using in Hospital, Coaches and Platform Cleaning.
- Advisories were issued to Passengers to avoid non-essential Train journeys.
- All Passenger services including Metro Railways were **suspended from March 22**. Now they are being restored in phases.
- More than 5000 Coaches are modified to be used as Isolation Wards with Fixtures for Medical Equipment and Oxygen Cylinders. Middle-berths in these Coaches have been removed and Mosquito Nets are fitted on windows.3
   23

# Actions taken by Indian Railways to tackle COVID 19 (contd.)



- More than 6,500 Hospital Beds of Indian Railways are made available to supplement the efforts of Government Hospitals.
- Railways are plying 'Annapoorna' Trains, a combination of two Food Grain loaded Trains for timely transportation of essential goods and continued to ramp up the supply chain by carrying Coal and petroleum products.
- Indian Railways Catering & Tourism Corporation (IRCTC) along with Railway Protection Force and other Railway Departments, is supplying cooked food with Paper Plates for Lunch and Food Packets for Dinner.
- Time tabled Parcel trains through Swift and Efficient Transport of Utilities (SETU) are being currently operated on 65 routes, to meet the supply of goods and products.
- Railways transported millions of tonnes of Food grains, Water, Dairy products and Perishable goods.
- Railways up-scaled transportation by using **Roll-on Roll-off** (Ro-Ro) facilities to carry loaded trucks.
- Special trains are run to transport stranded migrant workers and students, staying far away from their home.
  Medical check-up was done before the Passengers boarded the Trains.





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## **THANK YOU**