THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HOME AFFAIRS

FIRE AND RESCUE FORCE

STANDARD OPERATING PROCEDURE MANUAL

Second Edition

VOLUME VII

RAILWAY EMERGENCY OPERATION

2025

TABLE OF CONTENTS

SOP 1: RAILWAY ACCIDENTS

1.0 Introduction:

For the purposes of this guidance a rail system is defined as ***'Transport infrastructure managed for the mass transportation of people or goods, guided by one or more fixed rails.*** This description is intended to include metro, commuter train and interoperability train and SGR networks.

The term 'rail infrastructure' is a general term encompassing:

- rail vehicles
- Power systems
- all aspects of the built rail environment including:
  - — tracks
  - — stations
  - — bridges
  - — viaducts
  - — Workshops etc

1.1Purpose

Fire and Rescue Force may respond to a wide range of incidents involving surface, tunnels and that have the potential to cause harm and disruption to firefighters and the community.

Thus; the purpose of this guidance is to assist designated emergency responders to make safe, risk assessment, efficient and proportionate responses when attending and dealing with operational incidents involving the rail infrastructure.

2.0 Attending railway incidents

When attending railway incidents, Incident Commanders must determine and establish proportionate control

measures over rail vehicle movements and traction power that consider local standard operating procedures and relevant national guidance.

Where it is necessary for the implementation of control measures, such as, stopping rail vehicle movements and traction power being switched off, it is recommended that confirmation of implementation is received from the rail infrastructure director before committing crews.

In some, extremely rare, circumstances the need for immediate action may be such that it may not be possible for Incident Commanders to await confirmation of implementation of control measures prior to committing crews. Such circumstances can include incidents where a delay in intervention should result in a savable life being lost or preventing catastrophic escalation of the incident. *to be cited in MoU

Where it is necessary for operational crews to work on or near the railway, Incident Commanders must ensure that appropriate safety officers are appointed and that they are adequately briefed.

Due to the complex and specialized nature of railway incidents, effective liaison at an early stage is essential. Incident Commanders must ensure that timely and appropriate liaison is established with the 'Responsible Person' or in their absence with Rail Control Center via Fire and Rescue Force.

2.1 Railway Plans

Fire and Rescue Force should ensure that detailed railway plans are prepared to include some or all of the following information:

1. Access
2. Rendezvous points
3. Premises information boxes
4. Station control rooms
5. Intervention points
6. Ventilation systems
7. Fixed installations
8. Communications
9. Traction power supply system
10. Hazardous materials
11. Line speeds
12. Complex locations.

2.1.1 Access

All practical and reasonable areas of access, on to the rail infrastructure these may include:

- Stations (both surface and sub surface)
- Tunnels
- Intervention points/emergency response locations
- cuttings
- Bridges
- Level crossings
- Sidings and depots
- Gates and hard standing for appliances
- Appropriate maintenance access points.

2.1.2 Rendezvous points

A rendezvous point are prearranged reference points, i.e. road junction, crossroad or other specified place, to which personnel/vehicles responding to an emergency situation initially proceed to receive directions to staging areas and/or the accident/incident site. When determining the most suitable position for rendezvous points, consideration must be given to:

- Crew safety
- Access for appliances
- Effective communications
- Plans boxes
- Water supplies.

2.1.3 Infrastructure control rooms

An understanding of the facilities afforded by infrastructure control rooms will assist in determining the means by which an incident can be managed, these may include:
location

- Alternative access/egress
- Close circuit television
- Public address systems.

2.1.4 Intervention points/emergency response locations

These are locations that can be used for means of access for an emergency response. Emergency response locations will also provide integrated facilities for FRF intervention and managed evacuation by the relevant infrastructure director incorporating train design, cross passages and rail managed evacuation trains. They may also incorporate evacuation facilities for members of the public. They can vary greatly from basic access stairs to complex purpose-built structures. Crews should be aware of the following features:

- Location
- Rendezvous points
- Access arrangements
- Plans
- Water supplies
- Communication facilities.

2.1.5 Ventilation systems

These assist in the control of the fire/accident in stations environment. Crews should be aware of the type, location, and operation of the control systems. Types of system must be described in some detail in railway plan guidance for dealing with incidents in tunnels.

2.1.6 Fixed installations

Fixed installations to assist firefighting operations are provided in some locations throughout the rail infrastructure. The location, use, and implications of their operation should be known and understood. Fixed installations available may include:

- Automatic fire detection systems
- Sprinkler systems
- Total flooding systems Backup power supply systemFire mains/hydrants
- Communications systems.

2.1.7 Traction power systems

Rail vehicles use one or more of the following types of traction power; electricity, diesel, . Identification of the power systems present during the planning stage will inform firefighting tactics and enhance firefighter safety.

2.1.8 Hazards to firefighters

In general, the number of hazards facing firefighters and the likelihood of the associated risks occurring will vary in line with complexity in the rail infrastructure and its geographical location. Dealing with this part refer SOP Hazmat Operations and SOP for the Use of the Emergency Response Guidebook (ERG)

2.2 Emergency incident response phases

1. Mobilizing and en-route
2. Arriving and gathering information

3. Formulating the tactical plan
4. Implementing the tactical plan
5. Evaluating the tactical plan

Phase 1: Mobilizing and en-route

i. Initial call handling
ii. Assess the level and scale of the incident
iii. Mobilize appropriate resources to the incident, marshalling areas and/or predetermined rendezvous points (RVPs)
iv. Access incident specific information en-route
v. Notify relevant agencies

Phase 2: Arriving and gathering information

- Incident information
- Resource information
- Hazard and Safety and information

i. Confirm location
ii. Confirm incident type
iii. Identify access routes
iv. Identify type of infrastructure/rail vehicles involved
v. Confirm use of rail vehicles
vi. Liaise with persons on scene
vii. Use local knowledge
viii. Identify available resources
ix. Identify risks and hazards

Phase 3: Planning the response

- Think
- Prioritize objectives
- Plan

i. Identify and prioritize objectives
ii. Establishing proportionate control over railway
iii. Formulate and transmit appropriate messages
iv. Choose appropriate access and egress routes

v. Select and establish relevant cordons
vi. Select appoint and brief appropriate safety officers
vii. Actions of deployed crews
viii. Determine firefighting tactics
ix. Carry out rescues
x. Resolve hazmat issues
xi. Establish effective systems for liaison

Phase 4: Implementing the response

- Communicate
- Control
  i. Implement effective control measures
  ii. Implement effective firefighting and rescue operations
  iii. Communicate the tactical plan
  iv. Implement deliberate reconnaissance to gather further incident information
  v. Communicating with other agencies
  vi. Controlling the tactical plan

Phase 5: Evaluating the response

- Evaluate the outcome
  i Obtain and utilize specialist advice
  ii Assessment of safe system of work
  iii Evaluate the effectiveness of the tactical plan
  iv Consider the appropriate and timely reduction of the size and impact of cordons

Phase 6: Closing the incident

i. Scaling down Fire Service operations
ii. Handover/ownership of railway
iii. Facilitate debriefs
iv. Facilitate post incident reporting
v. Maximize learning

3.0 Power systems

3.1 Electric

Electrified railways can operate under a number of systems and voltages, using the following traction power supply systems:

- Overhead line equipment *catenary system

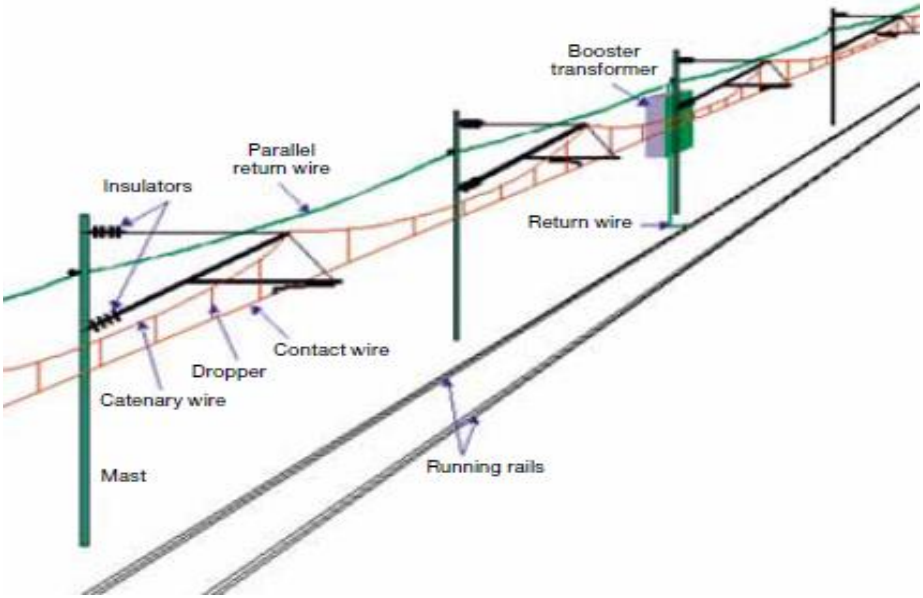
Overhead line equipment

Overhead line equipment power can be provided for alternating current or direct current rail vehicles. Consisting of a live contact bar or wire suspended by a catenary wire, this is supported by a complex system of suspension cables, arms and tension devices.

Every overhead line equipment structure has a unique number displayed that can be used for identification purposes. This can be extremely useful to the Fire and Rescue activities and infrastructure directors when determining the location of an incident. CAUTION Always assume that the overhead line equipment and everything in contact with it is live and extremely dangerous until formal assurance is provided.

The overhead line equipment on metro services is divided into sections by means of switch gear at feeder stations and track sectioning cabins. It operates on sections or circuits that vary in length, but can be 30 miles or longer. Incident Commanders should therefore be mindful that when isolation is requested it may have a serious impact on all train services within a radius of up to 15 miles. The effect of which could leave station platforms overcrowded and also trains left stationary on the track or in tunnels with no power supplies to keep lighting or air conditioning units functioning.

Each overhead line equipment structure has a cable connecting it to the running rail. This is known as electrical bond. Some bonds are colored red to be confirmed and are dangerous if they become disconnected. They must not be touched and should be reported to the rail infrastructure director



The equipment is fed from a railway feeder or sub feeder station. These operate at up to 25 kiloVolts alternating current for "heavy" vehicles (large metro systems). Typically, "light" rail vehicles (trams, lighter metro vehicles) operate between 550-750 volts direct current but exceptionally may be up to 1500 volts direct current.

3.2 Diesel

In the absence of overhead line equipment systems, rail vehicles will be self-powered, this is almost inevitably by diesel traction. Diesel vehicles may operate independently of any electrical power supply being available to the rail track or overhead catenary. When operating under diesel power rail vehicles can only be stopped by either communication with the driver or when the vehicle reaches a stop signal. Diesel vehicles may carry significant amounts of fuel, lubricants and batteries, and locomotives and some carriages will be fitted with electric alternators, and electric traction equipment. These vehicles can be used to move both passengers and goods.

4.0 Railway Stations

A station usually consists of one or more buildings for passengers and/or possibly goods and may be constructed over a number of levels. A 'terminal' is a station at the end of a railway line. Railway stations have public and non-public areas. Areas for providing public access will generally **present limited hazards**. Some facilities provided to keep the public safe can present a potential obstruction to a Fire and Rescue Service, for example platform edge doors or barriers. **Methods of opening these facilities should be known and readily available to the Fire and Rescue Force.**

Non-public areas can present additional hazards to those generally encountered in public areas, for example:

- Fast moving rail traffic
- High voltage electrical equipment for train stations and infrastructure
- Traction power
- Unusual direct access to the track.

Railway premises including station houses and other ancillary buildings may have been granted listed building status. Other buildings located adjacent to railway stations may include those for the purposes of depots or maintenance, consequently the potential for hazardous substances must always be considered when attending incidents on railway premises.

5.0 Bridges and viaducts

A 'bridge' is a structure built to span a gorge, valley, road, railway track, river or any other physical obstacle. The design of a bridge varies depending on the function of the bridge and the nature of the terrain where the bridge is to be constructed. **There are a number of additional hazards to consider when dealing with incidents in the vicinity of bridges**. **These can include working at height, restricted safety areas and difficult access.**

The official ground-breaking ceremony took place at the Cheyo B stadium in Tabora design

Viaducts are used to overcome steep gradients that are caused by geographical features such as gorges, valleys etc). They are raised sections of track, supported on pillars or on a series of arches. Viaducts present the same hazards as bridges but in addition the arches beneath (particularly in urban areas) are sometimes put over to commercial use, with each arch becoming a commercial unit.

Fires occurring in these locations can have a significant impact on the operation of the railway. These premises can sometimes contain commercial tenants who may store materials inappropriately. These locations, and secluded parts of the rail infrastructure can be frequented by drug users and vagrants with associated safety considerations for crews. Care should be taken when responding to such premises and Incident Commanders should consider the type of undertaking occupying the premises.

6.0 Tunnels

Rail tunnels can consist of a single bore with single track through to highly complex infrastructure containing multiple lines, with tunnels combining into multiple bi-directional routes, or incorporating underground sidings and depots.

An incident in a tunnel can present additional problems to operational personnel. This includes split attendances, length of hose lines, logistics of moving equipment, communications, breathing apparatus operations, difficult underfoot conditions and excessive heat/smoke. Overhead line equipment may have also been 'brought down' and could be a hazard in any firefighting operations. In addition, limited clearance, poor lighting and difficult working conditions could increase the risks to personnel.

7.0 Points

A set of railway points is a mechanical installation enabling trains to be guided from one track to another. Points can be either mechanically or electrically moved from within a signal box or a control room. Points can represent a hazard to firefighters as they can move without warning and therefore present a significant trap hazard. **To avoid**

railway points becoming frozen and inoperable during cold weather, electrically powered point heaters are used. Personnel must always be cautious as the electrical supply to the points is independent of all other power supplies. If isolation is requested for a particular area of the track this may not include the power supply to the points.

8.0 Rail vehicles (Trains)

There are a number of categories of trains providing services for passengers and freight. These are:

1. Multiple units
2. Locomotive hauled or propelled

8.1 Multiple units

The majority of passenger trains are made up of multiple units and are used mainly for local services and suburban services. All vehicles in a unit are normally designed as passenger carriages but exceptions can occur. Gangways are provided to allow movement of passengers and crew between vehicles. The outermost vehicles will have driver's cabs. A number of units can be operated together as a single train. Some units are equipped with gangways at the cab ends to allow movement between different units when formed into a multi-unit train. Units without end gangways for regular operation in narrow tunnels have end doors to permit evacuation.

There are three types:

i. Electric multiple unit (EMU)
ii. Diesel electrical multiple unit (DEMU)
iii. Diesel multiple unit (DMU) (mechanical or hydraulic transmission).

8.2 Locomotive hauled or propelled

Locomotives may be positioned at either end of the train or both and can be powered by diesel electric transmission or electric (alternating current). Locomotive hauled passenger trains have been largely replaced by multiple units but are still used on inter-city services and for special trains. Regular locomotive hauled trains are usually operated as if multiple units as fixed push-pull sets.

8.3 Conventional speed train

This category is focused on trains that operate national high-speed passenger services. The Network Rail High Speed Train or 'HST' is operated as a multiple unit but consists of two single ended locomotives between which are coupled seven to nine trailer carriages'

9.0 Fire Accidents in Trains (railway vehicles)

The fire incidences in trains are among the most serious disasters impacting human lives as well as property of Railways and other stake holders. Thus, prevention of train fire has been a serious concern for the Railways. **A train**

fire is different from a fire in other places in the manner in which it breaks out, grows and spreads, and in the method of fighting it, as well as the damages it causes.
Fire in a running train is more dangerous than a static one, because the fanning effect may spread the fire very quickly to other coaches.
Fire especially in uncontrolled state, is a source of very rapid destruction and this gets compounded when loss of human life is involved. Hence all possible steps should be taken to prevent fire from breaking out in coaches, and if it breaks out, to prevent it from spreading and causing further damage.

The following points summarize the characteristics of a train fire, which need special consideration when deciding upon counter measures: -

1) A train consists of long narrow vehicles coupled with each other with limited exits.
2) High traveling speeds prevent quick escape and assist rapid spread of fire.
3) Wide range of track conditions, including confined sections such as bridges, tunnels, Ghats, etc., may make it difficult for passengers to get off the vehicle easily in times of emergency.
4) Restriction in movement of passengers and fast spread of fire aggravates the situation.
5) A large number of passengers traveling on trains have to be attended to by a small team of on-board staff.
6) Even a delay of **few initial seconds** due to inadequacy of direct communication with the crew can be devastating.

Smoke emission in a confined place may also lead to panic.

Note: Fires in the railway trains are prone to cause large numbers of casualties, serious economic losses, and huge negative social impacts.

Probable Causes of Fire in Railway Trains

1) Carrying inflammable goods like stove, gas cylinder, kerosene oil, petrol, fireworks, poll posters etc. in passenger coaches.
2) Making/using fire near paper, wood, petrol or such other inflammable articles.
3) Throwing waste material outside dust bin, near door, non-removal of garbage from pantry cars/coaches.
4) Bad habits like carelessly throwing lighted match sticks, cigarette butts and Bidi butts etc.
5) Leakages/Blasts of pantry gas cylinders.
6) Gas regulator, flame arrester and pressure gauge in pantry car are not in proper working order.
7) Improper storage of inflammable materials like newspapers, edible oil etc. in pantry cars.
8) Insertion of cigarette butts, Bidi buts, Gutkha wrapper etc. in fan base, fuse distribution board, roof openings and ventilators etc.
9) Sabotage.
10) Mishandling/Careless use of pantry equipment by pantry car staff.
11) Poor maintenance of electrical equipment and short circuits.
12) Loose or temporary connection, hanging wires/exposed joints etc.
13) Defects in locomotive/traction unit causing fire.
14) Use of open fire near trains carrying petrol/gas/other flammable material.

Fire Fighting Arrangement in Trains

AC coaches and Pantry Cars in all trains are provided with portable fire extinguishers to cater for emergencies due to fire accidents. Presently, in sleeper coaches, fire extinguishers are not provided. It may be provided in those coaches with TTE seats. Efforts may be made to provide portable fire extinguishers in other Non-AC coaches also. Ball-type fire extinguishers may be proliferated in trains for ease of use.

All AC coaches are being provided with smoke and fire detection systems which give alarm in case of fire or smoke. The pantry and power cars are being provided with smoke and fire detection as well as suppression systems. The suppression systems provided may be manual or automatic.

The following number of Fire Extinguishers should be provided at the following locations on trains–

S/No.	Locations	No. of Fire extinguishers
1.	Each Electric / Diesel Loco	4
2.	Each Brake Van (SLR) (Front & Rear)	2
3.	Each AC Coach	2
4.	Each Pantry Car	4
5.	Each Generator Van	4
6.	Each Motorman Cabin of EMU coaches	2

Action Taken Against Fire in Trains

In case of fire on train, typical time available for rescue is a few minutes before smoke fills up and passengers start getting disoriented. Smoke (toxic/nontoxic) can cause suffocation and loss of consciousness in two minutes. Fire

in personal clothing causes loss of consciousness in 10-15 seconds and Death or incapacitation (followed by death) can happen in five minutes. A fire in train destroys the train carriage(s) completely in a few minutes.

In most of the cases, relief reaches a burning train after the carriages are completely burnt and passenger's dead or badly burnt. Under such situation, role of on-board Railway officials becomes vital and they should get into action to save the precious lives on priority. On-board officials who accompany trains need to react immediately to put-off / extinguish fire and rescue passengers / save the railway property.

All on-board Railway officials need to have basic knowledge on fire, firefighting methods, handling of Fire Extinguishers and operation of Fire Suppression system now being introduced in Coaches. They have to be imparted hand on practice in the methods of rescue through various training programs.

A Railway servant noticing a fire, likely to result in loss of life or cause damage to property, shall take all possible steps to save life and property, to prevent it from spreading and to extinguish it.

Role of emergency response Team

The members of instant action team should carry out the following task by distributing the work among them:

1) Do not panic.
2) Pull the Alarm Chain and stop the train immediately. Inform the Loco Pilot and Guard of the train.
3) Inform all concerned about the fire and seek their assistance in extinguishing the fire.

4) Do not wait for others to arrive or help to arrive. Start with rescue and fire controlling immediately.
5) Inform the local administration, local hospital and take help of local people, if available.
6) Report it to the nearest station/control/fire station. (fire services: 101, it can be dialed by mobile also), Disaster Helpline no.138 & Security Control no.182
7) Open emergency windows/break glasses for evacuation of the passengers.
8) Responsibility may be assigned to certain specific members of team for keeping the doorway and vestibules clear of obstructions.
9) Evacuate passengers to coaches which are away from fire through vestibules, if fire is not extinguished. After complete evacuation, rolling shutters of coaches on fire to be closed to contain spread of fire to other coaches.
10) More people expire due to suffocation from smoke rather than due to actual burning.

During Fire, the poisonous gases such as Carbon Monoxide (CO), Carbon Di-oxide (CO_2) etc. being lighter in weight circulates in the upper part of coach/space while oxygen is present in the lower part of the space. While running or walking, passengers may inhale poisonous gases quickly and thus resulting suffocation and asphyxiation. Passengers should be advised to crawl on the floor instead of running. They should also be advised to take a wet cloth and cover their nostrils. This reduces the smoke inhalation & subsequently its bad effects.

11) Insist that passengers should save themselves first and not to bother about their luggage which can be retrieved later on.
12) Advise passengers to remain calm and not panic.
13) Isolate the affected coaches/wagons from other coaches/wagons by decoupling both Mechanical & Electric couplers. Create and maintain adequate distance between the affected coach and other coaches so that fire does not spread to other coaches due to proximity.
14) Locate fire extinguishing equipment viz, fire extinguishers, water bucket with water/sand, etc. and use these to extinguish fire. Use water from coaches to extinguish fire.
15) Whenever alarm is triggered through Automatic Fire Detection system in coaches (Power car/ SLR, Pantry car & AC coaches) fitted with Fire Detection System (Manual/Automatic), extinguish fire as per the instructions pasted in coaches.
16) Try and put out the very source of the fire before it becomes a big blaze.
17) Turn off Electrical Appliances. In case of fire from electricity, switch off the source.
18) In case of the fire is discovered when the train is near the tank or a watering station, the Guard and Loco Pilot shall use their discretion to proceed there, but no such attempt shall be made until the portion of the train in rear of burning vehicle has been detached.
19) Provide wheel skids to prevent roll back of isolated coaches and train as well. Train shall be protected by Loco Pilot and Guard at both ends according to the provision of GR.

20) Loco Pilot to put flasher light of loco “ON” or make all possible efforts to attract attention of Loco Pilot of crossing train to stop his train and ask him for assistance.

When a Person is on Fire

1) Approach him holding the nearest available wrap in front of you.
2) Wrap it round him.
3) Lay him flat and smother the flames.
4) He may roll on the floor, smothering the flames.
5) On no account should he rush into the open air.
6) Call for assistance.

Handling of Injured Passengers

1) Building up confidence of injured passengers by suitable advice is of great importance.
2) First aid should be rendered to the injured passengers.
3) Ordinarily give nothing ORALLY to injured one, but if medical treatment is delayed more than 4 hours, give Oral Rehydration Solution (ORS) drinks preferably bio carbonated soda.
4) In serious case, remove the patient quickly to hospital as the injured may require an aesthetic, medical soothing.

General Safety Instructions and Roles of Various Stakeholders

Train locomotive drivers

1. Stop the train immediately and switch on the flasher light after observing fire or on receiving intimation about fire. Arrange to stop the train coming from other direction so as to pool help to tackle fire.

2. In the event of fire in a tunnel or over a bridge, the LP/ALP will not stop the train in the tunnel or over the bridge as far as possible. The LP/ALP, however, should slow down the train while clearing the tunnel/bridge. The stopping distance in case of LHB rakes after Alarm Chain Pulling is less and the Loco Pilot has little scope of stopping beyond a tunnel or bridge in case of fire. In some cases, the railway bridges are not having any pathway. Thus, the Loco Pilot should apply his best judgment in case of handling such an eventuality while passing through a tunnel or bridge.
3. Loco Pilot & Guard will immediately inform the control directly by mobile telephone or talking to nearest Station Master on walkie-talkie about the incident of fire and preliminary details about the fire.
4. Guard and Loco Pilot will protect their train, as per provisions of GR & SR, secure the train to prevent rolling down and protection of adjacent line, if any.
5. Arrange for isolating the affected coaches from other coaches by decoupling both Mechanical & Electric couplers.
    i. The vehicle behind the one on fire shall be detached and the front portion of the train moved forward so as to prevent the rear vehicles catching fire.
    ii. As soon as the front portion of the train has moved forward a sufficient distance, to secure the desired object, the burning

vehicle shall be detached and the vehicles in front of it shall then be moved forward to a safe distance.

iii. If required hand shunting may be carried out by taking help of passengers & railway staff travelling in the train.

6. Provide anti-rolling arrangements on isolated coaches and train as well by taking help of railway staff travelling in train & passengers.
7. Report it to the nearest fire and rescue officer/station through mobile 114.
8. Use available fire extinguishers, sand, loose earth, water, blankets etc. to extinguish the fire and help passengers trapped in fire.
9. Guard of the train to arrange stretcher and first-aid box for providing assistance to the injured passengers.
10. Render first aid to injured passengers, by obtaining assistance of the railway staff, doctors and/or volunteers on the help of ambulance service, means available.
11. If the fire cannot be controlled, inform the traction power controller through the emergency telephone or any other mode of communication to arrange the affected section of the over-head equipment to be made dead after isolating the affected coaches.
12. In case of fire in Freight train, in addition to action to be taken on relevant points above, the crew shall carry out the following;
    a. The train will be controlled immediately and brought to the nearest station/yard in the loop line or yard line in consultation with the nearest station & Section Controller.

b. The affected wagon or wagons shall be separated from the rest of the train.
c. Provide anti-rolling arrangement on the isolated wagons and train.
d. Guard and Loco Pilot shall try to extinguish the fire from nearby tank or water columns at stations.
e. Guard of the train should lodge a FIR, if required.

13. In the event of fire on electric engine
a. Loco Pilot shall immediately switch off the circuit breaker and lower the pantograph as provided in GR&SR.
b. The locomotive should be separated from the rest of the train after securing the train to avoid rolling down of the train. Anti-Rolling Arrangement should be provided in locomotive after moving adequate distance from rest of the train.

14. In the event of fire on EMU/MEMU, in addition to above mentioned action, following is also to be carried out;
a. The train shall then be brought to a stop at once.
b. The Loco Pilot/Motorman shall immediately switch off the circuit and lower the pantograph.
c. The Guard shall give all possible assistance to the Loco Pilot in putting out the fire, isolate the other coaches from the affected coach and help the passengers.

1) **Train crew**
2) Open the doors of both sides of coaches.

3) Open Emergency Windows for Evacuation of the passengers.
4) Evacuate the passengers to the adjacent coaches which are away from the fire through the vestibules; if the fire is not extinguished. After complete evacuation, close the rolling shutters of coaches on fire to contain the spread of fire.
5) Help the train crew in physically isolating/separating the affected coaches from the remaining train.
6) Follow the instructions laid down above for instant action team.
7) Provide necessary assistance to TTEs and other staff in extinguishing the fire and extricating the trapped passengers.

Maintenance Staff

1) Immediately isolate the affected coach/coaches electrically.
2) Break the box and take out hammer to break glass panes of AC coaches so that fresh air flows in and smoke goes out.
3) Follow the instructions laid down above for instant action team.
4) Provide necessary assistance to TTEs and other staff in extinguishing the fire and extricating the trapped passengers.

1) In case of fire in power cars,
   i. Stop train by pulling alarm chain immediately.
   ii. Inform Guard / Loco Pilot / TTEs etc of the fire incident and seek their assistance.
   iii. Shut down the power car engines and disconnect power supply.

iv. Use fire extinguishers and fire ball provided in engine room in case of fire in power car to extinguish fire.
v. In case fire is not controlled, detach power car from the train in consultation with crew and Guard and taking help of Railway men and fellow passengers.

2) In all other cases of fire, follow the instructions laid down above for instant action team.
3) Provide necessary assistance to TTEs and other staff in extinguishing the fire and extricating the trapped passengers.
4) When alarm is triggered through Automatic Fire Detection System in Power Car fitted with Fire detection system, operation of Fire Suppression system has to be ensured.

Railway Station Master

1) Inform the nearest Fire Brigade office of the location of the incident and requisition their services.
2) Advice the Section Controller and/or TPC of the fire incident indicating the affected section and/or for OHE isolation.
3) Inform the local hospitals and requisition the services of the doctors and para medical staff as per the requirement.
4) Inform all officers and supervisors of all departments available at the station.
5) The controlling station master shall proceed to the site with staff of various departments to help in rescue and relief operations.
6) Station Master shall not allow any train to enter on the adjacent track of the affected section.
7) After clearance of affected train from the section, advice Section Controller.

8) On receipt of advice from Section Controller allow the train service on the section on releasing the emergency power block and OHE power is switched on in the section.

Fire Risk and Safety Management

Safety Drive & Campaigns

Safety Drives and Campaigns must be launched at periodic intervals to thoroughly examine all fire safety measures to eliminate any potential fire hazard.

Safety Inspections

For ensuring implementation of prescribed rules and guidelines for safe operation of trains and fire safety inspections are conducted by Fire and Rescue Force on periodic intervals. The basic purpose of these inspections is to identify weak areas in asset maintenance as checking fire buckets, fire extinguishers, automatic fire alarms etc., safety procedures and systemic defects and to provide ways and means to prevent fire and other hazards.

Training, Mock drill exercises and Counseling of Railway Officials.

All on-board officials of all departments including crew and Guards whether departmental or contractual may be given basic training in firefighting and use of various firefighting on-board equipment by Fire and Rescue Force. Mock drills may be conducted for checking the preparedness of ARMVs/ARTs as well as concerned staff at least once per year and should be supervised by Fire and Rescue Force.

SOP 2: FOR CONTAINING FIRE INCIDENTS

1.0 Introduction

This SOP outlines the comprehensive protocols and guidelines to be followed by railway personnel in the event of a fire incident. The primary objectives of this SOP are to:

1. Establish a clear and coordinated response framework to rapidly detect, contain, and extinguish fires within the railway system.
2. Ensure the safe evacuation and protection of passengers, employees, and other personnel in the affected area.
3. Minimize damage to railway infrastructure, rolling stock, and other assets to expedite the restoration of normal operations.
4. Provide a systematic approach to incident management, investigation, and the implementation of corrective measures to prevent future occurrences.

The procedures detailed in this SOP are based on industry best practices, regulatory requirements, and the collective experience of railway operators worldwide. They encompass all stages of fire response, from prevention and preparedness to incident management and recovery, with a focus on clear communication, effective coordination, and continuous improvement.

All railway personnel including emergency response teams, are expected to familiarize themselves with the contents of this SOP and be prepared to execute their respective roles and responsibilities in the event of a fire incident

1.1 Purpose of the SOP

The purpose of this SOP is to establish a comprehensive and systematic approach to responding to fire incidents in

railway environments. This SOP aims to ensure the safety of passengers, staff, and property by providing clear guidelines for detection, initial response, evacuation, fire suppression, communication, and post-incident procedures

1.2 Scope of Application

This SOP shall apply to all railway operators, including but not limited to:

1. Passenger trains
2. Freight trains
3. Railway stations
4. Maintenance yards
5. Emergency response teams and services

This SOP is mandatory for all employees and contractors working within the railway network and shall be adhered to at all times to ensure a coordinated and effective response to fire incidents.

2.0 Immediate Actions (Detection of Fire)

Procedures for Staff and Passengers to Detect and Report a Fire

(a) **Observation and Reporting by Staff:**

- All railway staff shall remain vigilant for detecting any signs of fire, such as smoke, unusual smells, or visible flames.
- Upon detecting a fire or signs of a potential fire, the staff or crew on board a passenger crane shall immediately activate the nearest emergency alarm.
- The locomotive driver shall use onboard communication systems or mobile devices to notify the control center, providing details of the location, severity, and any immediate threats to passengers or staff.

Observation and Reporting by Passengers:

1. Passengers shall be encouraged to report any signs of fire to the nearest railway staff member or through emergency communication systems available in trains and stations.
2. Emergency communication devices, such as intercoms or emergency call buttons, shall be clearly marked and easily accessible to passengers.
3. Passengers shall follow instructions provided by the railway staff or automated systems without causing panic or obstruction.

Use of Fire Detection Systems and Alarms

(a) **Fire Detection Systems:**

- Smoke Detectors installed throughout trains and stations shall automatically detect smoke and trigger alarms.
- Heat Detectors positioned in strategic locations, shall detect or sense abnormal temperature rises indicative of a fire.
- Flame Detectors shall be used in high-risk areas to detect flames.
- Automatic Fire Suppression System Installed in areas like kitchens or engine compartments shall activate to control and suppress fires automatically upon detection.

(b) **Activation of Alarms:**

- Upon detecting fire through any of the detection systems, the fire alarm will automatically sound, alerting both passengers and staff.
- The alarm system will notify the control center immediately, providing real-time data on the location and nature of the fire.

- Manual Alarm at stations located at regular intervals in trains and stations, shall allow individuals to manually activate the alarm if they detect a fire.

(c) **Control Center Response:**

- Upon receiving an alarm, the control center will verify the fire incident through surveillance systems and direct communication with on-site staff.
- The control center will coordinate immediate response actions, including notifying emergency services and directing evacuation procedures.

(d) **Emergency Announcements:**

1. Automated announcements will provide instructions to passengers on evacuation procedures and safety measures.
2. Staff will use public address systems to give clear and calm instructions to ensure orderly evacuation.

2.1 Immediate Actions by Train Crew Upon Detection of Fire

(a) **Assessment of the Situation:**

- The train crew shall quickly assess the location and severity of the fire.
- The crew shall determine if the fire can be managed with onboard fire extinguishers or if it requires evacuation.

(b) **Initial Fire Suppression:**

- If the fire is small and manageable, the fire extinguishers onboard shall be used to extinguish it.
- The crew shall ensure personal safety and that of passengers before attempting to fight the fire.

2.2 Activation of Emergency Brakes if Necessary

(a) **Decision to Stop the Train:**

- If the fire poses an immediate threat to the safety of the passengers and crew, the train crew shall activate the emergency brakes to bring the train to a halt.
- The crew shall ensure that the train stops at a safe location, preferably near a station or in an area where evacuation can be safely conducted.

(b) **Procedures for Activating Emergency Brakes:**

- The emergency brake handle shall be applied or the emergency brake button located in the train cab pressed.
- The activation of the emergency brakes shall be announced to passengers using the public address system to prevent panic.

2.3 Communication with the Control Center

(a) **Immediate Notification:**

The crew shall contact the control center immediately upon detection of the fire, providing details such as:

- Exact location of the fire
- Severity of the fire
- Any immediate threats to passengers or staff
- Actions being taken by the train crew

(b) **Continuous Updates:**

- The responder shall maintain open communication with the control center, providing regular updates on the situation.
- The responder shall follow instructions and guidance provided by the control center, including coordination with emergency services.

2.3 Notification to Passengers with Clear Instructions

(a) Initial Announcement:

The Train Conductor shall use the public address system to inform passengers about the fire, ensuring to:

- Remain calm and composed
- Provide clear and concise information
- Instruct passengers to stay calm and follow crew instructions

(b) Evacuation Instructions:

If evacuation is necessary, the Train Conductor shall provide step-by-step instructions on how to evacuate the train safely by:

- Directing passengers to the nearest safe exit
- Instructing passengers to leave personal belongings behind
- Guiding passengers to move in an orderly manner to prevent crowding / panic

(c) Assistance for Vulnerable Passengers:

- The Conductor shall assign crew members to assist passengers with disabilities, elderly passengers, and those with children.
- He shall ensure all passengers are accounted for and safely evacuated.

2.5 Communication Protocols

Internal Communication (Communication Between Train Crew and Control Center)

(a) Immediate Notification:

- The train crew upon detecting a fire shall immediately contact the control center using the dedicated communication channels (radio, phone, or onboard communication systems).

- The crew shall provide initial details about the fire, including its location, severity, and any immediate threats to passengers or staff.

(b) Continuous Updates:
The crew shall:

- Maintain an open line of communication with the control center throughout the incident.
- Regularly update the control center on the status of the fire, actions taken, and any changes in the situation.
- Respond promptly to any queries or instructions from the control center.

(c) Status Reports:
The crew shall submit detailed status reports at regular intervals, including:

- Progress of fire suppression efforts
- Evacuation status and any issues encountered
- Condition of passengers and crew
- Any additional support or resources needed

3.0 External Communication (Notice to ES. Fire, Medical, Police)

(a) Initial Contact:
The control center shall:

- Immediately notify the relevant emergency services (fire, medical, police) upon receiving the fire report from the train crew.
- Provide essential information, including the location of the train, nature and severity of the fire, and any immediate dangers to passengers or staff.

(b) Coordination:
The controller shall:

- Coordinate with emergency services to facilitate their swift response and access to the affected train or station.
- Provide real-time updates to emergency services on the situation, including any changes in the fire's status or additional hazards.

4.0 Informing Nearby Stations and Railway Authorities

(a) Notification:
The controller shall:

- Inform nearby stations of the fire incident to prepare them for potential evacuation or assistance needs.
- Notify railway authorities to ensure they are aware of the situation and can provide necessary support.

(b) Coordination:
The controller shall

- Coordinate with station staff to manage the flow of passengers and ensure orderly evacuation if needed.
- Update railway authorities regularly on the incident's status and any required actions or resources.

5.0 Communication (Providing Clear Instructions to Passengers)

(a) Initial Announcement:
Upon arrival at the site, the Incident Commander shall:

- Use the public address system to calmly and clearly inform passengers about the fire situation.
- Provide specific instructions on what passengers shall do, such as staying seated, moving to designated safe areas, or preparing for evacuation.

(b) Ongoing Communication:
The Public Relations Officer shall:

- Continue to provide updates to passengers as the situation evolves, ensuring they are informed and reassured.
- Address any questions or concerns from passengers through onboard staff or automated systems.

6.0 Updates to Media and Public Through Official Channels

(a) Media Communication:
The Incident Commander shall:

- Designate a spokesperson or communication officer to handle media inquiries.
- Provide accurate and timely updates to the media, ensuring the information is consistent and clear.

(b) Public Updates:
The PR shall:

- Use official channels, such as the railway company's website, social media platforms, and press releases, to keep the public informed about the incident.
- Provide regular updates, including information on the status of the fire, evacuation efforts, and any impact on train services.

(c) Crisis Communication Plan:
The Incident Commander shall:

- Implement a crisis communication plan to manage the flow of information and ensure consistency in messaging.
- Monitor public and media reactions to address misinformation and provide accurate updates promptly.

7.0 Passenger Safety and Care

Medical Assistance (First Aid Procedures)

(a) Immediate First Aid:

Train crew members trained in first aid shall:

- Provide immediate assistance to injured passengers.
- Administer basic first aid procedures such as bandaging wounds, treating minor burns, and performing CPR if necessary.
- Use onboard first aid kits, which shall be well-stocked and easily accessible.

(b) Prioritizing Injuries:

Train crew members shall

- Prioritize care for those with the most severe injuries first.
- Keep injured passengers calm and comfortable until medical help arrives.

(c) Documentation:

The EMC shall document all first aid provided, including the nature of the injuries, treatment given, and any changes in the passenger's condition.

8.0 Coordination with Medical Emergency Teams

(a) Notification:

The Incident commander shall:

- Immediately notify the control center of any medical emergencies so they can alert medical emergency teams.
- Provide details on the number and severity of injuries, as well as the exact location of the train.

(b) Preparation:

The Incident commander shall:

- Prepare for the arrival of medical emergency teams by identifying safe and accessible locations for them to attend to injured passengers.
- Assign train crew members to assist medical teams with navigation and provide information about the incident.

(c) Handover:

The Incident commander shall

- Ensure a smooth handover of care from train crew to medical teams.
- Provide detailed information about the first aid given and any ongoing medical concerns.

9.0 Arrangement for Temporary Shelter if Evacuation is Required

(a) Identifying Safe Locations:

The Incident commander shall

- Identify nearby safe locations where evacuated passengers can be sheltered, such as station buildings, emergency shelters, or nearby public facilities.
- Coordinate with local authorities to confirm the availability and readiness of these shelters.

(b) Transportation:

The Incident commander shall

- Arrange for safe transportation of evacuated passengers to the temporary shelters.
- Use buses, taxis, or other available transportation means to move passengers quickly and safely.

10.0 Distribution of Water, Blankets, and Other Necessities

(a) Basic Necessities:

The EMC shall:

- Distribute essentials to passengers at the temporary shelter.
- Ensure that these supplies are readily available and distributed in an orderly manner.

(b) Comfort Measures:

The EMC shall:

- Provide comfort measures such as seating, rest areas, and restrooms.
- Ensure passengers have information and updates about the situation.

(c) Special Needs:

The EMC shall:

- Pay special attention to the needs of vulnerable passengers, including the elderly, children, and those with disabilities.
- Assign staff or volunteers to assist these passengers with their specific needs.

11.0 Investigation and Reporting (Incident Documentation0

(a) Collection of Witness Statements - Immediate Collection:

The EMC shall:

- Collect witness statements as soon as possible after the incident, ensuring details are fresh in memory.
- Identify and speak to key witnesses, including passengers, staff, and any first responders.

(b) Standardized Forms:
The EMC shall:

- Use standardized forms to document witness statements, ensuring all relevant information is captured consistently.
- Include details such as the witness's name, contact information, location at the time of the incident, and a detailed account of what they observed.

(c) Confidentiality
The EMC shall ensure witness statements are collected confidentially and that witnesses are reassured about the use of their information solely for investigation purposes.

12.0 Preservation of Evidence

(a) Securing the Scene:
The EMC shall:

- Immediately secure the area where the fire occurred to prevent tampering or contamination of evidence.
- Limit access to authorized personnel only.

(b) Photographic Evidence:
The EMC shall:

- Take photographs and videos of the incident scene, including any damage, fire suppression efforts, and relevant surroundings.
- Ensure images are time-stamped and accurately labeled.

(c) Physical Evidence:
The EMC shall:

- Collect and preserve physical evidence such as damaged materials, fire detection and suppression equipment, and items that contributed to the fire.

- Store evidence in a secure location for further analysis.

13.0 Post-Incident Analysis (Root Cause Analysis)

(a) Formation of Investigation Team:

The EMC shall assemble a team of experts including safety officers, engineers, and fire safety specialists to conduct a thorough investigation.

(b) Data Review:

The EMC shall review all collected data, including witness statements, photographic and physical evidence, and any relevant documentation (e.g., maintenance records, safety logs).

(c) Analysis Techniques:

The EMC shall use established analysis techniques such as fault tree analysis, failure mode and effects analysis (FMEA), or the five whys method to identify the root cause of the fire.

(d) Identify Contributing Factors:

The EMC shall determine all contributing factors, including human error, equipment failure, environmental conditions, and procedural weaknesses.

14.0 Recommendations for Preventing Future Incidents

(a) Develop Recommendations:

The EMC shall:

- Based on the root cause analysis, develop actionable recommendations to prevent similar incidents in the future.
- Consider improvements in equipment, procedures, training, and emergency response plans.

(b) Implementation Plan:
The EMC shall:

- Create an implementation plan for the recommended measures, assigning responsibilities and timelines for completion.
- Ensure that the plan includes monitoring and review mechanisms to assess the effectiveness of the implemented changes.

15.0 Submitting Internal Reports to Management

(a) Comprehensive Report:
The EMC shall:

- Prepare a comprehensive incident report for railway management, detailing the incident, investigation findings, root cause analysis, and recommendations.
- Include all supporting documentation and evidence.

(b) Executive Summary:
The EMC shall provide an executive summary highlighting key findings and recommendations for quick reference by senior management.

(c) Presentation:
The EMC shall present the findings and recommendations to railway management in a formal meeting, allowing for discussion and decision-making on the proposed measures.

16.0 Mandatory Reports to Regulatory Authorities

(a) Regulatory Compliance:
The Corporation shall:

- Ensure that all reporting requirements to regulatory authorities are met, including timelines and content specifications.

- Familiarize the team with the relevant regulations and guidelines for reporting fire incidents.

(b) Report Submission:
The Corporation shall:

- Submit detailed reports to the appropriate regulatory authorities, including a description of the incident, investigation process, findings, and corrective actions.
- Maintain copies of all submitted reports for records and future reference.

(c) Follow-Up:
The Corporation shall

- Respond promptly to any follow-up queries or requests for additional information from regulatory authorities.
- Implement any additional measures or recommendations provided by the authorities to enhance safety and compliance.

17.0 Training and Drills

(a) Staff Training
The HRSSU in liaison with DRH shall engage external experts to conduct:

- Regular training sessions on fire response procedures
- Certification requirements for train crew and station staff

(b) Emergency Drills
External Experts shall conduct:

- Scheduled fire drills and simulations
- Evaluation and improvement of response plans

18.0 Review and Update of SOP

(a) Regular **Review**

The HRSSU shall conduct:

- Periodic review of SOP for relevance and accuracy
- Incorporation of feedback and lessons learned

(b) Updating Procedures

The HRSSU shall:

- Process for updating the SOP
- Communicate the updates to all relevant personnel

19.0 Role of Train Crew (TRC) at this juncture

(a) Support and Coordination:

- TRC will support the Incident Commander by providing detailed information about the train, the incident, and any actions taken before the arrival of emergency services.
- TRC will assist in ensuring that emergency responders have access to all areas of the train and relevant resources.

(d) Passenger Management:

- TRC will continue to manage and assist passengers, ensuring their safety and providing any necessary care or comfort.
- They will help coordinate the evacuation of passengers if directed by the Incident Commander, ensuring an orderly and safe process.

(e) Communication:

- TRC will maintain communication with the control center, providing updates on the situation and actions being taken by emergency services.

- They will relay instructions from the Incident Commander to the control center and vice versa.

(f) Documentation and Reporting:

- TRC will document all actions taken during the incident, including the transition of command, and any interactions with emergency responders.
- This documentation will be critical for post-incident analysis and reporting.

20.0 Incident Command System (ICS) Integration

(a) ICS Structure:

- TRC shall integrate seamlessly into the Incident Command System (ICS) structure established by the emergency responders.
- TRC will report to the Incident Commander and follow the ICS protocols for communication, resource allocation, and operational procedures.

(b) Functional Roles:

TRC shall be assigned specific functional roles within the ICS, such as liaison officer, safety officer, or logistics coordinator, depending on the needs of the Incident Commander.

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