

# Implementation of On Site Emergency Plan in a largest Aluminium & Power Plant of India

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**Abstract:** Disaster management in Industrial sector has gone through a major paradigm shift. The focus has shifted from reactive and relief based approach to proactive disaster risk reduction and meticulous preparedness. A robust Disaster management plan is capable in significantly decreasing the loss of life, property and damage to environment. As per legal requirement in our country, it is mandatory for each MAH unit to prepare a comprehensive disaster management plan in accordance with the provisions stipulated in MSIHC Rules- 1989[1] and The Factories Act 1948[2]. This study is an attempt to implement these provisions in one of the largest Aluminum & Power plant of India.

## 1. Introduction

Modern industry, characterized by complex process and technology is open to an ever increasing danger from disasters, which can seriously affect the safety, security and stability of the organization. Some of these disasters are natural such as earthquakes, floods, tsunamis, cyclones, lightening, while others are man-made. The man-made disasters included dangerous spills & leak of chemicals, fires & explosions, hit by external objects, etc. All of these have occurred several times in industries, when unprepared for such disasters creating panic, disorder and confusion. The result has been extensive damage to men and material. Major accidents/disasters in a factory is one which has the potential to cause serious injury or loss of life. It may cause extensive damage to property, loss of life and serious disruption both within and outside the works.

A number of chemicals and flammable liquids used in the Aluminum & Power are one of hazardous nature. This hazard arises as a result of three properties, viz.: toxicity, flammability and corrosive nature. Sudden and uncontrolled leak of contaminant will give rise to a disastrous condition, magnitude of which will depend on the type of chemicals as well as its inventory.

An emergency plan is an informative document, which acquaints the occupants of a factory or

occupancy with procedures to be implemented, during an emergency. It details standard operational guidelines to emergency controllers and their personnel, who may be required to fulfil a key functional role, during the various stages of an emergency. In other words, it contains critical information, which can assist emergency services personnel to formulate appropriate incident management strategies and tactics, when attending on an emergency at a plant. Since it is a critical document in implementing appropriate management strategies, it is important that the plan is comprehensive and easy to read and use.

Each works shall formulate an emergency management plan, detailing explicitly what action will be taken in the event of a major accident occurring on site, to prevent further escalation and to ensure rapid control. The emergency planning within the factory premises is known as On-Site Emergency Plan. This article will deal with the details of On-Site Emergency Plan.

## 2. Legal Provisions

The On-Site Emergency Plan is a mandatory document under various statutes of India. By virtue of the provision under Section 41-B (4) of the Factories Act, 1948 and its amendments of 1987, the occupier is expected to draw up the On-Site Emergency Plan along with detailed control measures for their factory. The occupier should also make the plan known to the workers and general public in the vicinity of the factory, with safety measures required to be taken by them in case of an emergency. Incidentally, under Rule 13 and 14 of the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989, framed under the Environment (Protection) Act, 1986, it is the responsibility of the occupier to prepare and implement an On Site Emergency Plan and District Collector or District Emergency Authority to prepare an Off-Site Emergency Plan.

### 3. Management Strategies

An On-Site Emergency Plan must be related to final assessment of the size and nature of events foreseen. It means that it should be specific. The effectiveness of response during emergencies depends on the amount of planning and training. If management is not interested in employee protection and minimizing property loss, very little can be done to promote a safe workplace. It is therefore, management's responsibility to see that a programme is instituted and that it is frequently reviewed and updated. The input and support of all employees must be obtained to ensure an effective on-site emergency programme. The emergency response plan should be developed locally and should be comprehensive enough to deal with all type of emergencies.

### 4. Salient Features of ON Site Emergency Plan

An On-Site Emergency Plan must include the following features:

- Emergency escape procedures and emergency escape route assignments.
- Procedures to be followed by employees, who remain to perform critical plant operations before they evacuate.
- A procedure to account for all employees after emergency evacuations has been completed.
- Assigning Rescue and Medical duties for these employees who have to perform them.
- The procedures for reporting fire and other emergencies.
- Name and regular job titles of persons or departments to be contacted for further information or explanation of duties under the plan.

The emergency action plan should address all potential emergencies, which can be expected in the workplace. It must list in detail the procedures to be taken by those employees who must remain behind to care for essential plant operations until their evacuation becomes absolutely necessary. This may include monitoring plant power supplies, water supplies and other essential services that cannot be shut down for every emergency alarm.

### 5. Components of On Site Emergency Plan

While preparing an On-Site Emergency Plan, the following components should be considered:

- Chain of Command
- Communications
- Counting of Personnel
- Emergency Control Centre
- Training
- Personnel Protection
- Medical Assistance
- Security
- Mutual Aid

#### 5.1 Chain of Command

A chain of command should be established to minimize confusion, so that employees at the workplace will have no confusion, who has the authority for taking decisions. Responsible employees should be selected to co-ordinate the task of emergency response teams. Emergency Response Coordinator is also known as Works Main Controller. The duties and functions of the team leaders can be written and included in the emergency plan document. The size of the team will vary from organisation to organisation. Some of the duties and functions of the Works Main Controller are as listed below:

- To assess the situation and determining whether an emergency exists which requires activating the emergency procedures.
- To direct all action in the areas including evacuation personnel and minimizing property loss.
- To ensure that outside emergency services such as mutual help, police, medical aid and local fire brigade are called in when necessary.
- To direct the safe shutdowns of plant operations when necessary.
- To declare the withdrawal of emergency at the site.
- To look after the rehabilitation of affected persons after withdrawal of emergency at the site.
- To issue authorized statements to news media and ensure that evidence is preserved for enquires to be conducted by the statutory authorities.

#### 5.2 Communication

- During an emergency involving a major fire or explosion, it may be necessary to evacuate offices in addition to manufacturing areas. During such emergencies, normal services such as electricity, water and telephones may not exist. Under these circumstances, an alternate area may be necessary, where employees can report or which can act as a focal point for

incoming and outgoing calls. Since time is an essential element for adequate response, the person designated as being in charge should make this area, as the alternate headquarters, so that he can be easily reached.

- A method of communication also is needed to alert employees for evacuation or to take other actions as required in the emergency plan. An Emergency Sire and Public Address System (PAS) should be provided, which should be audible or seen by all people in the plant and should have an auxiliary power supply in the event of electricity failure. The alarm should be distinctive and recognizable by all employees. For these the training and awareness shall be given frequently.
- The employer should explain to each employee the means of reporting emergencies. Emergency phone numbers of Key Persons and Organisations should be posted on or near telephones and other conspicuous locations. It may be necessary to notify other key personnel such as Plant Managers, Shift In-Charges, First Aiders or Physicians during off duty hours. An updated written list should be kept of Key Personnel listed in order of priority.

### 5.3 Counting of Personnel

A responsible person in the Emergency Control Centre should be appointed to account for personnel and to inform plant security in charge, police and emergency response team member of those persons believed missing. The person appointed should make a team and team members are physically capable of performing the duties assigned to them. The team members should be trained in the following areas other than the Fire & Rescue Team members of the plant:

- Use of various types of fire extinguishers.
- Use of Self Contained Breathing Apparatus (SCBA)
- First Aid, including cardiopulmonary resuscitation (CPS) kits
- Evacuation procedures
- Chemical spill control procedures
- Search and Emergency Rescue procedures

### 5.4 Emergency Control Centre

The Emergency Control Centre is the place from which the operations to handle the emergency are directed and coordinated. It will be attended by the Works Main Controller, Key Personnel and Senior

Officers of the Fire Brigade, Police, Officials of the Factory Inspectorate, District Authorities, Emergency Services and Medical Personnel, etc.

The Emergency Control Centre should be sited in an area of minimum risk and close to road to allow for ready access by a radio-equipped vehicle for use, if other system fail or extra communications facilities are required. For large sites or where toxic and flammable releases might be anticipated, consideration should be given for setting up two Emergency Control Centres to ensure, that at least one centre will be available for use, should the other be disabled.

#### The Emergency Control Centre should consist of:

- Adequate number of external telephones,
- Internal telephones, and PA Systems
- Radio equipment, hot lines, walkie-talkie, mobiles, etc.
- Plans of the factory to show:
  - Areas of large inventories of hazardous materials, including chemical storage tanks, reactors, drums and compressed gas cylinders
  - Location of radio-active sources.
  - Location of sirens.
  - Location of safety equipment including fire, explosion, spill and gas control kits.
  - Location of firefighting installations.
  - The fire water system and additional source of water, site entrances and road system.
  - Assembly points, shelters, refuge areas, lunch rooms and canteens.

### 5.5 Training

Training is important for the effectiveness of an emergency plan. Before implementing an emergency action plan, a sufficient number of employees must be trained to assist in the safe and orderly evacuation of employees or occupants. Training for each type of emergency is necessary, so that employees or occupants know what actions are required to be taken. In addition to the specialized training imparted for emergency response team members, all employees should also be trained in:

- Evacuation plans
- Shutdown procedures
- Alarm System
- Reporting procedures for personnel
- Types of potential emergencies

**These training programmes should be provided:**

- Initially when the plan is developed
- For all new employees or occupants
- When new equipment, process, or materials are introduced
- When procedures have been updated or revised
- Twice in a year.
- Mock drill twice in a year

### 5.6 Personal Protection

Effective personnel protection is essential for any person, who may be exposed to potentially hazardous substances. In an emergency, employees may be exposed to a wide variety of hazardous circumstances, including

- Chemical splash or contact with toxic materials
- Heat and major Fires
- Unknown atmosphere that may contain inadequate oxygen to sustain life or toxic gases, vapours or mist
- Falling objects and flying objects
- Fires and electrical hazards

It is extremely important that employees be adequately protected in these situations. Some of the safety equipment that may be used includes:

- Safety glasses, goggles or face shields for eye protection
- Helmets and safety shoes for head and foot protection
- Whole body coverings, gloves, hoods and boots for body protection from chemicals
- Whole body protection for abnormal environmental conditions such as extreme temperature
- Respirators for breathing protection

### 5.7 Medical Assistance

Medical Assistance plays an important role, during an emergency, especially when a major fire and explosion occurs. Thus a Medical Assistance Team should be formed and the team should have:

- Persons trained in First-Aid should be available.
- Eye washers or suitable equipment for quick drenching or flushing must be provided in the work area for immediate emergency use.
- First-Aid supplies should be provided for emergency use.

- Ambulance service should be available to handle any emergency.

### 5.8 Security

During emergency, it is often necessary to secure the area to prevent unauthorised access and to protect vital records and equipment.

### 5.9 Mutual Aid

In major emergency situations, resources over and above those available at the works will be needed. In locations, where there are a number of industrial concerns, it may be beneficial to set up a mutual aid programme which will assist to secure additional supplies when needed.

### 6.0 Conclusion

Every industry is exposed to threat of disasters, both man-made and natural due to variety of causes. Experience has shown that such emergencies can strike at the most unexpected time. The impact of such emergency depends on how well the management copes with such a situation. A major accident/disaster may be defined as one or more emergencies, which can affect several or all departments and personnel working within a factory or occupancy and can result in extensive damage to property, loss of life and disruption both inside and outside the works. An important element of mitigation is emergency planning, i.e., recognising that accidents are possible, assessing the consequences of such accidents, and deciding the On Site Emergency procedures. Emergency planning is just one aspect of the safety, other being maintaining good safety standards of operating inside plants.

### 6.0 Reference

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