

# **EMERGENCY PREPAREDNESS AND RESPONSE**

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# **EMERGENCY PREPAREDNESS AND RESPONSE**

## **INTRODUCTION**

The importance of an effective workplace safety and health program cannot be overemphasized. There are many benefits from such a program including increased productivity, improved employee morale, reduced absenteeism and illness, and reduced workers' compensation rates; however, incidents still occur in spite of efforts to prevent them. Therefore, proper planning for emergencies is necessary to minimize employee injury and property damage.

## **PURPOSE**

This discussion details the basic steps to handle emergencies in the workplace. These emergencies include accidental releases of toxic gases, chemical spills, fires, explosions, and bodily harm and trauma caused by workplace violence. This discussion is intended to assist small businesses that do not have safety and health professionals. It is not intended as an all inclusive safety program but rather to provide guidelines for planning for emergencies.

## **PLANNING**

The effectiveness of response during emergencies depends on the amount of planning and training performed. Management must show its support for plant safety programs and the importance of emergency planning. If management is not interested in employee protection and in minimizing property loss, little can be done to promote a safe workplace. It is therefore management's responsibility to see that a program is instituted and that it is frequently reviewed and updated. The input and support of all employees must be obtained to ensure an effective program. The emergency response plan should be developed locally and should be comprehensive enough to deal with all types of emergencies specific to that site. When emergency action plans are required by a particular OSHA standard, the plan must be in writing; except for firms with 10 or fewer employees, the plan may be communicated orally to employees. The plan must include, as a minimum, the following elements:

- (1) Emergency escape procedures and emergency escape route assignments,
- (2) Procedures to be followed by employees who remain to perform (or shut down) critical plant operations before the plant is evacuated,
- (3) Procedures to account for all employees after emergency evacuation has been completed,
- (4) Rescue and medical duties for those employees who are to perform them,
- (5) The preferred means for reporting fires and other emergencies, and

- (6) Names or 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 that can be expected in the workplace. Therefore, it will be necessary to perform a hazard assessment to determine toxic materials in the workplace, hazards, and potentially dangerous conditions. For information on chemicals, the manufacturer or supplier can be contacted to obtain Material Safety Data Sheets. These forms describe the hazards that a chemical may present, list precautions to take when handling, storing, or using the substance, and outline emergency and first-aid procedures.

The employer 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, and use of fire extinguishers.

For emergency evacuation, the use of floor plans or workplace maps that clearly show the emergency escape routes and safe or refuge areas should be included in the plan. All employees must be told what actions they are to take in emergency situations that may occur in the workplace, such as a designated meeting location after evacuation.

This plan must be reviewed with employees initially when the plan is developed, whenever the employees' responsibilities under the plan change, and whenever the plan is changed. A copy should be kept where employees can refer to it at convenient times. In fact, to go a step further, the employer could provide the employees with a copy of the plan, particularly all new employees.

## **CHAIN OF COMMAND**

A

## **COMMUNICATIONS**

During a major emergency involving a fire or explosion it may be necessary to evacuate offices in addition to manufacturing areas. Also, normal services, such as electricity, water, and telephones, may be nonexistent. Under these conditions, it may be necessary to have an alternate area to which employees can report or that 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 the alternate headquarters so that he/she can be easily reached.

Emergency communications equipment such as amateur radio systems, public address systems, or portable radio units should be present for notifying employees of the emergency and for contacting local authorities, such as law enforcement officials, private sector charitable groups, and the fire department.

A method of communication also is needed to alert employees to the evacuation or to take other action as required in the plan. Alarms must be audible or seen by all people in the plant and have an auxiliary power supply in the event electricity is affected. The alarm must be distinctive and recognizable as a signal to evacuate the work area or perform actions designated under the emergency action plan. The employer must explain to each employee the means for reporting emergencies, such as manual pull box alarms, public address systems, or telephones. Emergency phone numbers should be posted on or near telephones, on employees' notice boards, or in other conspicuous locations. The warning plan should be in writing and management must be sure each employee knows what it means and what action is to be taken.

It may be necessary to notify other key personnel such as the plant manager or physician during off-duty hours. An updated written list of key personnel should be kept listed in order of priority.

## **ACCOUNTING FOR PERSONNEL**

Management will need to know when all personnel have been accounted for. This can be difficult during shift changes or if contractors are on site. A responsible person in the control center must be appointed to account for personnel and to inform police or Emergency Response Team members of those persons believed missing.

## **EMERGENCY RESPONSE TEAMS**

Emergency Response Teams are the first line of defense in emergencies. Before assigning personnel to these teams, the employer must assure that employees are physically capable of performing the duties that may be assigned to them. Depending on the size of the plant there may be one or several teams trained in the following areas:

- (1) Use of various types of fire extinguishers,
- (2) First aid, including cardiopulmonary resuscitation (CPR),

- (3) Shutdown procedures,
- (4) Evacuation procedures,
- (5) Chemical spill control procedures,
- (6) Use of self-contained breathing apparatus (SCBA),
- (7) Search and emergency rescue procedures,
- (8) Incipient and advanced stage firefighting, and
- (9) Trauma counseling.

The type and extent of the emergency will depend on the plant operations and the response will vary according to the type of process, the material handled, the number of employees, and the availability of outside resources. OSHA's Hazard Communication Standard (29 CFR part 1910.1200) is designed to ensure that the hazards of all chemicals produced or imported are evaluated and that information concerning their hazards is transmitted to employers and employees. This is done by means of comprehensive hazard communication programs including container labeling and other forms of warnings, material safety data sheets, and employee training.

Emergency Response Teams should be trained in the types of possible emergencies and the emergency actions to be performed. They are to be informed about special hazards - such as storage and use of flammable materials, toxic chemicals, radioactive sources, and water-reactive substances-to which they may be exposed during fire and other emergencies. It is important to determine when not to intervene. For example, team members must be able to determine if the fire is too large for them to handle or whether search and emergency rescue procedures should be performed. If there is the possibility of members of the Emergency Response Team receiving fatal or incapacitating injuries, they should wait for professional firefighters or emergency response groups.

## **TRAINING**

Training is important to the effectiveness of an emergency plan. Before implementing an emergency action plan, a sufficient number of persons must be trained to assist in the safe and orderly evacuation of employees. Training for each type of disaster response is necessary so that employees know what actions are required.

In addition to the specialized training for Emergency Response Team members, all employees should be trained in the following:

- (1) Evacuation plans,

- (2) Alarm systems,
- (3) Reporting procedures for personnel,
- (4) Shutdown procedures, and
- (5) Types of potential emergencies.

These training programs must be provided as follows:

- (1) Initially when the plan is developed,
- (2) For all new employees,
- (3) When new equipment, materials, or processes are introduced,
- (4) When procedures have been updated or revised,
- (5) When exercises show that employee performance must be improved, and
- (6) At least annually.

The emergency control procedures should be written in concise terms and be made available to all personnel. A drill should be held for all personnel, at random intervals at least annually, and an evaluation of performance made immediately by management and employees. When possible, drills should include groups supplying outside services such as fire and police departments. In buildings with several places of employment, the emergency plans should be coordinated with other companies and employees in the building. Finally, the emergency plan should be reviewed periodically and updated to maintain adequate response personnel and program efficiency.

## **PERSONAL PROTECTION**

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

- (1) Chemical splashes or contact with toxic materials,
- (2) Falling objects and flying particles,
- (3) Unknown atmospheres that may contain toxic gases, vapors or mists, or inadequate oxygen to sustain life,

- (4) Fires and electrical hazards, and
- (5) Violence in the workplace.

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

- (1) Safety glasses, goggles, or face shields for eye protection,
- (2) Hard hats and safety shoes for head and foot protection,
- (3) Proper respirators for breathing protection,
- (4) Whole body coverings chemical suits, gloves, hoods, and boots for body protection from chemicals, and
- (5) Body protection for abnormal environmental conditions such as extreme temperatures.

The equipment selected must meet the criteria contained in the OSHA standards or described by a nationally recognized standards producing organization. The choice of proper equipment is not a simple matter and consultation should be made with health and safety professionals before making any purchases. Manufacturers and distributors of health and safety products may be able to answer questions if they have enough information about the potential hazards involved.

Professional consultation will most likely be needed in providing adequate respiratory protection. Respiratory protection is necessary for toxic atmospheres of dust, mists, gases, or vapors and for oxygen-deficient atmospheres. There are four basic categories of respirators:

- (1) Air-purifying devices (filters, gas masks, and chemical cartridges), which remove contaminants from the air but cannot be used in oxygen-deficient atmospheres.
- (2) Air-supplied respirators (hose masks, air line respirators), which should not be used in atmospheres that are immediately dangerous to life or health.
- (3) Positive-pressure self-contained breathing apparatus (SCBA), which are required for unknown atmospheres, oxygen-deficient atmospheres, or atmospheres immediately dangerous to life or health.
- (4) Escape masks.

Before assigning or using respiratory equipment the following conditions must be met:

- (1) A medical evaluation should be made to determine if the employees are physically able to use the respirator.

- (2) Written procedures must be prepared covering safe use and proper care of the equipment, and employees must be trained in these procedures and in the use and maintenance of respirators.
- (3) A fit test must be made to determine a proper match between the facepiece of the respirator and the face of the wearer. This testing must be repeated periodically. Training must provide the employee an opportunity to handle the respirator, have it fitted properly, test its facepiece-to-face seal, wear it in normal air for a familiarity period, and wear it in a test atmosphere.
- (4) A regular maintenance program must be instituted including cleaning, inspecting, and testing of all respiratory equipment. Respirators used for emergency response must be inspected after each use and at least monthly to assure that they are in satisfactory working condition. A written record of inspection must be maintained.
- (5) Distribution areas for equipment used in emergencies must be readily accessible to employees.

A positive-pressure self-contained



- (4) Rescue procedures must be specifically designed for each entry. A trained stand-by person must be present. This person should be assigned a fully charged, positive-pressure, self-contained breathing apparatus with a full facepiece. The stand-by person must maintain unobstructed lifelines and communications to all workers within the permit-required confined space and be prepared to summon rescue personnel if necessary. The stand-by person should not enter the confined space until adequate assistance is present. While awaiting rescue personnel, the stand-by person may make a rescue attempt utilizing lifelines from outside the permit-required confined space.

A more complete description of procedures to follow while working in confined spaces may be found in the OSHA standard for permit-required confined spaces, 29 CFR 1910.145 and the National Institute for Occupational Safety and Health (NIOSH) Publication Number 80-106, *Criteria for a Recommended Standard... Working in Confined Spaces*.

## **MEDICAL ASSISTANCE**

In a major emergency, time is critical factor in minimizing injuries. Most small businesses do not have a formal medical program, but they are required to have the following medical and first-aid services:

- (1) In the absence of an infirmary, clinic, or hospital in close proximity to the workplace that can be used for treatment of all injured employees, the employer must ensure that a person or persons are adequately trained to render first aid. The first aid is to begin within 3 to 4 minutes of the incident if the injury is of a serious nature.
- (2) Where the eyes or body of any employee may be exposed to injurious corrosive materials, eye washes or suitable equipment for quick drenching or flushing must be provided in the work area for immediate emergency use. Employees must be trained to use the equipment.
- (3) The employer must ensure the ready availability of medical personnel for advice and consultation on matters of employees' health. This does not mean that health care must be provided, but rather that, if health problems develop in the workplace, medical help will be available to resolve them.

To fulfill the above requirements, the following actions should be considered:

- (1) Survey the medical facilities near the place of business and make arrangements to handle routine and emergency cases. A written emergency medical procedure should then be prepared for handling accidents with minimum confusion.
- (2) If the business is located far from medical facilities, at least one and preferably more employees on each shift must be adequately trained to render first aid. The American Red Cross, some insurance carriers, local safety councils, fire departments, and others may be contacted for this training.

- (3) First-aid supplies should be provided for emergency use. This equipment should be ordered through consultation with a physician.
- (4) Emergency phone numbers should be posted in conspicuous places near or on telephones.
- (5) Sufficient ambulance service should be available to handle any emergency. This requires advance contact

**Subpart J - General Environmental Controls**

- 1910.146 Permit-required confined spaces
- 1910.147 Control of hazardous energy sources

**Subpart K - Medical and First Aid**

- 1910.151 Medical services and first aid

**Subpart L- Fire Protection**

- 1910.155-156 Fire protection and fire brigades
- 1910.157- 163 Fire suppression equipment
- 1910.164 Fire detection systems
- 1910.165 Employee alarm systems
- Appendix A-E of Subpart L

**Subpart R - Special Industries, Electrical Power**

Generation, Transmission, and Distribution

**Subpart Z - Toxic and Hazardous Substances**

- 1910.1030 Bloodborne pathogens
- 1910.1200 Hazard communication

**INFORMATION AND CONSULTATION SERVICES**

Much of the planning and program development for responding to occupational emergencies will require professional assistance. Many public and private agencies provide information and services free or at minimal cost (e.g., Federal, State, and local health and labor departments, insurance carriers, and local universities). After having exhausted these sources, consider using a private consultant selected by matching his/her specialty with your specific needs.

If there is a carrier for workers' compensation insurance, that company probably has safety and health specialists on staff who are familiar with minimum standards and technical information currently available and may be quite helpful in advising about accident and illness prevention and control.

Trade associations often have technical materials, programs, and industry data available for specific needs.

The Department of Labor through the Occupational Safety and Health Administration (OSHA) provides information in interpreting the law (by explaining the applicable standards). This information is available.

This information is available. This information is available. This information is available.

Machine or product manufacturers can be helpful in providing additional information on precautions to take in using their products. Any special problems should be referred to them first. Professional societies in the safety, industrial hygiene, and medical fields issue publications in the form of journals, pamphlets, and books that may be quite useful (e.g., American Society of Safety Engineers or the Occupational Health Institute). They can also recommend individuals from their societies to serve as consultants.

Local colleges and universities sometimes have industrial hygiene, public health, medical, or other relevant departments with faculty and libraries to assist.

## **OTHER SOURCES OF OSHA ASSISTANCE**

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and their related costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended *Safety and Health Management Guidelines* [*Federal Register* 54(18): 3908-3916, January 26, 1988]. These voluntary guidelines apply to all places of employment covered by OSHA.

The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

- (1) Management commitment and employee involvement;
- (2) Worksite analysis;
- (3) Hazard prevention and control; and
- (4) Safety and health training.

The guidelines recommend specific actions, under each of these general elements, to achieve an effective safety and health program. A single free copy of the guidelines can be obtained from the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., Room N3101, Washington DC 20210, by sending a self-addressed mail label with your request.

## **STATE OCCUPATIONAL SAFETY AND HEALTH PLANS**

The *Occupational Safety and Health Act of 1970*, under Section 18(b), encourages States to develop and operate their own State job safety and health plans under the approval and monitoring of OSHA. Twenty-five states and territories operate such plans. They are required to set standards that are at least as effective as the federal, conduct inspections to enforce those standards (including inspections in response to workplace complaints), cover State and local government employees, and operate occupational safety and health training and education programs. In addition, all States provide on-site consultation to help employers to identify and correct workplace hazards. Such consultation may be provided either under the plan or through a special agreement under section 7(c)(1) of the Act. Federal OSHA does not conduct

enforcement activities in the state plan States, except in very limited circumstances.

A listing of those States that operate approved State plans can be obtained from your local OSHA Area Office.

A comprehensive customer service poster listing OSHA services and how to contact agency Regional, Area, and District offices is available from OSHA's Publications Office, 200 Constitution Avenue, N.W. Washington D.C. 20210, Rm N3101. Telephone (202) 219-4667.

### **FREE ON-SITE CONSULTATION**

Free on-site safety and health consultation services are available to employers in all states who want help

education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually. Grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, (847) 297-4810.

For further information on any OSHA program, contact your nearest OSHA area or regional office.

## **OSHA AREA OFFICE SERVICES**

OSHA Area Offices are prime sources of information, publications, and assistance in understanding the requirements of standards.

They can furnish:

1. Job Safety and Health Protection (the OSHA workplace poster),
2. The necessary forms for OSHA recordkeeping requirements,
3. Information on applying for variances,
4. Off-site advice on controlling various hazards,
5. Copies of various publications and fact sheets,
6. Safety and health complaint investigations,
7. Investigations of complaints alleging discrimination for exercising safety and health rights,
8. Speakers at public events on safety and health topics, and
9. Advice and consultation on maintaining and calibrating some monitoring measuring equipment.

In addition they can provide referral services regarding:

1. Free on-site consultation,
2. Grant recipients with projects, products, or services related to hazards,
3. Training and education delivery resources,
4. Other Federal agencies and their areas of jurisdiction,

5. Voluntary protection programs under which employers with exemplary programs and safety records can be exempted from routine OSHA inspections (not all States have implemented this program), and
6. The National Institute for Occupational Safety and Health for health hazard evaluations.

These offices may be contacted by phone, by mail, by Fax, or in person, without fear of initiating an inspection.

## **ADDITIONAL SOURCES OF INFORMATION**

### **Safety Data Sheets, Guides and Manuals**

*AIHA Hygienic Guide Series.* American Industrial Hygiene Association, 2700 Prosperity Ave., Fairfax, VA 22031. Separate data sheets on specific substances giving hygienic standards, properties, industrial hygiene practices, specific procedures, and references.

*ANSI Standards, Z37 Series, Acceptable Concentrations of Toxic Dusts and Gases.* American National Standards Institute, 11 West 42nd Street, New York, NY 10036. These guides represent a consensus of interested parties concerning minimum safety requirements for the storage, transportation, and handling of toxic substances; they are intended to aid the manufacturers, the consumer, and the general public.

*ASTM Standards with Related Material.* American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

### **Standards and Specification Groups**

American National Standards Institute, 11 West 42nd Street, New York, NY 10036, coordinates and administers the federated voluntary standardization system in the United States.

American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 10103. World's largest source of voluntary consensus standards for materials, products, systems, and services.

### **Fire Protection Organizations**

Factory Insurance Association, 85 Woodland Street, Hartford, CT 06105. Composed of capital stock insurance companies to provide engineering, inspections, and loss adjustment service to industry.

Factory Mutual System, 1151 Boston-Providence Turnpike, Norwood, MA 02062. An industrial fire protection, engineering, and inspection bureau established and maintained by mutual fire insurance companies.

National Fire Protection Association, 470 Batterymarch Park, Quincy, MA 02269. The clearinghouse for information on fire protection and fire prevention also writes NFPA standards. Nonprofit technical and educational organization.

Underwriter Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611. Not-for-profit organization whose laboratories publish annual lists of manufacturers whose products proved acceptable under appropriate standards.

### **Medical Consultation**

Arrange for a local doctor to advise on workplace medical matters. Contact the local Red Cross chapter for assistance in first-aid training. If a local chapter cannot be located write:

American National Red Cross  
National Headquarters Safety Programs  
18th and E Streets, N.W.  
Washington, D.C. 20006

### **References**

Chemical Industries Association, Chemical Industry Safety and Health Council.



U.S. Department of Health and Human Services. National Institute for Occupational Safety and Health, *Safety and Health Alert: Request for Assistance In Preventing Homicide In the Workplace*. U.S. Department of Health and Human Services, Cincinnati, Ohio, September 1993, Number 93-109.

Public Health Service. National Institute for Occupational Safety and Health. *A Guide to Industrial Respiratory Protection*. NIOSH Publication No. 76-189. Cincinnati, 1976.

*Criteria for a Recommended Standard...Working in Confined Spaces*. NIOSH Publication. No.80-106. Cincinnati, 1980.

*Respiratory Protection...An Employer's Manual*. NIOSH Publication No. 78-198A. Cincinnati, October 1978.

*Self-Evaluation of Occupational Safety and Health Programs*. NIOSH Publication No. 78-187. Cincinnati, 1978.

**U.S. Department of Labor  
Program Highlights**

**Fact Sheet No. OSHA 92-19**

**RESPONDING TO WORKPLACE EMERGENCIES**

Employers should establish effective safety and health programs and prepare their workers to handle emergencies before they arise.

**Planning**

Where required by the Occupational Safety and Health Administration (OSHA), firms with more than 10 employees must have a written emergency action plan; smaller companies may communicate their plans orally. [See 29 Code of Federal Regulation (CFR) Part

## **Emergency Response Teams**

Members of emergency response teams should be thoroughly trained for potential emergencies and physically capable of carrying out their duties; know about toxic hazards in the workplace and be able to judge when to evacuate personnel or depend on outside help (e.g. when a fire is too large for them to handle). One or more teams must be trained in:

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## **Personal Protection**

Employees exposed to accidental chemical splashes, falling objects, flying particles, unknown atmospheres

# Emergency Response

- ! Employers should establish effective safety and health programs and prepare workers to handle emergencies
  
- ! Emergencies include:
  - accidental release of toxic gases
  - chemical spills
  - fires
  - explosions
  - workplace violence

# Planning

- ! Emergency response plan should be developed locally and be site specific
  
- ! When plans are required by a particular OSHA standard, must be in writing for firms with more than 10 employees
  
- ! Plan must include, as a minimum, the following elements:
  - emergency escape procedures and escape route assignments
  - procedures to be followed by employees who remain to perform (or shut down) critical plant operations before evacuation
  - rescue and medical duties for employees who perform them
  - means for reporting fires and other emergencies
  - contacts for information about the plan

# Emergency Response Teams

- ! Thoroughly trained for potential emergencies and physically capable of carrying out their duties

!

# Employee Training

- ! Details of emergency action plan, including evacuation plans, alarm systems, reporting procedures for personnel, shut down procedures, and types of potential emergencies
- ! Drills should be held at random intervals, at least annually, and include, if possible, outside police and fire authorities
- ! Training must be conducted initially, when new employees are hired, and at least annually
- ! Additional training needed when new equipment, materials, or processes are introduced, when procedures have been updated or revised, or when exercises show inadequate employee performance



# Security

- ! Often necessary to secure area during an emergency to prevent unauthorized access and protect vital records and equipment
- ! Establish off-limits area by cordoning off with ropes and signs (local law enforcement or private security may be necessary)
- ! Store important records in duplicate outside the plant or in protected secure locations within the plant