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ON SITE EMERGENCY PLAN IN DAIRY INDUSTRY

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Abstract: Emergency planning is an obligation in the aspect of prevention from industrial accidents that occur for any reason during the usage and production of hazardous materials, and natural disasters that affect the environment and community is affected negatively, and taking necessary precautions for minimization of their effects is a must. The facilities available in the plant and the state of emergency preparedness followed in the dairy industry is studied and analyzed first. After a complete study of the emergency preparedness followed in the dairy industry recommendations are given with an aim to improve the safety system and to incorporate the enhanced technology of emergency preparedness. An attempt to prepare Emergency Plan is done for the facility and the emergency steps to be taken for hazardous chemicals used in the dairy industry are done with the help of information provided in the material safety data sheet and also preparedness in case of fire, water supply interruptions, electrical supply interruptions, sewage backups etc. are suggested. The role of offsite emergency plan is cited for the dairy industry so that emergency preparedness is carried out well in a dairy industry without any problems and prevention of hazards and safety systems will be well enhanced if preparedness to meet emergency is well known.

Keywords: Industrial accidents, Emergency planning, dairy industry.

1.INTRODUCTION

A major emergency can be defined as an accident/incident that has potential to cause serious injuries or loss of life. It may cause extensive damage to property, serious disruption both in production and working of the factory and may cause adverse effect on the environment..

On-Site Emergency

If an accident/incident takes place in a factory, and its effects are confined to thefactory premises only, involving only the persons working in the factory and the propertyinside the factory, it may be called an On-site Emergency.

The main objectives of an emergency plan are:-

To control and contain the incident/accident and if possible, eliminate it; and

To minimize the effects of the incident on persons, property and environment.

To identify and utilize the resources available including the mutual aid

To extend medical support to the affected by identifying the hospitals with proper required treatment facilities.

Each factory carrying out hazardous process shall prepare an emergency plan incorporating details of action to be taken in case of any major accident/disaster occurring inside the factory. The plan should cover all types of major accident/occurrences and the identified risk in the plant. Mock drills on the plan should be carried out periodically to make the plan foolproof and persons are made fully aware and are prepared to handle any kind of incident in the plant.

Level – I : Affecting only the concerned department.

Level – II : Affecting other departments but within factory boundary.

Level – III : Emergency which may have likelihood of cloud formation of toxic /Flammable Gases affecting general public outside the factory Boundaries & external help is needed.

2. LITERATURE SURVEY

This paper will integrate scenario planning with multi criteria analysis for the prioritization of initiatives that comprise regional. Disaster emergency plans. Primary focus centers on sheltering, Evacuation, and related population behaviors

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and needs in the aftermath of an attack by a radiological dispersion device. Considerable attention is focused on plans for sheltering or evacuating the population of the US national capital region in response to a regional emergency such as a terrorist attack or natural disaster. Such Planning engages multiple disciplines spanning infrastructure engineering, emergency management, health care, mass communication, water and food supply, logistics, and others. Knowledge of population behaviors should influence the many dimensions of protection, prevention, response, and recovery of particular interest are the behaviors and needs of the resident and non-resident populations in the aftermath of a regional disaster, including those at home, at work, and traveling.

This paper presents an intelligent simulation system for an earthquake disaster assessment system based on a development platform of a Geographic Information System (GIS) and Artificial Intelligence (AI). This system is designed to identify the weakness of the structure and infrastructure system in pre-earthquake conditions, quickly assess earthquake damage and make an intelligent emergency response for the public and government during the earthquake and post-earthquake. The system includes the following functions: intelligent seismic hazard assessment, earthquake damage and loss evaluation, optimizing emergency response and post-earthquake recovering plan. Based on its functional characteristics, this system is composed of four parts: an information database, analytical modules, an intelligent decision-making sub-system and a friendly user interface. There are 132 coverage's and 78 analytical modules included in the information database and analytical modules. With thissystem, seismic disaster mitigation strategies can be verified during a pre-earthquake, and be executed at the time of an earthquake and post-earthquake; the earthquake resisting capacities for an entire city and all of its communities can be greatly enhanced. To check its reliability and its efficiency, this system has been tested based on a scenario earthquake event in one city, and the related results have also been given in this paper.

In this paper is emergency management, governments, enterprises and institutions have formulated many emergency pre-arranged planning, in which different response levels are defined according to all different situation. Every response level defines the tasks needed to be accomplished by all the participant units and the relationship among different tasks. When emergent event occursdecision-makers must give effective response in the shortest time and coordinate all the respective staff. At the present time, most integrated emergency response information systems are lack of the management of emergency pre-arranged plans, or only focus on the documents management of plans without formal model. When complicated emergent event occurs, departments in charge usually have to consult several pre-arranged plans and make organizing and Integration. How to make emergency pre-arranged planning be really helpful to decision-maker? This article defines business process source, formalizes emergency plan into business process source, defines algebra system which includes several operations, achieves the business process source construction and assembling suitable for final users, and applies it in emergency response information systems.

Conclusion from Literature Review

Emergency management is a complex and continuous process that includes planning for preparedness, response, recovery and mitigation spanning the time frames before, during, and after the incident.

At the present time, most integrated emergency response information systems are lack of the management of emergency pre-arranged plans, or only focus on the documents management of plans without formal model.

3. PROBLEM IDENTIFICATION

In all industries implementing "on site emergency plan" is the major problem and the problems are listed below,

- ✓ Heat stress is Produced in Boiler
- ✓ Liquefied Petroleum gas Leakage
- ✓ Poor House Keeping
- ✓ Concentrated chemicals are used
- ✓ Improper Guarding
- ✓ Fuel storage area
- ✓ Working at height without barricade
- ✓ Furnace gas leakage because improper maintenance
- ✓ Improper Exit way
- ✓ Improper Safe assembly point
- ✓ Improper maintenance in machines

Based upon the above parameters, I like to give the best on site emergency plan to the industry.

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3.1 Hazard and Consequences in Workplace

- Workers should familiarize themselves with all potential fall hazards on a job site. Never work in an area where fall protection systems have yet to be installed. Workers using personal fall arrest systems should inspect them before each use to ensure they are working properly and are free of damage
- Hard hats should be worn when working on, under or around a scaffold. Workers should also wear sturdy, non-skid work boots and use tool lanyards when working on scaffolds to prevent slips and falls and to protect workers below. Workers should never work on scaffolding covered in ice, water or mud.
- Always maintain three points of contact while ascending and descending a ladder, that's both feet and at least one hand. Portable ladders should be long enough to be placed at a stable angle extend three feet above the work surface.
- Workers should be able to recognize the hazards of falling and know the procedures to follow to minimize hazards and prevent falls.
- When wearing eye and face protection, workers should make sure that they don't interfere with their movements and fit snugly on their faces. Eye and face protection should be kept clean and in good repair. Workers should inspect face and eye protection before use to ensure it is free of cracks, chips and other damage.
- Workers are required to wear head protection wherever there is the potential for being struck in the head, which is basically the entire time you are on the construction site.
- Workers should be able to read and use Material Safety Data Sheets (MSDS) for any hazardous chemical being used at the construction site. Employees should wear proper PPE when handling hazardous chemicals and should clean up any spill when they occur.
- The key take away from this standard for workers is that they should know that there are protections in place for their safety while working on the construction site.

4.ON-SITE EMERGENCY PLAN

Main Elements Of On-Site Emergency Plans

The main elements of on-site emergency plans are

- ✓ Leadership and Administration
- ✓ Role and Responsibilities of Key Personnel
- ✓ Emergency action
- ✓ Light and Power
- ✓ Source of energy control
- ✓ Protective and rescue equipment
- ✓ Communication
- ✓ Medical care
- ✓ Mutual Aid
- ✓ Public relation
- ✓ Protection of vital records
- ✓ Training
- ✓ Periodical revision of pla

4.1Emergency Control Centre

This is the main center from where the operations to handle the emergency are directed and co-ordinated. Facilities to be made available in the emergency control are

- ✓ Internal and external communication
- ✓ Computer and other essential records
- ✓ Daily attendance of workmen employed in factor
- ✓ Storage of hazardous material records and manufacturing records
- ✓ Pollution records
- ✓ Walky-talky
- ✓ Plan of the plant showing
- ➢ Storage area of hazardous materials
- ➢ Storage of safety equipments
- ➢ Fire fighting system and additional source of water
- ➢ Site entrance, roadway and emergency exist
- ➢ Assembly points
- ➢ Truck parking area
- ➢ Surrounding location

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4.2 Co-Related Activities for Emergency Plan

- ✓ Pre-Emergency Activities
- ✓ Internal Safety Survey
- ✓ Third Party Survey
- ✓ Pressure Vessel Testing
- ✓ Non-Destructive Testing
- ✓ Safety/Relief Valves Testing
- ✓ Fire System Testing
- ✓ Mutual Aid Scheme
- ✓ Mock DrillsTraining

4.2.Steps Used in Emergency Period

- ✓ Personnal protective Equipments
- ✓ Communications
- ✓ Emergency Lights
- ✓ Emergency Control Room
- ✓ Plant Assemblies And Assembly Points
- ✓ Liason With State Authorities
- ✓ Hospital Facilities

4.3Emergency Time Activities

Under these activities, the staff in the plants at the various levels with pre - assigned duties is expected to work in a coordinated manner to meet the emergency situation, remove the emergency conditions and bring the plant to normalcy with the help of resources available within and outside the plant.

Availability and correct use of different means of communications and control is an important emergency time activity.

4.4 Post Emergency Activities

Post emergency activities comprise of steps taken after the emergency is over so as to establish the reasons of the emergency and preventive measures.

The steps involved are-

- ✓ Collection of records
- ✓ Conducting enquiries and concluding preventive measures
- ✓ Making insurance claims
- ✓ Preparation of inquiry reports and suggestion scheme
- ✓ Implementation of inquiry report's recommendations
- ✓ Rehabilitate the affected persons within the plant and outside the plant
- ✓ To restart the plant

5.PREVENTIVE MEASURES

- ✓ Personal Protective Equipment
- ✓ Engineering Control
- ✓ Leaks & Spills Procedures
- ✓ Storage Requirement
- ✓ Fire Hazards
- ✓ Fire
- ✓ Maintenance.
- ✓ Explosion Vents

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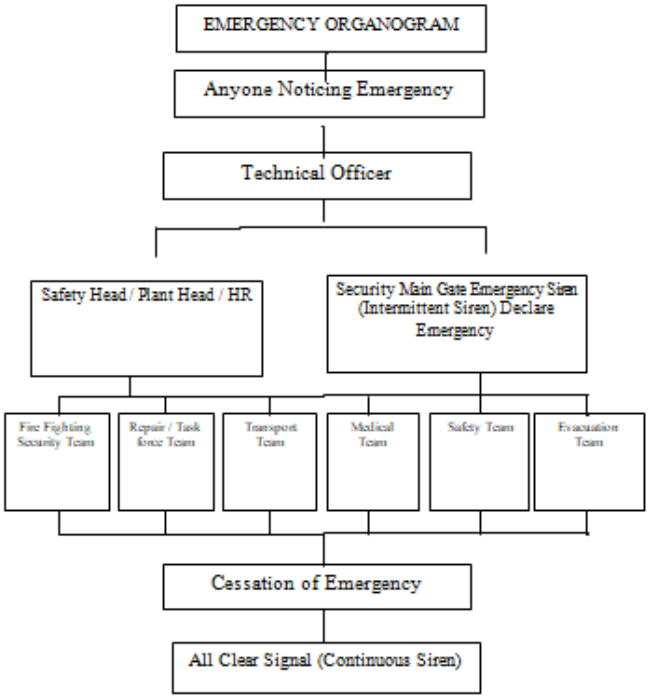

Figure.5.1EMERGENCY Plan Flow Chart

5.1 Site Main Controller (SMC)

In the emergency situations, decisions are to be taken which may affect the whole or a substantial part of the works and even places outside. Many of the decisions have to be taken in collaboration with the Senior Management at the works and the Senior officers of the outside services. It is essential that the authority to make such decision is with one individual. In this plan he is referred to as the "Site Main Controller"

5.2 Specific Responsibilities of Key Personnel

5.2.1 Site Main Controller

The SMC has the general responsibility of directing operations from the emergency control centre.

- On getting information about major hazard proceed to Emergency Control Centre **Administration Office**
- To decide (if not decided already) whether a major emergency exits or is likely, requiring the outside emergency services.
- Continuously to review and asses possible developments to determine the most probable course of events.
- To direct the shutting down of plants and their evacuation, in consultation with the Site Incident Controller and other key personnel.
- To ensure that casualties are receiving adequate attention.
- To liaise with Chief Officers of the fire and police services and with the Factory Inspectorate. / PCB Office.
- To control traffic movement within the works.
- To arrange for a log of the emergency to be maintained.
- To issue authorized statements to the News media and inform Management
- To control rehabilitation of affected areas after the emergency.

Teams:

The following teams comprising members ranging from two in each have been nominated to discharge duties assigned to them.

1.Fire Fighting Team (Security)
2.Repair & Task force Team
3.Transport Team
4.Medical Team
5.Safety Team
6.Evacuation Team

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5.3 Emergency Control Centre

Emergency Control Center –Near Weigh bridge:

Emergency management measures will be carried form control centers as detailed below

Emergency Control Centre (ECC)

ECC is the place from which the operations inside the plant to handle the emergency are directed and co-ordinated. Also, ECC is the place from where all communications will be established with outside agencies and district authorities. It will be located inside the plant and equipped with every facility to co-ordinate and manage the emergency. ECC will be attended by SMC.

Location: Administration Office

5.4 Assembly Points

In an emergency it will almost certainly be necessary to evacuate personnel from affected areas and, as a precautionary measure, to further evacuate non-essential workers, in the first instance, from areas likely to be affected, should the emergency escalate. The evacuation will be affected on getting necessary message from SIC. On evacuation, employees should be directed to a predetermined safe place called **Assembly Point security Gate** is the Assembly point where all non-key-personnel should assemble on getting information or Siren.

Escape Routes

The roads leading to main security gate the designated escape routes and are marked in the site

5.5 Declaration of Emergency

When an emergency situation arises in the factory, it will be first noticed by some workers or supervisor. He will immediately get in touch with the Technical Officer of that particular section. The Technical Officer will initiate action to overcome the emergency. He may declare emergency and make known to others by operating the emergency siren.

On declaration of emergency, the emergency organization will come into force and perform the various tasks as described.

5.6 Emergency Alarm

An emergency may arise in the plant due to major release of Ammonia or outbreak of fire. In such cases a state of emergency has to be declared by the concerned by sounding emergency siren.

For this purpose a separate emergency siren should be installed in Security gate and should be audible to a distance of 5 km. It's pitch and wailing should be distinctly different from usual siren. The factory siren will be in use for emergency purpose by altering the siren .

S.No	Type	Duration
1	In case of fire	10 sec on 5 sec Off –3 cycles
2	Emergency siren times during emergency	
3	All clear Signal	Continuous siren for 1 minutes only .

Table.5.6 Emergency Siren

Emergency Facilities

The following facilities should be provided in any factory to tackle any emergency at any time.

- Fire protection and fire fighting facilities
- Emergency lighting and standby power
- Emergency equipment and rescue equipment
  - ✓ Breathing apparatus with compressed air cylinder
  - ✓ Fire proximity suit
  - ✓ Resuscitator
  - ✓ Water gel Blanket
  - ✓ Low temperature suit
  - ✓ First aid kit
  - ✓ Stretchers
  - ✓ Torches
- Ladders

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- Safety Equipment
  - Respirators
  - Gum boots
  - Safety helmets
  - Asbestos Rubber hand gloves
  - Goggles and face shield
  - Toxic gas measuring instruments
  - Explosive meter
  - Oxygen measuring instruments
  - Toxic gas measuring instrument
  - Wind direction indicator

5.7 Emergency Team

For each identified area of the plant where disaster situation can arise or anticipated emergency teams have been constituted.

The disaster is broadly categorized according to area.

- ➢ Mechanical Disaster
- ➢ Electrical Disaster
- ➢ Chemical Disaster
- ➢ Natural Disaster

5.8 Emergency Precautions Observed While Performing Jobs at Height

- ✓ Proper and strong ladder is used
- ✓ Ladder in a proper place is put
- ✓ Oil and grease is cleaned from the place
- ✓ Hook at the top of top of ladder is attached
- ✓ Putting tools on ladder is avoided
- ✓ A slight mistake may cause fatal accident, hence proper care is taken
- ✓ If required men engaged to hold the ladder in the ground
- ✓ The site is checked before work
- ✓ The tools in used are tied up to avoid falling
- ✓ The safety belt is a life saving device for those working at high level, hence the belts are provided
- ✓ The safety belts whenever required are made available to make one self safe

5.9 Emergency Personnel's Responsibilities During Night Shifts and Holidays

As soon as he becomes aware of the emergency and its location, he will proceed to the scene. On arrival, he shall assess the scale of the incident and direct the operations for containment or extinguishment with the following priorities

Secure the safety of persons. This may require evacuation to the assembly points (gate). In the event of escape of material if the wind direction is adverse, choose appropriate assembly point

Try to minimize damage to plant, property and the environment,Have regard to the need for preserving evidence that may facilitate enquiry

Arrange to inform Site Controller, Incident Controller. Also call for other personnel till Site Controller / Incident Controller arrives

Act as Incident Controller till his arrival.

Advise local Police/Fire stations/Mutual aid members as deemed necessary.

6.EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

6.1 Eye Exposure

If liquid sulfuric acid or solutions containing sulfuric acid get into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper occasionally. Get medical attention immediately. Contact lenses should not be worn when working with this chemical

6.2 Skin Exposure

If liquid sulfuric acid or solutions containing sulfuric acid get on the skin, immediately flush the contaminated skin with water. If liquid sulfuric acid or solution containing sulfuric acid penetrate through the clothing, remove the clothing

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immediately and flush the skin with water. Get medical attention immediately.

6.3 Breathing

If a person breathes in large amount of sulfuric acid, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the effected person warm and at rest. Get medical attention as soon as possible.

6.4 Swallowing

If liquid sulfuric acid or solution containing sulfuric acid have been swallowed and the person is conscious, give him large quantities of water immediately to dilute the sulfuric acid. Do not attempt to make the exposed person vomit. Get medical attention immediately.

6.5 Rescue

Move the effected person from the hazardous exposures. If the exposedperson has been overcome, notify someone else and put into effect the establishment emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises. Spills, Leaks and Disposal ProceduresPersons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

Following stops should be taken

- Ventilate area of spill or leak
- Collect spilled or leaked material in the most convenient and safe manner for reclamationor for disposal in a secured sanitary landfill. Sulfuric acid should be absorbed in vermiculite, dry sand, earth or a similar material. It may be also being diluted and neutralized.

7.1 SAFE PRACTICE FOR WORKING

While working in The factory, people do not bother for safety rules, but no sooner accident occurs, they admit and understand that safety has got the first and foremost place.

The workers are trained for following safe practice.

- Always use tools, which are in proper good working condition
- Keep your work place clean and arrange things in their proper place & order
- Know the know-how of the machines and before operating the machines, get yourself acquainted
- Kept the safety guards in proper position
- Follow permit to work system while carrying out maintenance work
- Observe safety rules/precautions strictly
- Keeping in view the requirement - use safety boots without nails, helmets, safety belts, goggles, nose mask, hand gloves etc., as and when required
- Keep your officer concerned informed of the situation in case you feel any danger without any delay
- Caution your fellow worker about the dangerous situation whenever you observe him working negligently and ignoring the safety rules
- Adopt proper process and avoid short cut. This is dangerous
- Do not pour oil, grease and cotton waste or floor
- Keep passage clear; see that rope, tools waste is not there
- If you are not aware of any dangerous consequences of a particular job, consult & seek advice from your superior that only undertake it
- Do not consume intoxicants while you are in duty
- Put on tight cotton uniform while on duty. 16 Put safety belt and inspect the work place properly whenever you’re required to undertake job at a height. Safe working is best working.

7.2 On-Site Emergency Plan Should Contain

- Site plan and topographic plan
- Plan showing the fire fighting facilities
- Plan showing hazardous material storage area
- Material safety data sheets for hazardous chemicals, Facilities available in main control center and List of emergency equipment and List of Safety Equipment

7.3 CENTRAL CONTROL COMMITTEE

As the offsite plan is to be prepared by the Government, a Central Control Committee shall be formed under the Chairmanship of the District Collector. Other officers from Police, Fire Service, Factory Inspectorate, and Medical Department shall be incorporated as members of the Central Control Committee. Under the Central Control Committee the following committees shall be constituted under the control of the District Collector.

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- ✓ Incident and Environment Control Committee
- ✓ Fire Control Committee
- ✓ Traffic control, Law and order, Evacuation and Re habilititation Committee
- ✓ Medical help, Ambulance and Hospital Committee
- ✓ Welfare, Restoration and Resumption Committee
- ✓ Utility and Engineering Services Committee
- ✓ Press, Publicity and Public Relations Committee

7.4 Other Services Available On-Site Occupational Health Center

- ✓ Well equipped department with qualified and experienced staff
- ✓ First aid services are available on all working days
- ✓ There is well-equipped ambulance with the driver available round the clock for shifting any emergency case
- ✓ It has full range of routine as well as emergency medicines available for the treatment of injuries. The doctor issues a pack of medicines for continued treatment proportional to the nature of injury/accident
- ✓ Emergency first-aid box duly equipped are available to deal with on-site cases in case smaterial. The material is replenished as and when required through OHC
- ✓ The OHC is equipped with necessary resuscitation equipment like -- There are two observation beds available for short-term follow-up of the patients
- ✓ The Management has recognized few hospitals near / around area for further treatment of surgical, medical, orthopedic, hand surgery emergencies
- ✓ The doctor and social welfare counselors maintain a liaison and follow up with these hospitals telephonically and by hospital visits

CONCLUSION

The plant visited is a dairy industry that involves the process of storing, using, producing and transporting of substances that are hazardous and toxic for living organisms and environment. For this reason, emergency planning is needed to minimize the effects of a potential emergency. Various journals are referred and study is carried on emergency planning followed in dairy industry and emergency planning to be adopted in that industry. Based on the findings in the dairy industry emergency steps and precautions to be taken in case of leakage or spillage of toxic chemicals and also preparedness in case of water supply interruptions, Electrical Service Interruptions, Sewage backups, Fires are suggested. Recommendations for the dairy industry given with the latest technology will be helpful in case of emergency situations. Implementation of these recommendations will be very helpful in meeting emergency situations and this report will definitely helpful to reduce accident rates in case of emergency.

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