RISK ASSESSMENT AND SAFETY MANAGEMENT

5.1 Hazard prone areas in the factory area in the factory where potential and major fire hazard can take place are as follows –

a) Storage of Bagasse
b) Storage of Molasses
c) Boiler Operation
d) Storage of Sugar Bags
e) Others

a) Storage of Bagasse: - Bagasse in sugar factory should be stacked properly so as to have proper aeration.
b) Storage of molasses: - Molasses is stored in closed steel tanks. Molasses if not cooled properly can char and lead to ignition by spontaneous combustion.

(i) Leakage of molasses from pipes
(ii) Leakage from storage tanks

c) Boiler operation: - It may cause fire due to following reasons or inadequacies

1. Improper maintenance
2. Heat released by radiation
3. Bad house keeping
4. Fire injury to workers in boiler operation

d) Storage of Sugar Bags: - Sugar bags are generally stored in warehouses.

Major accidents can take place due to following reasons or inadequacies

(i) Electrical short circuit
(ii) Fire due to terrorist activities

Generally it is observed that factory management does not follow the necessary precautions for preventing disasters.

Following inadequacies are generally observed –

i) No special care taken for storage of Molasses
ii) Special action plans in emergencies are not provided
iii) Fire- fighting system is not adequate
iv) Fire- fighting training is not given to all employees
v) No special care taken for storage of bagasse
vi) Bad Housekeeping
vii) No special care taken of pipes, which carry steam

5.2 Measures to overcome possible hazards

To overcome all these possible hazards, the following measures may be adopted

(i) Spacing between the units in the plant should be kept as per the specifications of safety distances
(ii) Precautionary measures
(iii) Provision of fire fighting system & training to staff related safety

Precautionary Measures: - For Fuel – Bagasse (Boiler fuel)

a. Bagasse storage – Bagasse is a combustible material & as such the following measures may be taken:
b. Bagasse should be away from heat processes
c. Welding and cutting should not be allowed in the vicinity of storage of bagasse
d. Bagasse should not be stored where high voltage electric supply lines are overheads
e. Bagasse should be stored away from explosive materials
f. Bagasse storage should be kept in least to reduce the intensity of fire.
g. Bagasse should be used for pulp & paper mill or as a fuel for boiler
h. Proper ventilation should be provided while stacking bagasse so that auto combustion can be avoided.

5.3 Work Environment:

Dust and Heat free work environment is maintained in view of worker's health, safety & hygiene. The efforts taken in this regards are as follows:

Sr. No.	Source	Attenuation by
1	Scrap yard	Avoided by adopting smooth roads and yards
2	Plant	Avoided by adopting good foundation, good alignment, well lubricated
3	Generators	Fitted enclosure and tall stack
4	Vibrations	Proper sturdy foundation provided for all the machines and equipments to avoid fugitive escapes
5	Fumes	Closed, covered and carried through ducts

5.4 Disaster Management Plan: Industry has to be prepare Disaster Management Plan for emergency rescue

Objectives

- To localise the emergency
- To minimize the consequences
- To ensure that following concepts are considered namely, rescue, first Aid, evacuation, Rehabilitation, spreading the information

Elements on site plan:

- Assess the size of event
- Plan formulation and liaisons
- Action like raise alarm, communication within and outside
- Appoint key personnel and deploy. Appoint controller
- Emergency control center
- Action on site
- Action off site
- Alarm and visual signals at strategic point, first alert sent to incidence controller

5.5 Fire fighting facilities for Ethanol Plant

1. Possible Fire Hazards

i. Fire in fuel / bio-mass storage yards

ii. Fire in Alcohol storage tanks Electric static electricity and consequent fire accident.

2. Fire fighting facilities

Elaborate fire fighting system will be made available in any corner of the plant. Fire detection is also envisaged.

- Fire water storage tanks
- Fire water pump house containing combination of diesel and electrically driven pumps
- Hydrant system with piping, valves, instrumentation, hoses, nozzles etc
- Foam injection system fuel oil tanks for foam concentrated tanks, foam pumps, in line inductors, valves, piping and instrumentation
- Automatic high velocity water spraying system consisting of detectors. Deluge valves, piping & instrumentation
- Water curtain arrangement will be commissioned between each storage tank to avoid dissipation of heat to nearby tank
- Linear heat sensing cable detectors, deluge valves, isolation valves, nozzles, piping & instrumentation
- Automatic medium velocity water spraying system consisting of QB (Quartzite Bulb)
- Early warning fire detection & alarm