

ENCLOSURE 1. RISK ASSESSMENT

1.1 RISK ASSESSMENT

Risk is a potential that a chosen action or activity will lead to a loss of human or property.

Risk assessment is a step for Risk Management. Risk assessment is determination of qualitative and quantitative value of risk related a situation or hazard.

Hazard is a situation that poses a level of threat to life health or environment.

Risk assessment involves the following:

- Hazard Identification
- Vulnerability Analysis
- Risk Analysis
- Emergency Preparedness Plan

1.1.1 HAZARD IDENTIFICATION

The project is a Commercial Complex with Multiplex and there may be following types of hazards:

1.1.1.1 Natural hazard:

1. Earthquake
2. Flooding

1.1.1.2 Manmade hazard:

1. Health Injuries
2. Fire & explosion
3. Electrical
4. Mechanical
5. Radiation
6. Thermal
7. Chemical

1.1.2 VULNERABILITY ANALYSES

This is a Commercial Complex with Multiplex hence staff & visitors will be vulnerable to risks.

1.1.3 RISK ANALYSIS

The risk is likelihood of harmful effect big or small due to hazard, together with severity of harm suffered. Risk also depends on number of people exposed to hazard.

Risk analysis provides severity of harm from particular type of hazard.

1.1.3.1 Earthquake:

The project will be located at seismic zone IV where earthquake can occur from 4.0-7.0 Richter scale.

1.1.3.2 Flooding:

The project site will be located in an area where no natural river or drainage exists. However, flooding can occur due to excess rain.

1.1.3.3 Health Injuries

Health Injuries can occur during Construction Phase & appropriate measures shall be taken as described below:

1. Safety nets shall be provided at appropriate level and various shafts/ openings will be kept covered to prevent falls, slips, trips etc.
2. Necessary safety belts, helmets and eye-masks as required will be enforced at site.
3. Adequate guardrails will be provided to the staircases and common areas.
4. Adequate guardrails/ fences will be provided around the water storage spaces to prevent drowning accidents.
5. Adequate protection/ fence will be provided around the excavated areas.
6. The machinery and the equipments will be regularly tested and maintained with the specific emphasis against accidents failures.
7. The deployed Safety officers will ensure that the personnel/ labour will be kept at a safe distance from working machinery to avoid accidents/ injuries due to toxic gases/ chemical/ noise.
8. Moving parts of various parts of machineries/ equipments shall be properly guarded.
9. Required fire extinguishers will be provided at the construction site.
10. Arrangements for clean drinking water will be made.
11. Rest rooms and first aid facilities will be made available for the workers.

1.1.3.4 Fire & Explosion:

Since it is a Commercial Complex with Multiplex, fire can occur due to electrical spark or gas leakage from pantry.

Fire is mainly caused in Commercial Complex due to carelessness, short circuits, and malfunctioning of gas regulator, tube, and such related products.

1.1.3.5 Electrical:

The electrical current can pass to the floor & metals due to inadequate insulation or accidentally.

1.1.3.6 Mechanical:

The mechanical fault can cause the risk & hazard which include the elevators.

1.1.3.7 Radiation:

Due to use of wireless equipment's there may be electromagnetic radiation.

1.1.3.8 Thermal:

Thermal heat can be generated from the D.G sets and the vehicles in the project.

1.1.3.9 Chemical:

Chemical use in the Commercial Complex with Multiplex will be limited to cleaning agents & medicines.

1.1.4 ONSITE EMERGENCY PLAN

An onsite emergency is caused by an accident or hazard that takes place within the project and the effects are confined to the project.

The onsite emergency plan consists of following key elements:

- Planning as per hazard analysis
- Preventive measures
- Emergency response procedure
- Recovery procedure

1.1.4.1 Planning

1. Mapping of hazard vulnerable area shall be done in consultation with management.
2. There shall be Disaster Management Cell in place
3. The disaster management cell have following members to share the responsibility
 - I. Site Controller (Administrator of project)
 - II. Incident Controller (Asstt. Administrator)
 - III. Personal Manager
 - IV. Communication Officer
 - V. Fire Officer
 - VI. Security Officer
 - VII. Engineering Incharge
 - VIII. Fire pump attendant
 - IX. First Aid Team

1.1.4.2 Preventive Measures

1.1.4.2.1 Earthquake:

Since project will be located at Seismic Zone IV, structural designing will be done as per National Building Code 2016.

1.1.4.2.2 Flooding:

- Proper designing of drainage system for domestic as well as storm water.
- Rain water harvesting structures will have provision of storage for one hour peak rainfall.

1.1.4.2.3 Fire:

Reference:

- NBC-2016

FIRE STATIC STORAGE TANK:

Fire storage tank for covering the entire complex shall be provided with fire pumps like Hydrant Pumps, Jockey Pump, and Pressure Vessel & Diesel engine driver pump is proposed near the water storage tanks for proposed Commercial Complex with Multiplex.

• **Accessories:**

- i) Suction manifold (in fire pump room) fed from two fire water storagetanks.
- ii) Delivery manifold (in fire pump room) fed by the pumps as explainedabove.
- iii) An Air vessel shall be provided on delivery manifold of Hydrant system, tocompensate for slight loss of pressure and to provide an Air cushion forcounter acting pressure surges from the system. Separate delivery pipeswill be given for Hydrant system.

FIRE HYDRANT SYSTEMS:

Fire hydrant system shall consist of the following:

- i) Each fire hose cabinet shall be provided with
 - a) One single out let landing valve
 - b) Two sets of canvas hose pipe with branch pipe
 - c) One first aid fire hose reel.
 - d) One firemen's Axe
 - e) 2 Nos fire Extinguishers

PORTABLE EXTINGUISHERS & FIRE SAFETY APPLIANCES:

Portable Extinguishers will be located in prominent and easy to reach during fireemergency.

Type of Extinguishers:

Selection type and capacity of the Extinguishers shall be done as per I.S: 15683.

- Water-CO2 Type

- Dry Chemical Power (DCP) Type
- CO2 Type Extinguishers
- ABC (Power Type) Extinguisher:

Test Demonstration:

At least 1 extinguisher per each type shall be demonstrated at site in simulated fire conditions.

EXIT SIGNAGE

Exit Signage and evacuation instruction shall be displayed judiciously at prominent locations.

FACILITY OF FIRE MAN AT MAIN GATE

- i) Fire brigade inlet connection to tank.
- ii) Fire brigade draw out connection to tank

1.1.4.2.4 Electrical:

i) Planning Stage:

Safety parameters as indicated under Indian Electricity Rules 1956 and ECBC shall be complied. The following safety measurement is considered.

- Earthing system
- The earthing system shall comply the requirement of IS: 3043, Indian Electricity rules and other applicable statutory regulations and safety codes in the locality of installation.
- GI plates earthing system shall be provided.
- One Earth Leakage Breaker sensitivity 30 mA shall be used per phase in all Distribution Boards

In addition to that, following measures shall be adopted

- There will be colour coding and labelling of high voltage electrical wires.
- Sand bags/ wire bucket shall be placed near the electrical control/panel.
- Installation of electrical equipments shall be properly done like insulation, guarding and grounding.
- Work practices and handling of the electrical equipments shall be properly managed.
- Employees and workers shall be trained for awareness of safe work practices and systems.
- Properly maintained equipments and tools will be used.

- Service of electrical equipments shall be done under the supervision of trained personnel.
- Temporary connections made for experimental reasons shall be safe and properly insulated.
- Live electrical terminals shall be shielded.

ii) Operation Stage:

- **Have only licensed electricians install, repair and dismantle jobsite wiring.** That way, everything will be completed according to electrical safety codes, ensuring greater protection for the workers who will be using the wiring to power tools and equipment. Bringing in a professional electrician also prevents the injuries that result when less-qualified individuals attempt electrical jobs that they aren't properly trained to do.
- Check each extension cord before use. Ensure that insulation is completely intact (free from cracks, tears, or abrasion) and that power extension cables haven't been knotted, which can cause conductor damage and increase the risk of fire.
- Do a thorough check for electrical wiring before cutting through any wall, floor or ceiling. Any time that a tool inadvertently makes contact with an unseen electrical line, the person holding that tool is likely to be shocked or electrocuted. Always size up the situation before you get started to reduce your risk of injury.
- **Inspect power equipments on a regular basis.** Look over the tools' power cords and plugs for any sign of damage to the insulation, blades, or grounding pin. If you find signs of excessive wear and tear, take tools out of commission until they've been properly repaired. Maintain awareness during electrical tool use as well; if a tool starts to overheat, smoke, give off a burning smell, or shock you on contact, discontinue use immediately.
- **Check insulated tools for damage before each use.** Once the insulation layer of an insulated hand tool becomes nicked, cracked or cut, the tool is no longer effectively insulated – it actually becomes more of an electrical conductor, and can increase your risk of injury. If a tool has damaged insulation, it is no longer safe to use – destroy and replace it right away.
- ◆ **Never modify electrical plugs.** Under no circumstances should you ever file down the blades, remove the ground pin, or otherwise modify an electrical plug so that it will fit into a socket – doing so only increases the likelihood of shock, electrocution, and fire. Either have a certified electrician change the device's plug, or replace outdated two-prong receptacles with grounded outlets that can accommodate a ground pin.

- ◆ **Keep extension cords in a safe place where they won't be stepped on or driven over.** The force of a vehicle – or even repeated treading by pedestrians – can cause an extension cord's conductor to become misshapen or break, a problems that can lead to electrical fires. Because it occurs in the core of the cable, conductor damage isn't always obvious to the eye, so play it safe from the start by guarding jobsite extension cords with heavy-duty cord covers.
- ◆ **Ensure that all electrical components stay dry.** It's one of the cardinal rules of electrical safety: don't mix electricity and water. Store power tools and cables above water level when not in use, cover outdoor receptacles, and never use electrically powered tools in a wet environment.
- ◆ **Use the right extension cord for the job.** Before you plug in, make sure that the wattage rating of the extension cord you're using is greater than the pull (or power requirement) of the equipment it's powering. Using an extension cord to supply more wattage than it's rated for can cause conductor strain, overheating, and possibly even fire.

1.1.4.2.5 Chemicals:

This is a Commercial Complex with Multiplex project no chemical container/tanker shall be allowed inside the project.

The chemical hazard includes the following:

- Causing fire, explosion.
- Release of harmful /toxic gas or particles.
- Splashing of hot corrosive or toxic liquid.

To prevent chemical hazard following measures shall be taken:

1. Use of safer chemicals as far as possible.
2. Keep material safety Data Sheet (MSDS) of all chemical.
3. Storage of chemical in appropriate container (which is safer for chemical)
4. Storage of chemical at defined place with spillage control system.
5. Proper environment like ventilation, temperature.
6. Use of chemicals by qualified and trained personals.
7. Use of personal protective equipment (PPE) during handling of chemicals.
8. Use of emergency procedures in case of leakage like
 - a) Fire fighting – for fire
 - b) Spillage treatment

- c) First aid
- d) Evacuation of area

For building projects only chemicals used are:

1. Cleaning agent (acid /caustic)
2. Insecticides

Cleaning agents can be treated by water.

Insecticides shall be contained with specified space during sand & cotton and waste shall be sent to TSDF.

The spray of insecticide shall be done by using gas mask.

1.1.4.2.6 Terrorism:

All the preventive measures shall be taken as given in security plan.

1.1.4.2.7 Mechanical:

Mechanical hazards are created by powered operation of equipments or tools.

Mechanical hazards can occur at three locations:

1. Elevators
2. DG set room, Pump & motors room.
3. Vehicular Movement

Following preventive measures shall be taken.

1. Elevators shall be properly maintained with record book of maintenance.
2. Periodic replacement of critical components of elevator/ machine.
3. Proper training to operators of machines.
4. The protective guard will be installed at fan & motors.
5. There will be safe distance demarcation on heavy machines like cranes (during construction)
6. Sign of danger at the hazard places.

1.1.4.2.8 Radiation:

The radiation hazard can be of two types:

- Ionizing Radiation (nuclear radiation)
- No ionizing radiation (non-nuclear radiation)

In the buildings in a Commercial Complex with Multiplex, radiation hazard is non ionizing.

The radiation can be prevented in following manner:

1. Shielding of radiation.
2. Safe distance from radiation source.
3. Sign of radiation hazard at vulnerable areas.

1.1.4.2.9 Thermal:

Thermal hazards are objects or substances that transfer energy as heat.

Typical building can have following points of thermal hazard.

- Open flame
- Boiling liquid
- Hot machines/ equipments

The thermal hazard can cause burn of skin, following preventive measures can be taken:

1. The open flame area like mess shall be restricted.
2. Water heaters shall be properly insulated and safe distance & guard will be installed.
3. D.G set room will have restricted entry.
4. Operators in the thermal hazard area shall be provided with protective gears like gloves, goggles etc.
5. For emergency first aid room will be maintained.

1.1.4.3 Emergency Response Procedure

After all the preventive measures for any emergency following infrastructure shall be provided.

1. Administrative office shall also make an Emergency Control Room.
2. Assembly area shall be demarked for each type of flats.
3. Communication system shall be installed in the project which includes intercom and public addressing system.
4. Fire alarm shall be installed at vulnerable place.
5. The evacuation plan of each building shall be displayed at each floor of respective building.
6. The safe zones (at the time of emergency) on map shall be displayed at different locations.
7. First Aid facility shall be made available at Control room.

In case of emergency following action shall be taken.

1. The emergency shall be declared in case of following:
 - i) Fire alarm buzzing (Fire hazard)
 - ii) Vibration/Earthquake feeling (Earthquake)
 - iii) Water logging in the project above 30 cm (Flood)
 - iv) Any unusual smell of gas or suffocating feeling (Chemical leakage)
 - v) Security alarm from main gate. (Security risk/Terrorism)
2. On declaration of emergency communication shall be made to staff and visitor for any type emergency
3. All the staff & visitor of the affected area shall be moved to safe zone
4. The control measures shall be done as per the emergency action plan for each type of hazard.
5. All the members of disaster management cell shall take charge of their respective duties.
6. Outside help like fire tender, police ambulance etc. shall be called by site controller or Incident controller.

1.1.4.4 Recovery Procedure

The recovery procedure will depend on the type of emergency. Recovery procedure shall be followed by engineering section to restore the essential services like electricity, water, telephone, food items.

1.1.5 Offsite Emergency Plan

If an accident take place in the project and its effect are felt outside the project, the situation thus created is called an offsite emergency. In this case off site emergency is not applicable.

1.1.6 Security plan

An ISO 27001 and 27002, which are the international best practice information security management standards, defining and guiding Information Security Management System (ISMS) development shall be adopted. These will provide the necessary benchmarking for individual users to know the type of cover and the responsibilities that are defined and provided by that institution for its guests. Most importantly, training, to staff needs to be regularly imparted in dealing with such situations.

1. **Manual Checks:** At all gates the visitors and guest shall be manually checked and asked for ID's.

2. **CCTV:**At all important location with a remote viewing facility and record back up. With highest resolution and picture quality. DVR being the back bone, its recording and replaying capabilities must be considered.
3. **Video Door Phone System:** VDP equipment with associated telephone wiring shall be provided for all flats having color view screen.
4. **Central Control Room:** This will control the security system from inside.
5. **Communication Systems:** Proper communication system to security staff shall help them to coordinate better during emergencies.

Training and Security Drills (including Surveillance System)

Disaster planning is the responsibility of all sections of the community. The police, fire brigade, civil defence, Home Guards, press, clergy, industrial groups, and community groups must participate in the pre-disaster planning. The community as a whole has the responsibility to teach first aid to groups in the community that could be utilized in disaster situations. The disaster may involve the normal communication network itself. Therefore, two-way radio systems and messenger systems must be included as backups in the event of a communication-system failure.

Proper training, security drill and evacuation drill shall be conducted in a defined time period, so as to train the management people, security personnel's, senior staff and all other working staff in the Commercial Complex with Multiplexproject to take control of all odds what so ever come in the way. These trainings shall be conducted for use of weapons and Arms by some trained agencies for the said trainings. The training shall be done periodically.

Making of Standard Operating Procedures

A standard operating procedure manual shall be prepared, followed and maintained for all the eventualities due to attack by armed intruders.

Emergency Response Team

The disaster management cell shall act as an emergency response team shall be formed in the project which will comprise of persons from Internal Control room personnel, security staff,trainers, Police Control, Army official, Nearest Hospital Management, Fire officer to take control of any eventuality if comes in the project.

1.2 EVACUATION PLAN

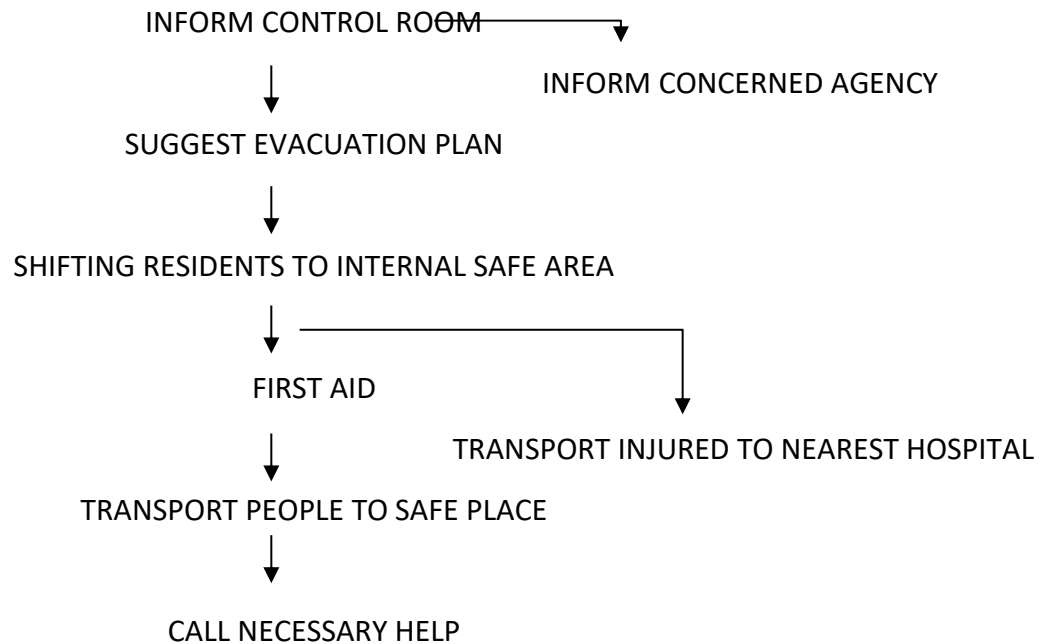
Standard operating procedures will be formulated and maintained for all eventualities due to attack by armed intruders.

Evacuation plan includes the evacuation due to

- fire hazard in the project

- Armed Intrusion
- Flood
- Earthquake

During any of the above-mentioned hazards, the evacuation will be as follows:



Communication

The communication system is useful for rapid notification to appropriate units and expeditious implementation of relief procedures. The fire brigade and metro police units are linked through a wireless communication network. Additional channels of communication are now available through personal cell phones. Use of personal cell phones will not be restricted during disasters.

On-site crowd control and information management

Disasters usually attract crowds consisting of curious bystanders, onlookers, overenthusiastic volunteers, and self-styled advisers. In general, this hampers rapid triage and transport. The primary responsibility for crowd management is with the police. When a call is received at any of the control rooms, the information is passed on to the local police. The police contingent which arrives on the scene has the primary responsibility for crowd control.

During construction Phase	During Operation Phase
<ul style="list-style-type: none"> • Safety nets shall be provided at appropriate level and various shafts/ openings would be covered to prevent falls, slips, trips etc. 	<ul style="list-style-type: none"> • The project is located at Seismic Zone IV. Structural designing will be done as per best structural engineering practices

<ul style="list-style-type: none"> • Necessary safety belts, helmets and eye-masks as required are enforced at site. • Adequate guardrails shall be provided to the staircases and common areas. • Adequate guardrails/ fences shall be provided around the water storage spaces to prevent drowning accidents. • Adequate protection/ fence shall be provided around the excavated areas. • The machinery and the equipments shall be regularly tested and maintained with the specific emphasis against accidents failures. • The deployed Safety officers ensure that the personnel/ labour shall be kept at a safe distance from working machinery to avoid accidents/ injuries due to toxic gases/ chemical/ noise. • Moving parts of various parts of machineries/ equipments shall be properly guarded. • Required fire extinguishers shall be provided at the construction site. • Arrangements for clean drinking water shall be made. • Rest rooms and first aid facilities shall be made available for the workers. • Fire Protection system shall be designed as per requirements of National Building Code – 2016. 	<p>complying with all the applicable codes / standards. Also we have received the structural stability certificate.</p> <ul style="list-style-type: none"> • Proper designing of drainage system for domestic as well as storm water shall be provided. • Rain water harvesting structures will have provision of storage. • Fire Protection system shall be designed as per requirements of National Building Code – 2016 • Proper Fire evacuation system shall be provided. • Safety parameters as indicated under Indian Electricity Rules 1956 and ECBC shall be complied. • Elevators shall be properly maintained with record book of maintenance. • Periodic replacement of critical components of elevator/ machines.
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