RISK ASSESSMENT

1.0 INTRODUCTION

This section provides an assessment of the hazards and risks to people and airport operations that may be associated with the Shillong Airport runway expansion project and the details of public consultation. The present report is prepared for submission to Meghalaya State Pollution Control Board for conducting the public hearing. The report will be updated with public hearing minutes after it is completed, and eventually submitted to EAC, MoEF & CC, New Delhi for obtaining environmental clearance.

1.1 Risk Assessment and Hazards

A risk is an integrated assessment of likelihood and severity of an undesired event. Risk assessment is the determination of quantitative or qualitative estimate of risk related to a well-defined situation and a recognized hazard. Risk Assessment aims at assessing the effects of hazards on the local environment and personnel at the hazard.

1.1.1 Introduction

Risk analysis provides severity of harm from particular type of hazard and follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring population or environment is exposed to as a result of hazards present.

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist at airport. On the other hand, risk analysis deals with the identification and quantification of risks, the plant equipment and personnel are exposed to, due to accidents resulting from the hazards present in the complex.

Hazard occurrence may result in on-site implications like:

- Fire and/or explosion;
- Leakage of flammable material;
- Crash landing;
- Bomb threat; and

- Natural calamities like earthquake, cyclone etc.

Other incidents, which can also result in a disaster, are:

- Air raids; and
- Crashing of aircrafts i.e. while landing or take-off.
- Agitation/forced entry by external group of people;
- Sabotage; and
- Hijacking.

In the sections below, the identification of various hazards, probable risks in the airport operation, maximum credible accident analysis and consequence analysis are addressed either qualitatively or quantitatively, which gives a broad identification of risks involved in the airport operation. Based on the risk assessment of various hazards, disaster management plan has been formulated and presented here.

1.2 Hazard Identification

Identification of hazards at the proposed project is of primary significance in the analysis, quantification and cost effective control of accidents. A classical definition of 'hazard' states that hazard is in fact the characteristic of system that presents potential for an accident. Hence, all the components of a system need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident.

The following two methods for hazard identification have been employed in the study:

- Identification of major hazardous units based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as amended in 2000) of Government of India; and
- Identification of hazardous units and segments of airports and storage units based on relative ranking technique.

1.2.1 Identification of hazards due to the storage of HSD and ATF at Shillong Airport

At the airport, HSD is stored and handled for DG sets operation while ATF is stored for refueling of aircraft. It is essential to have comprehensive information on High Speed Diesel (HSD) and Aviation Turbine Fuel (ATF) being handled at the Shillong airport. An understanding of their physico-chemical properties of HSD will help for hazard identification.

High Speed Diesel (HSD)

High speed diesel is a mixture of straight run product (150 °C and 350 °C) with varying amount of selected cracked distillates and is composed of saturated hydrocarbons (primarily paraffins including iso, and cycloparaffins), and aromatic hydrocarbons (including napthalenes and alkylbenzenes). Its exact composition depends on the source of crude oil from which it is produced and the refining methods used.

Aviation Turbine Fuel (ATF)

Aviation Turbine Fuel (ATF) is clear colourless to yellow liquid with slight petroleum odor. It is flammable liquid and highly flammable in presence of open flame and spark. The flammability of ATF is ranked as 2 by National Fire Protection Association (NFPA).

1.2.2 Fuel Storage

All the fuels are being stored in the fuel yard located within the airport premises. The fuel yard comprises of storages of HSD and ATF fuel. The details of storage capacity are given in **Table-7.2.**

TABLE-1.1

Capacity Details of Fuel Storages

Fuel	Total Storage Capacity
HSD	30 KL
ATF	Arranged by BPCL

The Material Data and Safety Information for these chemicals is provided below.

Aviation Turbine Fuel

NFPA 704

Diamond	Hazard	Value	Description
	Health	1	Can cause significant irritation.
	Flammability	3	Can be ignited under almost all ambient temperature conditions.
	Instability	0	Normally stable, even under fire conditions.
	Special		

(NFPA, 2010)

Hazards

Reactivity Alerts

Highly Flammable

Air & Water Reactions

Highly flammable. Insoluble in water.

Fire Hazard

Special Hazards of Combustion Products: None

Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back.

Health Hazard

INHALATION causes irritation of upper respiratory tract; central nervous system stimulation followed by depression of varying degrees ranging from dizziness, headache, and incoordination to anesthesia, coma, and respiratory arrest; irregular heartbeat is dangerous complication.

ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, substernal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonitis; acute onset of central nervous system excitement followed by depression.

INGESTION causes irritation of mucous membranes of throat, esophagus, and stomach; stimulation followed by depression of central nervous system; irregular heartbeat.

Reactivity Profile

GASOLINES: AVIATION (< 4.86G LEAD/GAL) is a mixture of saturated aliphatic hydrocarbons. May be incompatible with strong oxidizing agents such as nitric acid. Charring may occur followed by ignition and involvement of other nearby combustibles. In other settings, mostly unreactive. Not affected by aqueous solutions of acids, alkalis, most oxidizing agents, and most reducing agents. When heated sufficiently or when ignited in the presence of air or oxygen burns exothermically to produce carbon dioxide and water. May be ignited by strong oxidizing agents.

Respond Recommendations

Isolation and Evacuation

As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.

LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Firefighting

Fire Extinguishing Agents Not to Be Used: Water may be ineffective

Fire Extinguishing Agents: Foam, carbon dioxide, dry chemical

Non-Fire Response

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor-suppressing foam may be used

to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean, non-sparking tools to collect absorbed material.

LARGE SPILL: Dike far ahead of liquid spill for later disposal. Water spray may reduce vapor, but may not prevent ignition in closed spaces.

Protective Clothing

Protective goggles, gloves

DuPont Tychem® Suit Fabrics

No information available.

First Aid

Seek medical attention.

INHALATION: maintain respiration; give oxygen if needed.

ASPIRATION: enforce bed rest; administer oxygen.

INGESTION: do NOT induce vomiting; lavage carefully if appreciable quantity was ingested; guard against aspiration into lungs.

EYES: wash with copious quantity of water.

SKIN: wipe off and wash with soap and water.

Physical Properties

Flash Point: -50 ° F

Lower Explosive Limit (LEL): 1.2 %

Upper Explosive Limit (UEL): 7.1 %

Autoignition Temperature: 824 ° F

Melting Point: less than 76 ° F

Specific Gravity: 0.711 at 59 ° F

Boiling Point: 160 to 340 ° F at 760 mm Hg

Diesel

NFPA 704

Diamond	Hazard	Value	Description
	Health	1	Can cause significant irritation.
	Flammability	2	Must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
	Instability	0	Normally stable, even under fire conditions.
	Special		

(NFPA, 2010)

Hazards

Reactivity Alerts

Highly Flammable

Air & Water Reactions

Flammable. Insoluble in water.

Fire Hazard

Combustible. (USCG, 1999)

Health Hazard

LIQUID: Irritating to skin and eyes. Harmful if swallowed. (USCG, 1999)

Reactivity Profile

Saturated aliphatic hydrocarbons, which are contained in FUEL OIL, [DIESEL], may be incompatible with strong oxidizing agents like nitric acid. Charring of the hydrocarbon may occur followed by ignition of unreacted hydrocarbon and other nearby combustibles. In other settings, aliphatic saturated hydrocarbons are mostly unreactive. They are not affected by aqueous solutions of acids, alkalis, most oxidizing agents, and most reducing agents. When heated sufficiently or when ignited in the presence of air, oxygen or strong oxidizing agents, they burn exothermically to produce carbon dioxide and water. May be ignited by strong oxidizers.

Belongs to the Following Reactive Group(s)

•Hydrocarbons, Aliphatic Saturated

Response Recommendations

Isolation and Evacuation

As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.

LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Firefighting

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient. CAUTION: For mixtures containing alcohol or polar solvent, alcohol-resistant foam may be more effective.

SMALL FIRE: Dry chemical, CO2, water spray or regular foam.

LARGE FIRE: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk.

FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Non-Fire Response

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Vapor-suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean, non-sparking tools to

collect absorbed material.

LARGE SPILL: Dike far ahead of liquid spill for later disposal. Water spray may reduce vapor, but may not prevent ignition in closed spaces. (ERG, 2016)

Protective Clothing

Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. (ERG, 2016)

First Aid

EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

INGESTION: DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY

call a hospital or poison control center. Be prepared to transport the victim to a hospital if advised by a physician. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

Physical Properties

Flash Point: 125 ° F

Lower Explosive Limit (LEL): 1.3 %

Upper Explosive Limit (UEL): 6 %

Autoignition Temperature: 350 to 625 ° F

Melting Point: 0 ° F

Vapor Pressure: 2.17 mm Hg at 70 ° F

Specific Gravity: 0.841 at 60.8 ° F

Boiling Point: 540 to 640 ° F at 760 mm Hg

Water Solubility: less than 1 mg/mL at 66° F

1.2.3 Risk Quantification - Fuel Storage

Based on the storage of fuels and their properties, the following failure scenarios for the airport have been identified for quantification of risk, which are given in **Table-7.3.** The heat radiation contours are calculated around the source of failure to assess the extent of damage.

TABLE-1.2

SCENARIOS CONSIDERED FOR MCA ANALYSIS

S. No.	Fuel/Chemical	Total Quantity (m^3)	Model Considered
1	Failure of HSD storage tank	15	Pool Fire

For radiation calculations, pool fire has been considered. From the above considerations, the criterion of 4.5 kW/m^2 has been selected to judge acceptability of the scenarios. The assumptions for calculations are:

1.2.4 Model Computations

The results of MCA analysis for HSD are tabulated indicating the distances for various damages identified by the damage criteria. Calculations are done for radiation intensities levels of 10, 5 and 2 kW/m^2 which are presented in **Table-1.3** for Instantaneous pool fire. The distances predicted for various scenarios are given in meters and are from the center of the pool.

TABLE-1.3

Occurrence Of Various Radiation Intensities – Pool fire

Failures	Storage Capacity (m^3)	Radiation Intensities (kW/m^2)/Distances (m)		
		10	**5**	**2**
HSD Tank	10	10	11	15

- ***Pool Fire Due to HSD Tank failure***

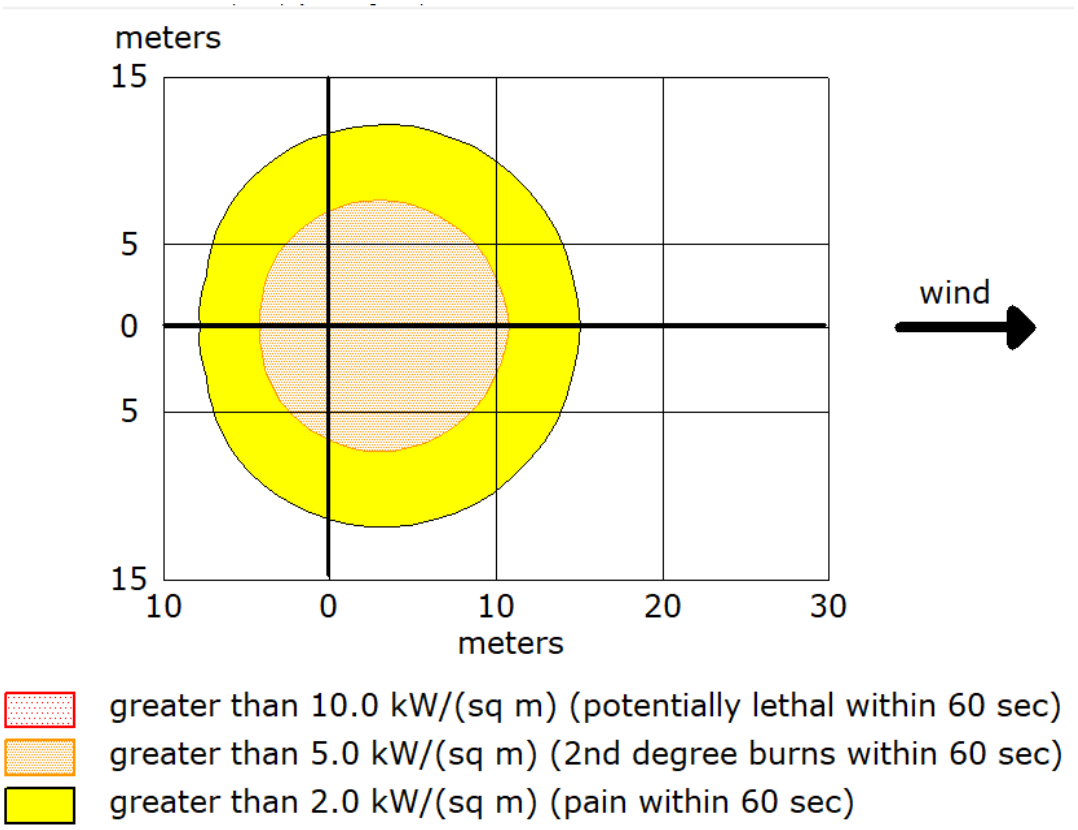
A perusal of the above table clearly indicates that 10 kW/m^2 (potentially lethal within 60 sec) and 5.0 kW/m^2 (2nd degree burns within 60 sec) occurs at 10 m and 11 m respectively. Therefore the potential failure of HSD will only have effect on the activities falling within the premises.

1.2.5 Effect of Thermal Radiation on Population

A perusal of Table-7.5 presented in above section indicates that radiation contours are restricted to airport boundary only and do not affect the surrounding human population.

In addition, the airport has watch towers to keep vigilance on all the activities occurring. The traffic movement is recorded by the security personnel. In case of any eventuality, the alarm is blown to alert the nearby work force.

The Passenger Terminal Building (PTB) and other facilities has adequate fire rescue system comprising of fire hydrants, emergency exits, assembly points for safety of the occupants.



1.2.6 Risk Mitigation Measures

The risk mitigation measures for the proposed airport are as given below:

- Prompt action in the event of an accidental release of HSD or ATF is essential. Where there is a possibility of a flammable liquid spill, provisions shall be made to ensure as follows: (i) the spread of the spill is limited; (ii) non-flammable absorbent material is available for immediate use; (iii) ignition sources can be quickly removed; and (iv) the area is well ventilated;

- Routine testing and inspection shall be carried out for storage area, hoses and fueling tanker and records shall be maintained;

- Leakages from tanker may be prevented by a suitable regime of preventive maintenance and inspection;

- Heat and smoke detectors shall be provided at strategic locations;

- Adequate fire fighting facilities shall be provided near storage and handling of HSD and ATF;

- Fire fighting facilities shall be tested as per schedule;

- Ground staff near aircraft shall be trained to take measures in the event of spillage and during fire emergency;

- Fueling in aircraft and DG sets 'day tank' shall be done under the supervision of trained operators;

- Open vents shall be provided of goose neck type, covered with a 4 to 8 mesh screen to discharge the vapours of hydrocarbons from storage tanks;

- Every storage tank and tanker, including all metal connections shall be electrically continuous and be effectively earthed;

- Static grounding of aircraft shall be ensured whenever the aircraft is parked including during refueling and defueling;

- Check list for operators for checking safety system and equipment shall be prepared and check records kept in safe custody;

- Critical operating steps shall be displayed on the board near the location where applicable;

- Thermal Safety Valve (TSV) shall be provided at the operating manifold (outside dyke);

- Mock drill shall be conducted in every three months involving all concerned agencies; and
- All concerned agencies shall be provided Disaster Management Plan and regular interaction shall be made.

Risk Mitigation Measures for Fueling of Aircrafts

- Earthing and bonding connections shall be attached and mechanically firm;
- Equipment performing aircraft servicing function shall not be positioned within 3 m radius of aircraft fuel vent openings;
- The accessibility to the aircraft by fire vehicles shall be established during aircraft fuel servicing;
- Handheld intrinsically safe communication devices used within 3 m from the fuel vent shall be intrinsically safe;
- For open hose discharge capacity of the aircraft fueling system, at least one listed wheeled extinguisher having a rating of not less than 80-B;
- Presence of at least 2 x 9 kg ABC dry powder fire extinguishers at both sides of the refueling browser / dispenser;
- Spark plugs & other exposed terminal connections shall be insulated;
- All vehicles, other than those performing fuel servicing, shall not to be driven or parked under aircraft wings;
- Electric tools, drills or similar tools likely to produce sparks or arcs shall not be used;
- Hot works within 50 / 75 metres of refuelling operations shall be ceased (for 50 m, a MOM approved safety officer shall be present);
- A clear area for emergency evacuation of the aircraft shall be maintained at the rear (or front) aircraft exit door.

1.3 Disaster Management Plan

The important aspect in emergency management is to prevent by technical and organizational measures, the unintentional escape of hazard or the hazardous materials out of the facility and minimize accidents and losses.

A disaster is a natural or man-made (or technological) hazard resulting in an event of substantial extent causing significant physical damage or destruction, loss of life, or drastic change to the environment. It is a phenomenon that can cause damage to life and property and destroy the economic, social and cultural life of people.

The disaster at an airport can occur due to the following reasons:

- Natural (Dense fog, floods, mud slides, earth quakes, snow storms)
- Wild life disasters (bird strikes)
- Human factors – Unintentional/Accidents (Collisions/Plane crashes due to spatial disorientation)
- Intentional /Man made (Terrorism/Bomb threats)

Airport emergency planning is the process of preparing an airport to cope with an emergency occurring at the airport or in its vicinity. The object of airport emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations. The airport emergency plan sets forth the procedures for coordinating the response of different airport agencies (or services) and those agencies in the surrounding community that could be of assistance in responding to the emergency.

The emergency arising out of the incidents whose effects are confined to the airport premises is termed as on-site emergency and those with effects extending beyond the airport premises is termed as off-site emergency.

This section identifies possible disasters that could occur at the airport and draws a disaster management plan, which includes the emergency control measures, plan of coordination and interaction with various agencies including administrative agencies, rescue and relief operations, training and awareness to minimize the severity of disasters.

The DMP plan should be prepared in accordance with the Civil Aviation requirement laid down by the Director General of Civil Aviation (DGCA), Disaster Management Act, 2005, the National Building Code as well as various code provisions of the

International Civil Aviation Organization (ICAO) Airport Service Manual, Part-7. The following most likely disaster scenarios shall be considered in the management plan.

Aircraft Accident Related Disasters

Aircraft accident occurs near and within the airport during landing/take off/taxing due to malfunctioning of some mechanism like undercarriage, failure of hydraulic power supply, non-functioning of one or more engines, malfunctioning of landing gear, sudden fire in aircraft while en-routing, unforeseen circumstances in which pilot loses control over aircraft and improper signaling by air traffic control tower (ATC).

Disasters due to emergencies are given below:

1.3.1 Aircraft Accident on the Airport

Any aircraft accident occurs within the perimeter of the aerodrome is termed as aircraft accident on the airport. The following actions shall be taken during this disaster:

- Switch on the fire station alarm;
- ATC to inform the exact location of the accident with co-ordinates;
- Sending the message to fire and safety department, fire station, medical department etc. to take appropriate measures;
- Alert the nearby hospitals for medical help and ambulances;
- Airline to which aircraft belongs to for the details of on board passengers and air crew; and
- Help line shall be set-up immediately to provide the details to the kin of the passengers.

1.3.2 Aircraft Accident off the Airport (Within the vicinity)

As per the Airport Authority of India, the vicinity of airport is the area upto 5 km on the approach path and for the areas it is 2 km around the airport boundary. The accident shall be informed by the ATC to rescue people for necessary action:

- Raising the alarm;
- Location shall be identified by ATC;
- Rushing fire fighting equipment to the site;
- Type of aircraft and name of aircraft operator to be informed by ATC;
- To activate the off-site emergency plan;
- Informing the incident to District Collector with details of location;
- Alerting the civil medical department to arrange medical facilities;
- Informing police department to provide the security etc;
- Searching for the black box, cockpit voice data recorder and other revelant documents to hand over to DGCA;
- Informing to District Fire & Emergency Services; and
- District Fire & Emergency Services will take command of the accident area and co-ordinate with various agencies.

1.3.3 Aircraft Crash within Airport Fire Service Turnout Area

The airport fire service turnout area shall include the entire airport area as well as the areas in the vicinity of the airport up to an arc of a circle centered at the runway threshold of 5 km radius, and 3 km from the perimeter of the airport. Crash action is declared for aircraft accidents on the airbase as well as off the airbase. The Air Traffic Controller shall activate the crash alarm immediately if one of the following events occurs:

When the aircraft accident/ crash is sighted by the Air Traffic Controller or the sighting is reported to the Air Traffic Control by any of the reliable sources such as the "Follow-Me" vehicles plying in the aircraft movement area;

b) During poor visibility- when the Air Traffic Controller is unable to sight the runway, and the aircraft, which has been cleared for takeoff or land, fails to respond to the Air Traffic Control's repeated calls or the inputs from the Advanced Surface Movement Guidance and Control System (A-SMGCS) and other radar have indicated that the aircraft might have crashed; or

c) When the aircraft has been cleared to land and fails to land within 5 minutes of the estimated time of landing and the communication with the pilot is not able to be reestablished. Or the inputs from A-SMGCS and other radar have indicated that the aircraft might have crashed.

If the crash is within the Airport Fire Service Turnout Area, the Air Traffic Control shall activate the crash alarm for at least one minute continuously, and the "Crash" message shall be broadcast over the Crash alarm communication system. The "Crash" message shall also be relayed to the Airport Fire Watch Tower.

The standard text and format used for the "Crash Action" message for aircraft crash within the airport Fire Service Turnout Area shall be as follows:
CRASH, CRASH, CRASH:

- Aircraft Type & Flight Number; Location of Accident;
- Grid Map Location [*SQUARE (Alpha-Numeric)]; Time of Accident;
- Number of Persons On Board (POB);
- Fuel On Board;
- Aircraft Operator;
- Any dangerous goods on board including quantity and location, if known

*The 'Square' is the alpha -numeric grid reference indicated on the Crash Map.

If the aircraft accident occurs on the runway, the Air Traffic Control shall give clearance for the responding airport fire vehicles to enter the runway as soon as possible.

1.3.4 Aircraft Crash outside Airport Fire Service Turnout Area

If an aircraft accident occurs outside the Turnout Area, the procedures for Crash Action outside the Airport Fire Service Turnout Area shall be as followed.

The decision to declare the Crash Action rests with the Air Traffic Control. If it is clear to the Air Traffic Controller that the aircraft has crash and landed outside the Airport Fire Service Turnout Area, the standard text and format used for the "Crash Action" message shall be as follows:

AIRCRAFT CRASH OUTSIDE TURNOUT AREA:

- Aircraft type & flight number;
- Location of accident;
- Time of accident;
- Number of Persons On Board (POB);
- Fuel on board;
- Aircraft operator;
- Any dangerous goods on board including quantity and location, if known

State Authorities/District Administration will be overall in charge of all ground operations at the scene. All the other agencies and services involved will activate their respective emergency operations plans to support the State Authorities/District Administration in the mitigation of the aircraft accident. Local Fire Service will be fully in charge and resume command of the aircraft fire-fighting and rescue operations at the crash site.

1.3.5 Fuel Spillage

The following actions shall be taken:

- Inform apron manager;
- Cordon off the area;
- Do not use mobile phones at the spill location;
- Stop the fuel flow by pressing Fuel Hydrant Emergency Stop switch;
- In consultation with apron manager, re-route or hold the taxiing aircraft; and
- Send the light vehicle with sorbent pads and saw dust bags.

1.3.6 Sabotage including Bomb Threat and Unlawful Seizure of Aircraft

Bomb Alert on Aircraft

a) Any aircraft that is suspected of carrying a bomb should be parked in Isolated Bay Area.

b) All passengers should be evacuated immediately by the fastest means while the local or airport police arrange for bomb disposal experts to attend and search the aircraft. All baggage should be left on board until it has been searched and cleared. Airport rescue and fire services should be standby at point no less than 300 m from air craft and predetermined procedure for bomb alerts should take into account the calling of local authority services of fire, police, ambulance and hospitals.

c) These types of incidents may occur on the ground or in the air including the seizure of an aircraft unlawfully, the placement of bomb on board or suspected bomb on board or armed attack on the aircraft which may include taking of hostage in such cases airport normally have contingency plan which firstly demand positioning the aircraft away from the main runway and terminal building and secondly police and law enforcement agencies are contact as necessary.

The Air traffic control must

- Maintain continuous communication with the rescue and fire fighting services to ensure that they are kept updated in relation to any change in distressed aircraft condition;

- Attend to bomb threat calls received to aircraft, terminal building, vital installations and arising from unclaimed observed insides/outside the airport and safe neutralization of explosives devices found; and

- Conduct regular training of airport security police and staff, airline agencies working at the airport. This training is based for identification of explosives.

1.3.7 Mass Casualities / in Flight Medical Emergencies

In a medical emergency, the degree or type of illness or injury and number of persons involve will determine the extent to which the airport emergency plan utilized.

As per ICAO recommendations, AAI has to set up an airport medical clinic to deal with day to day medical cases and minor first-aid requirements. In addition, an on call ambulance for routine emergencies as well as off-airport based ambulance to be provided for emergency transportation services. In case of this emergency, following actions are recommended:

- On receipt of a 'Medical Emergency Alert' from aircraft in flight, approve emergency landing with Number-1 priority;
- Pass the medical emergency alert to medical unit;
- Alert CISF at security check area to speedy security clearance of Medical Officers and medical kit;
- In case of international passengers involved, assist the airline representative for completing the immigration formalities; and
- Inform the next of the kin of the sick /deceased appropriately.

1.3.8 Public Health Emergencies

Public health emergency is an occurrence of eminent threat of an illness or health condition that is believed to be caused by bioterrorism, appearance of a novel or previously controlled or eradicated infection agent or biological toxin that possess high probability of harms viz. large numbers of deaths in the affected population and/or long period exposure to an infectious or toxic agent resulting in significant risk to a future harm of a large number of people in the affected population.

- In case of outbreak of any public health emergency, the Directorate of Health, shall take lead in responding to the situation under direct guidance of Ministry of Health;
- Airport medical service provider will assist public health department; and
- In case of any communicable dieses at the airport, the passengers diagnosed positive will be quarantined by APHO.

1.3.9 Natural Disaster

Natural Disasters are often sudden & intense and results in considerable destruction, injuries & death disrupting normal life as well as the process of development. Natural disasters are due to natural calamity such as Earthquake, Flood, Storm/ Cyclone, Cloud burst/ lightning/ extreme weather conditions etc.

The possible natural calamities that can affect the airport are earthquake (Seismic zone V) and torrential rains resulting water logging. All districts of the state of Meghalaya lie in Zone 5. Zone 5 covers the areas with the highest risks zone that suffers earthquakes of intensity MSK IX or greater. The IS code assigns zone factor of 0.36 for Zone 5. The proposed expansion and any other structures being built will consider this factor for earthquake resistant design of structures in Zone 5. The zone factor of 0.36 is indicative of effective (zero period) level earthquake in this zone.

Generally, the areas having trap rock or basaltic rock are prone to earthquakes.

The various actions procedures recommended in "The National Disaster Management Act 2005' and various regulations laid down by ICAO and DGCA are to be complied.

- In case of any major natural disaster, especially earthquake, resulting major loss in terms of life and property, the Incident Command System of State Disaster Management Authority (SDMA) shall be set up at the airport.

- To contain a developing scenario, the Aerodrome Emergency Management Committee (AEMC) shall be synchronized with the Incident Command System (ICS) of SDMA and airport operator shall provide all possible support to the state machinery.

1.4 Role and Responsibility in Handling Emergencies

The following table summarizes the key functions for the Airport and other supporting organizations/ agencies/ services during a crisis.

Sr. No	Service	Responsibilities
1	Airport Fire Service	• Aircraft rescue and fire fighting operation; • Post-accident fire protection support for triage activities; • Evacuate injured passengers to hospitals; • Support for structural fire-fighting and evacuation; and • Support for mitigation and dangerous floods, accidents/incidents
2	Airside Management/ Operation	• Activate key officials and ground handling agent concerned; • Muster airline's and ground handling agent's resources; • Provide and direct ground service supports; • Provide inputs to air traffic control in regard to runway and taxiway closure; and • Coordinate aircraft recovery and salvage

Sr. No	Service	Responsibilities
		operation.
3	Air Terminal Management	• Activate key officials and other external agency/services such as hospitals, panel doctors, ambulance services, bureau of civil aviation security, immigration and customs; • Activate the Emergency Response and Interaction Centre (ERIC) Group; • Setup the Emergency Co-ordination Centre (ECC), Survivors Reception Centre (SRC), Friends and Relative Reception Centre (FRRC) and Re-union Area (RA); • Passengers facilitation and business recovery at terminal buildings; and • Support terminal building evacuation.
4	Air Traffic Service	• Activation and Termination of Crash Action, Full Emergency, Local standby, etc.; • Air traffic management including issuing NOTAM (notices to airman)
5	Police	• Guarding of aircraft wreckage and preservation of evidence at the accident site including eye-witness accounts and photography; • Custody of flight data and cockpit voice recorders, cargo's onboard including dangerous goods, and baggage/passenger belongings; • Investigation and management of dead bodies including their identity establishment, mortuary arrangements, and release of the bodies; and • Arrange medical examinations of the crew members alive and passengers as well as post-mortem examinations of the deceased crew members and passengers mob control.
6	Airlines	• Support overall crisis mitigation efforts e.g. accountability of passengers, management of Next

Sr. No	Service	Responsibilities
		of Kin (NOK), aircraft accident investigation, etc.; • Support media management; • Passenger and NOK facilitation; • Facilitate reunions of survivors and NOK; • Prepare and provide passenger and cargo manifests; • Report the aircraft accident or serious incident to the authorities concerned as stipulated under Aircraft Rules, 1937, Part X Investigation of Accidents; and • Salvage/removal of crashed or disabled aircraft.
7	Ground Handling Agent	• Provide ground service staff and facilities including passenger steps, coaches, and aircraft towing equipment.

1.5 Operation and Management Control

1.5.1 Airport Emergency Managing Committee

To ensure coordinated action, an Airport Emergency Managing Committee will be constituted. The airport director will be the chairman of this committee. The committee will comprise of members from various airport departments including the following:

- Airport Administration;
- Air Traffic Control;
- Airport Rescue and Fire Fighting;
- Airport Security Services;
- Safety Department;
- Airport Medical Services;
- Maintenance Department;
- Environment Management Cell;

- Representative from Airlines;
- Transportation Department;
- Cargo Facility;
- Department of Information and Publicity;
- Representative from local NGO"s and Social Group; and
- Also member from Airport Authority of India and district administration will be part of the committee.

Airport emergency managing committee will design the procedure, the emergency action plan, evacuation plan and procedures for implementation based on local needs and facilities available. For effective implementation of emergency action, coordination among the various agencies involved in Emergency Control Centre will be expected. Emergency control centre will be established as the supreme command post for emergency action. For direct action and coordination at ground level mobile command post will be established.

Emergency action committee will select officers in charge for emergency control centre.

1.5.2 Airport Emergency Operation/ Coordination Centre

During a major airport disaster such as an aircraft crash or a severe fire outbreak at terminal building, the various emergency operations and coordination centers will be established immediately to mitigate the disaster. The Emergency Control Centre will be the top command for coordination and communication centre for all kinds of emergencies. The Chairman of Emergency Managing Committee will be the head of emergency control centre.

Under his direction, chief officer will operate and regulate all emergency operation. The centre will operate under the directions of Airport Emergency Managing Committee. Its location will be fixed, as per the requirement emergency situations. The main features of this unit will be:

- It will be operated by a specialized trained staff from Fire, Safety, Health and Environment department personnel of airport;
- It will be the command, co-ordination and communication centre for unlawful seizure of aircraft and bomb threats;
- It is operationally available for 24 hours; and
- The location of the emergency operations centre should provide a clear view of the movement area and isolated aircraft parking position, wherever possible.

- The Airport emergency operation centre should contain:

  - Emergency alert and communication system;
  - Adequate number of internal and external telephones. The latest telephone directories with a list of important numbers;
  - Radio equipment, hot-lines and walkie-talkie;
  - Plans of the airport to show various areas of airport;
  - Sources of sirens and safety equipments including fire, explosion, spill and gas controls; and
  - Stock of other fire extinguishing materials.

1.6 Mock Drills and Exercises

Mock drills constitute another important component of emergency preparedness and refer to the re-enactment, under the assumption of a mock scenario, of the implementation of response actions to be taken during an emergency. Mock drills and integrated exercises have the following objectives:

- To test, efficacy, timing, and content of the plan and implementing procedures;
- To ensure, that the emergency organization personnel are familiar with their duties and responsibilities by demonstration;
- Provide hands-on experience with the procedures to be implemented during emergency; and
- Maintain emergency preparedness.

The frequency of the drills would vary depending on the severity of the hazard. However, drills shall be conducted once in a year. Scenarios may be developed in such a manner as to accomplish more than one event objective. Drills and exercises will be conducted as realistically as is reasonably practicable. Planning for drills and exercises would include:

- Basic objectives;
- Date, time and venue;
- Participating organizations;
- Events to be simulated;
- Approximate schedule of events;
- Arrangements for qualified observers; and
- An appropriate critique of drills/exercises with participants.

Evaluation of drills and exercises would be carried out which include comments from the participants and observers. Discrepancies noted by the drill observers during the drill shall be pointed out. The individual responsible for conducting the drill or exercise would prepare a written evaluation of the drill or exercise. The evaluation would include assessments and recommendations on:

- Areas that require immediate correction;
- Areas where additional training is needed;
- Suggested modifications to the plan or procedures;
- Deficiencies in equipment, training, and facilities; and
- Records of drills, exercises, evaluations, and corrective actions would be duly maintained.

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