CAAT

สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Guidance Material on Hazardous Meteorological Conditions in an Aerodrome

CAAT-AGA–AD

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Director General

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0. Introduction

0.1 Background

A. ICAO Common Taxonomy Team (CICTT) categorized environmental hazards into six subcategories. There are two sub-categories related to weather hazards;

- Severe Weather or Climatic Events; and
- Adverse Weather Conditions.

Both terms can be considered as a part of hazardous meteorological conditions. Therefore, the term "Hazardous Meteorological Conditions" has a broader meaning compared to adverse weather or severe weather.

B. Hazardous Meteorological Conditions can be different from aerodrome to aerodrome. Each meteorological hazard needs different special actions by the aerodrome operator. In ICAO Doc 9137 Part 8 Aerodrome Operational Services divide adverse weather into seven groups: snow, fog, strong winds, frost, ice, rain and freezing rain.

C. In this guidance material, a guideline for hazardous meteorological conditions prevailing in Thailand including, but not limited to;

- Thunderstorm and Lightning;
- Strong winds; and
- Rain

Even though low visibility conditions can be considered as a hazardous meteorological condition, it will not be included in this guidance material. The guidance material for Low-Visibility Conditions will be provided separately. An aerodrome operator should also provide an emergency plan for natural disasters such as flooding in the Aerodrome Emergency Plan.

D. It is essential that a communications network is established to promulgate warning messages from the Meteorological Services of all the above meteorological phenomena to aerodrome operators, air traffic control, ground handling agents, and the airlines.

E. During adverse weather, airport operations will advise air traffic control of relevant surface conditions. Airport operations should also carry out various checks that weather may dictate.

0.2 Purpose

0.2.1 The purpose of this guidance material is to provide general information and guidance on measures to safeguarding an aerodrome during hazardous meteorological conditions. This guidance material provides a general concept that can be used to establish Standard Operating Procedures (SOPs) for hazardous meteorological conditions. However, each aerodrome must consider their local conditions when developing the SOPs.

0.3 Applicability

0.3.1 This guidance material is applicable to aerodrome operators. It may also be of interest to meteorological service providers or air navigation services providers.

0.4 Effective Date

20 March 2020

0.5 Reference Refer Regulation

- ACI Airside Safety Handbook 4th Edition 2010
- ACRP Report 160 Addressing Significant Weather Impacts on Airports: Quick Start Guide and Toolkit
- Australian Aviation Ground Safety Council. Safety Considerations for Thunderstorm Conditions
- CAA CAP 642 Airside Safety Management
- Changi Airport Group. Ground Operations Safety Manual
- ICAO Common Taxonomy Team (2014)
- ICAO Doc 9137 Part 8 Airport Operational Services
- ICAO Doc 9365 Manual of All-Weather Operations

0.6 Definitions and Acronyms

0.6.1 Definitions

Aerodrome Operator – A person, organization or enterprise responsible for operation and management of an aerodrome.

Airport Operations – A person, team, section, or department established by an aerodrome operator to responsible for the day-to-day control and organization of the safe and expeditious movement of aircraft around the airport to and from the aircraft stands.

Adverse Weather Conditions – Factors related to icing, freezing precipitation, heavy rain, snow, winds, extreme temperatures, and restrictions to visibility.

Severe Weather or Climate Events – Factors related to hurricanes, winter storms, droughts, tornadoes, thunderstorms, lighting, and wind shear.

0.6.2 Acronyms

AFTN	Aeronautical Fixed Telecommunication Network
ATC	Air Traffic Control
CICTT	ICAO Common Taxonomy Team
ICAO	International Civil Aviation Organization
ULD	Unit Load Device
SIGMETS	Significant Weather Reports
SOPs	Standard Operating Procedures

1. A Method of Disseminating Hazardous Meteorological Warnings[1]

1.1 A method of disseminating hazardous meteorological warning to airlines, airport operations, ground handling agents and other related parties should be implemented. The meteorological conditions required to be reported should be pre-agreed between the aerodrome operator and the meteorological office at the aerodrome.

1.2 Hazardous meteorological conditions to be reported may cover, but not limited to:

- Thunderstorm and Lightning;
- Strong winds;
- Rain

1.3 Accurate and timely reporting of meteorological conditions should be considered essential. Current meteorological information should be available to the flight crew prior to dispatch, en-route, and in sufficient time for adequate planning of the approach and landing. The information also is important to aerodrome operators and ground handling agents. Significant Weather Reports (SIGMETs) should be transmitted to all related parties immediately.

1.4 Normally, airport operations is nominal to compile and promulgate weather reports acquired from meteorological service providers to every stakeholders across the aerodrome. To effectively promulgate the information, aerodromes can communicate through various methods, whether they are visual, audible or other options. For example, the communications can be done, as agreed with receivers, by AFTN, Fax, E-mail, two-way radio, or other means of communications. Some aerodromes also use sirens and public announcement for hazardous meteorological weather warnings.

[1] ICAO Doc 9137 Part 8 Aerodrome Operational Services Chapter 6

2. Hazardous Meteorological Conditions Procedures

A. Hazardous Meteorological Conditions presents particular difficulties in maintaining normal operation in airside capacity and safety. Local procedures should be in place for a controlled and measured response to varying conditions. These procedures may result in a reduction of capacity but they should never result in a reduction of safety. Close cooperation between an aerodrome operator and ATC will contribute to a safe and smooth operation during hazardous meteorological conditions.

B. An aerodrome operator should include the particulars of the procedures to deal with hazardous meteorological conditions, include the following:

- The role of the aerodrome operator, the aircraft operator, the aerodrome air traffic control unit, the ground handling agents and other relevant stakeholders, as applicable; and
- The names and roles of the personnel responsible for dealing with hazardous meteorological conditions, and the telephone numbers for contacting them during and after working hours.

C. Hazardous meteorological conditions procedures should describe the action that may occur at the aerodrome (such as thunderstorms, strong winds, and gusts). The aerodrome operator should have procedures describing the actions that have to be taken and defining the responsibilities and criteria for suspension of operations on the runway.

D. The aerodrome operator should have formal coordination such as mutual of understanding, service level agreement, or agreement with the meteorological service provider in order to be advised of any significant meteorological conditions

E. With the forecast of inclement weather, the Aerodrome Operator should assess the likely impacts of this on airside operations and whether a restriction on the types of movements should be communicated. This may include limiting both access to the apron of vehicles and the types of vehicular movements on the apron to essential service vehicles only. The Aerodrome Operator should have developed access control restrictions that can be implemented in such circumstances including the communication of such access and movement restrictions to all airside organisations.

2.1 Thunderstorms and Lightning

2.1.1 Thunderstorm is a violent, short-lived weather disturbance that is almost always associated with lightning, thunder, dense clouds, heavy rain or hail, and strong, gusty winds.[2]

2.1.2 Lightning is a safety concern of personnel working in the airside, aircraft refueling, passenger embarking and disembarking, airside construction works, and even people evacuating from building in an emergency.

2.1.3 An aerodrome should establish a coordination with the local meteorological service provider, air navigation service provider, and other stakeholders operating in the aerodrome. Some aerodromes may install additional systems such as lightning detection system or warning system. The decision to install the system depends on risk assessment of the aerodrome.

2.1.4 When the aerodrome received a thunderstorm warning, the aerodrome should distribute the information to all stakeholders. The Thunderstorm Warning may be separated into three phases:

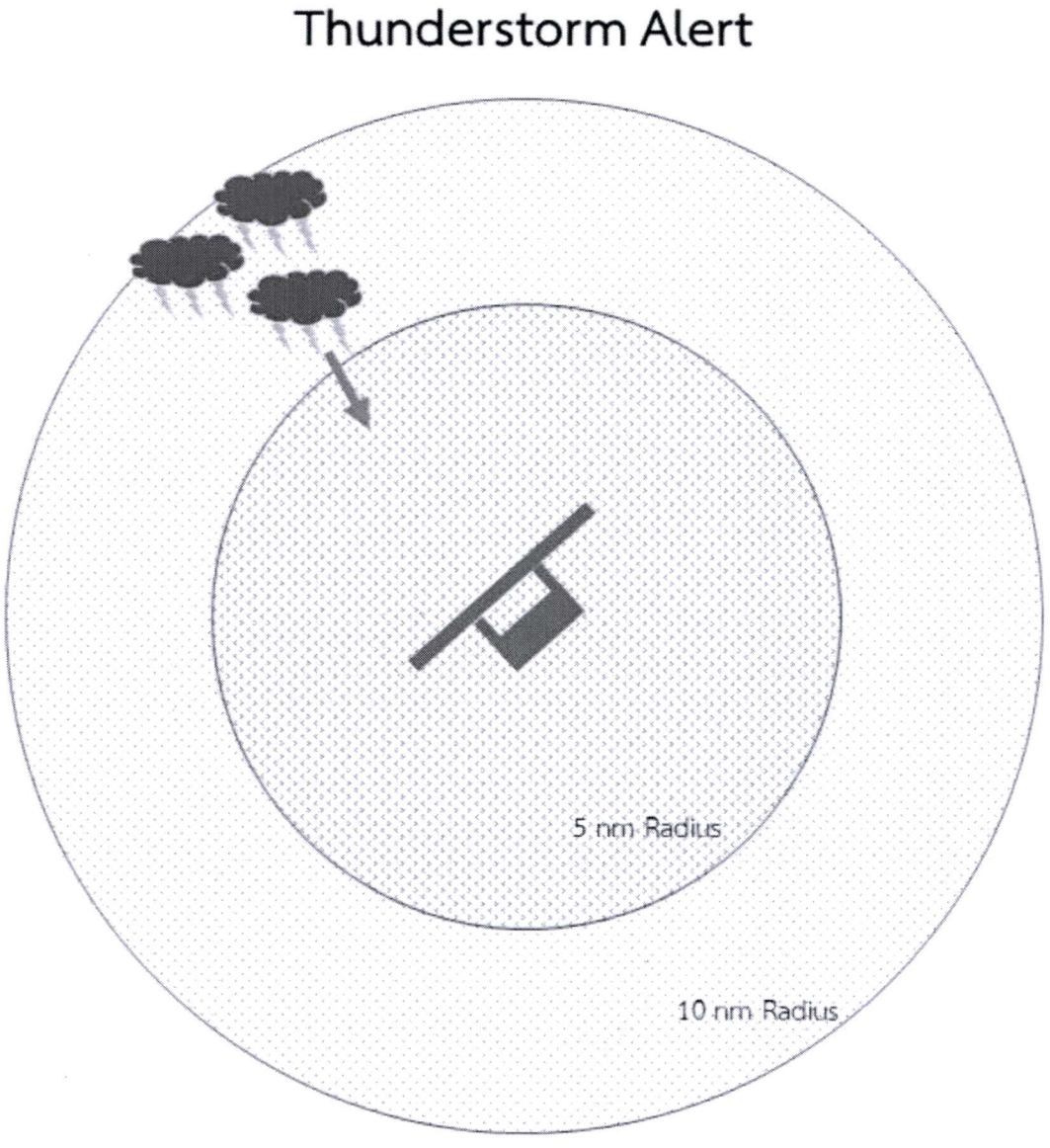
2.1.4.1 Thunderstorm Alert

2.1.4.1.1. When an active storm is within 10 nautical miles radius of the aerodrome and continue approaching, the aerodrome should declare "Thunderstorm Alert".

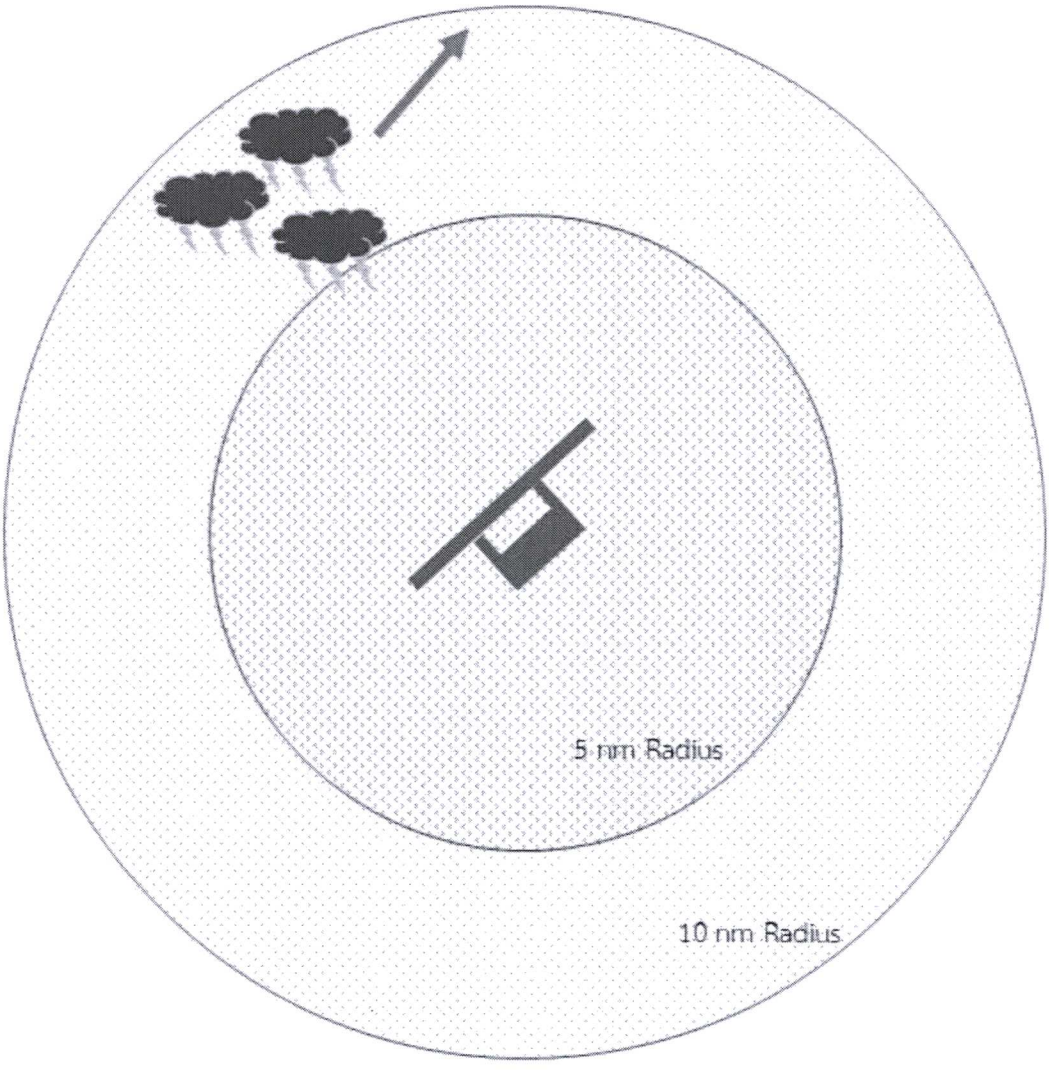
2.1.4.1.2. During a Thunderstorm Alert, the aerodrome should ensure that all aircraft are bounded. If strong winds have been forecasted, the aerodrome also should ensure that the strong wind procedures are implemented.

[2] https://www.britannica.com/science/thunderstorm

2.1.4.1.3. All apron operations, including aircraft refuelling operations, can be continued. However, personnel responsible for apron operations should be prepared for the Operations Shutdown.

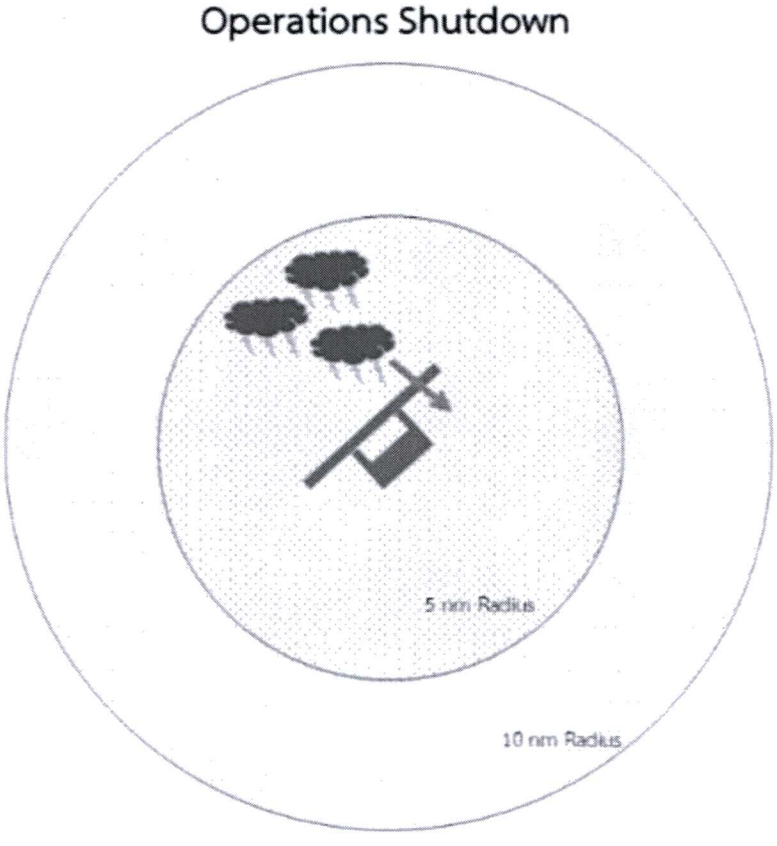


Thunderstorm Alert



2.1.4.2 Operations Shutdown

2.1.4.2.1. When an active storm is within 5 nautical miles radius of the aerodrome and continue approaching, the aerodrome should declare an "Operations Shutdown".



2.1.4.2.2. During the Operations Shutdown, the refuelling operations should be ceased and apron areas should be evacuated. Personnel in apron areas should seek shelter inside buildings, inside aircraft, and inside metal bodied vehicles. Do not shelter under the wings of aircraft or remain on tractors.

2.1.4.2.3. The following activities should be suspended:

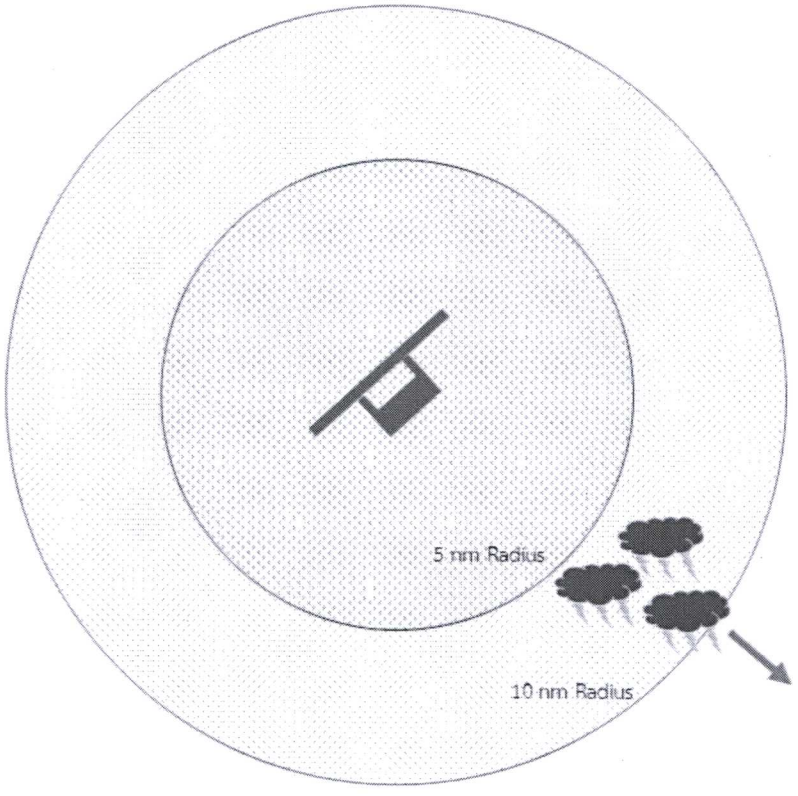
- Non-essential activities in open areas
- Working at height
- Aircraft marshalling service except when the driver can stay inside the car giving light signals to the aircraft
- Placing or removing chocks
- Headset communication between tug crew and cockpit
- Loading/ unloading of aircraft

- Remote stand passenger embarking or disembarking
- Refueling and catering services
- Construction activity

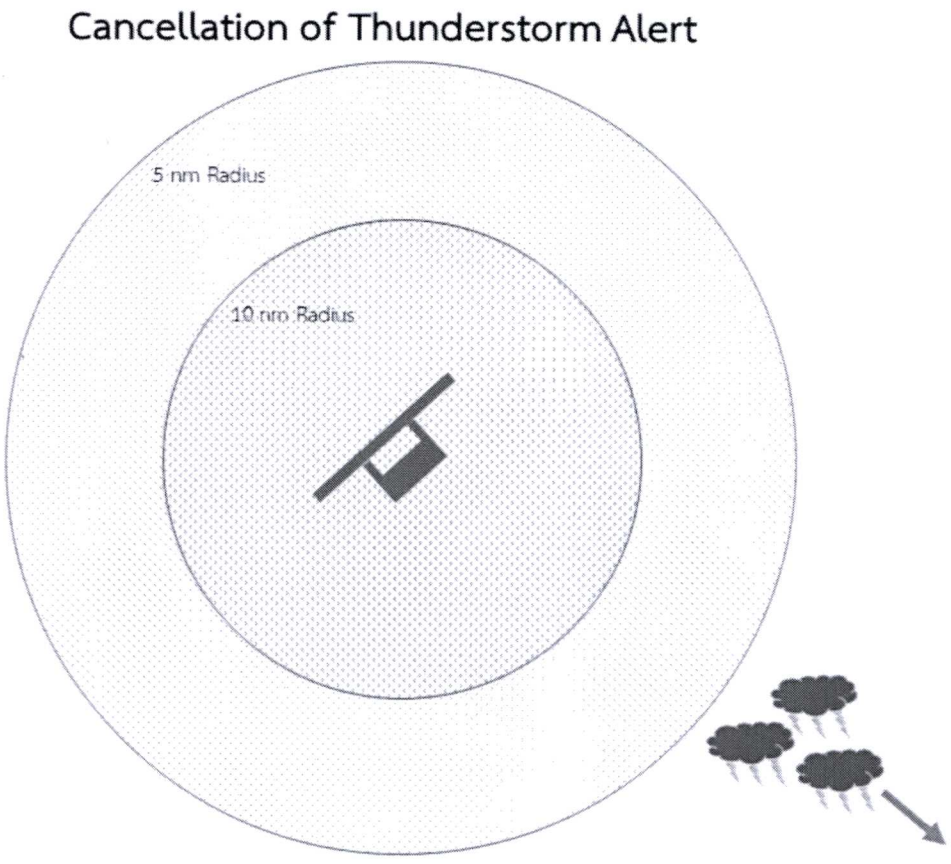
2.1.4.3 Cancellation of Thunderstorm Alert

2.1.4.3.1. When the thunderstorm passes but still resides within 10 nautical miles radius of the aerodrome, the "Operations Shutdown" can be downgraded to "Thunderstorm Alert".

Operations Shutdown Degrade to Thunderstorm Alert



2.1.4.3.2. The aerodrome can cancel the Thunderstorm Alert when the thunderstorm is departing 10 nautical miles radius of the aerodrome.



2.2 Strong Winds

2.2.1 Strong winds can cause hazards to aircraft operations on the aerodrome. The hazards caused by strong winds include FOD, aircraft damage, and personal injury. An aerodrome should set up a system to warn all personnel once strong winds are forecasted.

2.2.2 Considering aircraft using the airport, each airport should define wind speed that strong wind procedures are initiated.

2.2.3 When meteorological warnings of strong winds are received, they should be promptly relayed to all parties concerned including airlines, ground handling agents and operators.

2.2.4 When strong wind conditions are experienced, one of the first problems encountered is FOD being carried across the airfield, causing engine ingestion hazard to aircraft on stands, taxiways and runways. Plastic bags and sheeting may be of a particular problem. As wind speeds increase, baggage containers, unsecured equipment, and large debris (mostly from the aprons), can be blown across the movement area causing a damage hazard to aircraft in all areas. There is also a risk of personal injury and damage to vehicles and equipment by 'flying' debris.

2.2.5 Action must be taken to ensure that covers are securely fastened on all waste containers and to ensure that parking brakes are applied to all vehicles and equipment. All non-essential equipment should be removed to a protected area or stillage, secured to a fixed object or removed from the apron area. Additionally, aircraft may require enhanced chocking in line with airline requirements.

2.2.6 It is not always feasible or necessary to position a large aircraft into wind at aerodromes. Where there is a requirement for aircraft to be positioned into wind and/ or picketed, this should be the responsibility of the airline manager, agent or owner concerned. Aerodrome operators may assist by the allocation of suitable stands and other airfield areas for this purpose. As wind speeds rise, airline managers, agents or owners concerned shall ensure that windmilling propellers and rotors are feathered and/or secured.

2.2.7 An aerodrome should establish procedures to minimize the hazards. The procedures may include for example:

2.2.7.1 Work in Progress

2.2.7.1.1. Airport operations should arrange for checks to be made of work in progress to ensure markers and equipment are secure.

2.2.7.1.2. Contractors works may be suspended if necessary.

2.2.7.2 Airside Patrol

2.2.7.2.1. Airport operations should arrange for airside patrols to be carried out to collect blowing objects and warn air traffic control and operations regarding objects that cannot be retrieved and are blown onto operational areas.

2.2.7.3 The Safeguarding of Aircraft and Ground Equipment

2.2.7.3.1. The safeguarding of light aircraft should be the responsibility of the owner. Operational personnel should be aware of the effect of strong winds on such aircraft, and take positive steps to turn aircraft into the wind and to assist in tying them down as much as possible.

2.2.7.3.2. Although aircraft is a responsibility of its owner or handling agent, the aerodrome operator should ensure aircraft landing gears are chocked, aircraft propeller are secured, and other procedures are being implemented as necessary. Aircraft doors should not be opened if the wind speed is over the operational limit. Extreme care must be taken when opening or closing aircraft doors.

2.2.7.3.3. The safeguarding of aircraft ground equipment should be the responsibility of the owner but a careful watch should be maintained by airport operations. An adequate warning should be passed to all airline and handling agencies.

2.2.7.3.4. During strong wind conditions, the personnel responsible for the safeguarding of aircraft and ground equipment shall ensure:

2.2.7.3.4.1. Parking brakes are set on all parked ground services equipment;

2.2.7.3.4.2. Wheel chocks/stabilisers are deployed for GSE when docked onto aircraft or parked;

2.2.7.3.4.3. Stabilisers of maintenance steps are fully engaged;

2.2.7.3.4.4. Wheel chocks and securing chains are used when available;

2.2.7.3.4.5. Empty ULDs are secured;

2.2.7.3.4.6. All loose items such as cleaning tools are kept;

2.2.7.3.4.7. Equipment not required for the servicing of the aircraft are removed from the equipment restraint area;

2.2.7.4 Ground Operations Safety

2.2.7.4.1. Ground operations should aware that loose objects can be blown and cause damage to aircraft, vehicle, and equipment. Flying debris may cause personal injury. Therefore, ground operations should ensure that loose cargo and baggage containers are secured and tied down, waste containers are securely fastened, and parking brakes are applied to all vehicles and equipment.

2.2.7.4.2. Maintenance steps shall be stabilized and secured. The use of equipment that is extendable or can be elevated should be limited.

2.2.7.4.3. Bypass pin is inserted only when aircraft is ready for pushback and/or towing operations.

2.2.7.4.4. Some aerobridges have operating design limits during periods of strong winds. The limitation should be understood and adhere to. An aerodrome operator should establish Standard Operating Procedures regarding to operations of aerobridges.

2.3 Rain

2.3.1 There is an operational need for information on runways which may become slippery when wet. To this end, there is a need to measure periodically the friction characteristics of a wet runway surface to ensure that they do not fall below an agreed level. Details of methods for measuring and expressing friction characteristics of a wet runway can be found in the Requirements of the Civil Aviation Authority of Thailand No. 14 on Aerodrome Standards, Chapter 2. Information on runway conditions should be made available to aircraft operators.

2.3.2 Standing water checks should be carried out on request from air traffic control or airport operations. A verbal assessment for the center half of the width of the runway is required. On completion of the check, the results should be passed to ait traffic control and recorded for reference purposes.

2.3.3 Aerodrome maintenance should be ready to remove standing water, to build temporary dams and to declog drains if necessary.