SIERRA LEONE CIVIL AVIATION AUTHORITY

ADVISORY CIRCULAR

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Guidance on Airside Safety Management

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1 GENERAL

The Sierra Leone Civil Aviation Authority's Advisory Circulars contains information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated Regulations.

An AMC is not intended to be the only means of compliance with a Regulation, and consideration will be given to other methods of compliance that may be presented to the Authority

Information considered directive in nature is described in this AC in terms such as "shall" and "must", indicating the actions are mandatory. Guidance information is described in terms such as "should" and "may" indicating the actions are desirable or permissive, but not mandatory.

1.1 Purpose

The guidance in this document illustrates how risks might be identified and provides advice about how airside safety can be managed within the context of a systematic and structured management approach within a Safety Management System (SMS).

1.2 Applicability

This guidance is primarily aimed at Aerodrome Operators, airlines and ground handling service providers conducting activities at the aerodrome. In addition, it may equally be applicable to activities at a heliport.

1.3 Description of Changes

This AC is the first to be issued on this subject

1.4 Reference

(a) SLCAR's Part 14A– Aerodromes Design and Operations Standards
(b) SLCAR's Part 14C – Certification of Aerodromes
(c) SLCAA-AC-AGA021-Rev. 00 – Apron Management Services
(d) ICAO Doc 9981 – PANS Aerodromes
(e) ICAO Doc 9137, Part 8 – Airport Services Manual
(f) ICAO Doc 9157, Part 2 – Airport Design Manual
(g) ICAO Doc 9859 - Safety Management Manual
(h) IATA Ground Operations Manual (IGOM)

1.5 Cancelled Documents

Not Applicable

1.6 Definition and Abbreviations

Definitions	
Apron	A defined area on a land aerodrome provided for the stationing of aircraft for the embarkation and disembarkation of passengers, the loading and unloading of cargo, mail, fueling, parking or maintenance. In order to reflect industry used terminology, use of the word 'Stand' or 'Ramp' may be used.
Maneuvering Area	That part of an aerodrome provided for the take-off and landing of aircraft and for the movement of aircraft on the surface, excluding the apron and any part of the aerodrome provided for the maintenance of aircraft.
Movement Area	That part of an aerodrome intended for the surface movement of aircraft, including the maneuvering area, aprons and any part of the aerodrome provided for the maintenance of aircraft. **NOTE:** Maneuvering Area and Movement Area are generic terms intended to describe the 'airside' part of an aerodrome, rather than just those pavements or surfaces on which aircraft movements take place.
Runway	A defined rectangular area on a land aerodrome, prepared for the landing and take-off run of aircraft along its length.
Taxiway	A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including: **Aircraft stand taxilane**: a portion of an apron designated as a taxi route intended to provide access to aircraft stands only **Apron taxiway**: a portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron **Rapid exit taxiway**: a taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimising runway occupancy times.
Hazard	A condition or an object with the potential to cause injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.
Risk	A risk is the chance, great or small, that people or aircraft will be harmed or damaged by a hazard.

Definitions	
Abbreviations	
AGL	Aeronautical Ground Lighting
APU	Auxiliary Power Unit
ATC	Air Traffic Control
FEGP	Fixed Electrical Ground Power
FOD	Foreign Object Debris or Foreign Object Damage
GPU	(Auxiliary) Ground Power Unit
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
MEWP	Mobile Elevating Working Platform
MLSS	Ministry of Labour and Social Security
MOR	Mandatory Occurrence Report
POB	Persons on board
PPE	Personal Protective Equipment
RTF	Radiotelephone/radiotelephony
SMS	Safety Management System
VDGS	Visual Docking Guidance System

2 GENERAL PRINCIPLES OF SAFETY MANAGEMENT

2.1 Introduction

Personnel operating on aerodromes need to manage aviation safety and health and safety. Failure to adequately manage either, may lead to loss of life, injury, ill health and subsequent business, economic and reputational losses.

The precautions which protect aircraft often also protect people. Consequently, the management of health and safety and the management of aviation safety share common themes. The key elements of both are:

(a) Leadership and commitment from management that includes clear policies, targets and standards to be achieved and the setting out of responsibilities and accountabilities;

(b) A method for identifying hazards, assessing risks and controlling those risks;

(c) A method of monitoring and review that includes inspection and audit, incident investigation and data trend analysis;

(d) Documented processes and procedures.

2.2 Safety Management Systems (SMS)

(a) This is a function of the likelihood (probability) that harm will occur and the severity of that harm.

(b) The four components and twelve elements that comprise the SMS framework are as follows:

(i) Safety policy and objectives

(1) Management commitment and responsibility
(2) Safety accountabilities
(3) Appointment of key safety personnel
(4) Coordination of emergency response planning
(5) SMS documentation

(ii) Safety risk management

(6) Hazard identification
(7) Safety risk assessment and mitigation

(iii) Safety assurance

(8) Safety performance monitoring and measurement
(9) The management of change
(10) Continuous improvement of the SMS

(iv) Safety promotion

(11) Training and education
(12) Safety communication

(c) When undertaking risk assessments, the following key questions should be considered:

(i) What are the hazards to people and aircraft from the activity, location or task?

(ii) Who or what can be harmed and how?

(iii) What are the risks? Are they being controlled? If not, what more needs to be done, by whom and by when?

(iv) Have the results of the assessment been recorded?

(v) Does the assessment need to be reviewed and revised? When and how often?

2.3 Overview of Contractors

It is recommended that any assessment of contractors for service provision should use a number of criteria, including:

(a) Appointing a supervisor to oversee the activity, especially in relation to aircraft turnaround. This could be a personnel or a nominated agent. They should have sufficient authority to control the activities involved. For construction, additional specific legal requirements need to be followed including the appointment of a principal contractor.

(b) Good practice includes agreeing and writing down a plan for contracted activity. To be effective it is essential that all parties are involved.

(c) Where practicable, the undertaking of joint risk assessments for relevant processes. These assessments could inform the performance standards and the plan. Joint risk assessments will need to take account of differences between companies' management, supervision, equipment and training.

(d) Agreeing performance standards, for example, frequency of vehicle maintenance and standards for training and refresher training. These may be set through reference to standards imposed on the client and contractor employers by the aerodrome operator.

2.4 Performance Monitoring

To be effective, performance monitoring should consider adherence to the safety systems in place:

(a) Methods of work: standing instructions or method statements for the contractors' personnel should be clear, show confirmation that the plan for the activity is being followed and what procedures are in place to monitor compliance;

(b) Aerodrome procedures should be in place and should be clear to all working on the aerodrome.

(c) Methods of identifying, reporting and recording deviations from instructions and rules should be clear, as should those methods that are in place to identify and monitor trends in these deviations.

2.5 Aerodrome Operator

(a) The duty of the aerodrome operator (who is usually the aerodrome certificate holder) is to provide and maintain an aerodrome which is safe for aircraft and people to use.

(b) Each aerodrome operator is required to maintain an Aerodrome Manual, as an integral part of the operator's safety management system. The manual should complement the aerodrome operator's approach to quality management, including the management of the business, customer-critical processes and health and safety.

(c) The Manual should be disseminated widely so that all stakeholders who undertake tasks that can affect aircraft safety, are familiar with the relevant parts of the document and parts that are applicable to their tasks, duties and responsibilities, aerodrome operator's approach to quality management, including the management of the business, customer-critical processes and parts that are applicable to their tasks, duties and responsibilities.

(d) As the central organisation at the aerodrome, the aerodrome operator has a key role in developing co-operation and co-ordination between all the users of the aerodrome. It may consider establishing committees or other discussion groups for ensuring aircraft safety, setting aerodrome-wide health and safety standards or agreements.

2.6 Aircraft Operators

(a) In addition to the safety risks of aircraft, the aircraft operator will need to consider the health and safety of persons not in its employed list who are affected by its activities.

(b) Airlines and other stakeholders should co-operate with each other, the aerodrome operator and service providers, to agree uniform standards for performance and monitoring. This may reduce the time and effort required for individual airlines to develop such standards and reduce the probability of human error resulting from a wide variety of standards.

2.7 Ground Handling Service Providers

(a) Operators on the apron are often required to work to tight timescales to complete their respective tasks in the time allowed for aircraft turnaround. However, all those involved should take adequate account of each other's safety needs, for example ensuring that their vehicles or parked equipment is not blocking escape routes of a refuelling vehicle, and that vehicles are not parked in such a way as to hinder or prevent other vehicles having safe ingress/egress access to aircraft.

(b) Where a handling agent has been appointed, service providers should co-ordinate with them to ensure that safety procedures are understood and implemented by the handling agent. They should be working to an agreed plan for the turnaround and each service provider should ensure that they have a copy of this plan. In addition, each service provider should have a supervisor or leading hand who can control the various stages of the turnaround. In all instances plans should also be shared and coordinated with the airport operator and other stakeholders as applicable.

(c) Service providers should ensure that any subcontractors they engage undergo an assessment, control and monitoring processes as appropriate as may be outlined and in accordance with company procedures.

2.8 Airside Safety Committees (ASC)

Aerodromes need effective forums with airside stakeholders with the aim of communicating, promoting and maintaining safety standards and discussing airport, airside safety issues within an open and just culture.

3 IDENTIFYING HAZARDS AND MANAGING RISKS

3.1 Introduction

This section discusses some of the potential hazards typically encountered on the aerodrome and the risk control measures that may be applied to them. However, effective safety management requires co-operation and co-ordination between the aerodrome operator, ground service providers, airlines and other aerodrome users and contractors.

3.2 Controlling hazards

3.2.1 Vehicles striking people and/or aircraft

(a) Airside vehicles constitute a continual hazard to both people and aircraft and require vigilance at all times for all those working at the airside. Aerodrome Operators may be able to eliminate or minimise the risks by keeping pedestrians and vehicles apart where possible, for example by the use of passenger boarding bridges (air-bridge) and marked or barrier walk-ways.

(b) The layout of an aircraft parking stand can be so designed to minimise activities which present a higher risk and operators should consider the use of fixed services such as fixed electrical ground power or pre-conditioned air on the aircraft parking stand in order to reduce the number of vehicles operating around aircraft.

3.2.2 Hazards to passengers on the apron

(a) At aerodromes where aerobridges are not provided or where they are provided but the airlines choose not to use them, passengers may be exposed to the hazards on the ramp. The risk of injury to passengers is generally higher due to their vulnerability and general lack of awareness of the dangers around them. Passengers should therefore be supervised and monitored where practicable, to ensure adherence to marked walkways or within safety railings or barriers for as long as possible or unless otherwise directed by airside personnel en-route to or from aircraft.

(b) When operating outside of the safe areas, active management of passengers and vehicles may be required. Such routes should be clear and unambiguous and should not require passengers for example to walk underneath aircraft wings or in close proximity to aircraft engines or propellers or require to them to walk in conflict with other vehicular traffic.

(c) Aerodrome Operators should consider any unusual circumstances in which passengers may be found on the Apron when not embarking or disembarking an aircraft e.g. evacuation of the terminal building or aircraft. Adequate infrastructure and control methods should therefore be considered and provided in order to manage and control passengers in these circumstances. The elements which may be considered include:

  (i) Apron layout and stand configuration

  (ii) Provision and resourcing of passenger supervision

(iii) Safe traffic routes:
  (1) Physical segregation
  (2) Permanent route demarcation and clear crossing points e.g. roads or taxiways that do not dissect the pedestrian/passenger routes between the terminal and the aircraft.
  (3) Use of moveable barriers and chains to create a temporary safe route across the apron for passengers to follow.
  (4) Traffic control e.g. positive control of vehicular traffic may be required from the airline or handling agent with routes that do not pass below aircraft wings, beneath fuel vents or close to propellers or rotors of aircraft.
  (5) Routes should also be clear of electrical cables, fuel hoses and other ramp equipment; this may require the use of temporary mobile passenger guidance barriers - such as 'Passenger Integrated Guidance Systems'.

(iv) Running of aircraft engines in the vicinity of passengers

(v) Information to passengers of the safe route to follow

(vi) Transportation to and from remote stands

3.3 Vehicles, ground service equipment (GSE) and people movement

(a) Vigilance is necessary for all those working at the airside to be aware of the potential hazards associated with the movement of ground vehicles and GSE. Physical segregation between vehicles, GSE and people is the most effective risk control within aerodromes. Well organised traffic and pedestrian routes, including one-way systems, speed limits, adequate and appropriate ground markings and lighting are all aspects all need to be considered when looking at risks associated with vehicles, GSE and people.

(b) Some aerodromes may have service delivery systems built into the stands (such as fuel hydrants and fixed electrical ground power), thus reducing the number of vehicles that have to attend an aircraft. However, such systems are rare at smaller aerodromes and in such cases other methods will need to be considered. Where such systems are installed, it is important that safe contingency procedures are available to cater for equipment failure.

(c) All parties operating on the aerodrome should co-ordinate with each other in relation to the parking, storage and movement of vehicles and GSE. Elements to consider may include:

(i) Aerodrome traffic rules

(ii) Vehicle and GSE maintenance

(iii) Driver training, permits and refresher training

(iv) Behaviour of pedestrians (including passengers)

(v) Reversing vehicles

(vi) Suitability of vehicles and GSE

(vii) Safe parking of vehicles and GSE

(viii) PPE

(ix) Day and night operations

(x) Inclement weather, including low visibility conditions

(xi) Emergency procedures

(d) In reality, it is likely that a combination of measures will be required to control the risks. The exact combination may vary with location, activities and perhaps even the time of day. The effects of changes to the aerodrome, for example due to temporary works or the effect of new buildings will also need to be considered.

3.4 Aircraft Parking Safety Practices

The aerodrome operator and the ANSP are responsible for the rules and procedures, approved by the Authority, that safeguard the arrival and departure movements of aircraft on stands and for the dissemination of information to airline/company operators. Information documents/instructions and requirements should be based upon the subjects described in the following paragraphs.

3.5 Ownership of stand/parking bay

(a) In general the aerodrome operator has the responsibility to ensure that aircraft stands remain serviceable, clean and free from obstruction. However, in the busy operation of the apron, with minute to minute changes of status and vehicle/equipment movements, ground handling personnel also have specific responsibilities.

(b) Where practicable, a stand supervisor, turnaround co-ordinator or equivalent person with safety responsibilities should be nominated to control and manage the turnaround process and should be clearly identified to all personnel working on the stand. The supervisor, turnaround co-ordinator or delegated responsible person(s) in accordance with respective company procedures, should be working to an agreed plan for the turnaround process and have sufficient authority to control the activities around the aircraft and to recognise and intervene where safety matters arise.

3.6 Vehicle and equipment operations

Further guidance for vehicle operations and maintenance is contained in SLCAA-AC-AGA009-Rev.01 – Ground vehicle Operations. Prior to aircraft arrival GSE should be/remain parked in the equipment areas provided. Service vehicles and baggage trolleys should stay clear of the stand and equipment, such as ground power units or any other equipment with trailing cables or hoses should be fully retracted and stowed. The stand must be clear of all obstructions, including chocks and cones, and equipment prior to the arrival of the aircraft allocated to the stand. Other considerations for the safe docking and parking of an aircraft are described in the following paragraphs.

3.7 Stand markings

In areas or stands that can accommodate a number of variations of aircraft parking arrangements, there are often complex signs or markings, only some of which are appropriate for specific aircraft. It is important to ensure personnel who may be involved in activities in the area are fully trained in the appropriate configuration for all aircraft types that may use the stand and the appropriate marking and signage.

3.8 Self-manoeuvring – stand configurations and safety considerations

Self-manoeuvring is a procedure whereby an aircraft enters an apron or stands, parks and subsequently departs under its own power. The principal stand configurations are angled nose-in, angled nose-out and parallel-parking; each involves the adjacent apron area in being subjected to high levels of jet blast, noise and emissions at some stage of an aircraft movement. Taxi-through stands can also be used for self-manoeuvring and the blast effects are smaller. Some airports also employ what is known as 'remote holding', which is where loaded aircraft are towed from the stand to a remote area in order to wait for an ATC delayed slot time, therefore vacating the stand for another aircraft. This might involve small/medium sized aircraft being positioned nose-out on a remote stand where self-manoeuvring off the remote stand is not considered a blast problem.

3.9 Out of service or 'dead' aircraft handling

Handling personnel pushing back a 'dead' aircraft for towing must follow approved SOPs, which may take into account the following considerations:

(a) That trained personnel should normally be required to occupy the flight deck to control the brakes, monitor radio contact between tug/aircraft and ATC and control the aircraft's anti-collision and, if appropriate, navigation lights;
(b) That tug crews assigned the task associated with the movement of an aircraft on any part of the manoeuvring area should liaise with ATC for the necessary approvals and obtain a specific clearance before entering the manoeuvring area. The tug driver is normally required to advise ATC when the manoeuvre is complete;
(c) Whilst an aircraft is under tow, the tug driver is responsible for the safety of the aircraft, just as the aircraft commander is when it is taxiing. It should be remembered that, irrespective of any instructions issued by ATC, in accordance with Rules of the Air regulations it is the tug driver who is responsible at all times for ensuring that the aircraft does not collide with vehicles, aircraft, buildings or other obstructions;
(d) When towing an aircraft, it is particularly important to be aware of the extent of the extremities, such as wingtips, of the aircraft and their proximity to obstructions. In the event that a tug driver is unsure whether there is sufficient clearance for an aircraft under tow to be moved safely, he or she should safely bring the aircraft to a stop and request assistance. If the aircraft stops on the manoeuvring area for this reason, the driver should advise the ATC;

(e) For safety reasons, it is important that the number of persons on board (POB) the aircraft is known for local ground movements. Companies involved with ground movements should ensure that tug drivers ascertain the POB. In the event of an incident or other unusual circumstance involving the towed aircraft, the tug driver should be able to advise Airfield Operations or the Rescue and Firefighting Service (RFFS) of the POB;

(f) When an aircraft is being towed during the hours of darkness or low visibility, it must display those lights which would be required when flying, i.e. navigation lights. Logo lights will usually be of assistance to ATC; however, tow-bar-less tugs may require specific procedures regarding the display of navigation lights that must be agreed with both the aerodrome and Air Traffic Control.

3.10 Preparation of Stand

3.10.1 Visual docking guidance system (VDGS)

(a) When a stand is allocated for use to an aircraft operator and the arrival of their aircraft on stand is imminent, it is usually the responsibility of the handling personnel to ensure that the stand and clearways are free from obstructions, FOD and equipment (vehicles are usually permitted to wait in clearways when aircraft arrive on stand). The handling personnel should also ensure that, where provided, the air-bridge is fully retracted and correctly parked with the drive wheels in the parking box provided before the arrival of the aircraft. These actions must be completed by the handler prior to the VDGS being activated and switched on.

(b) VDGS assist in the safe manoeuvring of aircraft onto stand. Aerodrome Operators should ensure that VDGS are regularly checked for serviceability and calibrated for accuracy. As part of it local operating procedures for its aircraft parking stands, consideration should be made for the operation of VDGS, including training and on-going competency.

(c) Switching on the VDGS normally signifies to the aircraft commander that the stand is clear and is safe to enter. Once the VDGS is switched on, the stand should remain under supervision until the aircraft arrives on stand in order to ensure that it remains safe for use by the aircraft. If for any reason the stand becomes ‘unsafe’ or unattended before the aircraft has arrived on stand the VDGS should be switched off or ‘STOP’ indicated, using the Emergency Stop System if necessary. Therefore, the VDGS must be attended during aircraft arrival.

(d) Where a VDGS is provided the aerodrome operator should arrange for the stopping guidance to be calibrated and indicated for all selected user aircraft, in a clear and unambiguous manner. Azimuth guidance indication should also be regularly checked for accuracy. It is often the case with modern or advanced VDGS that the system self-checks prior to arming, however all systems should be subject to regular serviceability checks as deemed appropriate, the results of which should be recorded in line with local maintenance and serviceability procedures. Details of VDGS available at the aerodrome should be promulgated in Sierra Leone’s Aeronautical Information Publication (AIP).

3.10.2 Stop short system

On stands equipped with VDGS, an indicator system should be provided to advise the pilot to Stop Short; this may be because the airbridge is unserviceable and passenger steps may be used, or due an obstruction or due to works at the head of stand for example. The Stop Short indication may be an electronic sign associated with the VDGS display, or conspicuous painted signs may be used, normally fixed to the airbridge. In Stop Short conditions a marshalling service should be provided.

3.10.3 Location of controls

(a) The determination of the best positions for VDGS, Stop Short and Emergency Stop switches may vary from aerodrome to aerodrome, or even from stand to stand. However, it should be an objective of the safety system to standardise the location of switches on all stands at a particular aerodrome. It is important the VDGS controls are located in a position such that the operator has an unimpeded view of the specific apron parking position whilst the controls are being used.

(b) The following locations may offer the best control positions:

(i) Emergency Stop switches: One gated switch located in the airbridge cab and clearly marked. A second gated switch, working in parallel with the first, located in a prominent and easily reached position at the head-of-stand and conspicuously marked. Emergency Stop switches should be manned in accordance with local procedures and instructions.

(ii) Stop Short and VDGS Switches: These switches can be grouped together. One set of switches should be located in the airbridge cab and clearly marked. A second set of switches working in parallel with the first should be located at a prominent easily reached position at stand level and conspicuously marked. Which of these positions is the primary VDGS switching position will depend on which position gives the operator the best view of the stand area.

3.10.4 Aircraft arrival

Fundamental to the safe management of aircraft movement on stand during the arrival phase is the timely attendance of the dispatcher/airbridge operator to initiate those actions necessary to promote a safe arrival sequence. A full functional check of the airbridge should be completed in good time before the aircraft arrives. To maintain aircraft and personnel safety and to ensure that the prescribed safe clearances between aircraft and bridge are maintained, the following precautions should be taken into consideration by the person in charge of the turnaround:

a) Before the aircraft enters the stand, ensure by personal visual inspection that there are no potential hazards to the safe aircraft parking operation (such as FOD, vehicles or equipment illegally parked in the inter-stand clearway, or equipment poorly positioned);
b) Before the aircraft enters the stand, the drive wheels of an apron-drive airbridge must be positioned in the marked parking box or pre-position box provided;

c) Before the aircraft enters the stand, confirm that the stand is set up for the approaching aircraft type;
d) A careful check should be made to ensure that no vehicles or equipment are obstructing the horizontal or vertical movement of the bridge while ensuring that the airbridge remains in the appropriate position;
e) The airbridge cab should be adjusted vertically and in azimuth to suit the incoming aircraft type;
f) Only when the aircraft has fully stopped, brakes applied, the engines have shut down and the aircraft anti-collision beacon has been extinguished, can the wheel chocks be put in place. Only then should the airbridge be driven from its parking position and docked to the aircraft, or steps be positioned beside the aircraft;
g) The aircraft passenger door should remain closed until the airbridge has been docked, the canopy has been lowered on to the fuselage and the autoleveller device has been set;
h) The airbridge operator should remain in attendance in the cab until passenger disembarkation is completed.

3.10.5 Control of the parking/docking operation

Ground handling personnel are responsible for certain aspects of the control of the parking/docking operation once the aircraft has entered the stand, although, where a marshaller is responsible for guiding the aircraft on to the stand, local instructions should clearly indicate the point at which responsibility is transferred from the marshaller to the handling personnel. The nominated supervisor should control the progress of the operation and the actions of the handling team and should include considerations with regard to the protection of the marshallers whilst carrying out the task, particularly where they are required to be positioned on an airside road. However, under all circumstances, it is the Commander of the aircraft who retains ultimate control and responsibility of taxiing the aircraft onto stand and bringing the aircraft to a halt. The aircraft remains under the responsibility of the aircraft commander until the appropriate indication is given to ground personnel that the aircraft has stopped and the aircraft engines have been shut down.

3.10.6 Brakes and chocks

(a) On arrival, when the aircraft is positioned to the pilot's satisfaction and finally stopped, the appropriate aircraft wheel brakes should be engaged by the pilot and the aircraft can then be safely and appropriately chocked. Emergency situations such as dangerously hot or failed brakes should be addressed under specific operator company procedures. Wheel chocks should not be inserted until the pilot has indicated/signalled that the aircraft has finally stopped, engines are shut down and any propellers have stopped turning. In addition to aircraft marshalling hand signals, it is standard practice for the pilot of a jet-engine aircraft to indicate to ground crews that it is safe to insert chocks by turning off the anti-collision beacons and shutting down the engines. However, as aircraft engines and the anti-collision beacons are not coupled for all aircraft types, they should not be considered as the only indication for ground crews to assume it is safe to approach the aircraft. Generally, personnel should not be permitted to approach an aircraft unless it has been secured as described above. However, under certain operational circumstances (e.g. In-Op APU) and/or for emergency (aircraft) operational reasons, the approaching of aircraft for the purpose of connecting Fixed Electrical Ground Power (FEGP)/Ground Power Units (GPU) whilst anti-collision lights remain illuminated and when aircraft engines are running may be acceptable.

(b) To avoid the possibility of the aircraft climbing or ejecting its chocks, ground markings showing aircraft stop positions should not be used as a positive indication to insert chocks or that the aircraft has reached its final position. When not in use chocks should be safely stowed and not left on the apron surface or in the Fixed Electrical Ground Power (FEGP) 'bucket'.

3.10.7 Flap and control surface movement

Personnel should be aware of the dangers of the movement of aircraft flaps and other underwing devices when an aircraft is on stand. These areas should be avoided by personnel, and vehicles and equipment should not be driven or parked in such a way that damage would be caused by flap and other control surface movements.

3.10.8 Wheels

When an aircraft is in motion personnel should keep well clear of all wheels to avoid becoming trapped. When an aircraft arrives on stand, tyres and particularly brake assemblies can remain very hot for some time. Personnel should exercise care when required to work in the vicinity of aircraft wheels. Where there is some free movement of aircraft wheels, care must be exercised to ensure that clothing and hands or feet do not become trapped.

3.10.9 Marshalling of aircraft

The marshalling service is normally, but not necessarily exclusively, provided by the aerodrome operator. The principal considerations are as follows:

(a) The aerodrome operator, as part of its SMS, should provide for the training, testing and authorisation of aircraft marshallers. This provision may be also met by the approval of trainers from handling agents, or third-party employers providing the training. To ensure compliance with regulation and standards, it is recommended that this is audited by the aerodrome operator and findings communicated and followed up as required in any corrective action plans. Only the standard (ICAO) marshalling signals should be employed. Only trained, experienced marshallers in regular practice should be permitted to marshal aircraft unsupervised;
(b) Except where full self-manoeuvring is permitted, a marshalling service should be provided automatically on stands not equipped with VDGS or where the VDGS or other stand facilities have known unserviceability's. A marshalling service should also be available on request;
(c) In certain circumstances, such as a non-standard taxiway routing or on request from a visiting pilot unfamiliar with the aerodrome, and/or in poor visibility, a leader vehicle should guide the pilot to a marshaller or the designated parking place.

3.10.10 Fixed electrical ground power (FEGP), auxiliary power units (APU) and ground power units (GPU)

In accordance with airport environmental policies and rules, the running of all types of engines on the apron should be kept to the minimum necessary to maintain operational needs. Where FEGP units are provided on stands they should be used in preference to other forms of auxiliary power. The use of aircraft Auxiliary Power Units (APUs) and engine driven Ground Power Units (GPUs) should be managed in order to meet operational requirements. Airlines should be encouraged to use GPUs with the quietest engines available. At large aerodromes consideration can be given to the provision, on stand, of pre-conditioned air units to reduce the running of APUs for cabin conditioning.

3.10.11 Use of power during aircraft manoeuvres on stand

(a) When entering a stand, it is desirable that flight crews use the minimum power needed to carry out a normal arrival manoeuvre. Where possible the aircraft should be kept moving to avoid the need to apply 'break away' power to continue the approach to the stand. This may be particularly important in locations where there are stands on the opposite side of the taxiway or taxilane.
(b) Thrust levers should not be exercised with engine(s) running for any purposes when the arriving aircraft is on stand, unless specifically approved by the aerodrome operator or as part of flight crew pre-flight checks.

3.11 Departure and post turnaround responsibilities

3.11.1 Aircraft departure

(a) Aircraft departure is a critical phase of flight. Notwithstanding the pressures that often call for expeditious movement to meet schedules, clearances and 'slot' allocations, the safe management of departure procedures is paramount. For the purposes of this section the departure phase is considered to be from the time the aircraft starts an engine, or pushback movement starts (if earlier), to the point where taxi clearance is issued by ATC. Guidance covering the various methods of aircraft departure is given in the following paragraphs.

(b) To avoid damage and to maintain a safe clearance from the airbridge the following precautions should be observed before aircraft pushback is initiated:
   (i) The aircraft passenger doors must be closed;
   (ii) The airbridge canopy and autoleveller must be retracted;
   (iii) The airbridge safety barrier should be erected or the doors should be closed;
   (iv) An apron drive bridge or steps should be withdrawn and the drive wheels placed in the parking position provided;
   (v) A rail drive bridge should be fully retracted; and
   (vi) A check should be made that there are no vehicles, FOD, equipment or personnel obstructing the movement of the airbridge before it is moved.

3.11.2 Pushback procedures

(a) Aircraft pushback operations have the potential for accidents involving personal injury/fatalities for ground crews and damage to aircraft, vehicles and equipment. It is recommended that all stakeholders (Aerodrome Operators, airlines and ground handlers) conduct and coordinate risk assessments to establish and promulgate general rules and requirements for the safe conduct of pushback operations. The development of detailed procedures, within the guidelines issued, may remain the responsibility of airline operators/handling agents. Aerodrome Operators should maintain safety management arrangements to audit compliance with pushback requirements. When considering rules for pushbacks the following should be taken into account:
   (i) Detailed written operating procedures should be produced by the aerodrome operator and airline operators/handling agents for use by their personnel. These procedures should ensure the safety of the aircraft and the personnel involved; ideally this information should be contained within the aircraft turnaround plan or similar associated documentation;
   (ii) A check of the aircraft to ensure that there are no missing panels or damage has occurred and all doors/holds and service panels are closed;
   (iii) Unless required to ensure the safety of the aircraft, personnel involved in the pushback should stay within the aircraft tug. Personnel working outside the aircraft tug, such as the headset operator, are particularly vulnerable to injury and employers must have risk assessments and safe working practices in place to address the hazards. Where risk assessment has shown it to be advisable, 'tail look-out' and/or 'wing-walkers' should be used to

safeguard the rearward movement of the aircraft and prevent collisions with other aircraft, vehicles or personnel. Procedures for these personnel should be written down and should ensure the safety of the aircraft and the people involved. Personnel should be trained to ensure they are familiar with the procedures;

(iv) All tug drivers should be trained and competent in aircraft push and tow operations in all weather conditions;

(v) Pushback crews, and those carrying out supervisory roles should be nominated for the respective tasks, trained and competent.

(b) Normally, the head-set operator should be in verbal contact with the flight deck crew throughout the pushback, except for exceptional circumstances. Where there is a possibility that verbal communication will not be available for any reason, the head-set operator and other members of the ground crew should be trained to use internationally agreed hand signals.

(c) Before the Aircraft Commander calls for pushback, he/she must ensure that the tug driver is in the tug, ready to push. The tug driver must listen to the exchange between the aircraft crew and ATC so that the tug crew has a full understanding of the detail of the ATC approval. If the tug driver has not heard the pushback instruction he must not push the aircraft and the tug driver must confirm with the flight deck for pushback instructions.

(d) To reduce the possibility of an unauthorised pushback and consequent risk of collision etc, tug drivers should monitor the relevant RTF frequency on which the pilot is obtaining its ATC pushback approval and be prepared to challenge the pilot if an error is perceived.

3.11.3 Power-back procedures (reversing under power)

(a) Powering back an aircraft is inherently less directionally accurate than pushback or powering forward; there may also be an increase in noise and blast effect. Accordingly, the use of this technique should be limited to those aircraft types authorised in the aircraft's flight manual to reverse under power and for which procedures can be agreed which do not adversely affect apron safety in respect of engine noise, vibration and blast effects.

(b) Before approving power-backs the aerodrome operator should conduct a risk assessment taking into consideration aircraft characteristics, apron layout/configuration, and stand occupation frequency and the stand clearances available and any gradients involved on stands or taxiways.

(c) The following items should also be considered:

(i) The procedures are authorised in the aircraft manufacturer's manual;

(ii) The procedures to be used are incorporated in the airline's operations manual;

(iii) Pilots are trained and experienced in power-back operations;

(iv) The aircraft is directed by a trained ground handling marshaller using standard power-back marshalling signals ;

(v) Wing-walkers are employed to safeguard the rearward movement of the aircraft, particularly wing tip clearances, to prevent collisions with other aircraft or vehicles or personnel. Procedures, training and personal protective equipment should be employed which ensure the safety of these personnel during power-back operations;

(vi) A trial of a live power-back is carried out using the engine settings, aircraft weight and procedure intended for operational use in which the safety of the operation is demonstrated.

(d) The aerodrome operator should assess the effects of noise, vibration, blast and emissions, observed during the trial, in order to decide the suitability of the procedure demonstrated. It is not possible to state finite limits of noise, blast and emissions to suit all locations and all aircraft types; therefore, Aerodrome Operators should decide the limitations to be met in accordance with approved airport procedures.

(e) Power-back operations should not be permitted when passengers are being boarded or disembarked on adjacent stands unless it is necessary for operational reasons. In such circumstances, the aerodrome operator should specifically risk assess the associated hazards and put in place control measures to reduce the risks to as low a level as reasonably practicable.

3.12 Engine management on aircraft arrival/departure

(a) When entering a stand, it is desirable that flight crews use the minimum power needed to carry out a normal arrival manoeuvre. Where possible the aircraft should be kept moving to avoid the need to apply 'break away' power to continue the approach to the stand. This may be particularly important in locations where there are stands on the opposite side of the taxiway or taxilane. A trained member of airline or handling personnel should ensure that the area behind the aircraft and the zone immediately in front of the engine intakes are clear of personnel, vehicles FOD and equipment before engine start.

(b) The aircraft anti-collision beacon(s) must be switched on before an engine is started.

(c) The number of engines started before pushback commences should be the minimum to meet technical and passenger service needs.

(d) During start up and pushback, engine power settings should not normally exceed ground idle.

(e) Aircraft leaving the inner stands of a cul-de-sac should be towed forward to a safe distance from the blast screen (noting that not all airports provide blast screens at the end of a cul-de-sac where a rear-of-stand road is provided for example) before the tug and tow-bar are disconnected. This position may be marked on the taxiway centreline for additional guidance to the tug-crew.

3.13 Multiple pushback procedures

(a) Multiple aircraft pushback's from adjacent stands, or in a cul-de-sac, are an accepted method of achieving a faster pushback and departure rate, but they must be conducted with due regard to the additional health and safety requirements that arise for ground crews and for overall aircraft safety.

(b) Approval for start of 'pushback' normally rests with ATC and if there are apron areas of an aerodrome where the ground movement controller does not have a full view of the aircraft, then any procedures must take this into account.

(c) The principal safety hazards in multiple pushback operations where aircraft end up positioned nose to tail are:

  (i) Aircraft positioned too close to each other when the pushback phase is completed;

  (ii) Excessive levels of engine blast and fumes for pushback crews positioned behind aircraft with engines running.

(d) In order to avoid excessive jet-blast and fumes, the safe separation distance behind an aircraft should, where local procedures require, be determined by conducting collaborative a risk assessment involving all interested parties, including where practicable, the air navigation service provider, which should make reference to aircraft engine manufacturer's specific guidance. The distance may vary according to aircraft type and engine fit. Experience gained from other aerodromes may be useful in deciding what practical separation distances can safely be used. It is impractical for pushback crews or operational personnel to measure exact distance each time, so a practical rule of thumb should be established to permit multiple pushback operations to be managed and sequenced safely. Aircraft maintenance manuals will also include guidance on this topic.

(e) The acceptance of a clearance from ATC to push back into an area in which other aircraft are being manoeuvred will normally assume that the prescribed safety distance criteria will be achieved. The decision to accept a clearance for a 'multiple pushback' remains with an aircraft commander as does the responsibility to ensure that the pushback crew are fully aware of any limitation or conditions to be adhered to. Clearly there is a need for prior planning, co-ordination and information exchange between the aerodrome operator, the aircraft operators and ATC before such manoeuvres are adopted as standard practice at any aerodrome.

3.14 Engine hazards

The associated safety hazards caused by jet blast, vibration, noise, fumes, turning propellers and rotors and the intake suction of jet engines are well recognised. As part of the safety management system, Aerodrome Operators should ensure that rules and procedures for safe engine running on the aerodrome are promulgated and understood by flight crews and handling personnel.

3.15 Blast, vibration, and fumes

(a) Even at idle power the blast effects, ingestion, vibration and fumes from all sizes of aircraft engines can be significant. As engine size and power settings are increased, the potential for personal injury and damage increases. The amount of fumes produced is directly related to the engine running time and the power settings used. Engine running on the apron and adjacent taxiway areas should be limited to the minimum necessary to meet aircraft operating needs

(b) In approving engine running or self-manoeuvring on the apron, the following should be considered:

(i) The concentration of fumes present in an aerodrome area is in direct relation to the length of time engines are run, the type of engine and power settings used and the strength and direction of the surface wind;

(ii) Where workplaces, such as cargo-sheds and engineering facilities, have to open directly on to stand areas, a specific risk assessment is required to determine how best to operate all facilities safely and without risks to health, in respect of noise and fumes.

3.16 Live aircraft engines (including helicopters)

Aerodrome Operators should design aircraft parking stands and the airside road network as to minimise the risk and consequential hazard of vehicles and personnel passing behind aircraft with running engines. Where practicable, blast screens should be provided to protect buildings, installations, vehicles and personnel areas that are vulnerable to jet blast and propeller wash.

3.17 Adverse weather conditions

Respective employers, companies and operators with staff working airside should establish procedures that ensure areas where their staff operate remain safe to do so during periods of adverse weather including strong winds, low visibility and winter operations. Aerodrome Operators should advise all organisations operating airside promptly of any forecast adverse weather conditions.

For further guidance see SLCAR-AC-AGA007.Rev.01. Additional information can be found on ICAO Doc 9476 (Manual on Surface Movement Guidance and Control Systems),

3.18 Falls and falling objects

(a) Aerodrome Operators should ensure that adequate safeguards are in place to prevent a fall, or object falling from a height likely to cause a personal injury. Aerodromes should look to achieve this through the provision of a safe working environment, rather than the provision of provision of personal protective equipment. This includes the use of physical barriers, limitations of access and established local operating procedures.

(b) Access to external elevated levels on and around aircraft will be required when aircraft are on the stand. Such work includes catering, cargo and baggage handling at the aircraft holds, some cleaning activities and maintenance.

3.19 Access to aircraft doorways

Safe access to aircraft entry/service doorways is particularly important. Aircraft doors and doorways are also particularly vulnerable to damage. Such damage may go undetected for some time. For example, damage to escape slides may not be immediately apparent and may not be discovered until the next periodic inspection of the slide assembly or until it is used in an emergency. Equally, for example, damage to door sills can cause aircraft depressurisation; therefore all damage, even seemingly insignificant, must be reported via the local incident/accident reporting

3.20 Other parts of the aircraft

(a) Access to parts of the aircraft other than the doorway may be gained by a suitable MEWP, although other measures may be used if they are suitable and effective. The edge protection around the working platforms should be maintained in order to prevent persons falling.

(b) Lightweight fall restraint devices incorporating a lanyard and harness have been found to be effective for over-wing access. Any equipment which interfaces with the aircraft surfaces should be approved by the aircraft manufacturer. Some aircraft manufacturers provide attachment points for harnesses on wings of their aircraft and, in such cases; the manufacturer's guidance on their use must be followed.

3.21 Movement of passenger boarding airbridges

(a) Where provided by the aerodrome operator, passenger-boarding bridges should be installed, inspected and adequately maintained in accordance with the manufacturer's guidelines or better. Passenger boarding bridges should be installed with adequate safety equipment in order effect safe movement of the bridge, to prevent unintentional or excessive pressure on the airframe of an aircraft or contact with a pedestrian or a vehicle.

(b) Aerodrome Operators should provide ground markings in which passenger-boarding bridges should be parked when not in use. This marking should include the prohibited area in which vehicles and equipment may not park.

(c) Aerodrome Operators should establish a schedule of preventative maintenance, including regular inspections by competent personnel in accordance with the manufacturer's guidelines or better. Clear records should be kept of any preventative maintenance or repair.

3.22 Manual handling

(a) Manual handling is a term that applies to activities such as lifting, lowering, pushing, pulling or supporting a load by hand or bodily force. Whilst the best means of avoiding risk should be to eliminate the hazard all together, Aerodrome Operators should seek to removed manual handling tasks so far as is reasonably practicable e.g. sunken fixed electrical ground power units. Where it is not possible to eliminate the risk, the aerodrome operator should contribute mitigating it e.g. recurrent maintenance on equipment to reduce the forces required to move it.

(b) The best means of avoiding risk is to eliminate the hazard altogether, for example, by mechanised handling techniques. These include the use of ambulifts to assist the movement of incapacitated or disabled passengers onto the aircraft and handling aids for baggage. Where it is not reasonably practicable to eliminate the hazard, and ground personnel are required to undertake manual handling, the legislation requires that:

(i) A suitable and sufficient risk assessment is made of each task which isconsidered to present a risk of injury. This should address the task, the load, the working environment and the capabilities of the individuals concerned;

(ii) Action is taken on the results of the assessment, appropriate steps are taken to reduce the risk of injuries from manual handling;

(iii) Information is provided on the weight and centre of gravity of the loads that are to be lifted where it is reasonably practicable to do so.

(c) Baggage handling gives rise to more manual handling problems than any other activity at aerodromes. The primary objective must be to reduce the need for manual handling. Therefore, it is good practice to review each stage of the baggage handling process with the aim of eliminating any unnecessary stages. For example, it might be possible to eliminate some stages by using a baggage transfer vehicle that can adjust to the correct height of the aircraft hold door, which eliminates manual handling from the transfer vehicle to a belt loader: The following may help reduce injury from baggage handling. All these suggestions will require co-operation and co-ordination between the aerodrome operator, airlines and ground handling companies:

(i) Proper planning of new and refurbished facilities can provide significant reductions in the risk of injury, as well as increasing efficiency;

(ii) Examine the entire handling operation (where possible, from the first moment a bag is handled by a worker to the last) and consider whether a change of process or equipment could eliminate any stages of manual handling;

(iii) Handling systems should be integrated with each other where possible. Different pieces of equipment should be compatible with each other and positioned to prevent unnecessary handling between, for example, security scanners, conveyors, dollies and aircraft loading equipment;

(iv) Use conveyors (or similar) that are of a suitable height to minimise the risk of injury from lifting or lowering items to or from such equipment;

(v) Consider the environment in which manual handling is undertaken. Where indoors, floors should be dry, non-slip and adequately maintained. There should be sufficient space to allow people to undertake the activity. There should be no gaps between equipment that result in people having to throw baggage. Lighting should be sufficient to allow tasks to be carried out safely. Ambient temperature should be kept at a reasonable level (e.g. in baggage halls) or warm clothing provided where this is not possible (e.g. on the apron). The distance bags need to be carried should be kept to a minimum;

(vi) Ensure that automated systems are properly maintained;
(vii) Ensure that training is relevant to the tasks that people are undertaking;
(viii) Provide general indication of the weight of each bag. This could be achieved by the attachment of a 'heavy bag' label at check in with instruction and training given to employees on how to deal with such baggage.

3.23 Noise

(a) The primary sources of noise on aerodrome aprons are aircraft engines, APUs and support equipment such as mobile ground power units. Many of these sources are highly mobile and exhibit variability in their noise emissions. Therefore, the level of ambient/background noise and, potentially, levels of personal noise exposure, can fluctuate very significantly and can greatly exceed the action levels.

(b) Employers, where practicable, should reduce exposure to noise by reducing the noise at source by considering the following:
   (i) Where fixed electrical ground power units (with power generation sited away from employees on the apron) and fixed air conditioning units are provided on the stands, aircraft operators should make full use of these facilities to minimise the need for APUs or mobile units which generate high levels of noise;
   (ii) Where existing noisy ground support plant is used it should be engineered to minimise noise output. In some instances this may require retrospective remedial action, e.g. partial enclosure, to reduce noise emission;
   (iii) Before the procurement of new plant, noise emission data provided by the supplier, should be taken into account in deciding whether to purchase, and whether further protective measures may be needed. The aerodrome operator may set minimum standards for new equipment;
   (iv) The amount of time that workers spend in the vicinity of noisy plant and equipment should, if possible, be minimised by planning and organising work accordingly;
   (v) Work associated with cargo holds or other service points near the APU could be undertaken when it is not running;
   (vi) For vehicle operators, an acoustic cab could be fitted, provided that the vehicle can be operated with the doors and windows kept closed. If this is not reasonably practicable, it may be feasible for drivers to use hearing protection.

(c) The areas in which hearing protection is required should be marked and warning notices displayed, so far as is reasonably practicable. This may be difficult on the apron itself, but relatively easy within or on equipment, e.g. in cabs of vehicles where the second action level may be exceeded for part or all of the time. Signs should also be placed at all apron access points.

(d) On the apron one employer's activities may cause the employees of other employers to be exposed to noise. For example, high levels of noise from an APU will affect baggage handlers and others working in the vicinity of the aircraft. The various employers should therefore collectively agree to a

collaborative noise action plan involving all relevant parties to address the issue.

(e) Where communication between personnel is essential, or audible alarms are used to assure safety, a thorough risk, assessment of the environment must be carried out to ensure that any risks that result from the use of hearing protection are properly managed.

3.24 Work equipment (including machinery)

(a) Fixed equipment provided by an aerodrome operator is to be considered as work equipment. Work equipment includes every item on the apron, including vehicles, specialist equipment such as cargo loaders, fixed equipment such as airbridges and FEGP Units and hand tools.

(b) The hazards to health and safety and aircraft safety from work equipment can arise when it is moved, installed, used, maintained or dismantled. They include hazards from:

(i) Machinery

(ii) Hot or cold surfaces

(iii) Instability (collapsing or overturning)

(iv) Objects or people falling or being ejected from the equipment

(v) Disintegration, deterioration or malfunctions in the equipment or its controls

(vi) Improper use of the equipment (for example using it for a purpose for which it is not suitable)

(vii) Fire or overheating

(c) Aerodrome Operators should ensure that the equipment installed on an apron is suitable, maintained in a safe condition and inspected in certain circumstances to ensure that it is, and continues to be, safe for use. Any inspection should be carried out by a competent person and a record kept until the next inspection and longer if the inspection results are used to monitor serviceability trends.

(d) Dependent on the process involved, the hazards may always be present with the equipment, (such as its weight which may affect how easily it can be moved or lifted), or transitory (such as the risk of striking the aircraft when equipment is raised or lowered).

3.25 Mobile work equipment

Consequently, stakeholders and their personnel should ensure that where mobile work equipment is used for carrying people or objects, it is suitable for this purpose (i.e. there is proper seating and stowage areas). In some cases, measures may need to be taken to reduce the risks to the operator, any other people being carried, anyone else who might be affected (such as passers-by) and aircraft. This may include measures to prevent the work equipment rolling over, or people or objects being thrown from the equipment (i.e. seatbelts or other restraints). The measures

should be based on the findings of a risk assessment. In all cases it is important that loads carried in vehicles are appropriately secured, with vehicle side and rear flaps fastened.

3.26 Lifting equipment

(a) Aircraft may be struck and damaged by lifting equipment as it moves up or down. Lifting equipment also poses risks to people. People may fall from elevated working positions, become trapped, be struck by loads falling or released from the equipment. Lifting equipment may overturn or collapse, resulting in injury and damage.

(b) All lifting equipment and lifting operations (except those done solely by manual effort without assistance from equipment) are subject to the appropriate regulations.

(c) In order to ensure that the risks to aircraft people and are controlled, lifting equipment should be:

(i) strong and stable enough for the particular use and marked to indicate safe working loads;

(ii) positioned and installed to minimise any risks;

(iii) used safely, i.e. the work is planned and organised, and is performed by competent people; and

(iv) subject to ongoing thorough examination and, where appropriate, inspection by competent people.

(d) It may sometimes be difficult to determine what is, and what is not, lifting equipment. At aerodromes, the following should always be considered to be lifting equipment:

(i) Catering vehicles, ambulifts and other hi-loaders;

(ii) Aircraft de-icers with a boom assembly;

(iii) Cargo loaders;

(iv) Mobile elevating work platforms (MEWPs, ‘cherry pickers’);

(v) Lifting platforms on toilet and portable water servicing vehicles and refuelling

(vi) vehicles;

(vii) Forklift trucks.

(e) Equipment which is subject to any regulations, for example, dangerous parts of machinery which are components of a piece of lifting equipment should be protected.

3.27 Electrical storms

(a) Electrical storms in the vicinity of airports may present a hazard to personnel working in the airside environment. The nature of work being carried out, and

the risk to personnel performing their duties during an electrical storm should be risk assessed by respective employers operating airside.

(b) Where work equipment may be struck by lightning while being used, it must be protected as appropriate against the effects. It is therefore incumbent upon employers to ensure that where there is a risk to employees arising from lightning strikes to work equipment when being used, that appropriate safety precautions are followed.

(c) Aerodrome Operators, in liaison with their ANSP, should ensure that warnings of weather information regarding electrical storms is promulgated and cascaded to the airport's airside community to allow companies to initiate plans in order to mitigate the risk of a lightning strike to their personnel whilst operating in airside areas.

(d) During thunderstorms, local airport operating company procedures and direction must be strictly followed. It is not safe practice for personnel not to wear headsets during thunderstorms or when warnings have been issued. When lighting is present, ground crews should not communicate with flight deck using a connected communication headset. Where necessary, communication via internationally used standard hand signals should be used instead.

(e) It is best-practice to cease all aircraft refuelling during thunderstorms. Operators should ensure they are familiar with the aerodrome or customer representative's policies for such situations. Where doubt exists, fuelling should immediately cease until thunderstorms have passed.

3.28 Strong winds

(a) Strong wind conditions can give rise to hazards from wind-blown items and in very strong winds there is a possibility of structural damage to aircraft. Principal hazards may be:

  (i) engine ingestion
  (ii) airframe damage to aircraft on stands, taxiways and runways
  (iii) severity of the hazard of obstruction of a runway to an aircraft taking off
  (iv) danger of personal injury for apron personnel and damage to vehicles and equipment.
  (v) Some airbridges may have operational limits during periods of strong winds which should be understood and adhered to.
  (vi) Maximum wind limits for the operation of aircraft doors should be published and familiar to ground handling organisations.

(b) When meteorological warnings of strong winds are received, they should be promptly relayed to all relevant employers including airlines, ground handling employers and operators.

(c) 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. 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 ramp area. Additionally, aircraft may require enhanced chocking in line with airline requirements.

(d) 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, there is a requirement for airline managers, agents or owners concerned to ensure that wind milling propellers and rotors are feathered and/or secured.

3.29 Slips and trips

(a) Slips and trips account for almost a quarter of accidents at aerodromes. Whilst some of these accidents are difficult to prevent, many could be avoided by simple measures which should be taken. Slips and trips may be caused by a variety of obstructions, loose items and defects in walkways, stairs and other areas. Loose items may include FOD, which is also a hazard to aircraft. Improperly stowed cables (for example, from fixed or mobile electrical ground power units) can also cause trips. Slips can be caused by spillages, for example from hydraulic fluid or fuel leaks etc.

(b) The initial design and construction of work areas may contribute as much to the risk of slips and trips as to its reduction. Sudden changes in ground level, poor drainage or insufficient surface friction can increase the risk of slips or trips. The aerodrome operator should ensure that the risks from slips and trips are considered at the design of new or refurbished facilities, and are eliminated or controlled by design and an assurance that adequate task and flood lighting is provided.

3.30 Movement area inspections

(a) The requirement for inspections and maintenance of airfield facilities is implicit in the aerodrome certification process and associated legislations. The Aerodrome Manual must contain the requirements and accountabilities for the inspection and auditing of all the safety systems airside on a systematic basis. The results should be recorded/ reported and fed back into the safety management system.

(b) Aerodrome maintenance programmes should identify areas in need of attention before they become a hazard. All airside users should assist by reporting areas which have become damaged, or excessively worn. Maintenance programmes should ensure a regular inspection/audit programme is in place with records of inspections or repairs undertaken.

3.31 Electrical hazards

(a) Again, design and installation can significantly reduce risk. Proper means of isolation should always be provided to electrical systems. These should be lockable. Where possible, isolators should be designed so that people cannot

gain access to parts which carry dangerous electrical currents unless the power is switched off. The aerodrome operator should ensure that redundancy is designed into systems where isolation would cause severe inconvenience (for example, as with the AGL system), so that one circuit can be isolated and worked on safely, whilst the second circuit keeps vital services operating.

(b) Electrical equipment should always be used safely. Plugs should be used with the sockets for which they were designed. Circuits should not be overloaded, and should be suitable for the environment in which they are used. Cables should not be left in positions where they could be damaged.

(c) Of particular note is the use of FEGP and GPU's. Many FEGP/GPU have an electrical interlock which detects when the aircraft is connected. This interlock can be bypassed. However, this facility is intended for maintenance purposes only. Unless specifically required as part of an aircraft's ground handling procedures, interlocks should not be bypassed, even temporarily, whilst the GPU is in normal use. If the GPU will not operate unless the interlock is bypassed, then the GPU is faulty, and it should be withdrawn from service for repair.

(d) All electrical systems should be properly maintained. This requires a proactive preventative programme of inspection and test to identify defects before they become a source of danger. It also requires personnel to report promptly to their employer, and/or the operator or owner of the equipment, any defects they discover during the course of their work. All maintenance of electrical systems should be carried out by competent personnel.

(e) Where contractors are to be used to undertake electrical work, they should be subject to the assessment, control and monitoring arrangements outlined in Section 2 of this AC.

3.32 Faults and defects

(a) Aerodrome Operators should promulgate and maintain comprehensive fault reporting procedures for all apron equipment and installations provided by the aerodrome. Clear instructions should be issued to aerodrome users.

(b) All airside users should report faults on vital operational equipment, or facilities, that could affect aircraft safety, such as airbridges and VDGS immediately, preferably to a single point. This will allow the appropriate and immediate safety decisions can be taken and a prompt remedial response can be initiated.

(c) Details of all reported faults and their rectification should be recorded for management audit purposes.

(d) For faults where a hazard to aircraft existed or was potentially possible, a Mandatory Occurrence Report should be submitted. Further details regarding the reporting of occurrences can be found on the SLCAA website.

(e) All employers should ensure that there are systems in place to enable personnel to report defects and faults in company equipment. Action should be taken on these reports, within in a timescale which meets any regulatory requirements and reflects the seriousness of the defect or fault and the risk to aircraft and/or people.

(f) Some faults may also be serious enough to require reporting to the MLSS even if they also qualify as an MOR.

4 APRON/STAND DESIGN

An apron is a defined area intended to accommodate aircraft for purposes of loading and unloading passengers, mail or cargo, fuelling and parking or maintenance. The apron is generally paved but may occasionally be unpaved; for example, in some instances, a turf parking apron may be adequate for small aircraft.

4.1 Physical characteristics

(a) Front: boundary with the head of stand road, equipment area or building line;

(b) Rear: boundary with the rear-of stand road or taxilane /taxiway strip;

(c) Sides: 1 metre measured laterally from the wingtip of the largest span aircraft.

(d) Stand design should allow minimum 'safety' clearances around the extremities of the largest aircraft type expected to use the stand.

4.2 Design Requirements

The design of any of the various apron types requires the evaluation of many interrelated and often contradictory characteristics. Despite the distinct purposes of the different apron types, there are many general design characteristics relating to safety, efficiency, geometry, flexibility and engineering that are common to all types.

4.3 Management of change

When considering changes to existing aircraft parking stands, or the creation of new aircraft parking stands, Aerodrome Operators must firstly ensure regulatory requirements are met, and should endeavour to consult with all stakeholders to ensure that all issues are addressed and any associated risks mitigated and/or removed where practicable.

4.4 Safety in the vicinity of works areas

Development and maintenance work in the Movement Area occasionally involves sections of the Area being totally withdrawn from use. At other times aircraft access has to be restricted due to the work in progress; notification is always given by the issue of a Safety Instruction. These sections are always coned, barrier or fenced off and are marked at night with red obstruction lights along their perimeters. Pilots should use minimum power when in the vicinity of these working areas and should never direct jet-blast towards the areas.