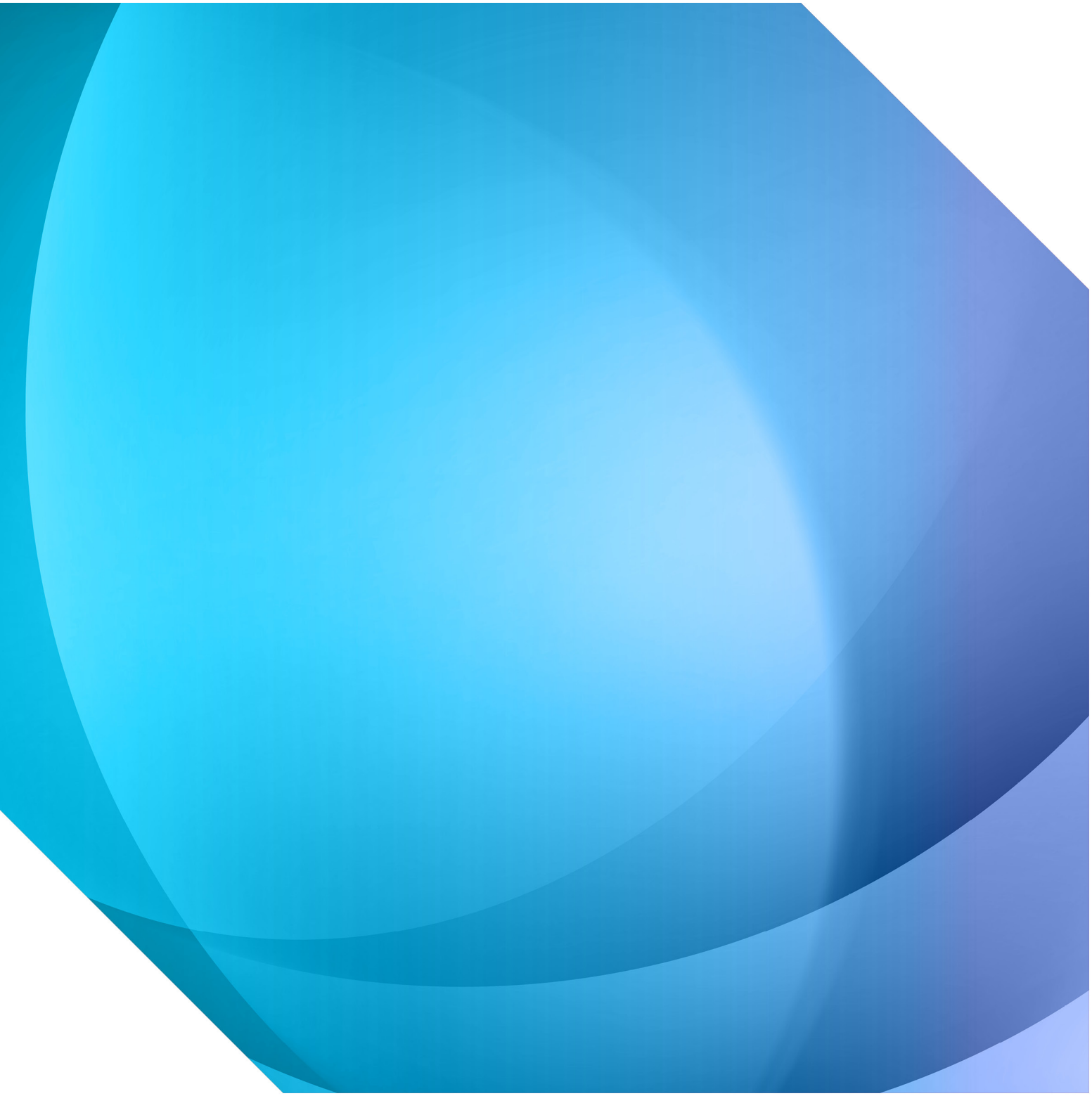
Safety and Airspace Regulation Group

Airside Safety Management

CAP 642



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Introduction

CAP 642, Airside Safety Management, was originally produced in 1995 to provide guidance to aircraft, aerodrome/airport operators, third party employers and contractors concerning safe operating practices for airside activities.

The document has been through several iterations since then and remains a key document discussing airside safety management for both aviation safety and health and safety stakeholders, employers and employees.

The CAP provides general guidance for those engaged in activities taking place on the airside areas of aerodromes, principally but not exclusively, at civil aviation sites. The document contains advice and guidance for the management of airside safety to help minimise potential ground damage to aircraft, particularly during ground handling activities and occurrences associated with the health and safety of workers and passengers.

With the support and contributions from industry stakeholders and the UK Health and Safety Executive (HSE), the UK Civil Aviation Authority (CAA) established a joint Working Group (WG) to review ground handling operations and airside safety under the auspices of GHOST (Ground Handling Operations Safety Team). The document was drafted in collaboration with those stakeholders and contains guidance which should be considered as good or best-practice, whilst at the same time accepting that respective company procedures may reflect variance or adaptation of the subjects discussed herein.

Status and purpose

Adherence to this guidance is not compulsory upon any stakeholder, unless where specifically stated (i.e. where Health and Safety legislation is quoted or referenced). Where stakeholders chose to follow the guidance and apply it as a local requirement, they would normally be doing enough to comply with the applicable laws.

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). Operators, and service providers, and their contracted employers (at every level) are ultimately responsible for deciding on the appropriateness and applicability of any particular safety arrangements with respect to their own specific circumstances and for monitoring the suitability and success of the arrangements collaboratively.

CAP 642 sets out the hazards and risks that respective employers operating in the airside environment should be expected to consider and manage, but it should be noted that this guidance is not necessarily comprehensive nor exhaustive. Employers are ultimately required to determine the hazards their employees and others face and assess the risk posed by these hazards. Where information has not been provided to cover a particular

situation, it is expected that users will be guided by the general safety management principles to identify and create a safe working and operating environment.

Applicability

Ensuring the safety of individuals and aircraft in airside areas is a complex undertaking and the content of this document cannot be taken in isolation. There are many associated systems and procedure documents that will affect the various employers that operate in airside areas at an aerodrome. It is important to recognise that not only will each organisation need to develop its own systems to complement those it interfaces with but that no two aerodromes are alike and that no assumptions can be made based on the solutions used at one location equally applying at another.

Whilst this document is primarily aimed at aerodrome operators, airlines and ground handling service providers, it may be equally applicable to activities at unlicensed aerodromes, heliports and military aerodromes. In these cases the term 'Aerodrome Operator' should be considered as the 'person in charge of safety at the aerodrome' or for example, the 'Accountable Manager'.

Any organisation, regardless of size or complexity of operation, or whether subject to direct oversight and regulation by CAA, should establish a Safety Management System through the application of the general principles outlined in this document and from further more comprehensive guidance found on the CAA website and other resources such as the Eurocontrol Skybrary. SMS is discussed further in Chapter 1.

Airport 'by-laws'

At the discretion of the aerodrome operator, certificate or licence holder specific local rules may apply at an airport/aerodrome. These might fall under conditions of use, or be promulgated separately, via airport 'by-laws', Managing Directors or Operational, Safety Instructions that all airport stakeholders must adhere to as requirements.

Where appropriate these rules may be encompassed within an airport's SMS and communicated to all relevant stakeholders as necessary. Where formal by-laws are not provided, it is for management to decide which rules and regulations need to be in place to satisfy the circumstances and to ensure that these are widely promulgated or accessible to all stakeholders and users of the airport.

IATA Ground Operations Manual (IGOM)

The guidance in this document does not take precedence over the information and operational instructions or considerations contained within the IGOM, it merely seeks to complement, where applicable. The CAA accepts that there may be examples where guidance contained within this document might differ with the IGOM. However, this document seeks to reflect what CAA, together with stakeholders considers as good and safe practices, particularly for those stakeholders whose employers, due to their size and complexity do not adopt the IGOM and/or are not IATA members. For GA, Business and

Corporate aircraft operators, the National Business Aviation Association's International Standard for Business Aircraft Operations (IS-BAO) may be referred to.

Amendment

This document is subject to continuous review and amendment if so required. Questions, suggestions for improvement or new material should be sent to: content@caa.co.uk

References

Useful references and further reading

Documents published by the Civil Aviation Authority (CAA) are available for purchase from TSO, PO Box 29, Norwich, NR3 1GN (Telephone 0870 600 5522). Many CAA documents are also available from the CAA's website at www.caa.co.uk/publications.

Documents published by the Health and Safety Executive are available from HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 6FS (Telephone 01787 881165). Most are available to download free from www.hse.gov.uk.

The following documents contain regulations, guidance or information concerned with airside safety. The documents listed below are the main legislative documents that those responsible for air side safety management must be familiar with.

Legislation (as amended)

- European Aviation Safety Agency (EASA) – Aerodrome Regulations
- Civil Aviation Publication (CAP 168- Licensing of Aerodromes
- Air Navigation Order 2016
- The Health and Safety at Work etc. (HSW) Act 1974
- The Management of Health and Safety at Work Regulations (MHSWR) 1999

Definitions and abbreviations

Although there are many terms used in this document that have a particular meaning, the following are of particular significance:

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, fuelling, parking or maintenance. In order to reflect industry used terminology, use of the word 'Stand' or 'Ramp' may be used.
Manoeuvring 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 manoeuvring area, aprons and any part of the aerodrome provided for the maintenance of aircraft. **NOTE:** Manoeuvring 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.

Abbreviations	
ACOP	Approved Code of Practice published by HSE
AGL	Aeronautical Ground Lighting
ANO	The Air Navigation Order
ANO(DG)	Air Navigation (Dangerous Goods) Regulations
APU	Auxiliary Power Unit
ATC	Air Traffic Control
ATEX	Protection of Workers Potentially at Risk from Explosive Atmospheres Directive
BS	British Standard
BS EN	Harmonised European Standard
CDG	The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations by Road
CAD	Chemical Agents Directive
CAP	Civil Aviation Publication (published by CAA)
CCTV	Closed Circuit Television
COSHH	Control of Substances Hazardous to Health Regulations (as amended)
CDM	Construction (Design and Management) Regulations
dB	Decibels
dB(A)	Decibels A-weighted (to reflect the response of the human ear)
EASA	European Aviation Safety Agency
FEGP	Fixed Electrical Ground Power
FOD	Foreign Object Debris or Foreign Object Damage
GPU	(Auxiliary) Ground Power Unit
HSE	Health and Safety Executive
HSG	Health and Safety guidance booklets (published by HSE)
HSW Act	Health and Safety at Work etc. Act
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation

Abbreviations	
ILS	Instrument Landing System
INDG	Guidance leaflets published by HSE
IRR	Ionising Radiation Regulations
$L_{ep, d}$	Personal noise exposure
LOLER	Lifting Operations and Lifting Equipment Regulations
LVP	Low Visibility Procedures
MEWP	Mobile Elevating Working Platform
MHSWR	Management of Health and Safety at Work Regulations
MOR	Mandatory Occurrence Report
POB	Persons on board
PPE	Personal Protective Equipment
PUWER	Provision and Use of Work Equipment Regulations
REPPIR	Radiation (Emergency Preparedness and Information) Regulations
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RTF	Radiotelephone/radiotelephony
SMS	Safety Management System
SOP	Standard Operating Procedure
VDGS	Visual Docking Guidance System

Chapter 1

General principles of safety management

Introduction

1.1 Those 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.

1.2 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:

- Leadership and commitment from management that includes clear policies, targets and standards to be achieved and the setting out of responsibilities and accountabilities;
- A method for identifying hazards, assessing risks and controlling those risks;
- A method of monitoring and review that includes inspection and audit, incident investigation and data trend analysis;
- Documented processes and procedures.

Safety Management Systems (SMS)

1.3 In recent years our understanding of how accidents and incidents happen has improved. More emphasis is now placed on the causal factors involved and the organisational factors that contribute to errors being made. Organisational factors include how an organisation operates, how it sets out its procedures, how it trains its personnel and what level of importance it gives to safety issues identified within the organisation.

1.4 ICAO provides an ‘SMS Framework’ within Annex 19 and the Safety Management Manual (Doc 9859) The objective of safety risk management components is to identify hazards, assess the related risks and develop appropriate mitigations in the context of the delivery of the organization’s products or services. Safety assurance is accomplished through ongoing processes that monitor compliance with international standards and national regulations. Furthermore, the safety assurance process provides confidence that the SMS is operating as designed and is effective. Safety promotion provides the necessary awareness and training. The four components and twelve elements that comprise the ICAO SMS framework are as follows:

1. Safety policy and objectives

1.1 Management commitment and responsibility

1.2 Safety accountabilities

1.3 Appointment of key safety personnel

1.4 Coordination of emergency response planning

1.5 SMS documentation

2. Safety risk management

2.1 Hazard identification

2.2 Safety risk assessment and mitigation

3. Safety assurance

3.1 Safety performance monitoring and measurement

3.2 The management of change

3.3 Continuous improvement of the SMS

4. Safety promotion

4.1 Training and education

4.2 Safety communication

1.5 A Safety Management System (SMS) provides for a proactive approach to safety by identifying causal factors and taking actions before an event happens. SMS helps by having a greater understanding of the hazards and risks affecting the safety of the organisation. These hazards and risks could have a severe impact on an organisation in terms of financial cost and reputation. An SMS is an effective way to take the organisation beyond compliance with the regulations with an organised approach to managing safety.

1.6 The SMS sets out the organisation's structure, identifies the accountabilities and responsibilities of key personnel members and documents the policies and procedures to manage safety effectively. An effective SMS allows the hazards and risks that could affect the organisation to be identified, assessed and prioritised so that appropriate mitigation measures can be put in place to reduce the risks to as low as reasonably practicable (ALARP). Reducing a risk to ALARP does not mean that the risk has been eliminated as some level of risk still remains; however, the organisation has accepted the remaining level of risk

1.7 A risk may be described as ALARP if all reasonable actions have taken place to mitigate the risk and where the cost (in terms of time, effort and money) of taking further action would be disproportionate to any further reduction in the level of risk.

1.8 Whether or not this guidance material is suitable for your organisation will depend on various factors including the size, complexity and level of risk associated with the activities it discharges. The structure and content of an SMS should be essentially the same for any organisation but it should be proportionate, with the level of detail reflecting the size, complexity and level of risk faced by the organisation. It is important to understand that there is no 'one size fits all' in terms of SMS development and implementation; what is important is to develop an SMS that works for the organisation and that it is demonstrably, effective.

1.9 All aspects of an SMS should be clearly documented in order to keep an accurate record of why decisions were made, why actions were taken and why any changes were implemented. Documentation should be controlled and in a suitable format so that it can be clearly understood by its own staff, by third party organisations that are contracted, and where applicable, the CAA.

1.10 It is implicit when considering what is reasonably practicable, that hazards have been identified and risks assessed. The primary function of identifying the hazards and assessing the risks airside is to determine whether enough has been done to prevent an incident or accident that may lead to fatalities, injuries and ill health and/or damage to aircraft. In this way, risk assessments assist in determining whether enough has been done to meet the requirements of aviation law and health and safety legislation and are a key component in any system for managing aircraft safety and occupational health and safety. Risk assessment can also indicate what improvements need to take priority, and thereby assist in developing budgets and business cases.

1.11 When undertaking risk assessments, the following key questions should be considered:

- What are the hazards to people and aircraft from the activity, location or task?
- Who or what can be harmed and how?
- What are the risks? Are they being controlled? If not, what more needs to be done, by whom and by when?
- Have the results of the assessment been recorded?
- Does the assessment need to be reviewed and revised? When and how often?

1.12 A hazard is anything which can cause harm or damage, a risk is the chance, great or small, that people or aircraft will be harmed or damaged by a hazard. This is a function of the likelihood (probability) that harm will occur and the severity of that harm. A number of typical hazards associated with operational airside activities are discussed within Chapter 2.

1.13 Under health and safety law, consideration must be given to the risks to the health and safety of employees from other organisations, visitors, members of the public and anyone else who may be affected by the activity or task.

1.14 There are various sources of advice which may be consulted when considering whether existing precautions are adequate, and what additional precautions may be necessary. These include CAA and HSE guidance and Industry codes of practice or Standards for comparable activities in other industries.

1.15 The general principles for prevention consist of a broad hierarchy of measures such as contained in HSE's advice concerning the management of health and safety, for example:

- Avoiding the risk
- Evaluating those risks which cannot be avoided
- Combating risks at source
- Adapting the work to the individual
- Adapting to technical progress
- Replacing the dangerous by the non-dangerous or less dangerous
- Developing a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors relating to the working environment
- Giving collective protective measures priority over individual protective measures
- Giving appropriate instructions to personnel

Further guidance material, tools and information regarding SMS can be found on the CAA website (https://www.caa.co.uk/sms) and from the HSE in managing health and safety (http://www.hse.gov.uk/pubns/books/hsg65.htm).

Compliance with statutory requirements

1.16 The requirements for the safe operation of aerodromes, with respect to aircraft safety and for the safety of individuals at their places of work, are contained within formal legislative requirements which form part of United Kingdom/GB (HSE) law. It is therefore incumbent on those who provide a workplace, all employers and all employees, to comply with the safety requirements that are set out in the relevant Statutory Instruments. Nothing in CAP 642 substitutes the requirements of the law.

1.17 The CAA and the HSE recognise the potential for confusion concerning which organization enforces safety at aerodromes. As a result both parties are

engaged to work together to resolve any overlaps and to detect any potential areas of conflict. Airside regulatory requirements are enforced by the CAA, and together with the HSE and HSENI have developed a Memorandum of Understanding (MoU) which sets out the framework for liaison between the two regulators. Specifically, the MoU aims to ensure co-ordination of policy issues, enforcement activity and investigation in respect of aircraft and the systems in which they operate.

Control of contractors and third party service providers

1.18 The use of contractors in the airport environment needs to be adequately managed and should form part of any safety management approach.

1.19 Courts have ruled that employers retain some responsibility for health and safety during activities carried out by their contractors. These legal responsibilities cannot be delegated. Some aviation standards, such as EU-965/2012 (EU Air Operations) require Air Operator's Certificate holders to ensure that their contractors safety and operational standards are satisfactory and meet the applicable requirements.

1.20 Working in partnership with contractors will support effective safety management. Reasonable and practicable steps that should be taken include:

- Reviewing the contractors' safety provisions to ensure they are adequate to maintain safety;
- Co-ordination and control arrangements to carry out work; and
- Auditing, monitoring and reviewing/assessing safety performance

1.21 The HSE provides guidance for employers on the Management of Contactors in HSG 159.

Assessing contractors

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

i. Appointing a supervisor to oversee the activity, especially in relation to aircraft turnround (described further in Chapter 3). This could be a member of 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, see HSE website for further information.

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

iii. 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.

iv. 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 or AOC holder.

Performance monitoring

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

- Methods of work: standing instructions or method statements for the contractors' personnel should be clear how confirmation that the plan for the activity is being followed and what procedures are in place to monitor compliance;
- Aerodrome procedures should be in place and should be clear to all working on the aerodrome.
- 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.

1.24 Individuals monitoring performance should be trained and competent to identify unsafe practices, and where applicable, empowered to stop unsafe activities. CAP 700 (Operational Safety Competences) provides guidance concerning the desired competencies that may be required by individuals conducting performance monitoring.

Control of ground handling service providers during turnaround

1.25 The use of contractors at aerodromes to provide services for aircraft is increasing. At many aerodromes, airlines or aircraft operators are the clients for turnround services. They may employ contractors directly or utilise the services of a handling agent, who subcontracts the provision of individual services during aircraft turnround. There may be a mix of service providers; some contracted locally, others on the basis of international contracts.

1.26 Whatever the arrangements, the airline/aircraft operator should consider the elements discussed in the relevant paragraphs on apron/stand management and

turnround. Further details concerning aircraft turnround can be found in Chapter 3 of this document.

Aerodrome operator

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

1.28 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. EASA Aerodrome Regulation and the ANO require that the aerodrome manual contains all necessary information and instructions to enable the aerodrome operating personnel to perform their duties and sets out information and instructions that are to be included in the Manual. 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.

1.29 The standard of occupational health and safety is not considered as part of the Aerodrome Certificate or Licence, and the HSE does not licence aerodrome operators. However, under occupational health and safety regulations the aerodrome operator must provide an aerodrome which is safe for aircraft and people to use. This includes:

- An aerodrome layout which is safe, for example such that pedestrians and vehicles can move about safely;
- Equipment provided by the aerodrome operator which is safe, for example airbridges and fixed electrical ground power for aircraft use;

1.30 The people who need to be protected include the aerodrome operator's own employees, the personnel of contractors and tenants, visitors, members of the public.

1.31 Many precautions will protect both aircraft and people, which include:

- Properly planned and adequately maintained infrastructure;
- Adequate standards of specification and maintenance of equipment which interfaces with the aircraft;
- Adequate standards of specification and maintenance for vehicles, whether directly serving aircraft or not;
- Adequate driver and operator training;

- Properly planned and executed aircraft turnrounds;
- Good co-operation and co-ordination between all operators.

1.32 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.

1.33 The operators of aerodromes should also take a proactive role in monitoring standards, for example by introducing aerodrome-wide safety assurance programmes or procedures for auditing companies operating at the aerodrome. The implementation of a ground operator licensing system may be a suitable solution at some aerodromes. Those aerodromes which have the power to make 'by-laws' may consider taking actions against employers or persons that consistently breach their regulations and requirements.

Aircraft operators

1.34 In addition to the risks to the safety of aircraft, the operator of the aircraft (usually the airline) will need to consider the health and safety of persons not in its employ who are affected by its activities.

1.35 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. Whilst not compulsory, adoption or adherence to the IGOM/ISAGO, as minimum standards, may be considered the best way to achieve uniformity and to deliver standardisation for airside operational practices including aircraft turnround activities.

Ground handling service providers

1.36 Contractors on the apron are often required to work to tight timescales to complete their respective tasks in the time allowed for aircraft turnround. 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.

1.37 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 turnround 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 turnround. In all instances plans should also be shared and coordinated with the airport operator and other stakeholders as applicable.

1.38 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.

Airside safety committees (ASC)

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

1.40 It is therefore recommended that aerodrome operators establish an ASC. The ‘committee’ might typically be headed by the aerodrome’s airside safety manager or equivalent manager with responsibilities for airside safety. There should be no barriers to membership or attendance, which should consist of many different organisations including airline operators, ground handling service providers, the ANSP and representatives from the emergency services.

1.41 Meetings should be scheduled on a regular basis, with notes and actions from meetings communicated and promulgated to the wider airside community, with agreed actions recorded and followed-up for closure.

Chapter 2

Identifying hazards and managing risks

Introduction

2.1 This chapter 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.

Controlling hazards

Vehicles striking people and/or aircraft

2.2 Airside vehicles constitute a continual hazard to both people and aircraft and require vigilance at all times for all those working 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 (airbridge) and marked or barriered walk-ways.

2.3 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.

Hazards to passengers on the apron

2.4 At aerodromes where airbridges are not provided or where they are provided but the airlines choose not to use them, then passengers may become 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 enroute to or from aircraft.

2.5 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.

2.6 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:

a) Apron layout and stand configuration

b) Provision and resourcing of passenger supervision

c) Safe traffic routes:

- Physical segregation
- 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.
- Use of moveable barriers and chains to create a temporary safe route across the apron for passengers to follow.
- 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.
- 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' (PASSENGER INTEGRATED GUIDANCE SYSTEMS).

d) Running of aircraft engines in the vicinity of passengers

e) Information to passengers of the safe route to follow

f) Transportation to and from remote stands

Vehicles, ground service equipment (GSE) and people movement

2.7 Vigilance is necessary for all those working 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.

2.8 Some aerodromes 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.

2.9 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:

- Aerodrome traffic rules
- Vehicle and GSE maintenance
- Driver training, permits and refresher training
- Behaviour of pedestrians (including passengers)
- Reversing vehicles
- Suitability of vehicles and GSE
- Safe parking of vehicles and GSE
- PPE
- Day and night operations
- Inclement weather, including low visibility conditions
- Emergency procedures

2.10 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.

Aircraft parking safety practices

General considerations – operation of the stand

2.11 The following paragraphs describe typical responsibilities and accountabilities for the operation of aircraft on and off stand. Relationships might vary from aerodrome to aerodrome due to differing contractual arrangements with stakeholders, or other owner/operator agreements. It is therefore good practice for aerodromes and other stakeholders to develop and establish the responsibilities and where practicable, conduct joint risk assessments with the aerodrome users and then seek to establish agreed safe working practices within that hierarchy. In any case, there are duties stated within HSE's MHSWR regulations to ensure that those sharing a workplace, however temporary, must to cooperate and coordinate to ensure that they meet the applicable regulatory requirements.

2.12 The aerodrome operator and the ANSP are responsible for the rules and procedures 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.

Ownership of stand/parking bay

2.13 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 (see Chapter 3 Aircraft Turnround).

2.14 Where practicable, a stand supervisor, turnround co-ordinator or equivalent person with safety responsibilities should be nominated to control and manage the turnround process and should be clearly identified to all personnel working on the stand. As described in Chapter 3, the supervisor, turnround co-ordinator or delegated responsible person(s) in accordance with respective company procedures, should be working to an agreed plan for the turnround process and have sufficient authority to control the activities around the aircraft and to recognise and intervene where safety matters arise.

Vehicle and equipment operations

2.15 Further guidance for vehicle operations and maintenance is contained in Chapter 4 of this publication. 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.

Stand markings

2.16 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. Further guidance and details on markings, signs and stand design considerations are contained within CAP 637 (Visual Aids Handbook).

Self-manoeuvring – stand configurations and safety considerations

2.17 Self-manoeuvring is a procedure whereby an aircraft enters an apron or stand, 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.

2.18 Self-manoeuvring operations do not require aircraft tugs or 'ground crews' but the layout of stands requires approximately double the apron area of nose-in pushback operations. Due to the relatively high levels of engine power likely to be used for self-manoeuvring, and dependent upon location, there is an increased potential safety hazard to buildings, installations, vehicles, equipment, personnel and passengers which must be controlled and managed.

2.19 Prior to deciding to adopt self-manoeuvring operations aerodromes should conduct a joint risk assessment with the aerodrome users. This should include consideration of other methods of aircraft handling. Self-manoeuvring on open, unmarked aprons should be subject to special procedures and a marshalling service should be available for all aircraft arrivals. The aerodrome operator should determine which combination of aircraft stands and conditions require a marshalling service on departure.

2.20 Risk assessments should ensure that the following are considered:

a) Stand entry routes, parking positions and departure routes should be marked with standard paint markings, in accordance with the requirements noted in the applicable Aerodrome regulations and CAP 637 (Visual Aids Handbook) or, in the event of non-mandatory markings, the ACI Apron Markings and Signs Handbook;

b) Buildings and installations adjacent to self-manoeuvring stands should be constructed to withstand the engine blast or be protected by blast screening;

c) Vehicles and equipment should not be placed in a position where they can be affected by blast, and where appropriate, equipment parking areas should be protected by blast screens or located remote from the stands;

d) Where appropriate, and as deemed necessary due to health and safety considerations, passenger areas and apron personnel working areas should

be protected by blast screens. Passengers should not be subjected to blast, excessive noise or fumes;

e) Safety instructions should be issued, specifying the maximum aircraft sizes to be permitted on individual stands so as to ensure that any prescribed safe clearances (such as aircraft to stand) are maintained. Pilots should also be required to exercise caution and use the minimum engine power settings needed to complete a satisfactory manoeuvre.

Out of service or 'dead' aircraft handling

2.21 In addition to the above considerations, handling personnel pushing back a 'dead' aircraft for towing must follow local procedures, 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, towbar-less tugs may require specific procedures regarding the display of navigation lights that must be agreed with both the aerodrome and Air Traffic Control.

Preparation of stand

Visual docking guidance system (VDGS)

2.22 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 airbridge 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.

2.23 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. Further information may be found in the EASA Certification Specification and Guidance Material for Aerodrome Design Manual, Chapter M –Visual Aids for Navigation (Lights).

2.24 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.

2.25 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 the UK Aeronautical Information Publication.

Stop short system

2.26 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 ma y 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.

Location of controls

2.27 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.

2.28 The following locations may offer the best control positions:

- 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.
- 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.

Aircraft arrival

2.29 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 turnround:

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.

Aircraft arrival on stand and safety considerations

2.30 In general, some of the hazards generated during the arrival of an aircraft on stand are, jet blast, vehicle driving standards, vehicle and ground equipment indiscriminately parked/stowed, misleading ground markings, visual docking guidance, signs and marshalling signals.

Control of the parking/docking operation

2.31 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.

Brakes and chocks

2.32 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.[1] 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.

2.33 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'.

Flap and control surface movement

2.34 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

[1] For the purpose of attaching ground power, it is recognised and accepted that some airports, aircraft operators and ground service providers (GSPs) require a process during the turnaround whereby ground handlers may approach the aircraft during the arrival phase whilst engines are still running and the anti-collision lights are illuminated, to attach ground power – See Appendix 3A. The CAA via the Ground Handling Operations Safety Team together with stakeholders have developed guidance for this procedure.

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.

Wheels

2.35 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. Ramp 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.

Marshalling of aircraft

2.36 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, as laid down in the 'Standardised European Rules of the Air' Regulations (SERA) 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 unserviceabilities. 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.

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

2.37 In accordance with local 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.

Use of power during aircraft manoeuvres on stand

2.38 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.

2.39 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.

Departure and post turnaround responsibilities

Aircraft departure

2.40 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.

2.41 To avoid damage and to maintain a safe clearance from the airbridge the following precautions should be observed before aircraft pushback is initiated:

a) The aircraft passenger doors must be closed;

b) The airbridge canopy and autoleveller must be retracted;

c) The airbridge safety barrier should be erected or the doors should be closed;

d) An apron drive bridge or steps should be withdrawn and the drive wheels placed in the parking position provided;

e) A rail drive bridge should be fully retracted; and

f) A check should be made that there are no vehicles, FOD, equipment or personnel obstructing the movement of the airbridge before it is moved.

Pushback procedures

2.42 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:

a) 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 turnround plan or similar associated documentation;

b) 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;

c) 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;

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

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

2.43 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 (in accordance with SERA).

2.44 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.

2.45 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.

Power-back procedures (reversing under power)

2.46 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.

2.47 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.

2.48 The following items should also be considered:

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

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

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

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

e) 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;

f) 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.

2.49 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 local airport regulations and procedures.

2.50 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.

Engine management on aircraft arrival/departure

2.51 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.

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

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

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

2.55 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 towbar are disconnected. This position may be marked on the taxiway centreline for additional guidance to the tug-crew.

Multiple pushback procedures

2.56 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.

2.57 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.

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

- Aircraft positioned too close to each other when the pushback phase is completed;

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

2.59 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.

2.60 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.

Engine hazards

2.61 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.

Blast, vibration, noise and fumes

2.62 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. In formulating safety rules, the issues detailed in the following paragraphs should be considered.

Fumes and noise

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

- 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;
- 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.

General

2.64 Vehicles, personnel and passengers should not pass behind running engines. Personnel should avoid approaching aircraft whilst engines are running and/or whilst anti-collision beacons are illuminated unless it is specifically part of their normal job function and is necessary for the task at hand. Where such eventualities arise, employers, together with other parties should conduct a risk assessment for the procedure, leading to the control measures and mitigations which ensure both aircraft safety and the health and safety of ground personnel.

2.65 Drivers and pedestrians should be vigilant at all times on the apron. A common indication to ground personnel that aircraft engines are running, or are about to be started, is the illumination of the aircraft's anti-collision beacon(s). However, anti-collision beacons should not be solely relied upon to indicate whether or not it is safe to approach an aircraft as they are not necessarily interlocked and may be illuminated or extinguished regardless of whether the engines are running or not.

2.66 Where possible, blast screens should be provided to protect buildings, installations and vehicle and personnel areas that are vulnerable to blast. These screens should be designed to withstand blast from the aircraft types that are expected to use those stand areas.

2.67 Consideration should be given to the location and building design (including protection to minimise the effects of blast, vibration, noise and fumes for the occupants) where contractors are required to use temporary buildings (i.e. portacabins etc) on the apron or other airside locations.

Engine test running

2.68 Engine ground runs and check starts should be controlled and where required, only carried out with prior approval from air traffic control and the aerodrome operators. which should specify the conditions to be applied, for example:

a) Where possible, engine ground runs should be carried out on agreed, selected and prepared remote areas, preferably equipped with engine baffles/de-tuners;

b) Engine ground runs at above idle power should not be permitted in cul-de-sacs or, for example, in areas where the jet efflux would impinge on stands, equipment areas or works areas;

c) Engine ground runs on stands in regular use in apron areas should be limited to check starts and idle power only;

d) Where engine running is permitted on the apron, a remote area should be chosen where the jet-blast will not affect other apron areas and busy taxiways;

e) Where necessary, engine ground runs should be safeguarded by Airfield Operations personnel who should arrange for any rear-of-stand roads and, if needed, sections of taxiway to be closed;

f) The area around the engine intakes, behind and adjacent to the cone of the blast should be clear of equipment and the ground must be firm and without loose tarmac, stones or other material;

g) The engineer in charge of the ground run must ensure that the aircraft wheels are safely chocked and that the aircraft cannot move forward under any circumstances;

h) Ground running must not take place when passengers are being embarked/ disembarked on any adjacent or opposite stands, except when such passengers are using an airbridge;

i) A trained member of airline or handling personnel is to be positioned on the stand and should be in verbal contact with the flight deck. He/she will communicate by RTF or interphone with the flight deck to ensure that the engine(s) are shut down if persons or vehicles move into the danger area in front of, behind or in the vicinity of a live engine. For this purpose and if the RTF or interphone link is unserviceable, internationally agreed standard hand signals by day and light signals by night must be used.

Propellers

2.69 Aerodrome operators should issue instructions to safeguard apron operations around propeller driven aircraft. All apron personnel must be alert to the dangers of running propellers and should be suitably trained. At aerodromes where there are relatively few propeller driven aircraft, ramp personnel are likely to be less familiar with precautions that need to be observed, particularly for personnel of airlines which themselves offer no propeller driven services. In these circumstances the airline also has a responsibility to communicate such risks to

the relevant handling organisation and any other stakeholders to ensure that the safeguarding of 'propeller areas' is included in operational safety procedures.

2.70 In accordance with aerodrome licencing/certification requirements, aerodrome operators should provide suitable apron layouts and facilities that provide compliant clearances for the operation of propeller aircraft types, with emphasis on ground and object clearance for propeller tips and the proximity of ramp equipment when the aircraft is at, or approaching, its parking position. Stands at which this cannot be achieved should not be used for propeller aircraft.

2.71 It is normal practice that passengers should not be permitted to walk onto aircraft parking stands when propellers of an aircraft on that stand are turning. However, where it is operationally essential to have the propellers turning, during embarkation or disembarkation, then all passengers must be effectively controlled and supervised by the relevant ground handling company.

Rotors

2.72 Helicopter operations, particularly those of large helicopters, should be segregated from fixed-wing apron operations where possible. In addition to the provision of standard clearances for rotors in the apron layout, due regard should be given to the other characteristics of rotary operations, including:

a) The heavy down draft produced by helicopter movements;

b) The vulnerability of helicopters and aircraft to jet blast, strong winds and rotor downwash from other helicopters;

c) The risk of reduced ground clearance caused by the drooping of the rotor (blade sailing) as it runs down following engine shut down or drive disconnection;

d) The ease of approach to the chosen helicopter stands in hover and hover-taxi mode and the least interference from/for taxiing fixed wing aircraft;

e) The risks associated with tail rotors.

2.73 Dependent on aircraft type characteristics, procedures should include arrangements whereby:

a) Helicopter arrivals are marshalled, unless the helicopter apron is remote and configured for self-manoeuvring. Marshalling assistance/safeguarding may also be required for departure;

b) Ideally passengers should not be allowed to walk on the apron when rotors are turning. Where it is operationally essential to keep rotors running passengers must be effectively controlled;

c) Personnel, vehicles and ground equipment should remain well clear of the rotor disk until it has come to rest. If as above, running the rotors is essential, handling personnel must be trained accordingly;

d) Suitable signs should be provided to warn drivers and apron personnel that they are approaching an area where helicopter operations are handled. All airside drivers and handling personnel should be briefed to maintain a good look-out and should be trained to look upwards as well as horizontally to detect and give-way to helicopter movements.

Suction - ingestion

2.74 Personnel entering the danger zones in front of a running jet engine expose themselves to the risk of being sucked in, almost invariably resulting in serious or fatal injury. The intake suction of jet engines is a hazard, even at idle power, and the flow characteristics of air into an engine are such that items can be picked up from in front of below and from the sides of the intake. Even small items ingested can damage the engine, but the larger engines are quite capable of ingesting large objects from several metres away with catastrophic effect.

2.75 The extent of the danger zone depends on the size of the aircraft engine(s), the mounting height and the power setting. Airline operators should calculate and promulgate information to ground handling employers on the safe distances for operating around the aircraft. This information should be incorporated into ground handling training regimes.

Foreign object debris/damage

2.76 ‘Foreign object debris’ or ‘foreign object damage’, both abbreviated to FOD, are a potential source of catastrophic damage to aircraft, particularly to engines. FOD can also be a tripping or slipping hazard resulting in injury to personnel and passengers. Foreign objects may be ingested into aircraft engines causing damage leading to engine failure, which is critical if it occurs during the take-off phase of flight. At best, such damage leads directly to premature engine removal and replacement. In addition, damage caused by foreign objects can occur to tyres and undercarriages, control systems and other parts of the airframe. All such damage could lead to in-flight failures and inevitably requires expensive repairs to be made. Foreign objects are a hazard to aircraft safety in the vicinity of moving aircraft and should be reported in accordance with local company procedure, and in accordance with the guidance set out by the CAA under the reporting of an MOR.

2.77 Dealing with the temporary sources of risk, such as FOD, requires the whole aerodrome community to play a part. Loose items should be removed by whoever notices them; some of them will only be suitable for the FOD bin. Larger items, such as cables, should be reported to the owner of the piece of equipment concerned, who should in turn have the items removed or tidied away promptly.

If the owner of a larger piece of equipment cannot be established, the FOD should be reported to the aerodrome operator.

2.78 FOD is a general term which applies to all loose objects which are a danger to the safety and integrity of an aircraft and which, therefore, must not be left in any areas that may constitute a hazard. The list of FOD items most frequently found on the apron is long and principally includes:

- Plastic and paper bags/sheets
- Rags
- Empty oil and hydraulic fluid cans
- Empty soft drink cans
- Nuts and bolts, tools and equipment
- Luggage wheels and baggage tags
- Metal cutlery
- Burst ballast bags
- Broken wooden items and miscellaneous rubbish

2.79 The presence of FOD is due mainly to the carelessness of personnel and their lack of understanding of the serious flight safety consequences. Every individual has a responsibility to ensure that the risk of damage to aircraft from FOD is minimised. Any item of FOD found by any personnel member in the course of their work should be removed and placed in the bin provided. An item of FOD seen in an area that a personnel member is not authorised to enter or which they are unable to remove for any reason should be brought to the attention of their supervisor and/or the aerodrome airside operations team. All operators should introduce personnel awareness and procedures that reflect these responsibilities.

2.80 Aerodrome operators should pro-actively manage FOD to minimise the potential for aircraft to sustain damage. Aerodrome operators should provide facilities for the disposal of FOD and should also have a pro-active prioritised and targeted inspection and sweeping programmes in place. Use of automated FOD detection systems may provide continuous monitoring of the movement areas to supplement and enhance manual procedures for inspection/sweeping regimes.

2.81 Aerodrome operators should include instructions, services, facilities and initiatives to combat the risks arising from FOD. The establishment of programmes aimed at communicating with and educating personnel employed on the ramp with hazards and requirements associated with FOD, stressing the responsibilities of all personnel employed on the apron to minimise risks from

FOD and of the necessity to both report occurrences and of taking ownership in picking up and removing items when first discovered.

2.82 Aerodrome operators should ensure that there are programmes of regular apron sweeping, cleaning and inspection, including appropriate and timely response to fuel and other liquid and chemical spillages in accordance with agreed procedures. They should also provide facilities for the disposal of solid and liquid aircraft waste and FOD protection, with attention to such prime FOD generators such as construction and contractor areas, bins, compactors and baggage facilities all of which should be regularly monitored.

2.83 All vehicles and equipment used on the aprons should be maintained in a clean and serviceable condition, not only for reasons of safe vehicle operation but also to minimise the leakage of fluids and depositing of FOD from these vehicles (See Chapter 4 for additional guidance on the management of airside vehicles).

2.84 Aerodrome operators should have in place agreed policies and arrangements for the removal of hazards from the apron such as abandoned vehicles and equipment and typically may levy a charge for the service.

2.85 The reporting of FOD is detailed within the guidance material associated with the 'reporting of safety occurrences' (EU 376/2014).

Aircraft movement

2.86 The movement of aircraft on the ground, either under their own power or towed, creates a number of hazards. In particular, live aircraft engines can cause fatal or serious injuries and extensive damage to equipment, infrastructure or other aircraft. The apron design and stand layout configuration should provide adequate distances between aircraft manoeuvring on and off the parking stand whether under their own power or towed. Further information regarding apron/stand design may be found in EASA Certification Specification Aerodrome Design Manual, Chapter E – Aprons.

2.87 Aerodrome operators should establish local operating procedures for aircraft parking stands, including the parking of vehicles, equipment and infrastructure in order to safeguard the movement of the aircraft on or off the aircraft-parking stand. This includes use of standard ground markings for vehicle and equipment parking bays, inter-stand clearways and passenger boarding bridges.

Live aircraft engines (including helicopters)

2.88 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.

Noise

2.89 There are many sources of noise on an apron. Whilst excessive noise exposure can result in both short-term and permanent hearing loss, excessive noise can also prove to be distracting and make communication difficult. The primary source of noise on aprons are aircraft engines, APUs and ground support equipment such as mobile ground power units. Specific apron areas may require the wearing of hearing protection, and this should be marked and warning notices displayed, so far as is reasonably practicable.

2.90 Aerodrome operators should seek to reduce and have procedures and policies to manage and reduce noise levels on aprons as far as is reasonably practicable. This can be achieved for example, through the use of fixed electrical ground power units (FEGP) and air conditioning units, with the source of power located away from personnel on the apron. Before procurement of new equipment, noise emission data should be confirmed with the supplier and be considered before procurement decisions are made.

Inadequate, confusing or glaring lights

2.91 During darkness and periods of low visibility aerodrome operators should ensure that apron floodlighting is provided to ensure adequate illumination, with minimum glare to pilots of aircraft in flight, on the ground, air traffic controllers and personnel on the apron. The arrangement and aiming of apron floodlighting should be such that an aircraft receives lighting from two directions.

2.92 The average illuminance for an aircraft parking stand being 20 lux, with other apron areas being 10 lux. Aprons used for recreational flying need not be illuminated.

2.93 Further information may be found in the EASA Certification Specification and Guidance Material for Aerodrome Design Manual, Chapter M –Visual Aids for Navigation (Lights). Lighting of non-aerodrome sites in the vicinity of aerodromes may be subject to planning permission. Further guidance can be found in the applicable British Standard or EN for Road Lighting.

2.94 Any lighting used on the apron must not conflict with aircraft guidance systems and if coloured lights are used they must not be capable of confusion with colour coded aviation lights. Where the location of lighting for aerodrome landside sites, is visible from the airfield, the levels of brilliance and direction of any light display should be such that there is no glare or dazzle to confuse or distract pilots or air traffic controllers.

2.95 During darkness and periods of low visibility, apron areas must be provided with lighting of sufficient coverage and level of illuminance to enable pilots and ramp personnel to operate safely and effectively.

Adverse weather conditions

2.96 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.

Falls and falling objects

General

2.97 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.

2.98 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.

2.99 It is not sufficient merely to indicate the presence of an edge from which a person may fall. There must be suitable and effective measures to prevent any person falling a distance likely to cause personal injury. Measures must also be taken to prevent aircraft or people being struck by falling objects. Preference should be given to collective measures providing a safe place of work (e.g. elevated platforms with edge guards) rather than relying on personal protective equipment, information, instruction, training or supervision to prevent these events.

2.100 The necessity and provision of head protection should be determined by the employer's risk assessment of personnel carrying out tasks on the ramp. Head protection may be necessary for other activities on the apron, such as construction work or maintenance of plant.

2.101 Access equipment is usually used in close proximity to aircraft. Drivers should seek assistance from a trained person to guide the vehicle (known as a banks-person), to ensure the correct positioning of the access equipment, that there are no gaps large enough for a person to fall through, and to prevent the access platform or its chassis striking the aircraft. Drivers should also make allowance for the change in height of an aircraft during loading/unloading as this may lead to aircraft damage.

2.102 Suitable access equipment should always be used to gain access at height. Mobile elevating work platforms (MEWPs) provide flexible and safe means of

access to heights. They should be used in accordance with a safe system of work and procedures which minimise the risk of injury and damage to the aircraft.

2.103 Some places may be temporarily adapted to make work at heights safe. For example, some aircraft have attachment points on their wings for running lines and harnesses. The health and safety of the engineers preparing such places of work for use should be considered, as well as the prevention of damage to the aircraft.

2.104 Wherever there is a potential fall from height risk each situation should be assessed for the likelihood of injury and aircraft damage, and appropriate preventive measures taken. For example, the likelihood of injury is increased if there are obstructions, such as low profile equipment with sharp edges, onto which people may fall, or the work is taking place alongside a traffic route.

2.105 As with all equipment, means of access and means for preventing falls (including those integral to the aircraft) should be maintained in efficient working order and in good repair. A regime of inspection should always be in place. This inspection should be carried out by people with sufficient knowledge, experience and training to identify and prioritise defects. The results of inspections should be recorded and kept until at least the next inspection and longer if the inspection results are used for monitoring serviceability trends.

Access to aircraft doorways

2.106 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 procedures (See Chapter 7 Safety Performance Management and Measurement for more details about reporting).

2.107 Proper planning, safe systems of work, equipment and instruction and training are required to ensure that aircraft doors are opened in such a way that no one is exposed to the risk of a fall, and the risk of damage to the aircraft is minimised.

2.108 Airlines should ensure that they do not require aircraft doors to be opened in a manner which exposes people to unnecessary risk. The types of vehicles commonly used to service aircraft rarely have means to prevent falls from the edge that is adjacent to the aircraft when in use. In some circumstances the access equipment can be brought close to the aircraft before a person has to approach the leading edge. Examples are when the aircraft doors open inwards

upwards, are powered open and closed, or otherwise avoid the need for people to approach the edge of the access equipment or the aircraft doorway.

2.109 Where the aircraft has outwards opening doors, which may foul the access equipment during opening and closing, employers should establish whether the safest option, for both the worker and the aircraft, is to open the door from inside. This may require co-operation and co-ordination with the airline operating the aircraft.

2.110 Whatever platform is used, the moveable side guardrails should be adjusted to be close enough to the aircraft to protect the workers without causing damage to the aircraft; it must be kept in mind that a gap of more than 300 mm will not ensure the safety of the workers and that the aircraft may move during loading and unloading. Guardrails should be moved into position as soon as is practicable and certainly before the doorway is used. The last task before the access equipment is withdrawn from the aircraft should be to retract the guardrails. It is equally important that any controls that move the platform should be located so that the operator has a clear view of the platform in order to prevent the platform striking the aircraft.

2.111 Sometimes aircraft doors are left open for reasons other than access, for example to keep the aircraft cooler in hot weather whilst ground personnel work inside. When doors are left open, suitable means to prevent a fall must be in place. These include placing aircraft steps at the doorway or protective nets.

2.112 The straps and their attachments which are often fitted to aircraft doorways are not sufficient as a means to prevent a fall, as they are not designed to withstand the forces generated by a person falling or leaning against them.

2.113 If other means of preventing a fall cannot be provided, then the aircraft doors should be kept shut. If necessary, the aircraft's air conditioning should be used to keep working temperatures comfortable. Where possible, this should be provided by a safely positioned mobile air conditioning unit, rather than the aircraft's auxiliary power unit (APU) as the APU generates considerable noise for those working outside the aircraft. Any aerodrome policies on the use of GPU/APU's should be followed.

Other parts of the aircraft

2.114 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.

2.115 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.

Movement of passenger boarding airbridges

2.116 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.

2.117 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. Further information may be found in the EASA Certification Specification and Guidance Material for Aerodrome Design Manual, Chapter E – Aprons.

2.118 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.

Airbridge incidents

2.119 There have been several incidents involving airbridges which have occurred in the UK and Europe which had potential for major aircraft damage and/or serious injury to personnel. These have included:

- Collapse and other extensive structural failure;
- Un-commanded or unexpected movements;
- Obstructions, such as vehicles and equipment, being struck by the airbridge, due in part to the failure of detection devices;
- Rotten floors and leaking roofs creating slip and trip hazards.

2.120 In order to reduce the likelihood of incidents it is considered best practice to allow only the operator to be on the airbridge while it is moving.

Airbridge installation and equipment

2.121 In order to reduce the likelihood of incidents it is considered best practice to allow only the operator to be on the airbridge while it is moving.

2.122 The following auxiliary equipment should be fitted to apron drive airbridges:

a) Audible and visual warnings that operate automatically when the bridge is in motion;

b) In order to overcome downward and rearward blind spots for the operator, CCTV or sight mirrors to cover blind areas in which the airbridge is able to manoeuvre;

c) Pressure sensitive safety system which, when they touch an object, cut out the motive force thus stopping movement of the bridge;

d) Means to prevent falls from the leading edge of the airbridge, such as doors or guardrails, for use when the airbridge is not in place against an aircraft;

e) VDGS Emergency Stop button installed in the airbridge cab;

f) A suitable means to prevent unauthorised use of the airbridge.

Ground markings

2.123 The airbridge operator should check the area is clear before moving the airbridge. For stands equipped with an apron-drive airbridge ground marking in the form of a hatched area or starburst pattern should be provided, to delineate the area within which the parking of vehicles and equipment must be prohibited. The aerodrome operator should enforce this parking restriction and airbridge operators should bring improperly parked vehicles to the aerodrome operator's attention.

2.124 For stands equipped with an apron-drive airbridge, a ground marking in the form of a parking box should be provided to show the position of the airbridge wheels when it is fully retracted so that the prescribed safe clearance can be maintained between any aircraft and the bridge structure.

2.125 To assist marshallers and tow-on crews, painted stop marks should be provided across the stand centreline and designed for each aircraft type permitted to use the stand. These stop marks should be harmonised with the VDGS stopping positions for the particular aircraft.

2.126 The extendable portion of rail-drive airbridges should be highlighted by conspicuous marking (such as retro-reflective chevrons) to indicate to pilots, drivers and apron personnel that the bridge is extended.

Airbridge maintenance and unserviceabilities

2.127 Aerodrome operators should establish a schedule of preventative maintenance including inspection by competent people.

2.128 Such inspection and maintenance regimes should be based on risk and with reference to the manufacturer's requirements.

2.129 Aerodrome operators should establish and promulgate a formal reporting system for airbridge faults. The procedure should include response activities by engineering and airfield operations personnel, where necessary withdrawing the

airbridge from service until remedial action is taken, to maintain safe aircraft and passenger handling.

Operating procedures

2.130 Aerodrome operators should ensure that they develop and promulgate SOP for airbridges. These should include emergency back-off and wind-off procedures. Instructions for emergency back-off action should be displayed in the airbridge cab and in the case of manual wind-off, at the point of operation.

2.131 Procedures that are specific to the stand or airbridge should normally be provided on a placard at the airbridge control position. This is particularly important if the procedures relate to different configurations for particular aircraft types.

2.132 Airbridges should not be left unattended during passenger embarkation or disembarkation. In practice, either a member of the cabin crew, ground crew or other nominated person would be in attendance. When bridges are not being used for passenger loading or unloading, or required for servicing the aircraft, they should be retracted into their parking box and closed down. Airlines and handlers are advised that whenever a bridge is docked to an aircraft a qualified airbridge operator should be in attendance, unless an approved and serviceable securing device is employed or for access by ground personnel servicing the aircraft. Should the bridge go out of limits while loading or unloading is taking place, the bridge is to be removed and repositioned.

2.133 Aircraft operators are reminded that they are responsible for the security of their aircraft and docked airbridges make aircraft vulnerable. To prevent unauthorised access via airbridges, airlines should either deploy personnel to control access to their aircraft or remove the airbridge from it.

2.134 The aircraft passenger door must remain closed until the airbridge has been correctly docked and must be closed before the bridge is retracted.

2.135 In the event of an emergency whilst the aircraft is on stand, the airbridge should remain attached or be re-attached to the aircraft until all passengers and crew have evacuated the aircraft.

Operator training and licensing

2.136 A system should be established for the training, testing and licensing of airbridge operators. An Airbridge Operator’s Licence (or permit), endorsed for the appropriate type of airbridge, should be issued by the aerodrome operator when a satisfactory level of competence has been demonstrated. The demonstration of competence should include a practical test. Procedures should be established to ensure that airbridge operators operate only those types of airbridge on which they have been assessed as being competent.

2.137 Licences should only be issued to those personnel who regularly operate airbridges as part of their job function. Licence holders should be subject to regular revalidation to confirm that they remain competent to operate the equipment. The aerodrome operator should also establish an audit system to ensure airbridge operator competency and adherence to standards. Records of airbridge incidents and major faults should also be examined. If responsibility for training and/or testing of airbridge operators has been delegated to a handling agent or a third party, the airport operator should conduct regular audits of the performance and actions of these employers in order to ensure that adequate levels of safety are achieved. Following an accident or incident, airbridge operators should be subject to revalidation on request of the aerodrome operator and it should be possible to suspend an operator's licence pending re-training.

2.138 If a new type of airbridge is introduced, all airbridge licence holders who will be required to operate (or trainers who will be required to give instruction on) the equipment, should undertake training to demonstrate their competency and familiarity with the equipment before being permitted to use it operationally.

Manual handling

2.139 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.

2.140 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:

- A suitable and sufficient risk assessment is made of each task which is considered to present a risk of injury. This should address the task, the load, the working environment and the capabilities of the individuals concerned;
- Action is taken on the results of the assessment, appropriate steps are taken to reduce the risk of injuries from manual handling;
- 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.

2.141 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:

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

b) 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;

c) 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;

d) 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;

e) 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;

f) Ensure that automated systems are properly maintained;

g) Ensure that training is relevant to the tasks that people are undertaking;

h) 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.

Noise

2.142 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.

2.143 Employers, where practicable, should reduce exposure to noise by reducing the noise at source by considering the following:

a) 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;

b) 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;

c) 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;

d) 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;

e) Work associated with cargo holds or other service points near the APU could be undertaken when it is not running;

f) 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.

2.144 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.

2.145 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.

2.146 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.

Work equipment (including machinery)

General

2.147 Fixed equipment provided by an aerodrome operator is to be considered as work equipment under the Provision and Use of Work Equipment (PUWER) 1998 (as amended). 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.

2.148 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:

- Machinery
- Hot or cold surfaces
- Instability (collapsing or overturning)
- Objects or people falling or being ejected from the equipment
- Disintegration, deterioration or malfunctions in the equipment or its controls
- Improper use of the equipment (for example using it for a purpose for which it is not suitable)
- Fire or overheating

2.149 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.

2.150 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).

2.151 The Provision and Use of Work Equipment Regulations 1998 (PUWER), apply to all equipment found on aprons, including belt conveyors, cargo loaders, catering

trucks and baggage tugs. The regulations are supported by an Approved Code of Practice (ACOP) which is available from the HSE.

2.152 In order to protect aircraft and people, all companies at aerodromes should ensure that:

a) Equipment is suitable (i.e. with regard to its initial integrity, the place where it will be used and the purpose for which it will be used);

b) Equipment is maintained in a safe condition;

c) Equipment is inspected to ensure that it is 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 for monitoring serviceability trends.

2.153 Companies should also ensure that the risks created by the use of the equipment are:

a) Eliminated, where possible; or

b) Controlled by:

- taking appropriate 'hardware' measures, e.g. providing suitable guards, protection devices (such as buffers to surfaces which interface with the aircraft), markings and warning devices (such as Emergency Stop buttons); and
- taking appropriate 'software' measures, such as following safe systems of work (e.g. ensuring maintenance is only performed when equipment is shut down) and providing adequate information, instruction and training.

2.154 The measures should be selected on the basis of an assessment of the risks. As part of this assessment, the hierarchy of controls outlined in Chapter 1 should be considered. In many cases, a combination of measures may be necessary. Whatever the combination of measures, stakeholders need to ensure that people using work equipment have received adequate training, instruction and information for the particular equipment.

Mobile work equipment (including vehicles)

2.155 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.

Lifting equipment

2.156 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.

2.157 All lifting equipment and lifting operations (except those done solely by manual effort without assistance from equipment) are subject to the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) as well as PUWER.

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

- strong and stable enough for the particular use and marked to indicate safe working loads;
- positioned and installed to minimise any risks;
- used safely, i.e. the work is planned and organised, and is performed by competent people; and
- subject to ongoing thorough examination and, where appropriate, inspection by competent people. LOLER lays down maximum periods between thorough examinations, depending on the nature and use of the equipment.

2.159 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:

- Catering vehicles, ambulifts and other hi-loaders;
- Aircraft de-icers with a boom assembly;
- Cargo loaders;
- Mobile elevating work platforms (MEWPs, ‘cherry pickers’);
- Lifting platforms on toilet and portable water servicing vehicles and refuelling vehicles;
- Forklift trucks.

2.160 Equipment which is subject to LOLER is also subject to the requirements of PUWER. For example, dangerous parts of machinery which are components of a piece of lifting equipment should be protected.

Hazardous substances and transport of dangerous goods

Substances hazardous to health

2.161 Some substances are defined as hazardous to health. Some of these substances may also damage aircraft, for example, by corroding control surfaces and fuselage. These substances can be toxic, corrosive, irritant or otherwise harmful to health (e.g. biological agents). Further reference to the carriage of dangerous goods may be found on the CAA website.

2.162 Substances can be:

a) Used in a work activity (such as hydraulic oil or cleaning products); or

b) Those that arise or are encountered during a work activity (such as engine exhaust fumes, microbes in aircraft toilet waste, leaks from damaged packages of dangerous goods).

2.163 The Control of Substances Hazardous to Health Regulations 2002 (COSHH) is the main legislation that applies to exposure to such substances. Cargo that is hazardous to health may also be subject to the requirements for the carriage of dangerous goods.

2.164 Companies should assess the risks arising from the work with hazardous substances. This assessment should consider the risk created by the use, handling, or release of the substance. First and foremost, the assessment should show whether exposure to the hazardous substance can be eliminated - for example, could a less hazardous substance be used instead?

2.165 If exposure cannot be prevented then it should be adequately controlled. This could be achieved, for example, by ensuring chemicals cannot splash onto aircraft or people, or that fumes cannot accumulate near to aircraft or people.

2.166 Certain substances used on aircraft, where appropriate, should be approved by the aircraft manufacturer but are still subject to COSHH etc. Any control measures selected must be effective and in some instances it may be necessary to monitor the exposure of people to hazardous substances to ensure that they are not exposed to harmful levels.

2.167 Exposure to substances which emit radiation can cause damage to health. Radiation may cause immediate harm, e.g. radiation burns, or may cause changes in cell DNA, which can eventually lead to cancers.

2.168 The control of risks to health from radiation is subject to the Ionising Radiations Regulations (IRR 2018) and their associated ACOP and to the Radiation Emergency Preparedness and Public Information Regulations 2001 (REPPIR). These regulations lay a number of duties on ‘radiation employers’, who include those who transport or store radioactive substances.

2.169 Companies need to assess the risks from exposure to radiation and to ensure that exposure is restricted. They should also have in place contingency plans. Personnel working with radioactive substances, including those handling radioactive cargo should be competent in order to ensure their safety, the safety of those working with them and the safety of the aircraft.

2.170 Companies may have to appoint Radiation Protection Advisors to give competent advice on the measures needed to protect personnel health and safety. Some radioactive substances may also be toxic or corrosive etc. and may, therefore, also be subject to the COSHH Regulations, as outlined above. Radioactive substances which form part of a cargo consignment may also be subject to the requirements relating to the transport of dangerous goods.

Flammable substances

2.171 As with substances hazardous to health, flammable substances may be used as part of a process (such as aircraft repairs), handled as cargo, or encountered accidentally, for example as the result of a fuel spillage. They may be solid, liquid or gaseous. Fire and explosion are the main hazards associated with these substances. Such events may cause considerable damage to aircraft and injury to people. However, these substances may also be hazardous to health or may damage aircraft in other ways, for example because they are corrosive.

2.172 The risks from work involving flammable substances, including storage and transport, should be assessed. Where possible, the flammable substance should be eliminated, or substituted for a substance which is non-flammable. There may be a balance to be struck between the risks involved, for example, if the proposed substitute carries a greater hazard to health than the flammable substance. Where the substance cannot be eliminated, or substituted, then appropriate precautions need to be in place. Control of the risks of flammable substances can be considered in terms of removing at least one side of the ‘Fire Triangle’.

2.173 This may include a combination of:

- Safe storage, away from sources of ignition, incompatible substances (such as oxidisers) and mechanical damage;
- Adequate ventilation to remove flammable vapours or gases;
- Dispensing and decanting in a way which reduces spills and releases;
- Use of equipment specifically designed for use with flammable substances;
- Good housekeeping to remove flammable residues;
- Adequate procedures and equipment for dealing with emergencies and spillages, including training, information and instruction for personnel.

2.174 The flammable substance which is most likely to be found in the greatest quantity at aerodromes, is aviation fuel. Guidance concerning safety standards and working with aviation fuel is not reproduced within this publication, however, the Code of Safe Practice in the Petroleum Industry Part 7 and HSE Contract Research Report CRR288 “Quantified Risk Assessment of Aircraft Fuelling Operations” may be referred to and, dependant on the type and volume of fuel stored, COMAH regulations may also apply.

2.175 Currently, there is no specific legislation on the use of flammable substances on the apron (although work with flammable substances in aircraft hangars may be subject to the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972). However, the EU has adopted two Directives, Council Directive 98/24/EC “Chemical Agents Directive (CAD)”, and Council Directive 1992/92/EC “Protection of Workers Potentially at Risk from Explosive Atmospheres Directive (ATEX)”. These Directives will apply to all areas of aerodromes. HSE legislation contained within the Dangerous Substances and Explosive Regulations and guidance within CAP 748 (Aviation Fuel at Aerodromes) should be referred to. As well as industry guidance found within Joint Inspection Group (JIG).

2.176 Flammable cargo is also subject to the requirements relating to the transport of dangerous goods, which is covered by the Carriage of Dangerous Goods and Transportable Pressure Equipment Regulations 2009 (as amended) and the Air Navigation (Dangerous Goods) Regulations 2002 (as amended).

2.177 Transport of dangerous goods by air is also subject to the requirements of the ICAO Technical Instructions, which are reflected in the IATA Dangerous Goods Regulations. Further advice on these standards can be obtained from the CAA Dangerous Goods Office.

2.178 Note that compliance with these standards does not necessarily mean that the requirements of UK law covering transport of Dangerous Goods by other modes of transport have been met. However, requirements for the carriage of dangerous goods by road include an exemption permitting the carriage of dangerous goods that are intended for air transport, to or from an aerodrome when not fully meeting the road requirements, providing that the ICAO Technical Instructions have been complied with.

2.179 Similarly, compliance with the standards relating to the transport of Dangerous Goods by air does not guarantee that the requirements of COSHH or IRR 1999 have been met, and vice versa.

Winter operations

2.180 Managers of aerodromes that operate during winter conditions of snow and ice are recommended to agree and publish a comprehensive snow plan.

2.181 During winter conditions additional precautions and arrangements are required, by all those involved with airside operations. Before the winter season starts, safety instructions should be issued to highlight the hazards of winter operations and detail the measures to be taken to mitigate the effects on the apron. The aerodrome snow plan should involve all relevant business partners where required, and it is good practice to arrange briefings for the managers and personnel of user airlines/companies on working and operating in winter conditions.

2.182 The aerodrome operator should establish that airlines and handling agents have arrangements to cover inclement weather including frost and snow.

2.183 Airlines and operators should take special care to avoid spillages of water on aprons during freezing conditions and the washing of vehicles/equipment and the flushing of tanks, except into containers, should be prohibited in all airside areas.

2.184 As part of the aerodrome snow plan, airlines and operators should be urged to undertake self-help measures to help clear and de-ice equipment and vehicle parking areas and to remove their equipment from such areas to enable clearance/de-icing to be completed. Handlers should assist in this process, for example by towing-off stand static aircraft when requested, to enable stand clearance/de-icing to be completed.

Low visibility procedures (LVP)

2.185 Aerodrome operators will have in place comprehensive arrangements and rules to safeguard low visibility operations on the manoeuvring area and these issues are not discussed in detail here.

2.186 When LVPs are in force, there is an impact upon apron operations and there is a requirement for ramp personnel to be aware of the implications for taxiway operations and to comply with any requirements and limitations that are notified.

2.187 When visibility is reduced, personnel must be aware of the additional safety requirements to maintain safe operations. All users should make themselves aware of the additional restrictions that are required in low visibilities. These may include escorts for vehicles normally allowed to operate on the manoeuvring area, warning signs should be placed at airside access points and safeguarding barriers on airside roads as required.

2.188 During periods of low visibility, vehicles should be operated with dipped headlights, and where fitted, fog lights should be illuminated. Drivers should proceed with extreme caution, and vehicle obstruction lights should be switched on. Personnel should be alert to the sudden appearance of an aircraft entering a stand and be prepared to give way accordingly.

Electrical storms

2.189 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.

2.190 PUWER (1998) requires that 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.

2.191 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.

2.192 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 a 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.

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

Strong winds

2.194 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:

a) engine ingestion

b) airframe damage to aircraft on stands, taxiways and runways

c) severity of the hazard of obstruction of a runway to an aircraft taking off

d) danger of personal injury for apron personnel and damage to vehicles and equipment.

e) Some airbridges may have operational limits during periods of strong winds which should be understood and adhered to.

f) Maximum wind limits for the operation of aircraft doors should be published and familiar to ground handling organisations.

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

2.196 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.

2.197 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 windmilling propellers and rotors are feathered and/or secured.

Slips and trips

2.198 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.

2.199 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.

Movement area inspections

2.200 **The requirement for inspections and maintenance of airfield facilities is implicit in the aerodrome certification/licensing process and associated legislation**. 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.

2.201 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.

Electrical hazards

2.202 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.

2.203 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.

2.204 Of particular note is the use of FEGP and GPU's. Many FEGP/GPU's 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.

2.205 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.

2.206 Where contractors are to be used to undertake electrical work, they should be subject to the assessment, control and monitoring arrangements outlined in Chapter 1.

Faults and defects

2.207 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.

2.208 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.

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

2.210 For faults where a hazard to aircraft existed or was potentially possible, an Mandatory Occurrence Report should be submitted. Further details regarding the reporting of occurrences can be found on the CAA website at http://www.caa.co.uk/mor

2.211 Some faults may also be serious enough to require reporting to the HSE even if they also qualify as an MOR.

2.212 In England, Scotland and Wales, reports submitted under RIDDOR or via company reporting procedures should be made via the HSE website http://www.hse.gov.uk/riddor/ and for Northern Ireland via http://www.hseni.gov.uk/contact-us/report-an-incident.htm

2.213 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.

Chapter 3

Aircraft turnaround

Introduction

3.1 The aircraft turnround phase is a potentially hazardous activity on the apron requiring high levels of awareness, diligence, adherence to safe practice and coordination between people from various organisations working in close proximity to moving aircraft, vehicles and equipment. The hazards associated with aircraft turnround may be affected by time pressures, environmental factors (such as noise and weather) apron design constraints and the adequacy of apron/task lighting and ultimately human factors.

3.2 This chapter discusses the generic turnround process and provides guidance to assist management and personnel working airside when either developing their plans for aircraft turnround policies, practices and procedures or during initial or ongoing, refresher training.

3.3 Whilst recognising the complexities and sensitivities in both the provision of respective ground handling manual's and aircraft turnround plans, the generic responsibilities and accountabilities of aircraft turnround guidance described in this document seek to reflect 'good practice', accepting that further, supplementary or alternative guidance on aircraft turnround and airside safety from various other sources, may be used, adopted or referenced.

3.4 The guidance in this chapter seeks to provide a common framework for employers and personnel involved with the turnround of aircraft.

3.5 The responsibility upon all parties to conduct the turnround procedure safely is enshrined in HSWA. Effective safety management within the turnround procedure should not only reduce the number of accidents and incidents but also improve efficiencies which may serve to benefit 'on time performance'.

3.6 The aerodrome operator/certificate or licence holder is typically best placed to develop co-operation and co-ordination on an airport-wide basis but this can only be achieved with the active involvement of everyone involved in the turnaround process. Airlines should equally ensure that their contracted ground service providers both co-operate and co-ordinate their activities accordingly. This may be achieved in several ways, such as:

- taking part in forums for co-operation and co-ordination at the airport or aerodrome, such as the Airside Safety Committee or other;

- ensuring mutual co-operation, communication and coordination with parties when working around the aircraft;
- monitoring and auditing adherence to aerodrome rules, 'by-laws' and other agreed operational and safety instructions;
- monitor and audit to ensure safe and considerate use of vehicle driving standards and parking and safe use of equipment and parking areas - particularly at the head of the stand and in-between taxilanes and other airside roads;
- ensuring that when developing procedures, they take into account the recommendations of the aircraft manufacturer concerning turnround and servicing guidance.

The turnaround plan

3.7 An aircraft turnround plan needs to be in place and agreed by all relevant parties. The plan should describe the activities involved during the aircraft turnround process and what should be considered at each stage. The plan should describe how the turnround will be carried out which enables all associated personnel to carry out their tasks safely and without endangering others. The airline operating company and ground handling service provider is responsible for ensuring that risk assessments for all activities are in place.

Co-ordination of the turnaround

3.8 In accordance with company operating procedures, the relevant or designated responsible person should be appointed to oversee the turnround activity to ensure that safe practices of work (as detailed in the company's turnround plan) are adhered to. This person should be in control of the turnround and empowered to stop the work activities where it is deemed safety is at risk. The responsible person should be clearly identifiable to others involved in the turnround process.

3.9 Regardless of whether an aircraft turnround coordinator has been appointed it is essential that all other stakeholders be empowered and confident to intervene, escalate where safety is at risk and report occurrences during the turnround procedure, in accordance with their stated company procedures and training and general safety awareness.

Turnaround process

3.10 Additional to generic planning for the operation, the turnround may be divided into separate phases, exampled below:

a) Pre-stand arrival;

b) Aircraft arrival on stand;

c) Aircraft on stand;

d) Aircraft stand departure;

e) Post-aircraft stand departure.

Pre-stand arrival

3.11 Immediately prior to aircraft arrival on stand, a procedure should be in place to ensure the following:

a) Turnround plan confirmed by Turnround Co-ordinator and any deviations are communicated;

b) All safety and security procedures are in place;

c) Communication of any special loads, dangerous goods and any procedures which must be followed in relation to those;

d) During periods of low visibility and/or the hours of darkness, ensure the parking stand/apron area is sufficiently illuminated;

e) The Turnround Co-ordinator or other personnel, as determined should consider adverse weather conditions when planning the turnround, ensuring the safety of passengers, personnel and the aircraft. Weather conditions should also be considered with regard to unloading of items such as animals and dangerous goods;

f) Visual inspections of the stand to remove FOD and report spillages or obstructions;

g) Confirm stand equipment availability (e.g. chocks, cones, Passenger Inbound Guidance, or ‘PASSENGER INTEGRATED GUIDANCE SYSTEMS’);

h) Check sufficient access; no trip, slip or fall hazards;

i) Ensuring all equipment is parked within vehicle parking bays, or as otherwise directed by the airport operator;

j) Ensure correct positioning and serviceability of airbridge or other passenger embarkation/disembarkation equipment.

k) As determined, a person near the VDGS emergency stop button to manage aircraft arrival;

l) When stand is clear activate VDGS, if available. Where a VDGS is not available marshalling assistance should be sought.

Aircraft arrival on stand

3.12 The following sequence typically demonstrates the safe arrival of aircraft;

a) Where VDGS is available, nominated person(s) should be in position to activate the VDGS emergency stop buttons.

b) The emergency stop button must not be used to stop aircraft on the nose wheel mark;

c) Use of aircraft marshalling hand signals where appropriate for initial communication with the aircraft commander;

Once indication has been provided by the aircraft commander that engines are off and anti-collision beacons extinguished:

d) Nominated person to chock aircraft;

e) Nominated person to connect Ground Power Unit (GPU or FEGP) if available, or requested;

f) Authorised person to communicate with flight deck crew, either through hand-signals, or on a headset;

g) When the aircraft is in a safe condition to approach (usually this means engines have shut down and the anti-collision lights are off)[2] and chocks are in place, the aircraft can be approached and coned as required. Some airlines may require permission to be given by engineers or other ground personnel to confirm it is safe to approach, particularly in the case of propeller aircraft or helicopters;

Aircraft on stand

3.13 Once the aircraft is parked on the stand, with its engines and anti-collision lights off and chocks in place, unloading and servicing can proceed as detailed in the off-load below. Not all events will occur in the same sequence and some may occur concurrently. There may also be some variations dependent on type of aircraft and the length of the turnround period. This stage is often carried out over a very short time scale and coupled with increased vehicle activity around

[2] For the purpose of connecting ground power to the aircraft, it is recognised and an accepted practice at some airports, for aircraft operators and their appointed ground service providers (GSPs) to require a procedure during the turnaround phase whereby a ground handler may approach the aircraft during taxi onto stand whilst the aircraft engines are still running and the anti-collision lights are illuminated. The CAA via the Ground Handling Operations Safety Team together with stakeholders have developed specific subject matter guidance, safety assessment and a related 'Bowtie risk model' to describe the practice in more detail, reflecting what might be considered an operational templateVIP to be followed.

the aircraft and passenger movement leads to an inherently hazardous environment.

3.14 There are three elements listed here:

a) Offload

b) Servicing

c) Onload

Offload process

3.15 The first action should be to perform a walkround inspection to check for any damage, this should be performed before any ground service equipment approaches the aircraft. The following tasks should be completed:

a) Ensuring equipment is in the correct and safe position with serviceability of brakes checked on equipment prior to positioning on the aircraft;

b) Check that the offload and emergency routes are available for passengers, and that all safety measures are in place including 'Passenger Integrated Guidance Systems';[3]

c) Positioning of rear and front steps where applicable;

d) Communications with crew for readiness to proceed with disembarkation;

e) Aircraft passenger doors opened;

f) Information passed to airline representative regarding disembarkation;

g) Appropriate control measures utilised when manoeuvring vehicles (e.g. the use of banksman);

h) Re-assess plan in respect to any unplanned changes;

i) Check the inbound loading for errors;

j) Co-ordinate offloading needs, the following items should be considered:

   a. People:

      i. PRM aids, hi-lifts, ambulance dispatched first;

      ii. Very Important Persons (VIPs), Unaccompanied Minors (UMNRS/UMs);

      iii. Monitored safe exit of passengers to bus or terminal, marshalling passengers to ensure they remain within the designated safe areas;

[3] Passenger Inward Guidance Systems

iv. Crew issued with local instructions.

b. Animals:

i. Quarantine procedures in force;

ii. Appropriate unloading, cages/containers;

iii. Hazardous material awareness.

c. Baggage, cargo and mail:

i. Positioning of equipment correctly;

ii. Aircraft hold doors opened according to safe system of work;

iii. Order of work scheduling followed, taking sequential unloading into consideration to avoid the risk of tipping;

iv. Offload of any Dangerous Goods following procedures laid out in the IATA Dangerous Goods Guidance;

v. Offloading bags/cargo/mail/valuable goods complete;

vi. Inspect and confirmation that all aircraft hold(s) are empty (repatriation of mobility aids with Persons of Reduced Mobility (PRM).

Onload process

a) Perform a visual inspection of aircraft for damage

b) Reposition of equipment as required;

c) Loading Instruction Report prepared and passed to person supervising the aircraft loading people;

d) Re-check aircraft hold(s) are empty (where applicable);

e) Co-ordinate loading;

f) Refuelling/Defuelling - emergency procedures for aircraft evacuation need to be adjusted during fuelling/defuelling process, a clear line of communication needs to be established during this process between the fueller and the aircraft crew.

Aircraft departure

3.16 For the purposes of this guidance the departure starts from checks of security of dead loads and nets (if applicable) or doors closing.

a) Check dead loads secure and net sections are in place and tensioned;

b) Closure of aircraft doors;

c) Check hatches and latches are all secure;

d) Check the stand is clear of FOD and obstructions;

e) Steps removed and equipment (including cones and chocks) parked or positioned safely (banksman used if required);

f) Chocks removed from nose and main gears;

g) Arrange aircraft de-icing if necessary when stand is clear, according to local arrangements;

h) Pushback should not start until:

i. Communication has been established between ground crew and the flight deck;

ii. Ground crew have completed an inspection of the aircraft as per the airline requirements;

iii. All vehicles and equipment have been withdrawn to the equipment areas and the path for the aircraft pushback is clear of obstructions;

iv. Aircraft anti-collision lights are on;

v. The aircraft commander has confirmed that clearance to pushback has been received from ATC; Pushback clearance and any special instruction should be heard and confirmed by the tug driver and head-set operator;

vi. ground crew should monitor the relevant frequency's in accordance with local procedures;

vii. Until all conditions of the pushback conditional clearance have been met.

viii. From a safe position, visible to the flight deck, signal the aircraft commander that all equipment and personnel are clear, and by-pass pin removed. The by-pass pin should be held aloft for the pilot(s) to see. When pilots are unfamiliar with local procedures at that aerodrome, they should be briefed by the headset operator in advance of how many personnel to expect, for example if ground personnel are in training.

ix. Where local procedures dictate, wing-walkers should be provided.

Post-aircraft stand departure

3.17 The items below should be checked at this stage:

a) That a walking inspection is undertaken to check that the stand is clear of obstructions, FOD and surface contamination;

b) That all equipment has been shut down and correctly parked or stored;

c) That any safety management shortfalls or near misses (e.g. fuel spills, trips, slips) are reported through applicable reporting systems.

APPENDIX A.3 – THE APPLICATION OF GROUND POWER TO LIVE AIRCRAFT

Introduction

For the purpose of attaching ground power to aircraft, whether for an inoperative Auxiliary Power Unit (APU) or a standard arrival, it is recognised and an accepted practice at some airports, that aircraft operators and ground service providers require a process during the arrival phase of the aircraft turnaround, whereby ground handling personnel need to approach an aircraft whilst the engines are still running and the anti-collision lights are still illuminated, which hitherto is considered a non-standard process, with safety concerns.

The CAA, via the Ground Handling Operations Safety Team (GHOST), has addressed this issue and jointly developed guidance material and procedures in accordance with regulatory obligations and industry best practices. The information and discussions in this appendix should form the basis of any related risk-based conversation safety assessment or bow-tie exercise.

Background

The Health and Safety Executive (HSE) set out their position on the subject matter in an open letter to industry in 2011, after an incident in 2010 at Edinburgh Airport. A prohibition notice was subsequently served on the ground handling organisation to “prevent persons approaching aircraft with engines running and anti-collision lights illuminated” which made it clear that health and safety management systems required additional mitigation to protect workers on the ground”.

GHOST sub-group

A sub-group of GHOST comprising representative members from industry and regulators reviewed this practice and identified a number of widespread concerns, namely:

- Inadequate stakeholder engagement;
- Lack of industry standardisation;
- Unfamiliarity with procedures;
- Inconsistent prior notification;
- Inadequate compliance monitoring.

Inadequate Stakeholder Engagement

Generally, ground service providers were not consulted during the formation and agreement of airline risk assessments and were merely instructed to adopt the procedure in accordance with agreed handling contracts. Evidence suggested that some risk

assessments were being completed without involvement of the airport/ aerodrome operator and without consideration to human factors/performance or coordination with other organisations that operate on the ramp.

Lack of Industry Standardisation

As with many activities in the aviation ground handling community, different organisations have determined different ways of conducting the same process. The CAA believes this lack of standardisation and associated ambiguity has potential to lead to confusion to what is a safety critical task.

Unfamiliarity with Procedures

Unfamiliarity with any procedure may result in very different and undesirable outcomes:

- Unfamiliarity with a routine procedure often dilutes the safety critical nature of the task and gives rise to complacency;
- The lack of familiarity with a procedure may result in a reduced level of safety for all involved in the process;
- Whereas total awareness of an 'unusual' situation may provide all participants involved, with a heightened level of awareness.

Inconsistent Prior Notification

In the case of an inoperative APU, there are currently various methods of communicating the need for ground power on arrival but it is recognised and evidenced that none are considered particularly robust.

If an APU unexpectedly fails before aircraft arrival, prior notification may not be possible and therefore the receiving ramp team will not be able to properly plan and prepare. This scenario emphasises the importance for use of clear and robust standardised hand signals and communications between the flight deck and ground crews whenever ground power is required upon arrival.

Inadequate Compliance Monitoring

'Practical drift' as defined in ICAO Doc 9859 (Safety Management Manual) occurs when the baseline performance of any system drifts from its original design and when the organisation's processes and procedures cannot anticipate all situations that may arise in daily operations.

Effective management and supervision of any safety critical activity is imperative, so the agreed process must be included with all stakeholder's compliance monitoring programmes. Whilst a desktop review of the risk assessment and procedures must be periodically conducted, it is essential to observe the actual process in all weathers and visibilities, day or night.

Procedural Principles

As a minimum, the following safety critical elements should be incorporated within any related policy and procedure. Persons not responsible for aircraft chocking and ground power actions should not approach the aircraft until this process has been fully completed:

1) All Ground Support Equipment (GSE) and personnel must be positioned clear of the aircraft path, outside the Equipment Restraint Area (ERA) (IGOM 4.9.1)
2) After the aircraft has come to a complete stop, receive confirmation from the flight crew that the parking brakes have been set (SERA 923/2012 Section 4 - Marshalling Signals)
3) Respond to the flight crew before positioning chocks at the nose landing gear wheels. This is the first action to take place around the aircraft, and shall be completed before any other activity (IGOM 4.7.1)
4) Position and connect the ground power to enable the flight crew to shut down the engine(s) (IGOM 4.9.3.1)
5) Only when the engine(s) have spooled down and the anti-collision lights have been switched off, is it safe for ground service providers to approach the aircraft and commence servicing tasks. (IGOM 4.9.1).

Summary

In a factory environment, physical barriers can be placed in the form of safety nets or shields to deal with close proximities and/or abnormal situations, such barriers do not exist when working in close proximity to live aircraft engines. Due to the severity of the potential consequence, the robustness of mitigations and strict adherence to agreed procedures is vital. Therefore, using Safety Management System principles and duty of care obligations, aerodrome operators, airline operators and ground handling service providers must ensure that the policies and procedures relating to this activity are widely promulgated and understood by all relevant parties, that include flight crews, handling staff and all other personnel working or intending to work on or around the aircraft

Actions

In consideration of the above, respective stakeholders should conduct a review of their operational policies and procedures that ensure:

- All stakeholders are involved in the evaluation of the specific activity and work together to ensure that all associated risks are identified and managed to an acceptable level;
- Related procedures, documents and training plans are fully and regularly reviewed for detail and accuracy;
- Specifically check that all Flight and Ground Operations Manuals align;
- Related supervision and monitoring activities are in place that ensure that this subject is appropriately checked for performance and compliance;

- Personnel, working within a just culture, understand the importance of reporting related incidents and concerns, including near misses, and;
- Work together during the subsequent investigations, to understand why they occurred and build the lessons learned into procedural reviews and future training.

Chapter 4

Operation of vehicles

Introduction

4.1 This Chapter supplements CAP 790 (Requirement for an Airside Driving Permit (ADP) Scheme and gives guidance and recommends standards to be set by aerodrome operators and airside contractors and operators for drivers and vehicles operating airside. It includes references on driver qualification and testing and on vehicle standards.

4.2 Every vehicle operating in airside areas should have an individual Airside Vehicle Permit (AVP). These should be conspicuously displayed in the vehicle and be visible to a person standing on the ground at all times when the vehicle is operating airside.

4.3 The aerodrome operator should establish and promulgate its own local minimum standards for vehicles operating in airside areas. These standards should ensure that each vehicle is fit for its intended purpose and that its condition is such that it will not endanger vehicle users, other vehicles, pedestrians, aircraft or property. Airside vehicle permits should not be issued to any vehicle which cannot meet the specified standards.

4.4 Before a permit is issued a vehicle should be inspected by a competent person. Periodic inspections should be conducted thereafter to ensure that it continues to meet the minimum standards. An inspection should also be conducted if information or reports indicate that a particular vehicle may not be meeting the specified standards.

4.5 All vehicles should normally be required to meet the requirements appropriate for the grant of a Department for Transport Test Certificate, where applicable. All vehicles and specialist equipment such as cargo loaders, belt conveyors and baggage trucks must also comply with The Provision and Use of Work Equipment Regulations 1998 (PUWER) and where applicable The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

4.6 The AVP displayed on a vehicle must include a clear identification and details of any limitations imposed. Additionally, vehicles should be readily identifiable by their livery or by the prominent display of the vehicle operator's name.

4.7 The aerodrome operator must ensure operators are aware of requirements for the maximum height, width and length of vehicles for airside operations or for operation within specific areas.

4.8 Because of the potential for serious damage to aircraft and their engine caused by foreign objects it is essential that all practical steps are taken to minimise the risk of such damage from vehicle operations.

4.9 Vehicles holding AVPs must be equipped with flashing yellow obstruction lights which meet the specification as per EASA ADR.OPS.B.080 (Marking and lighting of vehicles and other mobile objects). Where practicable trailers operating should display red rear lights, or be fitted with conspicuous retroreflective markings.

Traffic rules

General

4.10 The aerodrome operator should determine speed limits applicable to the airside area. Different limits may be applied to sections of roadway subject to local conditions. This information should be published and signs displayed as appropriate.

4.11 On the airside road system vehicles should always keep to the left when passing an approaching vehicle, particularly to avoid confusion where there are no road markings. On apron areas different rules may be promulgated.

4.12 In order to prevent risks such as overheating and consequent fire in the vicinity of aircraft, and uncontrolled or unauthorised vehicle movement areas, vehicles should not be left unattended anywhere on the airside area with the engine running, unless specific procedures are in place to address the risks.

4.13 To reduce the risk of personal injury and to ensure that no object is dropped on the apron or manoeuvring area, all doors and shutters on vehicles should be closed while the vehicle is moving. All loads and equipment, and all parts of the vehicle must be properly secured before a vehicle enters the apron or manoeuvring area.

4.14 Obstruction lights should be displayed at all times by vehicles operating on the manoeuvring area. Unless there are specific instructions to the contrary, dipped headlights should always be used in conditions of darkness and reduced visibility.

4.15 All parking restrictions should be strictly observed.

4.16 Vehicle drivers should follow designated routes, giving way, where appropriate, to routes provided for pedestrians and aircraft.

4.17 Vehicles should not be driven across aircraft stands, unless they are directly involved in the operation of the aircraft using or about to use the stand.

4.18 Vehicles must give way to aircraft at all times.

4.19 When aircraft engines are running, vehicle drivers must ensure that they stay well clear of areas behind the aircraft where slipstream and jet efflux may cause damage or danger to the vehicle or its occupants. The minimum safe distance should be determined (usually by the aerodrome operator) and promulgated to all vehicle drivers.

4.20 Vehicles should not be driven in reverse on the manoeuvring area or apron unless directly engaged in aircraft manoeuvring or servicing, or during parking positioning. When reverse movement is essential, guidance should be provided to the driver by a competent and trained person outside the vehicle (banksman) or by other means as determined by local procedure. The fitting of reversing alarms and CCTV cameras should be considered as part of risk management of reversing operations.

Control of vehicles

4.21 Control of vehicles on the manoeuvring area is normally the responsibility of Air Traffic Control. On apron areas, control of taxiing aircraft and aircraft under tow is the responsibility of Air Traffic Control but the control of vehicles is subject to rules and instructions issued by the aerodrome operator.

4.22 Irrespective of any clearance or instruction issued by Air Traffic Control, drivers of vehicles and of vehicles towing aircraft are responsible for ensuring that their vehicle (and any part under tow) does not collide with any other vehicle, aircraft, building or obstruction.

4.23 Where signs are displayed at airside area entry points, and at crossing points they should provide adequate information to drivers about the procedures to be followed for movement into and within the airside area. Where provided, signs should describe any relevant control methods, such as traffic lights or signal lamps. Uncontrolled crossings should be clearly marked as such, and the conditions of use displayed. Particular attention should be given to the need for the clear statement of prohibition of entry to airside areas by unauthorised pedestrians.

Radiotelephony (RTF) equipment and portable electronic devices

4.24 When operating on certain parts of the airport it will be necessary to use radiotelephony equipment. This may introduce additional risks whilst driving and vehicle operators must ensure that the use of such equipment does not distract the driver from the primary task of driving the vehicle.

4.25 Drivers of vehicles requiring to cross or enter active runways **must** be in two-way communication with Air Traffic. Drivers of vehicles entering or crossing active taxiways, except at designated uncontrolled taxiway crossing points, should

normally be in two-way communication with Air Traffic Control and **must** comply with any clearances and instructions issued to them.

4.26 With regard to other vehicles, the aerodrome operator should decide the basis on which RTF equipment is provided and used. In some cases a listening watch may be required of vehicles on certain parts of the movement area. In other cases vehicles may be required only to carry RTF equipment to satisfy the need of the company operator. The procedures for use of RTF equipment must be clearly promulgated by the aerodrome operator.

4.27 Users of RTF equipment who communicate with Air Traffic Control or transmit on any frequency used by aircraft should comply with the applicable requirements.

4.28 The aerodrome operator should establish a system of allocating RTF callsigns to be used by vehicles so that the potential for confusion between vehicles and, where relevant, between vehicles and aircraft, is minimised. This is particularly important at aerodromes where the RTF frequency used by vehicles is the same as that used by aircraft or where the RTF frequency used by vehicles is re-broadcast on the RTF frequency used by aircraft.

4.29 In the wider interests of safety it is recommended that Air Traffic Control is made aware of certain radio facilities being used on the airport, whether or not these facilities are used for communication with Air Traffic Control.

Vehicle accident reporting procedures

4.30 Every aerodrome operator should publish rules for the reporting of accidents and incidents involving vehicles and people operating on the airside environment.

4.31 If a person has been injured, there may be legislative requirements (under RIDDOR, for example) for the injury to be reported to the relevant health and safety enforcing operator. At most airports this will be the local office of the Health and Safety Executive, although at some airports, it may be the Environmental Health Office of the local Operator or Council.

4.32 If a vehicle is involved with an aircraft then the AAIB may need to be informed/reported to.

Monitoring of standards

4.33 The aerodrome operator should establish procedures for the monitoring and assessment of airside vehicle operating standards.

Inspections

4.34 Vehicle operators should ensure that persons carrying out safety inspections are appropriately trained and technically competent on the complexity and type of vehicle being inspected. Therefore, evidence of individual competencies should

be made available, if requested by the airport operator or other agency during audit.

Facilities for inspections

4.35 All vehicle/equipment operators and their maintenance providers should have facilities commensurate with the type and size of vehicle and equipment it operates and maintains and should be able to demonstrate compliance with the appropriate airport operator and Department for Transport (DfT) standards.

Records

4.36 Vehicles and equipment should have individual records including maintenance and fault history records.

Daily inspections

4.37 It is important that all vehicle owners and operators ensure their drivers and other personnel are aware of the airport operator's requirements for vehicle maintenance and standards.

4.38 Routine daily inspections of vehicles and equipment should be the responsibility of vehicle owners and operators. It is therefore the responsibility of vehicle operators to ensure checks are carried out and any defects recorded and corrected. Walk round checks should include the whole vehicle including any combination of trailers or dollies. It is also important that a 'nil', or 'no faults/defects found' entry is included in the recording system. This inspection must be recorded and the driver completing the inspection should sign/initial the inspection document.

4.39 Vehicle defects should be recorded and reported to a competent person who has the authority to ensure that appropriate action is taken to rectify any defects found. As determined by local policies, vehicles or equipment found to be unserviceable may be required to be removed from the airside environment by the operator until maintenance work has been completed to the required vehicle and equipment standards for operating airside.

4.40 Vehicles and equipment deemed to be in a dangerous condition by having a safety defect may be issued with a 'removal or prohibition notice' and the local airside vehicle permit withdrawn, in accordance with local airport operator instructions and policies.

4.41 Conventional road vehicles that have been modified for airport use should still comply with the standards contained in the Department for Transport Construction and Use Regulations, irrespective of whether the vehicle is being used on public roads or not. Operators of non-conventional vehicles should ensure that the appropriate and relevant paperwork is held, covering change of use notifications and the relevant insurance and modification certification.

4.42 The aerodrome operator should establish procedures for the monitoring and assessment of airside vehicle operating standards.

Performance management

4.43 The aerodrome operator should publish any penalties it has established for non-compliance with the rules and instructions for the use of vehicles on the airside. These may include temporary or permanent exclusion from the airside area of individuals, particular vehicles, or group of vehicle controlled by a specified vehicle operator.

Chapter 5

Apron design

Introduction

5.1 The internationally recognised definition of an aircraft stand is '*A designated area on an apron intended to be used for parking aircraft*.' The interpretation of the definition has driven the generally accepted design seen today at most aerodromes. Most designs provide a clearance area off each wing tip to the adjacent clearway and areas at the head and rear of the stand to enable vehicles to service. These areas can differ in distance from aerodrome to aerodrome.

5.2 There are a number of sources of guidance discussing Apron design, such as the Airports Council International's Apron Markings and Signs Handbook and the ICAO Aerodrome Design Manual (Doc 9157).

Physical characteristics

5.3 A stand is a 'box' of designated apron space intended to be used for the parking and turn-round servicing of an aircraft, and individual or groups of stands should have a design maximum size of aircraft to be served. The boundaries of a stand are:

- Front: boundary with the head of stand road, equipment area or building line;
- Rear: boundary with the rear-of stand road or taxilane /taxiway strip;
- Sides: 1 metre measured laterally from the wingtip of the largest span aircraft.

5.4 Stand design should allow minimum 'buffer/safety' clearances around the extremities of the largest aircraft type expected to use the stand.

Stand sizes and clearances

5.5 Stand sizes depend on the clearances to be provided and on the aircraft manoeuvre to be adopted. Aircraft either self manoeuvre, where the aircraft swings round under its own power either before or after stopping, or nose-in/push-back, where the aircraft has to be pushed back out of the stand by a specialist vehicle. The former may create blast problems and requires, roughly, 50% more apron area per aircraft, while the latter requires investment in specialist vehicles and in the training of ground crews.

5.6 The clearance between a moving aircraft on a stand and any obstruction should be a minimum of 20% of the wingspan. For nose-in/push-back stands this may be reduced to 4.5m where a Visual Docking Guidance System (VDGS) is

provided. However, greater clearances than this may be required to facilitate the movement of servicing vehicles around an aircraft while it is parked. These clearances apply to aircraft once they have crossed the double white lines marking the dividing line between taxiway and apron. Full taxiway or taxilane clearances are required on the taxiway side of the double white line.

5.7 Aircraft stands should be sized in accordance with the length and wingspan of the types of aircraft for which the stand is intended, both now and in the future. Where possible, aircraft specific stands should be specified by category and maximum permissible aircraft size. Guidance for the dimensions required is given below.

Stand length

5.8 The length of the stand should be sufficient to accommodate the longest aircraft, plus:

- For smaller aircraft types (code letters A-C) a minimum of 7.5 metres from the nose (not the nose-gear) of the aircraft to a head-of-stand road, building, equipment area, or other obstacle directly in front of the aircraft;
- For larger aircraft types (code letters D-F) a distance of up to 12 metres to allow for manoeuvring of the larger tugs used on these types, and will be dependant to an extent on the nose-to-nose gear dimensions applicable to various types.

5.9 Normally, as minimum, a 4 metre buffer from the rearmost part of the aircraft to the rear-of-stand road or taxiway / taxi-lane strip is required. The purpose of this clearance is to enable vehicles to move around the rear of the aircraft or to position at the tail of the parked aircraft without infringing the rear of stand roadway or taxilane strip.

5.10 Other aircraft specific stand sizes can be considered on a project basis but it is recommended that stands have flexibility for future changes. As a general principle (unless risk assessment determines otherwise) a stand length equals the maximum aircraft length, plus 12 m, and the stand width equals the maximum aircraft width plus 2 m. These distances may be reduced where, for example, head of stand roads are provided, as long as the overall adequate space is made available for vehicles to manoeuvre is maintained.

5.11 In exceptional circumstances, subject to favourable result from a risk assessment a 1 m clearance may be used where interstand clearways and head of stand roads have sufficient width and height clearance so that vehicles unable to pass safely beneath the tail of the aircraft can access the other side of the aircraft. A stand which is a designated aircraft wash-down stand must allow room for vehicles to pass behind the aircraft.

Stand width

5.12 For single centreline stands the width of the stand should be the wingspan of the largest aircraft, plus a 1 metre buffer to the interstand clearway (ISC) at either side, to ensure wingtip safety from passing vehicles and to allow for a parking error - allowance for aircraft parking accuracy is normally 0.6m to left, right, forward and aft (may be only 0.3m fore and aft for stands with “noseloader” airbridges), but for design purposes the clearance from a wingtip to an interstand clearway should be increased to a minimum of 1.0m to allow additionally for vehicle overhang.

5.13 If an ISC is not provided, a 4.5 metre buffer from an adjacent airside road is required in order to allow traffic to continue using the road whilst the aircraft manoeuvres alongside, and also to provide suitable safety clearance for the parked wingtip from traffic travelling at normal road speed.

5.14 Many of the servicing activities required during the aircraft turnround take place on the starboard side of the aircraft, with this side being busier and potentially more congested. To alleviate this, some aerodromes have redesigned or re-marked the stands to provide additional space on the starboard side in order to create additional working space as well as giving more room in which vehicles or equipment may wait until they are used in the turnround. By doing this the stand centreline may be is offset.

Inter-stand clearway

5.15 Each stand, or group of sub-divided multiple-centrelines, should be separated by an inter-stand clearway (ISC). An inter-stand clearway is a road down the side of a nose-in/push-back stand, the purpose of which is to provide a clearly delineated zone between the wingtips of aircraft parked on adjacent stands and to provide clear access for vehicles involved in aircraft turn-round to travel from the front to the rear of the aircraft.

5.16 It is recommended that ISC’s be a minimum of 7 m wide, however, this may be reduced after examination of the types and sizes of the vehicles likely to use it. The ISC is single lane and is not intended to be part of the airside road system for general traffic movement. Vehicles must never be left or parked unattended in an ISC because it also allows for access by emergency vehicles and may provide emergency egress for vehicles involved in the refuelling of aircraft. In addition, waiting restrictions may also be applied to sections of the clearway.

5.17 Where a road at the side of a stand is also used by vehicles to reach other destinations, then it is not classified as an inter-stand clearway, but as a general airside road and the appropriate clearances in should be provided between the wingtip and the road edge marking.

Multi-aircraft aprons

5.18 Flexibility for changing aircraft size can be accommodated by adopting Multi Aircraft Ramp System (MARS) stands or a Multi-Choice Apron (MCA) concept.

5.19 MARS stands allow either two smaller aircraft, or one larger aircraft to be parked on the same stand. Clearances will be as described above, except that it is recommended that the clearance between the wingtips of the two smaller aircraft as one passes the other, be no less than a minimum of 7 m. Guidance for vehicles to pass safely between the wingtips of the two smaller aircraft on MARS stands may be indicated by “MARS- Bars” ground markings.

5.20 A Multi-Choice Apron (MCA) is a defined area of pavement accepting more complex combinations of aircraft than MARS (for example: three smaller aircraft or two larger ones). Clearances around the edges of the MCA will be as described above.

5.21 Normally wingtip guidance lines (e.g. Mars Bars) are not provided within the MCA as these have been proven difficult to provide in an unambiguous way. The major advantage of aprons using MCA layouts is the flexibility provided to meet different aircraft mix requirements at different times.

Self-manoeuvring stands

5.22 Safety clearances to the sides of the stand, and to the rear (in this case the nose of the aircraft) are the same as for. Safety clearances around self-manoeuvring stands will need to be increased from those used for nose-in/push-back stands to take account of jet blast. There may also be requirements for jet blast protection, which may include blast diffuser screens and/or an area clear of equipment, roadways, buildings and activity.

Access roads

5.23 Stands should wherever possible have a head of stand road, used not only to access the stand but also to provide a route for traffic to move around the terminal area. Where this is not possible, tail of stand road may be provided but this must lie entirely outside both the taxilane strip and beyond the rear of stand buffer. The minimum width for a two-way road is 7.5 metres but this should be increased to 10 metres where large hi-loaders and freight dollies are expected to use the road.

5.24 Normally, a head of stand road is preferable to a tail of stand road because, on the latter, traffic would be held up as an aircraft enters or is pushed back from the stand, and at least one additional member of personnel is normally required in the push back ground handling team to check that traffic has stopped. The main exception is at small airports where the passenger handling is at ground level resulting in a tail of stand road being the lesser of two evils, as strings of

passengers going to and from the aircraft can hold up traffic on a head of stand road.

5.25 A reserved area should be located at the head of each stand for the push-back tug. Width should be a minimum of 6m for small and medium stands and minimum of 7.5m for Large Stands and above, equally disposed about the stand centreline. Access from the head of stand airside road should not be restricted by building columns, particularly where the head of stand road is one way providing less space to make the turn into the reserved tug area. On stands without a head of stand road, a greater length will normally be required.

Equipment parking/storage

5.26 Experience has shown that for a Code D and larger aircraft stand a minimum size of 22.5% of the total stand area should be provided as equipment area, whereas for Code C (small/medium) stands 12.5% should be sufficient. It is acknowledged that only a small proportion of the total amount of equipment area can be directly located on the stand/apron, the residue should ideally be located in the vicinity of the apron. Aerodrome operators should take a proactive approach in ensuring this is included in development plans for future projects.

5.27 It is generally accepted that equipment areas are divided into a number of locations, those on the stand/apron, support areas and dedicated areas for specific operations, (e.g. de-icing storage, ULD storage, large vehicle operations). However, growing pressures to achieve shorter turnround times has forced ground handling companies and aerodrome operators to develop initiatives which support the objectives of the airlines, but at the same time, using the opportunity to increase the safety aspects of the turnround operation. As a result of this review an enhanced method of managing the ‘on stand’ equipment areas may be suitable, which may include the establishment of dedicated areas on the stand for the storage and parking of equipment, seen as essential to the efficient turnround of aircraft.

5.28 The aerodrome operator, in co-operation with the ground handling companies, needs to identify the equipment that should be located close to the apron to support the shorter turnround times. It is important that the design of the stand is fine-tuned to identify the greatest possible area that could be allocated to equipment storage, taking into account the capacity of the stand and its layout, (eg. MARS, MCA). Allocation of the equipment area to specific equipment types should be jointly agreed and supported by the marking of the area to ensure it is effectively managed.

5.29 Demands on space caused by aerodrome development may cause pressure to reduce the levels of equipment areas. Aerodrome operators should be aware of their responsibility to ensure parking/storage space is allocated for aircraft and the equipment required to service it.

5.30 It is the responsibility of the turnround coordinator, or other such person with responsibility for the aircraft turnround, to ensure all equipment used in the turnround process is returned to its allocated space when the process is completed.

5.31 Aerodrome operators, airlines or ground handlers may wish to consider the use of equipment pre-positioning areas. Temporary waiting areas are identified and marked on the stand, which allow vehicles and equipment, intended to be utilised in the turnround, to await the arrival of the aircraft. To ensure the areas are not used as permanent parking areas, it is advised that the areas are identified in a different colour to that used for the existing equipment parking areas.

5.32 The guidance in this chapter supplements compliance with applicable internationally accepted minimum standards and discusses best practice at major airports, which may equally apply to terminal-contact and remote stands. Stand and aerodrome design therefore needs to be dynamic to allow for changes to aircraft size and other operating characteristics, ie the introduction of winglets and blended wings on aircraft has resulted in aerodromes having to modify stands to accommodate the extra wingspan generated by the new wing designs. In some cases this has led to reduced clearances between stands which results in a more demanding environment for ground service providers operate in.

5.33 Consideration should be given to addressing the growing shift towards containerisation of the smaller aircraft (e.g. A320 type), and the effect this operation places on the available space within the stand area. One solution may be the employment of offset stand centrelines, which provide an increased area on the starboard side of the aircraft that allows a greater manoeuvring area for the increased amount of large equipment employed during the turnround. Maintenance of compliant clearances on the port side should not be affected by such considerations.

5.34 Apron areas are, by their very nature, busy places of work, which contain many unique hazards, not just limited to the movement and operation of aircraft and ground vehicles, but also pedestrian traffic. The failure to control or eliminate these hazards may lead to accidents involving pedestrians, vehicles or aircraft.

5.35 Aerodrome operators should therefore fully consider the guidance detailed below in order to control or eliminate these common hazards found on all Apron areas. Control measures should be relative to risk and considered as a combination and not in isolation in order to deliver the most effective risk control and mitigation.

5.36 Control measures should be developed in co-operation and co-ordination between the aerodrome operator, ground service providers and other aerodrome users such as the Air Navigation Service Provider (ANSP) and maintenance contractors. Any proposed changes to the aerodrome, either the construction of new aircraft parking stands or changes to existing ones, should be made in

consultation with as wide a user group as is possible. The Airside Safety Committee could be utilised for such purposes.

Management of change

5.37 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.

Safety in the vicinity of works areas

5.38 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, barriered 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.

Chapter 6

Training and proficiency

Objective

6.1 Working in the airside environment is inherently hazardous therefore all employers have a duty to ensure that their employees are suitably trained and competent to work safely within their operating environment.

6.2 This should entail:

- Identifying safety skills and training required for each role (typically identified by way of a task and role analysis matrix);
- Developing and co-ordinating training programmes and competency frameworks in co-operation with employees, aerodrome operator and third parties.
- Ensuring suitably qualified instructors and assessors are in place to deliver appropriate training including assessments in a timely fashion;
- Regularly reviewing the effectiveness of the programme and providing adequate reinforcement training as necessary;
- Ensuring the training takes account of the capabilities of the individuals being trained;
- Recording and Maintaining adequate records of the training undertaken.

Introduction

6.3 All employers have a responsibility to provide relevant Information, Instruction, Training and Supervision to their employees under the Health and Safety at Work Act and associated regulations from EASA and in the ANO.

6.4 Employers should have clear training policies and objectives in place which are supported and driven at Board level and by senior management. It is critical that these policies include the monitoring of the effectiveness of any training.

6.5 In developing training and proficiency programmes for working in the airside environment employers should consider:

a) Whether personnel undertaking different roles airside require different training, and whether it is adequately provided;

b) What specialist training is required and by whom;

c) Whether there are sufficient resources (financial, human and facilities) available to provide training;

d) Whether there is a structure in place to deliver the relevant training;

e) Whether the organisation has the knowledge, competence and skills to design, deliver and assess the training;

f) Assess whether the balance of theoretical and practical training is adequate;

g) Determine what level of supervision is required and who will provide it;

h) Determine what oversight monitoring is in place that will ensure that key airside safety and performance objectives continue to be met and to ensure that there is good co-operation and co-ordination to meet the objectives;

i) Ensure a suitable recording system is in place for audit purposes.

6.6 The aerodrome operator should assess the compliance and compatibility of airside training concerning third party airside service providers in order to foster standardisation and to ensure safety training delivers a safe working environment.

Evaluate and measure effectiveness

6.7 Training should be reviewed at least annually to ensure that training needs are being met and that the training is effective in bringing about desired changes in behaviour and safety awareness. Systems to measure these changes should be in place and methods of measuring achievement need to have been set at the training objectives stage within this module. A system of feedback from employees will enable employers to assess whether the courses are meeting their objectives and changes identified by training evaluation or audit should be fed back into the course design administration.

6.8 Training needs to be tailored to the individual and the role, and needs to take account of the whole term of employment.

- Induction Training - On employment with the organisation, as part of the induction process;
- Specialist Training - When there are specialist requirements, new systems or tasks are introduced to the person's role;
- Refresher Training - At periods throughout employment to reinforce the health and safety message.
- As required by statute or as required to maintain competence;
- When a person changes job.

Induction training

6.9 Safety Induction training should be carried out for every person who is new to an organisation or department. The induction training should be carried out by a suitably qualified and competent 'trainer'. It should not be assumed that because an individual has worked in airside areas in the past that they will already be familiar with these topics. The following list of training areas should to be considered (this list is not exhaustive):

- The company health and safety policy;
- Safety responsibilities;
- Local emergency procedures;
- Incident reporting;
- Main hazards of the job;
- Welfare arrangements;
- Key safety procedures;
- Rules and the names of key safety personnel and safety representatives within the organisation.

6.10 To include:

- General Apron Safety
- Provision and use of personal protective equipment;
- Emergency procedures
- Low visibility and inclement/severe weather
- Flight safety/Mandatory Occurrence Reporting procedures;
- Environmental related considerations

Specialist training

6.11 Specific training should be provided where specialist skills are required to work safely, with requirements identified as part of a task-focused training needs analysis.

Refresher training

6.12 Refresher training should be provided where deemed necessary. The frequency will vary according to the degree of risk, the use of the skills and the rate at which skills can be forgotten and when any significant changes to procedures are made. Refresher training should be programmed and recorded when completed.

Proficiency checks

6.13 Employers should ensure that all persons have demonstrated their capabilities in the performance of their assigned duties through proficiency checks at adequate intervals to ensure continued competence.

Conclusion

6.14 By following the general guidance and advice contained within this chapter, airside operators at all size and complexity of aerodromes should be able to develop a systematic approach to assessing training, delivering training needs and evaluating its effectiveness.

Chapter 7

Safety performance management and measurement

Introduction

7.1 The term ‘Safety Performance Management’ is used here to reflect a structured process of management and involves policy and target setting, activity monitoring, measuring and reviewing performance against targets, supervising, rewarding and disciplining.

7.2 This Chapter provides guidance on safety performance management, within the aerodrome safety management system. It includes the following topics:

a) The fostering and maintenance of safety discipline;

b) Just Culture;

c) Active performance monitoring and management;

d) Investigation of accidents and incidents;

e) Enforcement of regulations;

f) Implementation of remedial action.

7.3 Any system to manage safety and to measure and monitor safety performance will have a number of common elements. There are many texts which describe both theoretical aspects and practical application of safety performance management and this document seeks to illustrate some of these principles. It must be remembered, however, that only the aerodrome operator and managers of airside operators can determine the most appropriate systems for their employers and environment.

7.4 One of the prime contributory factors in the establishment and maintenance of effective safety discipline is an open and honest occurrence reporting system. Such a system creates an environment of trust at all levels and facilitates learning from common experiences and contributes to the prevention of accidents. A sound reporting system should make due allowance for the honest genuine mistakes. However, there is no place in the air transport industry for ill-discipline or lack of professionalism.

7.5 Industry sources, via the CAA Ground Handling Operational Safety Team (GHOST) consider that one of the major issues on the ramp is the threat to safety posed by aircraft damage that is not reported, but is subsequently found upon aircraft arrival. It is therefore important that stakeholders provide education and awareness training so that all personnel understand the safety significance

of reporting all incidents. It follows that the most important task is to establish a 'just' culture for the genuine mistake which is honestly reported. It is in the general interests of the industry to reduce damage (and thus costs) to aircraft and equipment and it is everyone's duty of care and responsibility to do their utmost to prevent injury to personnel. However, of paramount importance is the need to avoid aircraft departing with unreported and unknown damage. Such incidents can potentially lead to catastrophic accidents. Experience has shown that the major disincentive to reporting accidental ground damage is the fear of dismissal or other punishment.

7.6 Not only is unreported damage potentially lethal but it also precludes timely investigation and subsequent remedial action aimed at preventing a recurrence; a significant disadvantage when statistics show that accidents have often been presaged by earlier similar incidents. Everyone must be made aware that in any incident in which an aircraft is damaged, the most serious offence is failure to report. It follows that keeping quiet about an accident or incident would be considered as a 'wilful violation' under a Just Culture policy and any subsequent disciplinary action would reflect the seriousness of the failure to report.

7.7 To foster the comprehensive reporting of accidents and incidents, aerodrome operators should encourage the adoption of effective safety reporting systems. These systems should be brought to the attention of every employee and adopted by all the other employers that have an airside role. The safety reporting system should be headed by a formal statement, and signed by the company Accountable Manager. What should flow from this policy statement is an instruction to all personnel on the subject of the reporting of aircraft ground damage.

7.8 Safety awareness and an understanding of reporting procedures should be fostered by all personnel as part of normal working activity. Both are a function of line management and should not be regarded by either management or employees as separate issues that are the sole responsibility of specialist safety personnel. The aerodrome operator should take particular care to see that its own safety management arrangements and personnel attitudes are exemplary and that they are seen to be so by other employers and persons working airside.

7.9 Although this Chapter sets out a number of recommended practices on enforcement of regulations, fostering and maintenance of safety discipline should also operate on the reward principle. Good standards and operating practices should be recognised when observed and promoted to others. Safety management should not be confined to seeking out low standards, bad operating practices and breaches of regulations, but the overall safety performance system should include procedures for recognising, highlighting and possibly rewarding good performance.

7.10 One cause of airside accidents is where personnel trained for low skill tasks are required to carry out these tasks in a 'high-tech' environment. Managers and supervisors must ensure that selection and training recognise the full operational safety requirement: that is, selection and training satisfy the needs of the task and the environment within which the task is to be undertaken.

Just culture

7.11 The CAA advocates a 'Just Culture' in the interests of the ongoing development of flight safety. This means the CAA supports the development, within all areas of the aviation community, of a culture in which people have confidence to report safety concerns without fear of blame. Employees must know that confidentiality will be maintained and that the information they submit will be acted upon, otherwise they will decide that there is no benefit in their reporting.:

7.12 Just Culture has evolved from a 'No-Blame' approach and recognises that there are instances, such as gross negligence, where, even though an incident has been reported the circumstances are such that the responsible individual should face disciplinary or punitive action. Such action should, however, be the exception rather than the norm and a transparent process to make such determinations is necessary. The point is that personnel are encouraged to report incidents without fear of unfair punitive action.

Active performance monitoring and management

7.13 Airside safety performance and management should be pro-active, rather than reactive, at all levels of the management structure. Monitoring should be part of the daily routine, not a set piece procedure kept 'on ice', for use only following an incident or accident. Performance monitoring and management should be an accepted part of the overall responsibilities of all management and supervisory personnel. Although large employers might have personnel dedicated to full-time safety performance monitoring, safety performance monitoring and management is a line management responsibility - it should not be delegated.

7.14 Very few, if any, airside operations procedures or working practices occur in total isolation. Many airside operations involve co-operation, both formal and informal between two or more departments of an organisation and often between two or more separate employers. This is a complex matrix that requires cooperation, co-ordination and good understanding and agreement. It is clearly advantageous, and in many cases necessary, for line managers to work closely with their counterparts from other departments and third party employers. The benefits of co-ordination are obvious: increased rapport, a mutual exchange of safety-related information and the same standards of safety discipline applied across the whole aerodrome operation. The aerodrome operator should act as the focal point in coordinating best practice for all employers on the aerodrome; for example, by acting as the Chairman of the Airside Safety Committee (see

Chapter 2, Appendix 2A). Where appropriate and practicable, managers and supervisors of airside operators should ensure that they maintain a suitable level of visibility on airside working areas. Their role should include observation of, and participation in, all aspects of airside work carried out by their personnel and indeed the personnel of other employers where it can be seen that airside safety could be improved.

7.15 Wherever practical, aerodrome operators should collate safety performance data from all airside operators and co-ordinate an overall safety performance programme. Such a system will identify those employers that operate best practice and will enable lessons from incidents to be shared by all airside operators. In order to do this it is essential that all operators collect comparable data and the aerodrome operator should define the data to be collected as part of a total system approach.

7.16 Accident investigation looking into causal factors suggest that as much as 50% of all serious aircraft accidents have resulted from non-compliance with procedures at some point. Clearly it is important that all safety-related activities are described by documented procedures. Such procedures should include defined performance measures and monitoring systems where appropriate.

7.17 Companies operating on the apron should establish measures to ensure and monitor that safety performance procedures are implemented correctly and are achieving their intended objective. The aerodrome operator should conduct a similar programme of audits to assess the effectiveness of aerodrome-wide procedures. Any deficiencies that are identified in an audit should be considered and appropriate remedial action or measures taken. The audit should be followed up to ensure that these remedial actions and measures are effective. In this way deficiencies in procedures that could lead to an unsafe situation should be remedied before an incident or accident occurs.

Investigation of accidents and incidents

7.18 It should be the primary aim of any investigation following an accident or incident to establish the facts of the matter in order to prevent a recurrence. Managers are reminded that beyond the requirement for internal procedures, some occurrences and accidents fall within statutory reporting requirements. This includes occurrences that take place on the apron. These requirements are set out in descriptive material covering the Mandatory Occurrence Reporting (MOR) scheme (in accordance with regulation EU 376/2014 see the CAA's MOR guidance for further details), and in The Investigation of Accidents, Regulations and The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 1995. Accident or incident investigation will usually be best conducted by a line manager or supervisor. Such persons will almost certainly be most familiar with the type of operation or working practice during which the

accident or incident occurred. In some cases, it may be preferable for the investigation to be carried out by a manager from a different department from that involved in the accident or incident. It is important that managers do not assume that investigations into accidents and incidents conducted under statutory provisions will necessarily meet the requirements of their own internal investigation procedures.

7.19 'Accidents' and 'Incidents' in the context of this Chapter should not be limited solely to occurrences where physical damage or injury is sustained to equipment, structures or persons. Occurrences exhibiting a possible risk of damage or injury will also merit formal investigation, where managers consider there has been exposure to unacceptable but avoidable risk. Managers should also be aware that where an accident occurs airside it might be necessary to co-ordinate the airside safety investigation with parallel investigations by others.

Enforcement of regulations

7.20 It is essential that accident and incident reporting policy is not confused with the necessity for sanctions that preserve airside safety against indiscipline. Establishing a 'Just Culture' needs to have formal disciplinary procedures that, at their extreme, might have the force of criminal law under airport bye-laws or legislative provisions. It is this area of safety performance management that requires the greatest management expertise, clear thinking and well-documented procedures. It is imperative that all personnel are aware of the Just Culture principles to give them the confidence to report incidents without fear of punitive action, while acknowledging that there is no place for gross negligence, wilful violations or destructive acts. Fundamentally, Just Culture should be understood as being fair.

7.21 Accidents and incidents will come under the jurisdiction of the CAA, the AAIB, Police or HSE and these employers should be involved during the course of any investigation as required.

7.22 Each organisation needs to establish processes to support their Just Culture, including what is considered as gross negligence, wilful violation or a destructive act. Examples of situations where punitive or disciplinary action may be appropriate are:

a) Failure to report damage to an aircraft;

b) Smoking airside;

c) Driving on the manoeuvring area without permission;

d) Failure to report a potentially hazardous incident;

e) Driving in front of, or behind, an aircraft with aircraft engines still running and/or anti-collision warning lights on;

f) Parking in areas marked as ‘parking unsafe’ or ‘prohibited’;

g) Leaving vehicle unattended with engine running on movement area.

7.23 All employers at each aerodrome will need to consider their disciplinary structure in order to ensure that it is appropriate and fair. Procedures should provide proper opportunities for individuals to put their side of the case.

7.24 The aerodrome operator should publish details of any penalties it has established for non-compliance with the rules and instructions whilst working airside including the use of vehicles. These may include temporary or permanent exclusion from the airside area of individuals, particular vehicles, or group of vehicles controlled by a specified vehicle operator.

7.25 In the interests of natural justice it will be important for any penalty system to include an appeal procedure. However, this should not prejudice the immediate exclusion of a particular individual or vehicle where, in the opinion of the aerodrome operator, this is necessary in the interests of safety.

7.26 CAP 790 (Requirement for an Airside Driving Permit (ADP) Scheme) provides comprehensive guidance concerning an airside driving permit scheme and penalty points system.

7.27 The aerodrome operator is responsible to the CAA for ensuring that the aerodrome is safe for use by aircraft. The continuance of the aerodrome operating certificate/licence depends on the operators ability to secure the continued maintenance of safety for aircraft. The aerodrome operator should make this responsibility for safe operation quite clear to all third parties and seek compliance with appropriate safety management and safety performance standards.

7.28 All employers and operators are collectively and individually responsible for safety in its widest sense. It should be noted that nothing said within this document can absolve any person from their responsibility and accountability under the law.

7.29 Clearly, disciplinary offences against safety regulations may be reported by anyone, but should be directed in the first instance via the alleged offender’s supervisor or manager. Subsequent action will depend on what arrangements are in force for disciplinary offences at each particular aerodrome. However, it is the aerodrome operator who carries the responsibility and they may require to know how disciplinary offences against aerodrome safety regulations have been dealt with, in pursuit of their responsibilities. It is a matter for service providers and aerodrome operators to reach agreement about how accidents and incidents are to be reported, recorded and investigated. Participation in an Airside Safety Committee (ASC) as described further in Appendix 2A of Chapter 2 is a good vehicle for this action.

Implementation of remedial action

7.30 The objective of any accident or incident investigation should be to identify the root causes and produce findings which facilitate further action aimed at prevention of recurrences. Such findings should focus on how procedures, practices, or regulations failed to prevent the accident or incident. The report should list recommendations and nominate those responsible for taking corrective action. The whole proceedings should be reviewed at senior management level with the intention of establishing what subsequent actions are required. The loop should then be closed by ensuring that all line managers and safety specialists are aware of the changes so that they can monitor their effectiveness. It is equally important to determine whether the changes identified require any changes to training syllabuses and to action accordingly.

Conclusion

7.31 Whatever systems are implemented, airside safety performance management essentially consists of two fundamental elements:

- A 'Just' culture, based on company policy to ensure that all safety and personnel related occurrences and accidents affecting aircraft and airside safety are reported, in order to protect the public and the workforce from preventable injury;
- A code of discipline to secure a safe airside working environment for everyone is in place.

7.32 The outcome of effective safety performance management should be seen by everyone to be:

a) Educational and developmental;

b) Encouraging and rewarding;

c) Active rather than reactive;

d) Constant rather than intermittent;

e) Continuing rather than currently fashionable;

f) Part of normal work rather than an isolated activity;

g) A means of reducing or containing costs rather than costing money itself;

h) Everybody's concern, not that of specialists, or worse, nobody's concern;

i) Punitive only as a last resort.