INDEX

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Target Audience:
All FOD Inspectors
All SG Inspectors

PREVENTING FALLS FROM HEIGHT FROM, OR WHEN OPENING OR CLOSING AIRCRAFT DOORS

This SIM provides guidance for inspectors on procedures and safe systems of work for opening aircraft doors, and for avoiding falls from aircraft doors when open. The guidance does not apply to cargo and hold doors.

INTRODUCTION

1 Falls from height are a significant risk at airports with 69 reported incidents under SIC codes 63230 and 62100 etc (Standard Industrial Classification codes for scheduled and non-scheduled air transport and supporting activities) in 2002/03. In addition to those accidents coded under these SIC codes HSE is aware of significant numbers of falls from maintenance platforms, from catering high loaders, from passenger access steps, and from open aircraft doors when steps have been either absent or withdrawn without warning, which may be coded under different SIC codes not attributed directly to airport activities, or involve cabin or flight crew and are reportable to, and may be investigated by, the Air Accident Investigation Branch (AAIB).

2 Risks arise during maintenance of aircraft and during servicing and turnaround activities. Specific guidance on safe access to aircraft during maintenance is in SIM 05/2002/52; guidance on safe access for catering activities and use of high loaders is in SIM 05/2004/13.

3 Risks to ground handlers and aircraft crew have been identified during opening of the aircraft door, when the door must be cracked and then opened, sometimes swinging out from the

aircraft body. A detailed description of this process and the risks arising when an operative has to lean out from an unguarded high loader platform or steps can be found in SIM 05/2004/13.

4 While there are obvious risks in opening aircraft doors from the outside, there are also risks in opening the doors from the inside. These include serious risks of injury if the emergency chute is accidentally activated, and falling from an unguarded door if there is no ground support equipment in place.

5 All Ground Support Equipment (GSE) should be designed in accordance with BS EN 1915 - 1:2001 Aircraft GSE - General safety requirements Part1: Basic safety requirements, and the relevant parts of BS EN 12312 - Specific requirements. Safety features and proposed systems of work should be considered at the design stage to ensure that access equipment reduces the risk of falls so far as is reasonably practicable.

6 Procedures and responsibilities for opening and closing aircraft doors often rely on cooperation and coordination between airline crew and ground handlers and should be included in the Turnround Plan and monitored by the Turnround Coordinator or Supervisor.

7 **Note: Terminology and definitions in this guidance are as detailed in the new Work at Height Regulations 2005.**

GENERAL PRINCIPLES

8 Inspectors should be aware of existing industry guidance on opening aircraft doors:

- CAA publication CAP642 (available on the CAA website) Chapter 2 para 8.2.2 states that `Proper planning, safe systems of work 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 ` and para 8.2.3 ` Airlines should ensure that they do not require aircraft doors to be opened in a manner which exposes people to unnecessary risk'.
- The IATA Airport Handling Manual 25th edition 2005 AHM 430 recommends that cabin access doors shall be operated by specially trained and qualified staff from outside, unless otherwise instructed by the carrier. It also emphasises the importance of communication between cabin crew and ground staff and of standard signals (thumb up signal and knocking on the door) for door operation. Operators should advise cabin crew before removing ground support equipment (GSE) from cabin access doors, and that GSE must not be removed unless a safety device has been put across the aircraft door opening, or the aircraft door is being closed.

9 When an aircraft door is opened this operation should preferably be performedwith a wide

platform which allows the door to open within the confines of the area protected by guardrails. If it is not possible to open the door with such a platform in place, further precautions as detailed in the guidance must be utilised.

10 Airlines have the ultimate responsibility for procedures for opening their aircraft doors. While HSE is aiming for maximum protection for ground workers at airports, the airlines responsibility for cabin crew must also be considered, with consistent procedures to facilitate training. We are looking for clear, consistent procedures, signals and communication which can be applied at all airports for each aircraft type, as far as this is possible.

11 Some airlines have already introduced door nets to protect against falls from open doors. Such nets or restraint systems must be adequately tested and secured. Door straps on many aircraft are simply a warning device and are not fall protection systems.

12 There are 3 main types of aircraft door:

1) Passenger cabin access doors

These doors are used for:

- Passenger access and egress
- Servicing the aircraft eg catering

2) Overwing (emergency evacuation)

3) Upper deck doors (emergency evacuation). It is proposed that catering of the new Airbus A380 can be carried out via upper deck doors.

NOTE: All passenger cabin doors may be used for emergency evacuation

Cargo and hold doors are not included in this guidance

13 Some aircraft doors are automated or semi-automated which can reduce the risks of approaching an unguarded edge to open or close the door. Steps or air bridges should be positioned outside the door before it is opened to provide some fall protection, even if guard rails cannot be fully positioned until the door is fully open.

14 If it is necessary to approach an unguarded edge to open or close a door, consideration should be given to additional protection such as door nets or personal fall protection (see paragraphs 31 - 34) where possible.

15 Signals in use for door opening procedures vary at UK airports and between aircraft operators. Signals may include `thumbs up' or a code of knocking on the door. Procedures may also include a count down before opening the door. As far as possible signals and procedures should be standardised to avoid confusion for cabin or ground crew. Both MUST be fully conversant with the signals or codes to be used.

16 Aircraft doors should only be operated by door trained personnel such as trained ground staff, cabin crew, engineers or other competent workers.

17 Open aircraft doors must be protected by effective fall prevention barriers, ground support equipment or other means. Doors should never be left unprotected once open. Where doors are open and passengers are on board the aircraft it is particularly important that the doors are guarded either by a physical barrier or by a suitably trained crew member.

18 Where doors are opened from outside by ground handlers such as caterers, the guidance in SIM 05/2004/13 applies.

Means of access

19 Passenger doors may be accessed via air bridges, mobile access steps or integral aircraft steps. Other means of access includes service vehicles such as catering high loaders.

Air Bridges

20 Where an air bridge is used the risk of a fall is minimised. Once the bridge is positioned communication between cabin crew and ground handlers is paramount. Signals must be clearly understood by all parties and there should be positive confirmation by a pre-agreed signal that the bridge is fully in position and the door can be opened. Door opening may be from inside or outside the aircraft but must be according to agreed procedures, to avoid any risk of accidental activation of the emergency chute. There should also be a suitable procedure for the closing of the door and retraction of the air bridge.

Access steps

21 These may be provided by the ground handler, the airport or the airline operator and should be designed to be compatible with the aircraft type, and to provide adequate protection from risk of falls.

22 Whether the door is opened from inside or outside, the steps and adjustable guard rails should be positioned as close to the aircraft as possible to avoid risks of falls from the platform or the open door. Clear procedures and signals should be used to open the door.

Communication is again paramount.

23 Once the door is open adjustable guard rails on the access steps should be extended and locked in place such that the risk of any personnel/ equipment falling through the gaps between the aircraft and access steps is minimised. The aircraft door must NOT be left unguarded during this operation.

24 Clear procedures and means of communication should also be in place for removal of aircraft steps. Steps should only be removed by ground handlers on positive instruction from authorised persons eg trained cabin crew or handling staff, according to the Turnround plan. Where possible the door should be closed before the steps are moved away from the aircraft. Where the steps have to be moved away before the aircraft door is closed, the door **MUST NOT** be left unprotected and unsupervised at any time and the door must be closed without delay.

25 The Turnround Plan should ensure that all ground staff have completed their tasks and left the aircraft or can exit safely using passenger steps before doors are closed and steps removed.

Integral aircraft steps

26 These are part of the aircraft structure and are invariably operated by the cabin crew. The door is first cracked open then the stairs positioned. As the operation and design of such steps are part of the aircraft design, safe operation is dependent on training and competence of cabin crew. The manufacturer's instruction should include a method of work for safely opening the door and positioning the steps.

27 Once an aircraft door is open and guarded steps are in position, the access may be used by authorised cleaners, security, airline employees, or passengers as necessary without risk of falls from unguarded edges.

Service equipment

28 Where doors are used solely for servicing the aircraft, such as loading catering and galley supplies, they may be opened from inside by authorised/ trained cabin crew, in which case the same requirements apply as with passenger doors above.

29 If ground handlers access the aircraft via passenger doors to open the service door from the inside, procedures, communication and signals must be in use to protect both the worker inside the aircraft and any worker outside the aircraft door. Steps or a platform must be in position outside the door before it is opened to provide protection from falling, and guard rails must be fully positioned as soon as the door is open.

Emergency doors

30 These doors should only be used for emergency evacuation. Where procedures exist for opening other aircraft doors for routine turnround, airlines should have contingency plans in place for any unforeseen access difficulties, airport diversions or emergencies.

Personal Fall Protection Systems/Equipment

31 The provision of equipment with edge protection may not be reasonably practicable for some tasks of short duration or where guard rails cannot be positioned fully, for instance when opening aircraft doors outwards. In such circumstances the use of personal fall protection equipment connected to a suitable anchorage point may be an acceptable solution, if there are no alternative means of protection.

32 There are considerable limitations on the use and suitability of fall protection or work restraint equipment on aircraft and access platforms, including availability of attachment points that are rated for fall arrest (i.e. strong enough), actual height of work, whether there is sufficient height for a fall arrest system to work, the risk of hitting obstructions on the aircraft or vehicle during a fall, and the additional safety risks introduced in attaching and using harnesses. In particular aircraft structures and components are subject to stringent design requirements, and attachment points can only be provided according to manufacturer's specifications and approval.

33 Attachment points must be of sufficient strength to support the load imposed by the weight of the worker in the event of a slip or trip and should be fitted and tested by a competent person. Where attachment points are on guard rails, the rails must be of sufficient strength to withstand foreseeable forces.

34 Detailed consideration of the use of fall arrest or fall restraint equipment when opening aircraft doors from a high loader platform can be found in SIM 05/2004/13.

COMPETENCE

35 Employees involved in airside operations must receive specific training on airside safety awareness, vehicle and aircraft familiarisation, aircraft approach and full use of safety features and procedures, including relevant turnaround plans, whilst servicing aircraft.

36 People positioning, using and supervising the use of vehicles and other access equipment should be competent to undertake this work safely. This will require specific training to be provided for each type of vehicle, equipment, guarding system or fall restraint system used.

37 Users should be instructed in the use and limitations of access equipment, and the limits on their authority to modify it. Employees using fall protection equipment should be trained in its safe use, including user equipment checks. Access to high loader vehicles or other access equipment should be restricted to authorised personnel and it should be clearly indicated that access is not allowed to unauthorised personnel such as other ground support workers or flight crew.

38 Supervisors with a responsibility for ensuring that the workplace is safe must be able to recognise any inadequacies in equipment or work practices and will therefore need suitable training. They should also have sufficient authority to take any necessary action if a situation of imminent danger is identified.

39 Where a company has specialist equipment, including equipment designed and constructed for use with only one type of aircraft or limited types, staff should be sufficiently competent to recognise and select the right equipment for the aircraft and task at hand.

40 Doors should only be opened by door trained personnel. Training should include aircraft manufacturers requirements, awareness of emergency chute operation and deactivation and risk of falls. Door opening procedures should be monitored and assessed and refresher training undertaken at suitable intervals, or if there are any incidents or changes to procedures.

41 Fall restraint equipment should be inspected and maintained according to relevant manufacturers recommendations. Anchorages need to be proof tested when installed and when any usage changes. There should be checks of all equipment (vehicles, platforms, guard rails, harnesses, etc.) by users, inspections by competent persons, as well as any statutory inspections required by Lifting Operations and Lifting Equipment Regulations (LOLER). This is all in addition to any maintenance that is specified by the manufacturer.

LEGAL REQUIREMENTS

42 Every employer has a duty to protect so far as is reasonably practicable the health and safety of their employees whilst working at a height. Typically, this will involve providing guarded access equipment and fall protection equipment.

43 The Work at Height Regulations 2005 address **all** work at height where a person could fall a distance liable to cause personal injury. The practice of differentiating between the precautions required for high falls and low falls will no longer apply. Instead the precautions will be identified solely on the basis of an assessment of the risks involved.

44 The Lifting Operations and Lifting Equipment Regulations 1998 also apply to high loader vehicles.

45 The legal framework for the management of risks to employees and others is set out in the Health and Safety at Work etc Act 1974 and the Management of Health & Safety at Work Regulations 1999. The Management Regulations also set out requirements for co-operation and co-ordination between employers.

46 The CAA Safety Regulation Group (SRG) and HSE are both involved in enforcing existing legislation and standards at airports in line with their statutory responsibilities. It is the responsibility of those involved in both organisations to liaise where they believe there may be a joint interest or need for clarification of responsibilities to ensure that such matters are dealt with effectively, and to ensure there is no conflict of responsibilities with the other organisation. CAA is tasked with investigating and enforcing under the Air Navigation Order (ANO) and with in-flight health and safety of crew under The Civil Aviation (Working Time) Regulations 2004. Contravention of the ANO or any Regulations made under it is a criminal offence.

47 The roles and responsibilities of HSE and CAA and a framework for liaison are outlined in a Memorandum of Understanding (MoU) to ensure coordination of policy issues, enforcement activity and investigation in respect of aircraft and the systems in which they operate. There are a number of Annexes to the MoU on specific areas. For further information on the MoU, see Appendix 1 guidance and reference material.

FURTHER ADVICE

48 Standards for ground support equipment (GSE) are given in BS EN 1915-1:2001 Aircraft ground support equipment - General requirements - Part 1: basic safety requirements. Specific requirements for different types of GSE are in BS EN 12312 (see Appendix 1).

49 Specific guidance on the roles and responsibilities of those involved in aircraft turnround is given in Aircraft Turnround HSG209.

50 Documents which give general advice on working at heights are listed at Appendix 1. Further guidance is also contained in various British and European standards on which the Transportation Section can advise. However, not all of these documents or standards are specific to aircraft access and will need to be interpreted in the light of the task and the law, as summarised earlier.

51 Advice on enforcement is given in paragraphs 56 - 63 describing a number of scenarios that inspectors may encounter, to aid the inspector when they are considering enforcement. This is for guidance only; any enforcement should be determined by the circumstances found on site.

52 Advice on access to aircraft can be sought from the Transportation Section in East

Grinstead (503 4200) who are prepared to provide expert evidence on standards of safe access, if required.

ACTION BY INSPECTORS

53 Inspectors are requested to:

1) apply the standards detailed in this SIM when inspecting or discussing opening aircraft doors;

2) alert the Transportation Section to any problems which arise from applying these standards, or any of the other advice contained in this SIM;

3) draw to the attention of the Section any new or innovative means of gaining safe access or fall protection;

4) advise CAA of any matters of concern relating to the safety of aircraft uncovered during inspections or investigations;

5) inform the Transportation Section when contacting CAA to raise an issue of concern.

54 As part of a longer term strategy the Transportation Section is engaging with airlines and with vehicle and aircraft manufacturers and designers to raise awareness of requirements for safe access. Representatives of airlines, airports and ground handlers have worked with HSE in the development of this guidance. Inspectors are encouraged to enquire into manufacturers' and airline guidance on such things as opening aircraft doors and positioning of access equipment, and to ensure that safe access is covered as part of routine employee training programmes.

55 Where inspectors consider that an airline has responsibilities for safety such as procedures for opening aircraft doors, they should contact the Transportation Section and airline Head Office lead PI to check the national situation before taking any enforcement action.

ENFORCEMENT GUIDANCE

56 The following is a guide to when enforcement action may be appropriate. It is based on the intranet version of the Enforcement Management Model (EMM) current in March 2005 and applies to situations where there is a risk of falling a distance liable to causepersonal injury. Any action should reflect any subsequent changes to EMM. The final decision on enforcement action should also take account of dutyholder factors and the strategic factors outlined in paragraphs 64 - 66.

57 Table 1 sets out some risks of serious personal injury that require immediate action, after which further action may be necessary to secure compliance and to achieve the benchmark of negligible risk of serious personal injury.

58 The risk of a fall will depend on various factors including:

1) procedures in place for opening aircraft doors.

2) the availability and adequacy of any existing fall protection measures including guarding and personal fall protection systems.

3) the work that is being done, for instance whether it involves handling awkward or heavy loads, the suitability of platform or step design.

4) the surface on which the person is standing whilst working, including its integrity, angle, its level of slip resistance and the actual surface area available.

5) the duration of the work and the location in which it is carried out. If carried out externally there may be impact from the weather conditions such as high winds.

Table 1: Risks of serious injury requiring immediate action, including consideration of a Prohibition Notice

Scenario	**Remedial action**
Access steps in use without guard rails on steps or upper platform	Position existing guard rails or take steps out of use until suitable guard rails are fitted
Ground handler reaching across unguarded gap at height to open/ close aircraft door without suitable guard rails or personal fall protection	Adequately guarded access equipment or personal fall protection to be provided and used, with suitable training
Aircraft doors open and unguarded when passengers or workers on board aircraft	Door to be guarded/ protected or closed, or ground support equipment to be positioned outside aircraft to provide protection

59 Inspectors are reminded of the possible implications of an immediate Prohibition Notice and should consider the impact such a Notice might have on other workers around an aircraft, and on overall air traffic control and flight safety at the airport. Where immediate prohibition could cause significant health and safety or air safety risks, a deferred notice should be considered.

60 Consideration should be given to risk control systems for equipment procurement, maintenance and thorough examination, as well as training in procedures, selection and use of equipment, systems for maintaining edge protection and restricting access to unguarded edges, and management control of contractors.

61 Given the potential for injury it is essential that a suitable and sufficient risk assessment is carried out. To be suitable the assessment should consider the issues identified above. The assessment should recognise the potential for serious injury arising from low falls as well as high falls. The failure to undertake a risk assessment should be dealt with by reference to the EMM.

62 Where inspectors find failings of management systems such as:

1) absence of suitable risk assessments; and/or

2) inadequate arrangements for planning, organising, control etc; and/or

3) lack of suitable training,

And there is evidence that:

4) employees are not following safe practices while opening/ closing aircraft doors; and/ or

5) there is a lack of suitably guarded access equipment; and/or

6) there are damage or defects to access equipment or fall protection equipment which give rise to significant risks an **Improvement Notice** should be considered. Advice or enforcement should be addressed to the parties best able to rectify an identified problem that is airport and/or airline and/or ground handler.

63 The long term aim should be better designed access equipment, better guarding, and improved design of aircraft doors and their opening mechanisms. Where current equipment and guarding are obviously inadequate, we should be asking for immediate improvements. This may mean modifying the equipment or using fall restraint equipment in the short term. In the longer term we should be asking companies to come up with a programme and timetable for replacement or improvement of equipment where necessary.

STRATEGIC FACTORS

64 Falls from a height are currently a HSE industry reduction programme priority programme. A failure by inspectors to take enforcement action where the EMM and local factors indicate such action to be appropriate may have a negative impact upon employers' attitudes. This should be considered as a strategic factor for the purposes of the EMM.

65 HSE has been working with the industry via the Revitalising Health & Safety in Air Transport (RHSAT) Industry Strategy Group (ISG) and Working Groups, and industry representatives have been involved in the development of this guidance. There is general industry acceptance that the standards outlined in this document are reasonably practicable.

66 Requirements of the Air Navigation Order should be taken into consideration, in relation to the requirements to avoid endangering an aircraft or compromising aircraft or flight safety. Transportation Section can give further advice, if required.

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APPENDIX 1

GUIDANCE AND REFERENCE MATERIAL

1) The Work at Height Regulations 2005 SI 2005 No735

2) SIM 05/2002/52 - Safe external access and working platforms at aircraft during maintenance

3) SIM 05/2004/13 - Safe access to aircraft for catering operations

4) OC 282/19 - The PPE at Work Regulations 1992

5) OC 282/30 - Inspection of fall arrest equipment made from webbing or rope

6) OC 234/11 - Lifting Operations and Lifting Equipment Regulations 1998

7) INDG 367 Inspection of fall arrest equipment made of webbing or rope

8) Mobile elevating work platforms - User safety guide. Published by the Construction Plant Hire Association, 28 Eccleston Street.

9) Preventing falls from boom-type mobile elevating work platforms HSE Information Sheet MISC 614

10) Preventing falls from mobile elevating work platforms and selection and use of fall protection equipment OC 314/20

11) Airside Safety Management CAP 642

12) Memorandum of Understanding between HSE and CAA

13) BS EN 1915 Aircraft ground support equipment - general requirements Part 1: Basic safety requirements

14) BS EN 12312 Aircraft ground support equipment - specific requirements:

Part 1: passenger stairs

Part 2: catering vehicles

Part 4: passenger boarding bridges

Part 8: (draft) maintenance stairs and platforms - due for publication 2005

TOP