An extract from the

Presented on the following pages, containing material relevant to the Runway Safety Toolkit.

The entire Handbook is available from ACI

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ACI AIRSIDE SAFETY HANDBOOK

Fourth Edition 2010

ACI is proud to present the updated and revised Airside Safety Handbook 2010 which replaces the 2009 edition.

Much of the text has been distilled from excellent guidance material available from several large Civil Aviation Authorities around the world, ACI Member Airports operational safety procedures, ICAO material and other international aviation and non-aviation organizations publications pertaining to safety.

The content of this Handbook also builds upon the existing guidance in the ACI Policies and Recommended Practices Handbook, with safety related policies included in this publication for easy reference. While remaining short and succinct, it provides checklists for action, as well as an explanation of risks to be assessed and means of mitigation available. As stated in the text, local risk assessments are inevitably necessary to the safe operation of an airport.

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Airside Inspections and Audits

Conducting regular inspections and audits is a key aspect of ensuring the safety of airside operations. All airside areas need to be periodically checked to ensure they are serviceable and available for use. Particular attention should be paid to the aircraft movement area, namely runways, taxiways and aprons including airside roads and grass areas. The purpose of such inspections is to ensure that:

- No FOD is present
- The surface condition is suitable (no loose material)
- No birds or other wildlife are present (bird and wildlife presence is monitored and controlled)
- The paint markings are visible and correct
- The signs are visible and correct
- The lighting is serviceable
- Equipment provided is safe for use and serviceable

It is often beneficial to repeat these inspections during low visibility conditions (e.g. after dark or during adverse weather) to check the lighting, signs and markings.

The importance of diligence and accurate recording of these inspections and audits cannot be overstated. To reinforce this, it is good practice to confirm that the checks have been carried out and that the duty supervisor has performed quality control of the checks. Furthermore, senior management should also carry out a periodic check to ensure that the reports have been completed, all deficiencies noted and passed on for rectification, as well as visit airside to check that everything has been reported. Records should be kept according to national requirements, but not less than five years, and negative or exceptional reporting will not be accepted.
Asset Management

Asset Management is a structured method that addresses maintenance responsibilities, ownership of items on the airside as well as removal from and return to service procedures. All assets on the airport should have a clear owner within the organization; this owner should be a named individual. One of the benefits of this type of system is that a clear responsibility for each asset is assigned, therefore preventing possible gaps in ownership. The owner of any asset on an airport is required to ensure that:

- Each asset is registered, with a unique identification
- Levels of serviceability are agreed upon between all the stakeholders
- Operating instructions are produced to enable staff to make safe use of the asset and checks are made to ensure that they are followed
- Training for staff is in place to ensure competency – both by operators and maintenance personnel
- A maintenance strategy is in place and can be carried out by trained and competent personnel
- A maintenance inspection regime is in place and is carried out in accordance with a specified scheme and schedule
- An access strategy has been developed to ensure integrity when out-for-maintenance, recognizing that even vital pieces of equipment need to be off-line for maintenance
- A process has been identified to agree how modifications should be designed, authorized and introduced
- Operational time windows should be agreed upon defining when maintenance work can occur
- A clear, positive and unambiguous written hand-over process occurs when assets are removed from and returned to service
- A works authorization and control procedure is in place
- Contingency plans exist to deal with any failures
- Any legal or statutory checks are complied with, including fire strategies, certification requirements, etc.

- Safety records are maintained
- Change control processes are in place, including subsequent communication to affected parties
- Funding for maintenance and capital replacement is acquired

All the above processes and activities should be recorded and documented, and records should be kept according to national requirements, but not less than five years.

Airports cover vast areas, so it is important to have appropriate asset management procedures in place.

Munich International Airport
Fault Reporting

Fault reporting should be easy to conduct in order to ensure that all observed faults actually get reported. The process should include a specific location and adequate detail to ensure the correct location or piece of equipment is identified along with the exact nature of the reported fault. Furthermore, it should be possible for those involved in airport safety to subsequently track the progress of the rectification work and to be aware when the fault has been completely rectified. Documents should be disseminated explaining the type of fault (e.g. cracks, rips), whether these are acceptable or not (after a risk assessment), or have to be rectified within a certain period of time. This type of document will enhance awareness of desired levels of safety within the airport community.

Specific fault reporting software and products exist on the market to allow the development of adequate procedures as well as the management and storage of data. Historical records should be kept according to national requirements but not less than five years; these can form a useful database of fault tracking and trend analysis.

Adverse Weather Operations

Adverse weather presents particular difficulties in maintaining normal operation in airside capacity and safety. Local procedures should be in place for a controlled and measured response to varying conditions. These procedures may result in a reduction of capacity but they should never result in a reduction of safety. Close cooperation between airport operations and ATC will contribute to a safe and smooth operation during adverse weather.

Snow and/or Ice

The presence of snow and / or ice on an airport results in reduction in surface friction and a covering of surfaces, lighting, pavement, markings and signage and can cause a serious risk to the safety of operations. Airports affected by snow and / or ice should have procedures in place for clearing runways, taxiways, emergency response routes, and aprons as well as de-icing pavements. Equipment and resources will need to be provided depending on the size of the airport, the amount and occurrence of snow, and the required time to the resumption of operations after runway sweeping.

Runway friction readings should be taken after snow removal to check the effects of the removal and to assist decisions if further treatment is required. When clearing snow off the pavement areas specific attention should be paid to keep snow banks to the sizes specified in ICAO Annex 14 – Aerodromes, Volume 1.

Detailed local procedures are required for the planning, activation and operation of snow clearing equipment and training of staff. Typical priorities are to clear the runway first, including any rapid exits, then the taxiways, then the apron areas. Fire stations should also receive special consideration because of their emergency response requirements. Separate teams can achieve a quicker return to service than a single team. Safety of both aircraft and staff (especially on the apron areas) is important.
Using multiple snow ploughs greatly reduces the time to remove snow from airport paved surfaces. Munich International Airport

Specific activities will vary from airport to airport and are too detailed to itemize here. General principles include:

- Preparation and planning – equipment availability, staff rosters, etc.
- Communication of the snow removal plan to airlines, handlers, ATC and other parties laying out preparation and clearance activities that will take place when different types of weather forecast are received
- Communication of snow warnings when snow is forecast
- Identification of snow removal areas / dumping locations
- Communication of runway opening estimates to ATC, airlines and other parties
- Establishment of snow committees
- Activation of a ‘snow desk’ using the principles of Collaborative Decision Making (CDM)

Strong Winds

Strong winds can cause significant disruption to operations on the airport. The main hazards are aircraft engine ingestion of FOD, airframe damage and personal injury. A system should be in place to bring to the attention of all staff any forecast conditions of strong winds. To minimize the hazard it is good practice for the airport to publish a set of requirements detailing actions other parties should take upon receipt of strong wind warnings. These can be graded depending on the forecast wind speed and maximum gust speeds and should include appropriate restrictions, examples of which are as follows:

- Use of air bridges and mobile steps for passenger boarding / deplaning
- Loose cargo and baggage containers secured and tied down
- Additional chocking requirements of parked aircraft
- Parked aircraft oriented into wind or secured, if necessary
- FOD and rubbish containers securely fastened
- Vehicle parking brakes set or chocked
- Arriving aircraft to receive positive chocking communication from ground crew before releasing parking brake
- Restrictions on working at height
- Wind milling propellers secured
- Early fuelling of aircraft to increase ballast
- Restriction on extension of catering and other scissor lift vehicles and use of stabilizers
- Restrictions on aircraft towing
- Aircraft doors not to be opened
- Aircraft rubbish to be immediately removed and not left on stand
- Suspension of aircraft fuelling
- Contractor works areas to be secured
- Immediate reporting of any items seen being blown by the wind
Storms – Sand, Dust and Volcanic Ash

Sand and dust storms are a reality in certain regions when strong winds pick up loose sand and dust from a dry surface, thus reducing visibility. The vertical extent of the dust or sand that is raised, is largely determined by the stability of the atmosphere above the ground as well as by the weight of the particulates. Dust and sand may be confined to a relatively shallow layer, but dust may be lifted more than 5,000 feet up in the air. In addition to issues like visibility, health problems (broncho-pulmonary, ophthalmic, skin abrasions) and impact on operations, these contaminants, when combined with rain, can form mud, thus affecting runway friction values.

Volcanic ash consists of fine particles of pulverized rock created by volcanic eruptions, which are very hard, abrasive, electrically conductive and mildly corrosive. The ICAO Doc 9691 – Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, provides additional information about the impact on aircraft operations, airports and ATC.

Airport operators should consider the following:

- Possible contamination of electronic, electrical, mechanical ground equipment and parked aircraft, requiring cleaning and sometimes replacement
- Availability of materials (duct tape, plastic sheeting) needed to cover or seal openings on aircraft, engines, ground equipment, certain strategic buildings and electronic / computer equipment
- Availability of cleaning materials, additional heavy equipment, large volumes of water, a suitable and approved area for dumping and covering (or at least stabilizing) contaminants away from the airport
- Accelerated and intensive programme of inspection, maintenance, cleaning and monitoring
- Special aircraft ground operating procedures (restricted operations)

- Conduct risk assessment of equipment and facilities
- Wet ash has the consistency of wet cement and can cause buildings to collapse, or markedly shift the centre of gravity of parked aircraft, causing it to tip over
- Special provisions in the Airport Emergency Preparedness Plan (Natural Disasters)

Storms – Rain

Heavy rain storms (or torrential rain), are sometimes the result of a fast on-set or can last for a long period of time. Hazards may include runway, taxiway, apron and roadway contamination (standing water), reduced friction, problems with water run-off, flooding, drainage problems and ground saturated with precipitation. Heavy rain events can also be accompanied by strong winds and lightning and cause reduced visibility. Airport operators should ensure runway design is such that water runs off as quickly as possible and that drainage systems can handle run-off. Rapid intervention by maintenance crews may be required to remove standing water, to build temporary dams and to unclog storm water drains.

Prevention of Runway Excursions and Incursions

Runway excursions and incursions present one of the greatest aviation hazards with potentially very serious consequences. A number of fatal accidents have occurred around the world resulting from these events.

In recognition of the seriousness and growing frequency of these events, a number of years ago the FAA and Eurocontrol began a concerted industry-wide review to seek to reduce the numbers of runway incursions. This work gave rise to the Eurocontrol “European Action Plan for the Prevention of Runway Incursions”, which involved many industry sectors. Additional information can be found in the ICAO Doc 9870 Manual on the Prevention of Runway Incursions.
One of the conclusions was that a Local Runway Safety Team should be established at each airport. Some airports have gone beyond this recommendation and have established a Manoeuvring Area Safety Team (MAST). The topic of runway excursions, among other runway safety issues, should be discussed on a regular basis by the Airside Safety Committee or Local Runway Safety Team or Manoeuvring Area Safety Team.

ACI has been actively participating in the development of a Runway Excursion Toolkit and supports the findings of the FSF Report of the Runway Safety Initiative ‘Reducing the Risk of Runway Excursions’. Some of the recommended mitigations include: RESAs, runway closure criteria, compliance with ICAO Annex 14 – Aerodromes, Volume 1, availability and training of RFFS personnel, and means for flight crews to visually determine runway distance remaining.

Further information can be found in the ACI Policies and Recommended Practices Handbook, Section 5.6.

5.6 A runway end safety area should be provided to mitigate the consequences of overruns and undershoots, which may result from a combination of adverse operational factors. At airports where adequate distance and suitable terrain is available, a greater length of RESA than the ICAO Standard should be provided.

**Airside Safety Committee**

An Airside Safety Committee should be hosted by the airport to review safety in the airside areas. Its purpose is to:

- **Provide a safe environment for the travelling public, airport users, airport employees and aircraft**
- **To eliminate and / or reduce hazardous conditions, acts and situations ALARP, as well as to prevent and / or reduce accidents, incidents and occurrences ALARP**

The Committee should consist of different airport divisions, airlines, handling agents, aircraft catering companies, aircraft cleaning companies, fuelling companies, ATC, government agencies, policing and security organizations, FBOs, emergency response services – ideally all large organizations that operate in airside areas. The Terms of Reference for an Airside Safety Committee should include:

- Promotion of safety awareness through training, licensing and the publication of safety bulletins
- Establishment and discussion of local safety procedures and guidelines
- Accident, incident and occurrence reporting and investigation, subsequent data analysis and dissemination of trends, common causes etc.
- Generation, evaluation and recognition of safety suggestions
- Preparation of regular joint safety campaigns
- Discussion of forthcoming airside works programme

The meeting should be held in a relaxed and open atmosphere conducive to discussion and sharing so as to maximize the learning and development of ideas. It is suggested meetings are held either monthly or quarterly. Depending upon the size of the operation at the airport, the subject could be covered under an Airside Safety Committee or be separated into a Local Runway Safety Team / Manoeuvring Area Safety Team and an Apron Safety Committee.
Airside Safety Promotion

Every airport should continuously improve its safety culture. To promote positive safety attitudes, it is essential to have the collaboration of all organizations working airside. Promotion can be done in a number of ways:

- Emphasis on the safety component in the training of new staff. New staff must understand the importance of strict adherence to procedures when carrying out tasks.
- Short-cuts, improper or unsafe execution of tasks should be pointed out and strictly discouraged.
- Periodic promotion to call attention to different aspects of safety.
- ‘Road Shows’ or safety promotional vehicles could be used to tour the airside areas and rest rooms or staff restaurants to draw the attention of ramp staff to the latest safety message.

Disabled Aircraft Removal

The airport operator should establish a plan for the safe removal of an aircraft, disabled on or adjacent to the movement area of the airport, and should designate a coordinator to implement the plan, when necessary. Information concerning the office of the airport coordinator for the removal of the disabled aircraft should be made available to aircraft operators.

Safety will remain the guiding principle during the whole process. Further information can be found in ICAO Doc 9137, Part 5, Removal of Disabled Aircraft.

The plan should identify key parties, their responsibilities and the lines of communication, be based on the characteristics of the aircraft that may normally be expected to operate at the airport, or use it as an alternate and also include:

- A list of equipment available on or in the vicinity of the airport.
- A list of additional equipment available from other airports on request (mutual aid agreements).
- A list of nominated agents acting on behalf of each aircraft operator at the airport.
- A statement of the airlines’ arrangements for the use of pooled specialized equipment.
- A list of local contractors (with names and phone numbers) able to supply heavy removal equipment.
- Equipment for hire.

The airport operator should request a copy of the disabled aircraft removal plan from each aircraft operator prior to the latter commencing regular operations at the airport. The airport operator should maintain and constantly update its database of relevant contacts in aircraft operators’ operations centres. Key parties to the disabled aircraft removal plan are: the airport operator, aircraft operators, ground handlers, State accident investigators, aircraft manufacturers, Customs officers, Dangerous Goods / HAZMAT specialists, environmental specialists, Workplace Health and Safety officers, insurance representatives, cargo specialists, RFFS personnel, air traffic controllers, MET information providers, specialized equipment operators, contractors and consultants, police having jurisdiction, and other interested parties. Good communication between the airport operator and other parties is essential.

Contingency plans need to be drawn up to handle an event where a disabled aircraft needs to be moved. This can involve a relatively simple task such as an aircraft with deflated tyres to a full accident recovery requiring lifting and moving of large aircraft. Often this can be a time-pressured situation as the re-opening of the airport can depend on the timely removal of the disabled aircraft. To assist in this process, it is helpful to have detailed layout blueprints of the airport showing the locations of electricity cables underground, telecom wires, network cables, fuel pipes, water pipes, fire mains, airport lighting circuits etc. These can be important in dealing with the recovery.
Disabled aircraft removal must be done in a timely and efficient manner, taking into account safety and operational requirements.

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The airport operator should, as part of the emergency preparedness training cycle, include a disabled aircraft removal partial and/or tabletop exercise taking into account the size of the aircraft to be moved and the recovery equipment available. This will provide an excellent training and learning opportunity allowing all participants to exchange information, identify gaps in the different plans and responses and initiate corrective action. Other benefits include:

- Staff familiarity with specialized equipment that is rarely used
- Increased experience in team-work with the above key parties
- Testing of communication protocols with other organizations
- Practical knowledge of how to move the aircraft, where to park it
- Availability of cranes and other heavy equipment and locating them airside
- Experience with chains, pulling gear and aircraft tugs in moving the aircraft
- Impact on obstacle limitation surfaces or interference with radio NAVAIDS

Key aspects of disabled aircraft recovery include:

- Exact location and height of the aircraft. This may necessitate re-declaring distances for aircraft operations to continue from a reduced runway length
- Recovery can only begin once the passengers have left the aircraft and the accident investigators give permission for the aircraft to be moved
- Recovery can only begin once the airside lighting system is off
- Airlines insurers need to give permission
- Requirement to provide matting or a temporary road surface to either enable the aircraft to power out of the grass or for a tug to pull it out
- Requirement to offload cargo and bags in-situ before the recovery commences
- Importance of preventing secondary damage
- Requirement to de-fuel. Airports should ensure that there are sufficient empty containers or fuel tankers available to do this
- Requirement to have flat-bed trucks to transport parts of the aircraft
- Requirement to have sweepers to clean the area afterwards
- Prevention of secondary damage

The disabled aircraft must be removed in a timely and efficient manner, taking into account safety and operational requirements (e.g. number of movements, single runway operation and other considerations), subject to authorization by the State accident investigation authorities. If the aircraft operator fails to take responsibility for the removal operation within a suitable time period, the airport operator may take over the responsibility, contract the removal to a third party and pursue cost recovery from the aircraft operator. Written permission or a 'hold harmless' document should be sought from the aircraft operator either as part of the operating agreement between the airport operator and the aircraft operator, or at the latest prior to commencing the disabled aircraft removal operation. Failure to obtain such a document should not unnecessarily delay this operation. The airport operator should ensure visual records of the disabled aircraft removal operation are made and kept.
Note: In addition to a Disabled Aircraft Removal Plan, airport operators should also have procedures in place to remove any obstacle, obstruction, vehicle, equipment (including GSE), aircraft and similar items, abandoned or not, whether or not they affect operational safety.

Further information can be found in the ACI Policies and Recommended Practices Handbook, Section 5.25.

5.25 The safe and timely removal of a disabled aircraft and rendering the movement area fully operational are critical elements of the airport’s operational readiness plan. Especially at a single-runway airport, it is vital to minimize any closure period, for safety, continuity of operations and economic reasons. The airport operator, in conjunction with aircraft operators, should - as part of its emergency preparedness training – organize an exercise covering all aspects of disabled aircraft removal.