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Disabled Aircraft Removal Plan

1.0 PURPOSE

1.1 The purpose of this Advisory Circular (AC) is to provide guidance material to aerodrome operators in formulating the disabled aircraft removal plan. This AC is issued in accordance with the provisions contained in Manual of Aerodrome Standards Section 10.7.3- Disabled Aircraft Removal. This AC also recommends and explains elements of a disabled aircraft removal plan, in particular, planning, response and responsibilities of the relevant parties.

1.2 The appendices provide guidance to aerodrome operators in establishing an effective disabled aircraft removal plan for their respective aerodromes. Appendix A presents an outline of a disabled aircraft removal plan. Appendix B is used for Planning chart. Appendix C is Composition of the Aircraft Removal Team. Appendix D is Aircraft Removal Report Form.

2.0 REFERENCES

2.1 MCAR Part 139, Section 1 – Aerodrome Certification
2.2 Manual of Aerodrome Standards (MOAS)
2.3 ICAO Annex 9; Facilitation
2.4 ICAO Annex 13 ; Aircraft Accident and Incident Investigation
2.5 ICAO Annex 14, Volume I; Aerodrome Design and Operations
2.6 ICAO Doc 9137 (Airport Services Manual, Part5, Removal of Disabled Aircraft;)
2.7 ICAO Doc 9859 (Safety Management Manual)

3.0 APPLICABILITY

3.1 The Advisory Circular (AC) applies to all aerodrome operators certified under MCAR Part 139. However, not all items addressed in this AC applicable at every aerodrome. Aerodrome operators should examine each item carefully, by considering the size, complexity and scope of operations at the aerodrome to determine what applies.

4.0 INTRODUCTION

4.1 An aircraft accident can occur at any time and in any weather conditions with varying degrees of magnitude and the aircraft involved may likely require assistance to remove it from the site. The aircraft removal event can range from minor debogging to major events including damaged or missing landing gear.

4.2 Disabled aircraft will affect many parties. The traveling public, other aircraft operators, the aerodrome operator and the operator of the incident aircraft will be affected to varying degrees. The resultant runway and taxiway closures can substantially reduce the number of arrivals and departures and restrict movement around the aerodrome. Therefore, disabled aircraft that interfere with the normal activity of an aerodrome should be removed expeditiously. The recovery process may take from a few hours to many days depending on the severity. While recovery incidents cannot be predicted, they can be anticipated and prepared for.

5.0 OBJECTIVE

5.1 The objective of a disabled aircraft removal plan is to specify the roles and responsibilities of all parties involved so as to aid the appropriate management in ensuring that the removal of aircraft is executed as speedily as is consistent with the safety of personnel concerned and with the avoidance of further damage to the aircraft.

6.0 DEFINITION

6.1 The ICAO Airport Services Manual Part 5 “Removal of Disabled Aircraft” defines the removal of disabled aircraft as being three distinct areas – aircraft debogging, aircraft recovery and aircraft salvage.

6.2 These three types of removal are further defined as follows:

a. Aircraft debogging – The removal of an aircraft from a runway or taxiway where the aircraft has become bogged down but has relatively little or no damage is considered a “debogg”.

b. Aircraft recovery – Any aircraft that is unable to move under its own power or through the normal use of an appropriate tow tractor and tow bar will be considered an “aircraft recovery”. Examples are:

- one or more landing gear off the hard surface of a runway, taxiway or apron;
- aircraft bogged down in mud or snow;
- one or more landing gear collapsed or damaged;
- an aircraft that is considered to be economically repairable.

c. Aircraft salvage – An accident or incident in which the aircraft sustains substantial damage and the insurer considers the hull a constructive loss will be considered "aircraft salvage".

7.0 PRINCIPLES AND PROCESSES

7.1 There are five generally accepted major principles of the disabled aircraft removal process. These are:

a. Site survey
b. Planning
c. Preparation
d. Recovery
e. Reporting processes

7.2 Each of these principles and the considerations which should be taken into account at each of these stages are detailed below.

Site Survey

7.3 Site survey involves any preliminary tasks which can be completed prior to removal but after permission has been granted to access or move the aircraft.

7.4 The site survey may include, but is not limited to

a. an initial aircraft survey (visual inspection, checks for fluid leaks and identification of the need to defuel of the aircraft)

b. an initial site survey (terrain, soil characteristics, topographical site map including pavement specifications, access routes, temporary roadway construction)

c. checks of the weather forecast

d. identification of any health and safety issues including tyre pressure

e. identification of PPE required

f. identification of any hazmat or biohazards

g. identification of fire safety precautions required

Planning

7.5 During the planning phase an assessment of the weight and centre of gravity management method required to ensure that the lift is at a central point to ensure an equal vertical lift should be carried out.

Preparation

7.6 The preparation stage of the process ensures that the aircraft is ready to be moved. This is done through a number of actions which may need to be taken, including:

a. stabilising and securing the aircraft

b. removing any loose or damaged components which could hinder the removal process

c. tethering, shoring or ground anchoring the aircraft

d. preparing the ground to ensure that it is capable of supporting the removal equipment and weight of the aircraft

7.7 A major part of the preparation stage is reducing the weight of the aircraft where possible. This can be done through a number of methods including defueling the aircraft and removing cargo or baggage which is on board. However, when reducing the weight it should be ensured that the centre of gravity does not shift, as some of the weight on board could be acting as a stabiliser in these circumstances. It may also be necessary to remove other parts of the aircraft to reduce the weight, such as the landing gear or engines. This should only be done on the authority of the aircraft engineer.

Recovery

7.8 Once all of the above has been put in place, the aircraft is ready to be removed. The main element of this stage is the levelling and lifting of the aircraft. The aircraft should firstly be levelled and the centre of gravity maintained before any attempt to lift the aircraft is made. There are a number of methods to achieve these which should be considered, including:

a. jacks

b. cranes

c. pneumatic lifting devices

7.9 Once the aircraft has been lifted it will need to be moved onto either a hard surface (permanent or temporary) or a trailer/vehicle. It can then either be towed or moved to a more suitable location.

Reporting Processes

7.10 Full records of each stage of the above processes should have been kept for any investigatory purposes. These should include where relevant diagrams, photographs, maps, risk assessments, calculations etc. If any damage occurred during the removal process full details of this should also be recorded.

7.11 Any necessary corrective actions to the aircraft will be undertaken by the airline company. Any remedial works required to the surfaces shall be undertaken by the aerodrome authority.

7.12 A full investigation shall be carried out by the aerodrome authority following an aircraft recovery to review the procedures and actions taken and apply any lessons learnt to the process.

7.13 The incident shall be reported to the MAIB in line with current DCA and ICAO requirements.

8.0 DISABLE AIRCRAFT REMOVAL PLANNING

8.1 MOAS clause 10.7.3 requires each aerodrome to establish a comprehensive plan for the removal of a disabled aircraft on or adjacent to, the movement area and a coordinator designated to implement the plan, where necessary.

8.2 The disabled aircraft removal plan (see Appendix A) should be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things;

(a) a list of equipment available on or in the vicinity of the aerodrome;

(b) a list of additional equipment available from other aerodromes on request;

(c) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes;

(d) a list of nominated agents acting on behalf of each operator at the aerodrome;

(e) a statement of the airlines arrangements for the use of pooled specialist equipment; and

(f) a list of local contractors (with names and telephone numbers) able to supply heavy removal equipment on hire.

8.3 Information in the form of a disabled aircraft removal plan on the capability to remove a disabled aircraft on or adjacent to the movement area should be made available. Information regarding the capability to remove a disabled aircraft should be expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove.

8.4 This capability should be based on the equipment available at the aerodrome and on equipment which can be available at short notice. Should the disabled aircraft removal plan take into account an airline pooling arrangement, the determination of the capability to remove a disabled aircraft should also take into consideration the specialized aircraft recovery kits available from the aerodromes.

8.5 The telephone/telefax number(s) of the office of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area must also be made available to aircraft operators as required by MCAR 139,139.57(b) (10).

9.0 RESPONSE

9.1 The removal of disabled aircraft can be complex and involve a number of specific procedures including multipart leveling and lifting actions. These procedures can be dangerous and safety precautions must take precedence over all other constraints. Prevention of secondary damage must also be a priority. In some cases, the removal process may not be able to commence until investigation by the Myanmar Accident/Incident Investigation Bureau (MAIB) has been completed and the aircraft is formally released. Because of these issues, it is not always possible for the aerodrome to be cleared as quickly as hoped for by the aerodrome operator.

10.0 RESPONSIBLITIES

10.1 For an aircraft removal operation to complete as quickly as possible, all parties should be expeditiously facilitated and already have the proper procedures in place. An efficient removal operation requires sufficient planning and readily accessible recovery equipment.

10.2 Aerodrome operator

10.2.1 Where the aircraft accident or serious incident occurs on or adjacent to an aerodrome, the aerodrome operator shall notify MAIB as soon as reasonably practicable and the DCA within 24 hours of the occurrence.

10.2.2 The aerodrome operator should have:

- An officer designated to coordinate the aircraft recovery operation;
- A disabled aircraft removal plan available; and
- A copy of aircraft operators' removal plan on file, for every regular user of the aerodrome.

10.2.3 The aircraft should be removed in a timely and efficient manner. The aerodrome operator may take over the responsibility and contract the removal to a third party in the event that the aircraft operator is unable to recover the aircraft or could not proceed in timely manner.

10.2.4 The aerodrome operator should hold regular tabletop exercises with the aircraft operators to anticipate and prepare for various aircraft removal scenarios and their projected.

10.2.5 Aircraft recovery operations may be conducted while an aerodrome is still in operation. However, recovery devices such as mobile cranes may penetrate the obstacle limitation surfaces or interfere with radio navigational aids. Therefore, risks associated with the recovery operations should be mitigated to ensure aerodrome operational safety.

10.3 Aircraft operator

10.3.1 It is crucial that the aircraft operator notifies MAIB of the incident as quickly as possible. The relevant person which includes aircraft operator to inform MAIB as soon as practicable after he becomes aware of the accident or serious incident.

10.3.2 It is the responsibility of the registered owner or a aircraft operator to remove the disabled aircraft. The operator's insurance representative should also be notified of the accident or incident.

10.3.3 The aircraft operator should have an aircraft recovery process document available for review. The document should include information on who the aircraft operator will use to remove the aircraft and all relevant contact number. A copy of the document should be provided to the aerodrome operator.

10.4 Insurance underwriter

10.4.1 The aircraft operator is ultimately responsible for his aircraft, which includes its removal after an accident. The insurance underwriter may be involved in the aircraft removal process through a representative. The aircraft operator, with the assistance of the underwriter will arrange for the removal of aircraft and, in the case where the aircraft operator possesses the necessary expertise, the operator will perform the aircraft removal. Every effort should be made during the recovery operation to avoid further damage to the aircraft as well as the accident site.

11.0 CONCLUSION

11.1 An established command structure and clear lines of communication between various parties is essential to the efficient removal of disabled aircraft. While tabletop exercises can help to anticipate and prepare for various aircraft removal scenarios, a post mortem of an actual disabled aircraft removal event should be conducted to examine areas where improvements can be made.

11.2 Periodic review of the disabled aircraft removal plan should be conducted by the aerodrome operator to ensure that the plan is in line with the aerodroe operator's own safety policy and in compliance with the requirements found in the MOAS and in tuned to the latest technology, where possible.

Director General
Department of Civil Aviation

Appendix A

OUTLINE OF A DISABLED AIRCRAFT REMOVAL PLAN

An outline of a disabled aircraft removal plan is given below. It is intended as a guide for basic matters to be covered in the plan as well as on action to be taken by the main parties responsible for the overall aircraft removal operation. In general, the disabled aircraft removal plan should be structured to take into account the principal functions, as shown in Appendix B.

1. RESPONSIBILITIES

1.1 **Removal of a disabled aircraft or parts thereof**. Identify the person or agency (usually the aircraft owner or operator) responsible for the removal of the aircraft and define the procedures to follow in the event of failure to comply with such directions.

1.2 **Notification of the aircraft accident to the MAIB**. Identify person or agency (usually the aircraft owner or operator or, when this is not possible, the appropriate authority) responsible for notifying the *MAIB*. Give the telephone number of the MAIB . List the details to be notified, such as the aircraft operator, time, route stage, passengers and fatalities.

1.3 **Preservation of aircraft, mail, cargo and records**. Identify the person or agency (normally the aircraft owner or operator) responsible for preserving, to the extent possible, the aircraft and parts thereof, cargo, mail and all records. Define the procedures to be followed when it is necessary to disturb or move the aircraft or parts thereof (i.e. photographs, marks on the ground and a diagram of the accident site).

2. ACTION REQUIRED BY MAIN RESPONSIBLE PARTIES

2.1 The aerodrome Operator should, among other things:

a) issue the required notice to airmen (NOTAM) as may be appropriate;

b) coordinate all aerodrome operations with the air traffic services units for continuation of aircraft operations, when possible;

c) determine any obstacles and, as a result, consider whether any section of the movement area should be closed;

d) provide for security of the accident site and coordinate with the MAIB on measures to be taken before the aircraft removal operation is initiated;

e) provide advance vehicles and personnel to escort airline equipment to the site;

f) establish a removal command post at the site, if considered necessary;

g) inspect all areas prior to resumption of normal aircraft operations;

h) convene a removal operation debriefing of all interested parties. The debriefing may include a review of MAIB requirements, the coordinator's chronological report, and a discussion of the procedures and equipment used during the recovery operation. It may be desirable that all aircraft operators, especially those operating the same type of equipment, be invited to attend; and

i) amend the disabled aircraft removal plan to overcome problems identified under 2.1 h).

2.2 The aerodrome coordinator of disabled aircraft removal operations should, among other things:

a) convene a meeting with the aircraft operator representative, MAIB investigators, representatives of resident oil companies, heavy equipment contractors and other parties, as necessary, to discuss the most appropriate removal operation and agree upon a broad plan of action. This should cover the following points:

1) escort routes between the aircraft operator's area and the accident site;

2) defuelling to lighten the mass of the aircraft;

3) requirements and availability of equipment for the removal of the aircraft;

4) use of the aerodrome and aircraft operator's equipment;

5) dispatch of aircraft operator ancillary support devices to the scene;

6) weather conditions, particularly when a crane-lifting or pneumatic lifting-bag operation is necessary;

7) lighting of the site;

8) a contingency plan, should difficulties develop in the initial plan; and

b) provide for a rescue and fire fighting vehicle, when necessary;

c) supervise the aerodrome personnel and equipment assigned to the removal operation;

d) make decisions on behalf of the aerodrome authority, as necessary, to expedite the removal of the disabled aircraft;

e) report further penetrations of the obstacle limitation surfaces due to the manoeuvring of cranes or other equipment during the lifting of the aircraft;

f) monitor weather forecasts;

g) maintain a chronological summary of the removal operation;

h) have photographs of the removal operation taken where possible;

i) where excavations are necessary, check with the appropriate aerodrome maintenance services for underground utilities;

j) keep the DCA and other aircraft operators informed of the progress of the aircraft removal operations; and

k) participate in the removal operation debriefing.

2.3 The aircraft operator should, among other things:

a) arrange for portable stairs and removal of mail, baggage and cargo; it being understood that authority to remove these items must be secured from the MAIB;

b) designate one representative with the authority to make all technical and financial decisions necessary to remove the aircraft. The representative should have the use of company facilities, personnel and equipment required for the removal operation;

c) consider designating of a representative to answer any questions from the press and to issue press releases as may be appropriate; and

d) participate in the removal operation debriefing.

2.4 The aircraft operator's representative should, among other things:

a) implement the aircraft operator's removal plan for such an emergency;

b) meet with the aerodrome coordinator, MAIB investigator and other parties, as necessary, to develop a comprehensive plan for the removal of the aircraft;

c) decide on the need for consultation with aircraft airframe and engine manufacturers or other aircraft operator representatives experienced in such accidents; and

d) participate in the removal operation debriefing.

3. EQUIPMENT, PERSONNEL AND FACILITIES

3.1 **Equipment and personnel available**. List of equipment and personnel on or in the vicinity of the airport that would be available for the removal operation. The list of equipment should include information on the type and location of heavy equipment or special units needed and the average time it will take to get them to the airport. The list of personnel should also contain information on the availability of human resources for road-making and other duties. Names, addresses and telephone numbers of personnel and equipment representatives should be given.

3.2 **Access routes**. Include information on access routes to any part of the airport including, if required, special routes for cranes to avoid power lines. A grid map of the type referred to in Annex 14, Volume I, Attachment A, Section 17, may be useful for this purpose.

3.3 **Security**. Define a means of maintaining security for the aircraft removal operation.

3.4 **Aircraft removal equipment kits**. Describe arrangements for the rapid receipt of aircraft removal equipment kits available from other airports. This should be coordinated with the airlines operating at the aerodrome.

3.5 **Aircraft data**. Describe arrangements to make available, at the aerodrome, manufacturer's data pertaining to aircraft removal for the various types of aircraft that normally use the aerodrome.

3.6 **Aircraft defuelling**. Describe arrangements with the resident oil companies to ensure that the defuelling, storage and disposal of the aircraft fuel, including contaminated fuel, can be done at short notice.

3.7 **Responsible representatives**. List names, addresses and telephone numbers of responsible representatives of each aircraft operator, as well as of the nearest representatives of aircraft and engine manufacturers.

Appendix B

PLANNING CHART

The attached chart is intended to be used as a general review and guide to assist in the aircraft removal process. It is not anticipated to be used as step-by-step instructions in dealing with a removal event.

Planning chart

Basic Recovery Steps				
1. Survey	*2. Plan*	*3. Prepare*	*4. Recover*	*5. Report*
Aircraft condition: – Recover or salvage – Attitude – Landing gear – Structure – Damaged components – Missing components – Unserviceable components – Cargo and fuel **Site:** – Terrain – Soil – Access routes **Weather:** – Current – Forecast **Equipment availability:** – Preparation – Levelling – Lifting – Moving – Stabilizing **Manpower availability:** – Number – Skills **Environmental issues:** – Fluid spills – Hazardous materials	**Rapid recovery:** – Important – Not important **Weight and balance:** – Calculate weight of fuel and cargo – Calculate centre of gravity **Weight reduction:** – Unload cargo – Defuel – Remove major components **Recovery:** – Reduce weight – Prepare site – Level – Lift – Stabilize – Move **Schedule equipment and manpower required:** – Confirm delivery plan **Secondary damage:** – Prevent or – Accept to reduce recovery time	**Monitor and record:** – Loads – Actions performed **Assemble equipment and manpower:** – Confirm arrival dates **Weight reduction:** – Unload cargo – Defuel – Remove major components **Prepare site:** – Clear – Excavate – Fill – Stabilize **Roadway:** – Clear – Excavate – Fill – Stabilize – Manufactured temporary roadway	**Monitor and record:** – Loads – Actions performed **Stabilize:** – Tether – Ground anchors – Jacks – Shoring **Level/lift:** – Jacks – Airbags – Cranes – New technology equipment **Debogging:** – Confirm a lifting method **Move:** – Tow on gear – Move on suitable trailer	**Report:** Include in aircraft technical history: – recovery details – repair details – record of loads

Appendix C

COMPOSITION OF THE AIRCRAFT REMOVAL TEAM

It is required that each aircraft operator develop a core group of personnel who will become responsible for any aircraft removal events related to the operator. The consideration for the team are:

a) that it be made up of volunteers from the aircraft maintenance department;

b) that each individual should possess a good technical background and have a strong interest in the aircraft removal process; and

c) those individuals that remain part of the removal team, even if they are promoted or moved to other internal departments, so that any experience gained is not lost.

Appendix D

AIRCRAFT REMOVAL REPORT FORM

This form is designed for use by the aerodrome and/or aircraft operator to record information arising from the removal of a disabled aircraft. It is required by ICAO Annex 13 — *Aircraft Accident and Incident Investigation*.

Aircraft Removal Report Form

Operator: _____

Date of accident/incident: _____ Time: _____

Aerodrome: _____

Aircraft type including dash number: _____

Aircraft registration: _____

Part 1

a) Provide pictorial description of accident/incident showing plan view of aerodrome, buildings, runways and positions of all obstacles encountered during the incident.
b) Provide approximate location, trajectory of aircraft and final attitude of aircraft following incident.
c) Provide supporting photos, diagrams, etc.

Part 2

Provide a detailed written description of the accident/incident. Provide additional photos and diagrams, where necessary.

Part 3

Provide information on ground conditions and depths of wheel ruts. Provide supporting photos, diagrams, etc.

Part 4

Provide a diagram or photo of all nose-gear and main gear wheels. Identify which wheels are off the hard surface by circling the wheel.

Part 5

Provide wind direction and speed at time of accident/incident and at various intervals during the recovery process.

Part 6

a) Approximate aircraft weight: _____

b) Aircraft centre of gravity: _____ distance from datum *or* _____ per cent of mean aerodynamic chord (MAC)

c) Flight phase of aircraft at time of accident/incident (check appropriate phase): _____

☐taxiing/manoeuvring ☐take-off ☐landing ☐towing

d) Distance traversed off runway: _____

e) Runway/taxiway surface condition (check box or specify as appropriate):

☐dry ☐wet ☐snow ☐ice ☐other: _____

f) Off-runway surface nature and conditions (check box or specify as appropriate):

i) Type of ground:
☐sand ☐clay ☐stone ☐other: _____

ii) Nature of surface: ☐flat ☐sloped

iii) Condition of ground:

☐dry ☐wet ☐snow ☐ice

☐hard ☐soft ☐other: _____

iv) Provide details of weather conditions at time of accident/incident :

_____

_____

_____

_____

v) Visibility: ☐day ☐night ☐clear ☐reduced

vi) List obstacles traversed:

_____

_____

_____

_____

g) Resting attitude of aircraft off runway (check appropriate box):

Roll_____ (degrees) ☐to port ☐to starboard
Roll_____ (degrees) ☐nose down ☐nose up

Part 7
Provide full details of the recovery or debogging including all loads imposed.