CIVIL AVIATION GUIDANCE MATERIAL – 1401

AERODROME DISABLED AIRCRAFT REMOVAL PLAN

CIVIL AVIATION AUTHORITY OF MALAYSIA

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Civil Aviation Guidance Material components and Editorial practices

This Civil Aviation Guidance Material is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as *"shall"* or *"must"*, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as "*should"* or "*may*", are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Appendices: Material grouped separately for convenience but forms part of the Standards and Recommended Practices stipulated by the CAAM.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Guidance Material, the use of the male gender should be understood to include male and female persons.

Record of Revisions

Revisions to this CAGM shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

Rev No.	Revision Date	Revision Details	Initials

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Summary of Changes

ISS/REV no.	Item no.	Revision Details

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1 General

1.1 As newer generations of aircraft commence operation at airports, the problem of removal of a disabled aircraft becomes increasingly serious. Most airports find it economically impossible to store all the equipment necessary for the removal of a disabled aircraft. It has been generally agreed that the most feasible approach to the problem to prepare a plan for each airport for the removal of a disabled aircraft and to make arrangements with other States and airports for pooling the required specialized equipment. To this end, airlines have made arrangements so as to make specialized equipment available on short notice on a worldwide basis, and kits have been strategically placed around the world.

1.2 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.

1.3 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.

1.4 Objective

1.4.1 The objective of a aerodrome 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.

1.5 Applicability

1.5.1 This guidance applies to all aerodrome operators certified under Civil Aviation Regulations (Aerodrome Operations) 2016; Regulation 6. Aerodrome operators should examine each item carefully, by considering the size, complexity and scope of operations at the aerodrome to determine what applies.

2 Disabled Aircraft Removal Planning

2.1 CAD 14 Vol. 1 clause 9.3.1 requires the aerodrome operator to establish a plan for the removal of an aircraft disabled on, or adjacent to, the movement area, and a coordinator designated to implement the plan, when necessary.

2.2 The aerodrome disabled aircraft removal plan (Appendix 1) 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 and personnel on, or in the vicinity of, the aerodrome which would be available for such purpose; and

b) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes.

2.3 CAD 14 Vol. I clause 2.10.2 requires that information in the form of an aerodrome disabled aircraft removal plan on the capability to remove a disabled aircraft on or adjacent to the movement area shall be made available.

2.4 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.

2.5 This capability should be based on the equipment available at the aerodrome and on equipment which can be available at short notice. Should the aerodrome 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.

2.6 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 CAD 14 Vol. I clause 2.10.1.

3 Response

3.1 The removal of disabled aircraft can be complex and involve a number of specific procedures including multipart levelling 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 Air Accident Investigation Bureau (AAIB) 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.

4 Responsibilities

4.1 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.

4.2 Aerodrome operator

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

4.2.2 The aerodrome operator should have:

a) an officer designated to coordinate the aircraft recovery operation;

b) an aerodrome disabled aircraft removal plan available; and

c) a copy of aircraft operators' removal plan on file, for every regular user of the aerodrome.

4.2.3 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.

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

4.2.5 Aircraft recovery operations may be conducted while an aerodrome is still in operation. However, recovery equipment 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.

4.3 Aircraft operator

4.3.1 It is crucial that the representative of the aircraft operator notifies aerodrome operator, CAAM and AAIB as soon as practicable after he becomes aware of the accident or serious incident.

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

4.3.3 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 numbers. A copy of the document should be provided to the aerodrome operator.

4.4 Insurance underwriter

4.4.1 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.

5 Conclusion

5.1 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.

5.2 Periodic review of the aerodrome disabled aircraft removal plan should be conducted by the aerodrome operator to ensure that the plan is in line with the aerodrome operator's own safety policy and in compliance with the requirements of CAD 14 Vol. I and in tuned to the latest technology, where possible.

6 Appendices

6.1 Appendix 1 – Outline of an Aerodrome Disabled Aircraft Removal Plan

An outline of a aerodrome disabled aircraft removal plan is given below. It is intended as a guide on basic matters to be covered in the plan as well as action to be taken by main responsible parties for the overall aircraft removal operation. In general, the aerodrome disabled aircraft removal plan should be structured to take into account the principal functions shown in Appendix 2.

1 Responsibilities

1.1 Removal of a disabled aircraft or parts thereof.

Identify person or agency (usually the aircraft owner or operator) responsible for the removal of the aircraft, and define procedures in the event of failure to comply with such directions.

1.2 Notification of the aircraft accident or serious incident to AAIB.

Identify person or agency responsible for notifying AAIB. List the details to be notified, such as aircraft operator, time, passengers and extent of damage.

1.3 Preservation of aircraft, mail, cargo and records.

Identify person or agency (normally the aircraft owner or operator) responsible for preserving, the aircraft and parts thereof, cargo, mail, and all records. Define 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 diagram of the accident site).

2 **Action required by main responsible parties**

2.1 Aerodrome operator should, amongst other things:

a) initiate NOTAM as may be appropriate;

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

c) determine if the serious incident or accident created 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 co-ordinate with AAIB 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 mobile command post at the site, if 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 AAIB's requirements, the coordinator's chronological report, and a discussion of the procedures and equipment during the recovery operation;

i) amend the aerodrome disabled aircraft removal plan to overcome problems identified under h); and

j) participate in the removal operation debriefing.

2.2 Aerodrome coordinator of disabled aircraft removal operations should, amongst other things:

a) convene a meeting with the aircraft operator representative, AAIB investigators, representatives of resident oil companies, heavy equipment contractors and other parties as may be 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 event site;

2) defueling to lighten the mass of the aircraft;

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

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

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

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

7) lighting of the site; and

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

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

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

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

e) monitor weather forecasts;

f) maintain a chronological summary of the removal operation;

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

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

i) keep CAAM and other aircraft operators informed of the progress of the aircraft removal operations;

j) arrange for removal of mail, baggage and cargo, it being understood that authority to remove these items must be secured from AAIB; and

k) participate in the removal operation debriefing.

2.3 Aircraft operator's representative should, amongst other things:

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

b) meet with the aerodrome coordinator, AAIB investigator and other relevant parties to develop a comprehensive plan for the removal of 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 Information on equipment, personnel and facilities

3.1 Equipment and personnel available.

3.1.1 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 aerodrome.

3.1.2 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

3.2.1 Include information on access routes to any part of the airport. A grid map of the type referred to in Annex 14, Volume I, Attachment A, Section 18, may be useful for this purpose.

3.3 Security

3.3.1 Define means of maintaining security for the aircraft removal operation.

3.4 Aircraft removal equipment kits.

3.4.1 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 dara

3.5.1 Describe arrangements to make available, at the aerodrome, manufacturer's data pertaining to aircraft removal for the various types of aircraft which normally use the aerodrome.

3.6 Aircraft defueling

3.6.1 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

3.7.1 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.

6.2 Appendix 2 – Planning Chart

The attached chart is intended 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.

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

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