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Aerodrome Advisory Circular
[AC/AD – 002]

DISABLE AIRCRAFT REMOVAL PLAN

FIRST EDITION

September 2017

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1. Purpose

1 The purpose of this Removal Plan is to provide supplementary guidance material to aerodrome operators in formulating the disabled aircraft removal plan. This Plan provides guidance on what is acceptable to demonstrate compliance with the regulatory requirements in Bhutan Aerodrome Standards section 9.3.

1.1 This Plan recommends and explains elements of removal of a disabled aircraft, 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 and **Appendix B** offers a general review and guide to assist in the aircraft removal process.

2. Applicability

2.1 The Plan applies to all aerodrome operators certified under BANRs 14.2.3.3. However, not all items addressed in this Plan will be 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.

3. Introduction

3.1 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 debugging to major events including damaged or missing landing gear.

3.2 Disabled aircraft will affect many parties. The travelling 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.

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4. Objective

4.1 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.

5. Legislation

5.1 Bhutan Civil Aviation Act section 117 (2) and BANRs 14.2.5.10 state the responsibilities for Protection of evidence, custody and removal of aircraft.

5.2 When an accident or serious incident or incident in the territory of Bhutan to any aircraft either registered in Bhutan or any other State, the Minister being the authority of State of occurrence shall take all responsible measures to protect the evidence and to maintain safe custody of the aircraft and its contents for such a period as may be necessary for the purpose of an investigation.

5.3 Safe custody shall include protection against further damage, access by unauthorized persons, pilfering and deterioration and shall be deemed to be in the custody of the Minister. The aircraft shall not be removed or otherwise interfered without the permission of the Minister.

6. Disabled aircraft removal planning

6.1 The Bhutan Aerodrome Standard section 9.3 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.

6.2 The disabled aircraft removal plan (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:

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

6.2.2 a list of additional equipment available from other aerodromes on request;

6.2.3 arrangements for the rapid receipt of aircraft recovery equipment kits available from other

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aerodromes;

6.2.4 a list of nominated agents acting on behalf of each operator at the aerodrome;

6.2.5 a statement of the airlines arrangements for the use of pooled specialist equipment; and

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

6.3 Bhutan Aerodrome Standards section 9.3.1 recommends that a plan for the removal of an aircraft disabled on, or adjacent to, the movement area shall be established for an aerodrome, and a coordinator designated to implement the plan, when necessary.

6.4 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.

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

6.6 The **telephone/ fax number(s)** of the aerodrome coordinator of operations for the removal of an aircraft disabled on or adjacent to the movement area (if contracted out) must also be made available to the aircraft operators and aerodrome operator.

7. Response

7.1 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 Accident Investigation Unit 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.

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8. Responsibilities

8.1 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.

8.2 Aerodrome operator

8.2.1 Where the aircraft accident or serious incident occurs on or adjacent to the aerodrome, the aerodrome operator shall notify Director General – BCAA and Air Accident Investigation Unit – Ministry of Information and Communications – Thimphu as soon as reasonably practicable.

8.2.2 The aerodrome operator should have;

an officer designated to coordinate the aircraft recovery operation; a disable aircraft removal plan available; and a copy of aircraft operators’ removal plan on file, for every regular user of the aerodrome.

8.2.3 The aircraft should be removed in a timely and efficient manner. The aerodrome operator would 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.

8.2.4 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

8.2.5 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.

8.3 Aircraft operator

8.3.1 It is crucial that the relevant person of the aircraft operator notifies Aerodrome operator, Director General – BCAA and Air Accident Investigation Unit –Ministry of Information and Communications–Thimphu as soon as practicable after he becomes aware of the accident or serious incident.

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

8.3.3 The aircraft operator should have an aircraft recovery process document available for review. The document should include information which 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.

8.3.4 Expenditures incurred in the aircraft recovery process are to be borne by the Owner(s) and Operator of the aircraft.

8.4 Insurance underwriter

8.4.1 The aircraft operator is ultimately responsible for its aircraft, which includes its removal after an accident or a serious incident. 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 the 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.

9. Conclusion

9.1 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

9.2 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 aerodrome operator’s own safety policy and in compliance with the requirements of Bhutan Aerodrome Standard of BCAA and in tuned to the latest technology, where possible.

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10. Reference:

10. Civil Aviation Act, BANRs, Bhutan Aerodrome Standards, ICAO Annex-14 volume I, ICAO Doc 9137 (Part-5).

11. Queries:

11.1 If there are any queries with regard to this Advisory Circular please refer to:



Director General
Bhutan Civil Aviation Authority

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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 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 disabled aircraft removal plan should be structured to take into account the principal functions shown in **Appendix B**.

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 Director General – BCAA and Air Accident Investigation Unit –Ministry of Information and Communications–Thimphu.

- Identify person or agency (usually the aircraft owner or operator or the aerodrome operator) responsible for notifying Aerodrome operator, Director General – BCAA and Air Accident Investigation Unit –Ministry of Information and Communications–Thimphu. 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, among other things:

- a. Issue required NOTAM as may be appropriate;

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- 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 Bhutan Civil Aviation

Authority 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 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 Accident Investigation Unit – MoIC’s requirements, the coordinator’s chronological report, and a discussion of the procedures and equipment during the recovery operation;
- (i) Amend the 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, accident investigators, representatives of resident oil companies, heavy equipment contractors and other parties 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 to the event site;
- 2) Defueling to lighten the mass of the aircraft;
 - 3) Requirements 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;

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- 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
 - (i) maintenance services for underground utilities;
 - (j) Keep BCAA and other aircraft operators informed of the progress of the aircraft removal operations;
 - (k) Arrange for removal of mail, baggage and cargo, it being understood that authority to remove these items must be secured from accident investigators; and
 - (l) 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 aerodrome coordinator, accident investigators and other relevant parties to develop a comprehensive plan for the removal of aircraft;
- (c) Decide on the need for consultation with aircraft airframe 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

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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 aerodrome manual 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 data.

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 defueling, 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.



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APPENDIX B

Planning chart

The attached chart is intended as a general 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: <ul style="list-style-type: none"> - Recover or salvage - Attitude - Landing gear - Structure - Damaged components - Missing components - Unserviceable components - Cargo and fuel Site: <ul style="list-style-type: none"> - Terrain - Soil - Access routes Weather: <ul style="list-style-type: none"> - Current - Forecast Equipment availability: <ul style="list-style-type: none"> - Preparation - Levelling - Lifting - Moving - Stabilizing Manpower availability: <ul style="list-style-type: none"> - Number - Skills Environmental issues: <ul style="list-style-type: none"> - Fluid spills - Hazardous materials 	Rapid recovery: <ul style="list-style-type: none"> - Important - Not important Weight and balance: <ul style="list-style-type: none"> - Calculate weight of fuel and cargo - Calculate centre of gravity Weight reduction: <ul style="list-style-type: none"> - Unload cargo - Defuel - Remove major components Recovery: <ul style="list-style-type: none"> - Reduce weight - Prepare site - Level - Lift - Stabilize - Move Schedule equipment and manpower required: <ul style="list-style-type: none"> - Confirm delivery plan Secondary damage: <ul style="list-style-type: none"> - Prevent or - Accept to reduce recovery time 	Monitor and record: <ul style="list-style-type: none"> - Loads - Actions performed Assemble equipment and manpower: <ul style="list-style-type: none"> - Confirm arrival dates Weight reduction: <ul style="list-style-type: none"> - Unload cargo - Defuel - Remove major components Prepare site: <ul style="list-style-type: none"> - Clear - Excavate - Fill - Stabilize Roadway: <ul style="list-style-type: none"> - Clear - Excavate - Fill - Stabilize - Manufacture temporary roadway 	Monitor and record: <ul style="list-style-type: none"> - Loads - Actions performed Stabilize: <ul style="list-style-type: none"> - Tether - Ground anchors - Jacks - Shoring Level/lift: <ul style="list-style-type: none"> - Jacks - Airbags - Cranes - New technology equipment Debogging: <ul style="list-style-type: none"> - Confirm a lifting method Move: <ul style="list-style-type: none"> - Tow on gear - Move on suitable trailer 	Report: <ul style="list-style-type: none"> - Include in aircraft technical history: - recovery details - repair details - record of loads

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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.

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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

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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):

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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.