KINGDOM OF BAHRAIN
Ministry of Transportation
and Telecommunications

مملكة البحرين
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CIVIL AVIATION PUBLICATION

CAP-106

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Guidance on Frangibility requirements on Installations in Aerodrome Operational Areas

Preface

This Civil Aviation Publication (CAP) on criteria and associated guidelines on Friction testing and maintenance of paved runway surfaces has been prepared by Aviation safety and security directorate (DASS) of Bahrain Civil Aviation Affairs (BCAA) to offer guidance to Aerodrome Operators guidance on frangibility requirement on installation in Aerodrome operational Area .

The guidance can be amended from time to time upon introduction of new methods and techniques through the International Civil Aviation Organization (ICAO).

Director, Aviation Safety and Security

15. JAN.2018

RECORD OF AMENDMENTS

Amendments				
Serial No.	Issue No.	Revision No.	Date	Description
01	01	0	30, Mar 2017	Initial Issue
02	01	01	15, Jan 2018	CAP. serial number revised (CAP- 65 revised as CAP.106)
03	01	01	18 July 2024	Change Logo (Cover)

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Intent

- The purpose of this Civil Aviation Publication (CAP)is to provide supplementary guidance on the frangibility requirements of installations in Aerodrome operational Area at a certified aerodrome. It provides guidance on what is acceptable to the Aerodrome safety section. under Aviation safety and security directorate of the Kingdom of Bahrain , Civil Aviation Affairs to compliance with regulatory requirements in of Civil aviation regulations – CAR001.Aerodrome Standards & Certification regulations.

Applicability

This Civil Aviation Publication (CAP) applies to all certified aerodrome in the kingdom of Bahrain

References

- Civil aviation regulations – CAR001.Aerodrome Standards & Certification regulations.
- ICAO. Annex 14. Vol.1. Aerodrome Design & Operations
- ICAO. Annex 14. Vol.1. Aerodrome Design & Operations
- ICAO. Doc 9157 Aerodrome Design Manual part.6 (frangibility)

1. Introduction

1.1 All fixed and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight, are obstacles. Certain airport equipment and installations, because of their air navigation or aircraft safety functions, must inevitably be so located and/ or constructed that they are obstacles, may be permitted but are required to be frangible in design.

1.2 The specifications of the limits of the area to be kept free of any obstacle other than which are required for air navigation or aircraft safety purpose are given in section 5.4.6,5.4.7& 5.14 Civil Aviation Regulation CAR001.

1.3 This CAP provides guidance to the aerodrome operators regarding frangibility requirements to be ensured while siting of airport equipment or installation required for air navigation or aircraft safety purpose, to be located at certain operational areas.

1.4 It is important to note that this CAP on its own does not change, create, amend or permit deviations from regulatory requirements nor does it establish minimum standards.

2. Obstacles to be made Frangible

2.1 The frangibility of an object is its ability to retain its structural integrity and stiffness up to a desired maximum load, but on impact from a greater load, to break, distort or yield in such a manner as to present the minimum hazard to aircraft.

2.2 When airport equipment, such as a vehicle or plant, is an obstacle, it Is generally a temporary obstacle. However, when airport installation, such as visual aids, radio aids and meteorological installations, are obstacles, they are generally permanent obstacles.

2.3 There are many types or airport equipment and installations which, because of their particular air navigation functions, may be so located that they constitute obstacles. Such airport equipment and installations may include:

a) ILS glide path antennas;
b) ILS localiser antennas;
c) Wind direction indicators;
d) Landing direction indicators;
e) Anemometers;
f) Ceilometers;
g) Transmissometers;
h) Elevated runway edge, threshold, end and stopway lights;
i) Elevated taxiway edge tights;
j) Approach lights;
k) Visual approach slope indicator system lights;
l) Signs and markers;
m) Certain radar and other electronic installations and other devices not itemized above;

2.5 As per CAR specifications, any equipment or installation required for air navigation or aircraft safety purposes which must be located on a runway strip, RESA, Clearway which would endanger aircraft in air or taxiway strip (within specified distances) should be frangible and mounted as low as possible

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2.7 The provision also specifies that any equipment which penetrates the inner approach surface, the inner transitional surface or the balked landing surface; should also be frangible and mounted as low as possible.

3. Siting and design of Equipment

3.1 The detailed guidelines for siting of navigational and visual aids and their design consideration are given in ICAO Doc 9157 Aerodrome Design Manual Part 6.

3.3 Many factors must be considered in the selection of aid fixtures and their mounting devices to ensure that the reliability of the aids is maintained and that the hazard to aircraft in flight or manoeuvring on the ground is minimal. It is therefore important that appropriate structural characteristics of all aids which may be obstacles be assessed for frangibility and reliability.

3.4 Every effort should be made to ensure that the aids will retain their structural integrity when subjected to the most severe environmental conditions. However, when subjected to aircraft impact in excess of the foregoing conditions, the aids will break or distort in a manner which will cause minimum or no damage to the aircraft.

3.5 Caution should be taken, when installing visual aids in the movement area, to ensure that the light support base does not protrude above ground, but rather terminates below ground as required by environmental conditions so as to cause minimum or no damage to the aircraft overrunning them. However, the frangible coupling should always be above ground level.