CIVIL AVIATION GUIDANCE MATERIAL – 1409

GUIDELINES FOR AEROPLANE LANDING AREAS

CIVIL AVIATION AUTHORITY OF MALAYSIA

ISSUE 01
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Introduction

This Civil Aviation Guidance Material 1409 (CAGM – 1409) is issued by the Civil Aviation Authority of Malaysia (CAAM) to provide guidance for the Aeroplane Landing Areas, pursuant to Civil Aviation Directives 2001 – Protection of Persons and Property (CAD 2001 – Protection of Persons and Property).

Organisations may use these guidelines to ensure compliance with the respective provisions of the relevant CAD's issued. Notwithstanding the Regulation 65 of the Civil Aviation (Aerodrome Operations) Regulations 2016 (CA (AO) R 2016), when the CAGMs issued by the CAAM are complied with, the related requirements of the CAD's may be deemed as being satisfied and further demonstration of compliance may not be required.

(Datuk Captain Chester Voo Chee Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

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.

It is to be noted that some Standards in this Civil Aviation Guidance Material incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

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 Objective

These guidelines set out factors that may be used to determine the suitability of a place for the landing and taking-off of aeroplanes. Experience has shown that, in most cases, application of these guidelines will enable a take-off or landing to be completed safely, provided that the pilot in command:

a) has sound piloting skills; and

b) displays sound airmanship.

2 Applicability

This guidance applies to:

a) aeroplanes of a maximum certified take-off weight of 5700 kg or less. International and commercial air transport operations by this aircraft are only permitted at certified aerodromes; and

b) specifications stated in this guidance are only for flights conducted by day light hours and under Visual Flight Rules (VFR).

3 Types of Operations May Be Conducted from A Landing Area

Aeroplanes engaged in the following operations may use a landing area:

a) private;

b) aerial work-excluding student solo flying and student dual flying prior to successful completion of the General Flying Progress Test; and

c) charter.

4 Minimum Physical Characteristics

4.1 General

The following summarise the basic requirements of Civil Aviation Directive (CAD) 14 Vol. I physical specifications for a non-instrument runway for an aeroplane with a wing span of less than 15 m and an outer main gear wheel span of less than 4.5 m. It is the responsibility of the pilot and/or operator to ascertain whether the aerodrome meets the other Annex specifications and obstacle clearance surfaces. Refer also to figures 1 and 2.

4.2 Runway

4.2.1 Width. A minimum width of 15 metres is recommended for runways.

4.2.2 Length. A runway length equal to or greater than that specified in the aeroplane's Approved Flight Manual (AFM) or approved performance charts for

the prevailing conditions is required. Both take-off and landing requirements need to be considered for both directions.

4.2.3 Longitudinal slope. The longitudinal slope between the runway ends should not exceed 2%.

4.2.4 Transverse Slope. The transverse slope between the extreme edges of the runway strip should not exceed 2.5% or 12.5% upward slope over the fly-over area.

4.3 Taxiway

4.3.1 Where provided, the taxiway width shall be a minimum of 7.5 m wide.

4.4 Surface

4.4.1 The runway and taxiway surface shall be capable of withstanding the traffic of aeroplanes it is intended to serve.

4.5 Obstacle clearance surfaces

The following describe the basic CAD 14 Vol. I requirements for obstacle clearance surfaces for a non-instrument runway. No obstacle shall infringe above those surfaces. It remains the responsibility of the pilot and/or operator to ascertain that the aerodrome has the required obstacle clearances.

4.5.1 Approach surface. An inclined slope of 5% (3° or 1:20) to 1600 m with 10% divergence.

4.5.2 Transitional surface. A surface alongside of the runway strip that slopes upwards and outwards at 20 % to a height of 45 m.

4.5.3 Inner horizontal surface. A surface located in a horizontal plane above an aerodrome to a height of 45 m (150 ft) and a radius of 2000 m from a defined aerodrome reference point.

4.5.4 Conical surface. A surface sloping upwards at 5% and outwards from the periphery of the inner horizontal surface to a height of 35 m (106 ft) above the inner horizontal surface.

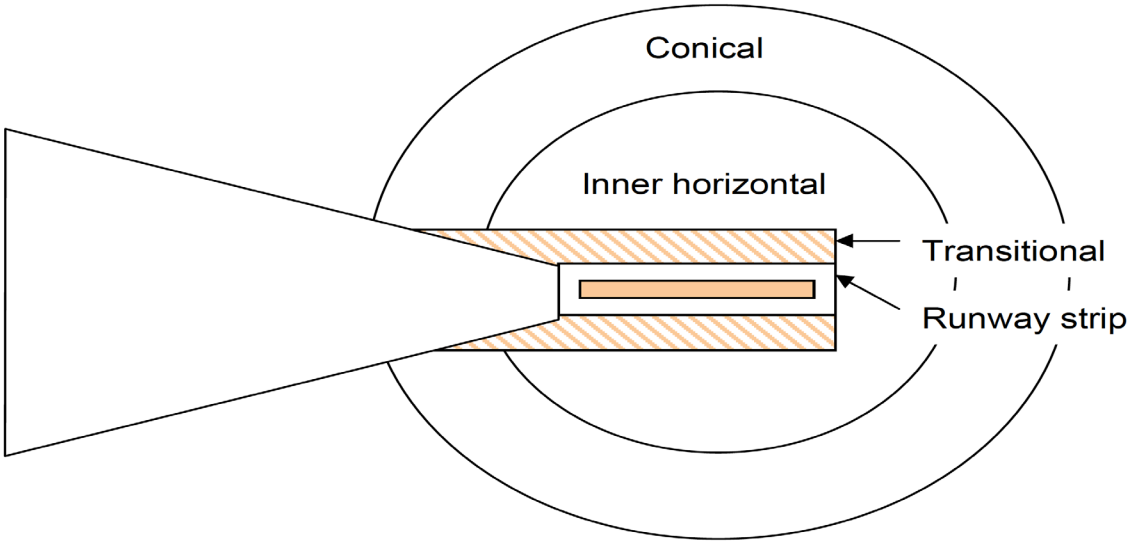

Figure 1: Basic obstacle clearance surfaces

4.6 Float plane alighting areas

For water operations, a minimum width water channel of 60 m shall be required. The depth of water over the whole water channel shall not be less than 0.3 m below the hull or floats when the aeroplane is stationary and loaded to maximum take-off weight. An additional 30 m wide area, as shown in figure 2, provides a protective buffer for the water channel but need not consist of water. Where the additional area consists of water then it shall be clear of moving objects or vessels under way. The centre line of a water channel may be curved, provided that the approach and take-off areas are calculated from the anticipated point of touchdown or liftoff.

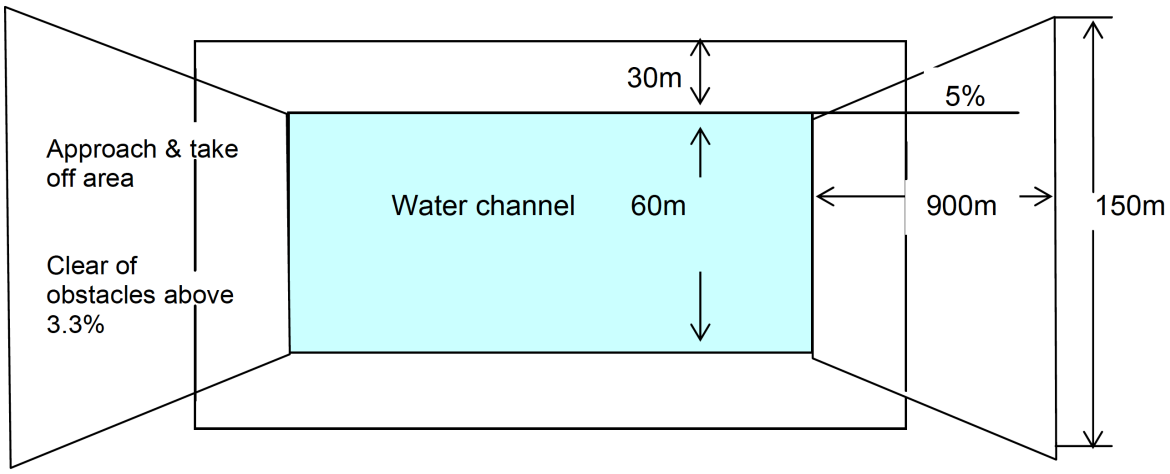

Figure 2: Water Alighting Area Dimensions

5 Marking of Landing Areas

5.1 Where extended operations are expected to be conducted at a landing area, the owner/operator is encouraged to provide markings similar to those found at certified aerodromes. If markings are provided, they should follow the colours and specifications set out in CAD 14 Vol. I.

5.2 Where runway markers are provided which are not flush with the surface, they should be constructed of a material that is not likely to damage an aircraft.

6 Other Considerations

6.1 A pilot should not use an aerodrome or have an aeroplane engine running unless the aeroplane is clear of all persons, animals, vehicles or other obstructions.

6.2 A pilot shall not use an aerodrome without taking all reasonable steps to ensure the physical characteristics and dimensions are satisfactory. For aerial work and charter operations the operator should provide evidence to the pilot on the suitability of an aerodrome prior to its use. Ultimately it is the pilot who is responsible for the safe operation of the aircraft.

6.3 Geographic Location. A landing area should not be located:

a) within the area or in such close proximity as to create a hazard to aircraft conducting a published instrument approach, excluding the holding pattern; or

b) within any area where the density of aircraft movements makes it undesirable; or

c) where take-off or landing involving flight over a populated area creates

6.4 Except in an emergency, the consent of the owner/occupier is required before a landing area may be used.

6.5 If the proposed landing area is located near a city, town or populous area or any other area where noise or other environmental considerations make aeroplane operations undesirable, the use of such a landing area may be affected by the provisions of the environment protection law and other legislation. It is the responsibility of the pilot and/or operator to conform with these requirements.

6.6 A method of determining the surface wind at a landing area is desirable. A wind sock is the preferred method.

6.7 The surface of a landing area should be assessed to determine its effect on aeroplane control and performance. For example, soft surfaces or the presence of long grass (over 150mm) will increase take-off distances while moisture, loose gravel or any material that reduces braking effectiveness will increase landing distance.

7 Surface Testing of a Landing Area

7.1 Rough Surfaces. The presence of holes, cracks and ruts will degrade aeroplane performance and handling and increase the possibility of structural damage. The smoothness of a runway can be tested by driving a stiffly sprung vehicle along the runway at a speed of at least 75 kph. If this is accomplished without discomfort to the occupants, the surface can be considered satisfactory.

7.2 Soft, Wet Surfaces. A test vehicle as indicated in the table below should be driven in a zig-zag pattern at a speed not exceeding 15 kph along the full length and width of the runway. Particular attention should be paid to suspect areas with possibly three passes over these areas. If tyre imprints exceed a depth of 25mm the surface is not suitable for aircraft operations represented by the test vehicle. Experience may prove that for a certain type of aircraft (eg, an aircraft with small wheels or high tyre pressure) operations are unsafe with a lesser imprint. Testing with a crowbar should also be done in several places along the runway to ensure that a dry surface crust does not conceal a wet base.

USER AIRCRAFT WEIGHT	SUGGESTED VEHICLE TO BE USED FOR TEST
1. MTOW not exceeding 2000kg	Fully laden utility, Landrover, station sedan
2. MTOW 2001kg to 3400kg	Fully laden 1.5 tonne truck or lightly laden 3 tonne truck
3. MTOW 3401kg to 5700kg	Fully laden 3 tonne truck
Attention should also be given to the remainder of the strip as this area is provided for run-off in the event of an abnormal take-off or landing	

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