CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

Advisory Circular
AC 139-11

Revision 2

Use of day-VFR aerodromes

27 April 2007

General

Civil Aviation Authority advisory circulars (AC) contain information about standards, practices and procedures that the Authority has found to be acceptable for compliance with the associated rule.

Consideration will be given to other methods of compliance which may be presented to the Authority.

When new standards, practices or procedures are found to be acceptable they will be added to the appropriate advisory circular.

In addressing a subject the use of the imperative "shall", a term not normally welcome in an AC, is because it is associated with mandatory provisions of the Rule itself.

Each reference to a number in this AC, such as 139.15, is a reference to a specific rule within Part 139

Purpose

This Advisory Circular (AC) provides methods acceptable to the Authority for showing compliance with the requirements on the use of aerodromes under Part 139 of the Civil Aviation Rules (CAR) in relation to day-VFR aerodrome design.

Focus

This material is intended for the operator of an aeroplane at or below 5700 kg MCTOW that is engaged in day-VFR air transport operations.

Related Rules

This AC relates specifically to Part 139, Subpart E, *Use of Aerodromes*, 139.305 *Use of Aerodromes - Air Transport Aeroplanes*.

Change Notice

Revision 2 re-formats and re-numbers this advisory circular from AC 139-11A to AC 139-11 as part of a project to standardise the numbering of all ACs.

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USE OF LAND AERODROMES FOR DAY-VFR OPERATIONS

1 Objective

1.1 This AC provides explanation and guidance on:

(a) aerodrome design;

(b) aeroplane performance and its relationship with aerodrome design; and

(c) continued use of aerodromes that do not fully meet the aerodrome design standards.

2 Day-VFR aerodrome design

2.1 AC139-7[†] Aerodrome design contains design standards that are acceptable to the Director for use by aeroplanes at or below 5700 kg MCTOW that are engaged in air transport operations.

[†] *Always use the latest version of an advisory circular, each subsequent version has a suffix letter in alphabetical sequence.*

2.2 New Zealand day-VFR aerodrome standards have been developed and applied to VFR aerodromes used for infrequent air transport operations at remote areas for a number of years. The aeroplanes using these aerodromes are operated by professional pilots who are subject to a regime of training and checking related to the aerodromes.

2.3 Aerodrome standards are based on a reference aeroplane which is usually the largest or the most critical aeroplane to use the aerodrome. The specification for the day-VFR runway and runway strip widths are related to the reference aeroplane's wheel and wing span. The runway has defined take-off climb, approach, and side obstacle limitation surfaces that are essentially free of protruding objects. This is to ensure that any obstacle does not restrict the effective use of the aerodrome or be a hazard to safety.

2.4 The intention of the aerodrome standards is to enable the reference aeroplane to be operated safely to its full payload potential. The required runway length is a product of aeroplane performance and should be equated to the requirements of the reference aeroplane.

3 Design compliance

3.1 Any aerodrome used for day-VFR air transport operations should meet the minimum design specifications contained in AC139-7 *Aerodrome design aeroplanes at or below 5700 kg MCTOW*. The aerodrome design specifications are not intended to set operational limitations, but set the minimum standards for aerodrome design.

3.2 There are a number of long established aerodromes used for day-VFR air transport operations which do not fully comply with the aerodrome design specifications due to the presence of irremovable objects. These aerodromes have a history of safe operations by specific operators who have applied limitations on the use of the aerodromes in terms of specific pilot training, pilot experience, surface wind conditions and suchlike.

3.3 In the case of aerodromes that cannot fully meet the design specifications of AC139-7, the aeroplane operator concerned should:

(a) establish operating conditions and limitations to maintain an equivalent level of safety; and

(b) document the established conditions and limitations to the operating pilots.

4 Aerodrome design and aeroplane performance

4.1 The approved performance data contained in the aeroplane flight manual is used to determine compliance with the aeroplane performance operating limitations prescribed in the Civil Aviation legislation.

4.2 The performance limitations applicable to the use of aerodromes are those prescribed for take-off, landing, and obstacle clearance in the take-off flight path.

4.3 Take-off and climb:

(a) The aerodrome design take-off climb surface of 1:20 related to runway take-off effective operational length (EOL) provides a simple system for the aeroplane operator to calculate the aeroplane's maximum take-off weight to comply with the prescribed obstacle clearance requirements. If an obstacle does intrude into the take-off climb surface, the runway take-off EOL is reduced to the distance from which the 1:20 is achieved. Figures 1 and 2 provide simple illustrations of this.

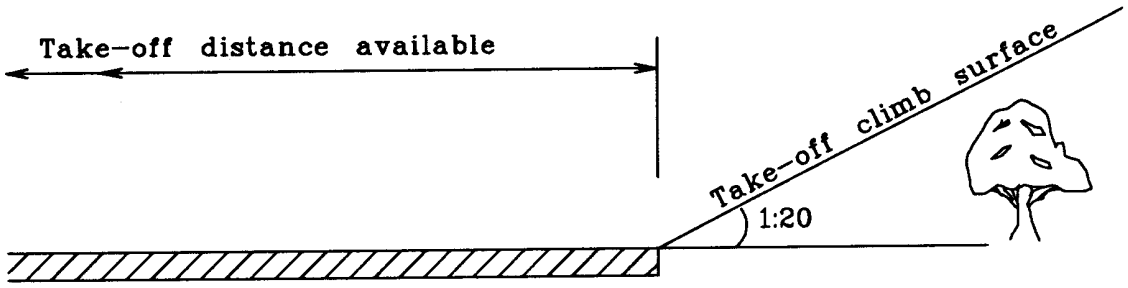

Figure 1. Obstacle free design take-off surface

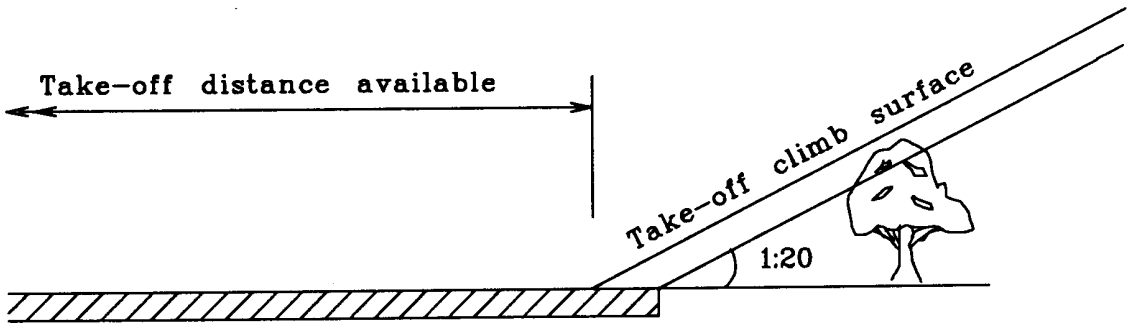

Figure 2. Obstructed design take-off climb surface

(b) A more precise method of calculating compliance with the take-off and climb performance requirement is to determine:

(i) the height of the critical obstacle above the aerodrome level; and

(ii) the distance of the critical obstacle from the end of the take-off distance available; and

(iii) use the aeroplane flight manual performance data to calculate the aeroplane take-off weight and configuration to clear the obstacle by the required margin; or

(iv) in the absence of usable performance data, establish demonstrated procedures and limitations to achieve obstacle clearance.

This involves a more sophisticated calculation but may be advantageous to the aeroplane operator in terms of increased payload over that calculated using the take-off EOL. Refer to Figure 3.

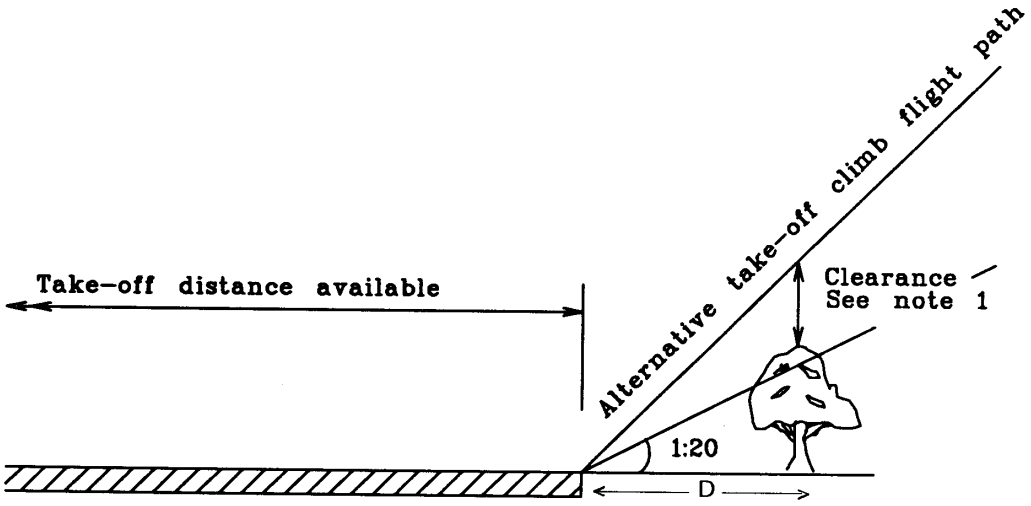

Figure 3. Takeoff climb obstruction clearance requirement

Notes:

1. *Obstruction clearance to be at least 15m (50 feet) + 0.025D* vertically, or 30m (100 feet) + 0.10D laterally*
   **D = Distance from the end of the runway takeoff distance available*
2. *A turned flight path is permissible but the bank should not exceed 15º for multi-engine aeroplanes*

4.4 Landing:

(a) The aerodrome design approach surface of 1:20 provides a nominal touch down point on the runway which provides obstacle clearance for the aeroplane on a normal approach in accordance with the flight manual. An obstruction intruding into the approach surface would displace the landing threshold and reduce the runway landing length available. Refer to Figures 4 & 5 for no-obstruction and obstruction approach surface designs.

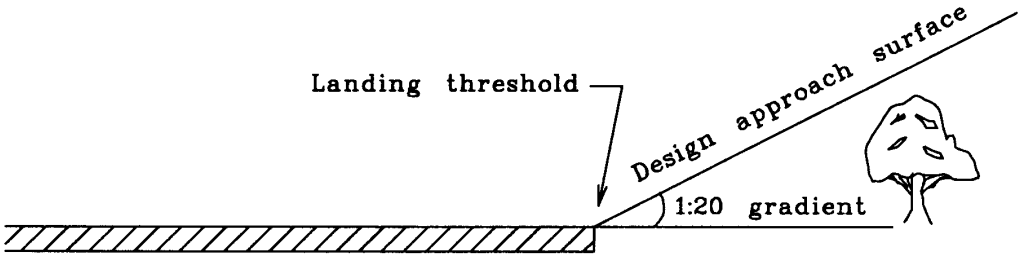

Figure 4. Aerodrome design approach surface - no obstruction

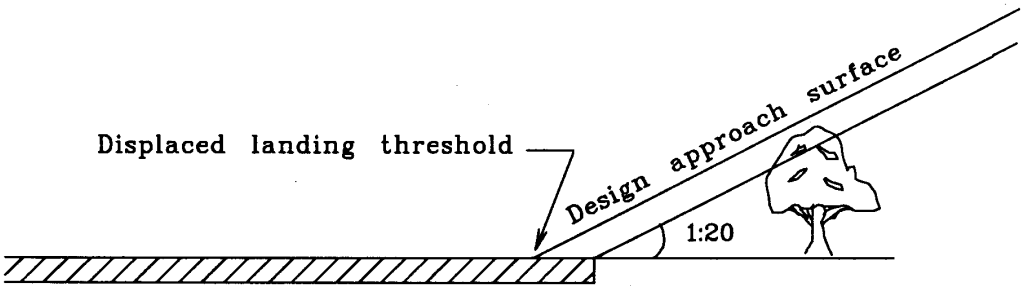

Figure 5. Aerodrome design approach surface - obstruction

(b) If an obstruction does reduce the 1:20 landing EOL, an aeroplane operator may establish a variation in the approach and landing techniques for steeper approach angles, within the limitation of the aeroplane flight manual, to clear the obstruction and utilise the full length of the runway available for landing rather than use the displaced threshold. Refer to Figure 6.

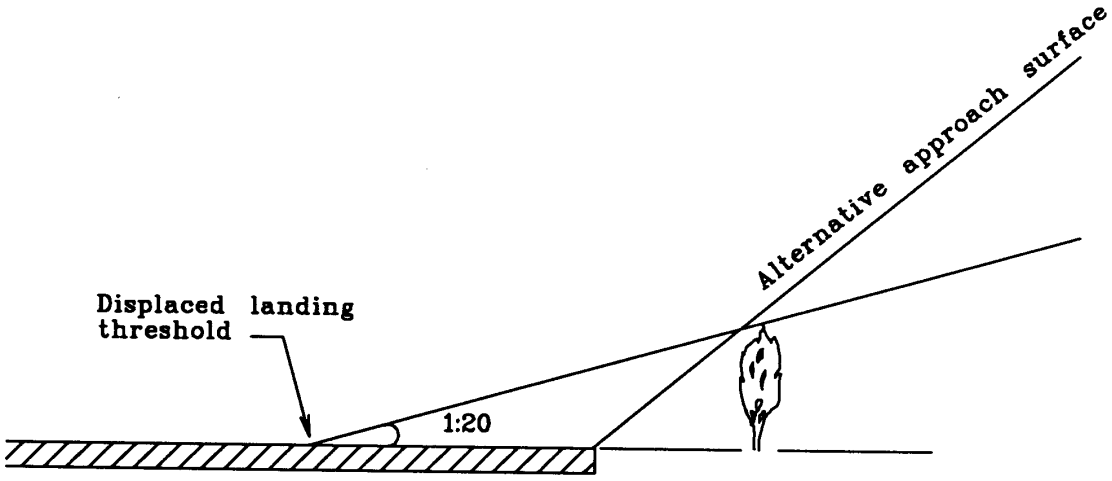

Figure 6. Approach surface obstruction clearance