REPUBLICA DE CABO VERDE

AGÊNCIA DE AVIAÇÃO CIVIL
CIVIL AVIATION AUTHORITY

Advisory Circular
CT 42-004

SUBJECT: CONTROL OF OBSTACLES

Data: 14/03/2018

PURPOSE

This Advisory Circular provides methods, acceptable to the Authority, for showing compliance with the control of obstacle limitation surfaces requirements of Part 14 and explanatory material to assist in showing compliance.

RELATED CAR

This CT relates specifically to CAR PART 14 and MOS 14.

CHANGE NOTICE

Revision 1 updates the content of this advisory circular to align with the latest amendment to Part 14.

1. AERODROME OBSTACLE LIMITATION SURFACES

1.1 General

A. The effective utilisation of an aerodrome may be influenced by natural features and man made objects inside and outside the aerodrome boundary. These may result in:

(1) limitations on the distance available for aircraft take-off and landings;

(2) the range of meteorological conditions in which take-off and landings can be undertaken; or

(3) a reduction in the payload of some aircraft types, or all the above.

1.2 Obstacle limitation surfaces

A. Of the aerodrome design obstacle limitation surfaces the following are the essential elements —

(1) take-off climb surface

(2) approach surface

(3) transitional side surface

(4) inner horizontal surface

(5) conical surface

B. The aerodrome design specifications state that all existing objects penetrating the obstacle limitation surfaces should, as far as practical, be removed unless they are shielded by existing immovable objects. Detailed specifications about the marking and lighting of obstacles are contained in MOS 14, Chapter 4.

1.3 Aerodrome obstacle chart Type "A"

A. The aerodrome obstacle chart Type "A" represents a profile of the take-off obstruction environment on departure from a specific runway. The basic slope shown on the chart is 1.2 percent which is below the slope of the protected take-off climb surface established for a runway intended for use by multi-engine aircraft.

B. Although objects may penetrate the 1.2 percent (1:83.3) slope, there is no need to remove any which are beneath the aerodrome design take-off climb surface. However, all objects shown are accountable in the calculation of the aircraft take-off performance and in some instances may affect the payload of a particular aircraft type. The extent of this limitation depends on individual circumstances, but it is possible to significantly reduce the payload penalty by judicious obstacle removal close to the aerodrome. Conversely, it may be that an obstacle several kilometres from the aerodrome is the limiting factor.

1.4 ICAO PANS-OPS surfaces

A. The PANS-OPS surfaces are used in the construction of instrument flight procedures. They are designed to safeguard an aeroplane from collision with obstacles when flying on instruments. Pilots use minimum safe altitudes, established for each segment of the instrument procedures, which are based on obstacle clearances in the procedure areas.

B. Instrument flight procedure obstacle free surfaces sizes and dimensions do not usually coincide with the aerodrome design obstacle limitation surfaces. Look in PANS-OPS, Doc 8168, Volume 2 for the obstacle free surfaces needed for instrument approach, missed approach procedures, and for visual manoeuvring (circling) procedures.

2. OBSTACLE CONTROL

2.1 General

A. When considering obstacle control the following should not be overlooked as they could have an adverse effect on the regularity of aircraft operations:

(1) objects which penetrate the approach surface are critical since they represent an erosion of the clearance between the final approach path, usually 3 degrees, and fixed or mobile obstacles on the ground.

(2) on an approach where the approach surface is significantly obstructed, the safe operation of aircraft is ensured by raising the aerodrome approach meteorological minima. If the object penetrates into the approach surface, the landing threshold is displaced, effectively reducing the available landing distance. This can have an adverse effect on the regularity of aircraft operations and could impose payload penalties on landing aircraft.

(3) the transitional surfaces are adjacent to the runway strip and approach surface. Penetration of them by an obstacle results in the reduction in the clearance available whilst carrying out an approach to land or during a missed approach procedure.

(4) such obstacles may have an adverse effect on the aerodrome meteorological minima and may need marking and lighting.

(5) aircraft performance requirements, applicable to take-off and climb, require all aircraft to clear all obstacles by a minimum specified margin.

(6) For a multi-engine aircraft, that requirement includes the climb following failure of the critical engine. Objects which penetrate approach and take-off climb surfaces do not represent a degradation of safety standards but they may impose significant payload penalties on aircraft taking off.

(7) the inner horizontal surface is more significant for VFR operations.

(8) it also provides protection for circuiting aircraft following an instrument approach. It does not usually represent a critically limiting surface around a large aerodrome handling IFR traffic, except in so far that it extends beneath the approach surface.

(9) the conical surface represents the obstacle limiting surface some distance from the aerodrome.

(10) it is often not practical to control obstacles which penetrate this surface, although it does usually provide a limit to new construction.

(11) obstacle control, to maintain or improve the Aerodrome Obstacle Chart - Type "A" obstacle profile, should be based on the clear understanding of the

performance requirements of the aircraft regularly using the aerodrome or those proposed to be brought into regular use.

(12) any obstacles which are allowed to penetrate the established PANS-OPS surfaces could raise the minimum safe altitudes of the aerodrome instrument flight procedures.

2.2 Identifying obstacles

A. Identification of obstacles requires a complete engineering survey of all areas beneath the aerodrome obstacle limitation surfaces.

B. The initial survey should produce a chart presenting a plan view of the entire aerodrome and its environs. The scope of the chart should be to the outer limit of the conical, approach and take-off climb surfaces. It will need to include profile views of all obstacle limitation surfaces. Each obstacle should be identified in both plan and profile with its description and height above the datum, which should be specified on the chart. Engineering field surveys can be supplemented by aerial photographs and photogrammetry to identify possible obstacles not readily visible from the aerodrome.

C. The survey specification for the aerodrome obstacle chart Type "A" is contained in MOS 14, Chapter 4, as it is data and information that is required to be provided for promulgation by AIS.

D. Periodic surveys should be conducted to ensure the validity of the information in the initial survey. The aerodrome operator should make frequent visual observations of surrounding areas to determine the presence of new obstacles. Follow-up surveys should be conducted whenever significant changes occur. A detailed survey of a specific area may be necessary when the initial survey indicates the presence of obstacles for which a control programme is contemplated. Following completion of an obstacle control programme, the area should be resurveyed to provide corrected data on the presence or absence of obstacles. Similarly, revision surveys should be conducted if changes are made, or planned, to the aerodrome characteristics such as runway length, elevation or orientation. No firm rule can be set down for the frequency of periodic surveys, but constant vigilance is required. Changes in obstacle data arising from surveys are to be notified to the Aeronautical Information Service (AIS) as soon as practicable for promulgation to the aircraft operators.

2.3 Methods of control

The viability, and safety, of aerodrome use, by aircraft operators, can be assured by establishing effective obstacle control to maintain the obstacle limitation surfaces. Control can be achieved, in a number of ways, by:

(1) enactment of height zoning protection by the local authority;

(2) establishing an effective obstacle removal programme; or

(3) purchasing of easement or property rights, or all of these.

2.4 Height zoning

A. The objective of height zoning is to protect the aerodrome obstacle limitation surfaces from intrusion by manmade objects and natural growth such as trees.

B. This is done by the enactment of ordinances identifying height limits underneath the aerodrome obstacle limitation surfaces. The responsibility for the enactment of such an ordinance is a matter between the aerodrome operator and the local authority.

C. To give effect to height-zoning a zoning map should be prepared for the guidance of the responsible local authority. The map is a composite, relating all zoning criteria to the ground level around the aerodrome. It should cover the aerodrome design obstacle limitation surfaces and, where applicable, the take-off flight path for the aerodrome obstacle chart Type "A" and any PANS-OPS surfaces.

D. Typical zoning ordinances include a statement of the purpose of, or necessity for, the action. They include a description of the obstacle limitation surfaces which should conform to the aerodrome design surfaces and, if applicable, the aerodrome obstacle chart Type "A" and the PANS-OPS surfaces. They also contain a statement of allowable heights which should conform to the specifications for these surfaces. Provisions are made, in the ordinances, for a maximum allowable height, for existing non-conforming uses, for marking and lighting of obstacles and for appeals from the provision of the ordinance. The matter of bird control could also be addressed at the same time by defining areas which the siting of gravel pits, refuse dumps, sewage outfalls and other features, which attract birds, may be subjected to restriction in the interests of aviation safety.

2.5 Obstacle removal

A. When obstacles have been identified, the aerodrome operator should make every effort to have them removed, or reduced in height so that they are no longer an obstacle. If the obstacle is a single object it may be possible to reach agreement with the owner of the property to reduce the height to acceptable limits without adverse effect. Examples of such objects are a tree, a television aerial or a chimney.

B. In the case of trees, which are trimmed, agreement should be reached in writing with the property owner to ensure that future growth will not create new obstacles. Property owners can give such assurance by agreeing to trim the trees when necessary, or by permitting access to the premises to have the trimming done by the aerodrome operator's representative. It is important to assess the growth rate of trees and trim them low enough so that the ensuing growth will be below the obstacle surface until the surface is next due for survey.

C. Some aids to navigation both electronic, such as ILS components, and visual, such as approach and runway lights, constitute obstacles which cannot be removed. Such

objects should be frangible designed and constructed, and mounted on frangible couplings so that they will fail on impact without significant damage to an aircraft.

2.6 Easements or property rights

A. In those areas where zoning is inadequate the aerodrome operator may take steps to protect the obstacle limitation surfaces by other means. Examples of zoning inadequacies might be locations close to runway ends or where obstacles exist. Examples of other means might be such as gaining easements or property rights. They should include removal or reduction in height of existing obstacles and measures to ensure that no new obstacles may be erected in the future.

B. Where agreement can be reached, for the reduction in height of an obstacle, the agreement should include a written aviation easement limiting heights over the property to specific levels unless effective height zoning has been established.

2.7 Marking and lighting of obstacles

A. Where it is impractical to eliminate an obstacle, it should be appropriately marked or lighted, or both, to be clearly visible to pilots in all weather and visibility conditions. ICAO Annex 14, Aerodromes, Chapter 6, contains detailed specifications about the marking and lighting of obstacles.

B. Note that the marking and lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of obstacles. It does not necessarily reduce operating limitations which may be caused by the obstacle. ICAO Annex 14 specifies that obstacles be marked and, if the aerodrome is used at night, lighted, except that:

(1) lighting and marking may be omitted when the obstacle is shielded by another obstacle; and

(2) the marking may be omitted when the obstacle is lighted by high intensity obstacle lights by day.

C. Vehicles and other mobile objects, excluding aircraft, on movement areas of aerodromes should be marked and lighted, unless they are used on apron areas only.

2.8 Obstacle shielding

The principle of obstacle shielding is employed to permit a more logical approach to restricting new construction and to the requirements for marking and lighting of obstacles. Shielding principles are employed when some object, an existing building or natural terrain, already penetrates above one of the aerodrome design obstacle surfaces. If the obstacle is permanent, then additional objects within a specified area around it can penetrate the surface without being obstacles. The original obstacle dominates or shields the surrounding area. Further guidance material on the principle of obstacle shielding is contained in ICAO Doc 9137-AN/898, Airport Services Manual, Part 6, Control of obstacles.

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