

Chapter 13

Apron Floodlighting

13.1 INTRODUCTION

13.1.1 The following material is provided in order to give guidance in the application of Annex 14, Volume I, 5.3.21.

13.1.2 An apron is a defined area on a land aerodrome intended to accommodate aircraft for the purpose of loading and unloading passengers, mail or cargo; refuelling; parking or maintenance. Aircraft would normally be expected to move into these areas under their own power or by towing, and adequate lighting is necessary to enable these tasks to be performed safely and efficiently at night.

13.1.3 The part of the apron containing the aircraft stands requires a relatively high level of illuminance. The size of each aircraft stand is largely determined by the size of the aircraft and by the amount of space necessary to manoeuvre the aircraft safely into and out of this position.

13.2 FUNCTIONS

13.2.1 The primary functions of apron floodlighting are to:

- a) assist the pilot in taxiing the aircraft into and out of the final parking position;
- b) provide lighting suitable for passengers to embark and disembark and for personnel to load and unload cargo, refuel and perform other apron service functions; and
- c) maintain airport security.

Aircraft taxiing

13.2.2 The pilot mainly relies on apron floodlighting when taxiing on the apron. Uniform illuminance of the pave-

ment within the aircraft stand and elimination of glare are major requirements. On taxiways adjacent to aircraft stands, a lower illuminance is desirable in order to provide a gradual transition to the higher illuminance on the aircraft stands.

Apron service

13.2.3 These functions require uniform illuminance of the aircraft stand area of a sufficient level to perform most of the tasks. In case of unavoidable shadows, some tasks may require supplementary lighting.

Airport security

13.2.4 Illuminance should be sufficient to detect the presence of unauthorized persons on the apron and to enable identification of personnel on or near aircraft stands.

13.3 PERFORMANCE REQUIREMENTS

Choice of light source

13.3.1 Various light sources can be applied. The spectral distribution of these lights shall be such that all colours used for aircraft markings connected with routine servicing, and for surface and obstruction markings, can be correctly identified. Practice has shown that incandescent halogen, as well as different high-pressure gas discharge lamps, is suitable for this purpose. Discharge lamps, by the nature of their spectral distribution, will produce colour shifting. Therefore it is imperative to check the colours produced by these lamps under daylight as well as artificial light to ensure correct colour identification. Occasionally it may be advisable to adjust the colour scheme used for surface and obstruction markings. For economic reasons high-pressure sodium or high-pressure mercury halide lamps are recommended.

Illuminance

13.3.2 An average illuminance of not less than 20 lux is needed for colour perception and is considered the minimum requirement for the tasks to be carried out on the aircraft stands. In order to provide optimum visibility, it is essential that illuminance on the aircraft stand be uniform within a ratio of 4 to 1 (average to minimum). In this connection the average vertical illuminance at a height of 2 m should not be less than 20 lux in relevant directions.

13.3.3 To maintain acceptable visibility conditions, the average horizontal illuminance on the apron, except where service functions are taking place, should not be less than 50 per cent of the average horizontal illuminance of the aircraft stands, within a uniformity ratio of 4 to 1 (average to minimum) in this area.

13.3.4 It is recognized that some visual tasks require additional supplementary lighting, e.g. portable lighting. However, the use of vehicle headlights for purposes other than guidance during driving should be avoided.

13.3.5 For security reasons, additional illuminance greater than that specified above may be required.

13.3.6 The area between the aircraft stands and the apron limit (service equipment, parking area, service roads) should be illuminated to an average horizontal illuminance of 10 lux. If the higher-mounted floodlights do not light this area adequately, then glare-free lighting of the street-lighting type could be used. Some examples of illuminance on aprons are presented in Figures 13-1, 13-2, 13-3 and 13-4.

Glare

13.3.7 Direct lamplight from the floodlights shall be avoided in the direction of a control tower and landing aircraft. Aiming of floodlights should be, as far as practicable, in the directions away from a control tower or landing aircraft. Direct light above the horizontal plane through a floodlight should be restricted to the minimum (see Figures 13-5 and 13-6).

13.3.8 To minimize direct and indirect glare:

- a) the mounting height of the floodlights should be at least two times the maximum aircraft eye height of pilots of aircraft regularly using the airport (see Figure 13-6);
- b) the location and height of the masts should be such that inconvenience to ground personnel due to glare is kept to a minimum.

In order to meet these requirements, floodlights will have to be aimed carefully, giving due consideration to their light distribution. Light distribution may have to be adapted by the use of screens.

Emergency lighting

13.3.9 To cover the possibility of a power failure, it is recommended that provision be made for sufficient illumination to be available to ensure passenger safety (see also 13.4.3).

13.4 DESIGN CRITERIA

Lighting aspects

13.4.1 In addition to the design criteria derived from the performance requirements, the following aspects should be considered in designing an apron floodlighting system:

- a) the height of the apron floodlighting masts should be in accordance with the relevant obstacle clearance requirements as shown in Annex 14, Volume I, Chapter 4;
- b) obstructions in the view of control tower personnel should be avoided. In this respect special attention should be paid to the location and the height of the floodlighting towers; and
- c) the arrangement and aiming of floodlights should be such that aircraft stands receive light from different directions to minimize shadows. Better results are obtained by uniform illuminance of the total area than by directing individual floodlights at the aircraft (see Figures 13-7 and 13-8).

Physical aspects

13.4.2 During the design stage of an airport, due consideration should be given to the physical aspects of the apron in order to provide efficient apron floodlighting. The ultimate choice of the location and height of the floodlights depends upon:

- a) dimensions of apron(s);
- b) arrangement of aircraft stands;











