International Civil Aviation Organization

Eighth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/8)

Bangkok, Thailand, 15 to 19 July 2024

Agenda Item 4: Planning & Design of Aerodromes

TOLERANCE IN PHYSICAL CHARACTERISTICS OF AERODROME

(Presented by Malaysia)

SUMMARY

This paper presents tolerance studies and proposed deviation in the physical characteristics of aerodromes from the perspective of the aerodrome operator. Permissible tolerance in Annex 14 is crucial for maintaining consistent and safe aerodrome operations. It will provide Civil Aviation regulatory Authority and aerodrome operators with clear guidelines on acceptable deviations from standard dimensions. These guidelines will also accommodate practical variations in aerodrome design and operation, ensuring both safety and operational efficiency.

1. INTRODUCTION

1.1. The requirements of physical characteristics of aerodromes play a critical role in ensuring safe and efficient operations at aerodromes. As outlined in Annex 14 Volume I, these characteristics encompass a spectrum of elements from runway markings to lighting systems which need to be complied at an aerodrome.

1.2. This paper explores permissible deviation/tolerance in the physical characteristics of aerodromes, examining how flexibility in these attributes accommodates practical needs without compromising safety and operational reliability.

2. DISCUSSION

Tolerance in Aerodrome Physical Characteristics

2.1 The following are the permissible deviation and tolerance in physical characteristics of aerodrome which required deliberation:

2.1.1 Markings

Annex 14 Volume I Chapter 5 specifies the marking colours, dimensions and spacing generally for all markings in the movement area which include runway centre line markings, threshold markings, runway side stripe markings, taxi side stripe markings, taxiway centre line markings, runway holding position markings and various apron markings.

However, due to construction works, routine maintenance works, application methods or wear and tear, some tolerance deviations in dimensions or spacing should be allowed if it is within the acceptable limit. The limit was not clearly defined in the ICAO documents.

As for best practice comparison, FAA Advisory Circular AC 150/5370-10H, which outlines the Standard Specifications for Construction of Airports, Part 9, provides details regarding dimensions and spacing tolerances limit for runway and taxiway markings:

No.	Dimension and Spacing	Tolerance
1	36 inch (910 mm) or less	±1/2 inch (12 mm)
2	Greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
3	Greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
4	Greater than 60 feet (18.3 m)	±3 inch (76 mm)

Reference: FAA Advisory Circular AC 150/5370-10H

2.1.2 Aeronautical Ground Light

Runway Edge Light

Annex 14 Volume I Para 5.3.9.6 stated that runway edge lights must be uniformly spaced, with intervals not exceeding 60 meters for instrument runways and 100 meters for non-instrument runways. However, irregularities in the spacing of runway edge lights can occur at airports globally due to construction, maintenance or design flaws.

As for benchmarking of practices, CAA UK CAP168 Licensing of Aerodromes Para 6.52 specifies that on runways of up to 50 m in width, the longitudinal spacing of the lights should be 60 m ± 6 m. Where the width of the runway exceeds 50 m, a closer longitudinal spacing as determined by the CAA may be required depending upon the nature of operations and other visual aids serving the runway.

2.1.3 Wind Directional Indicator Circular Band

The circular band specified in Annex 14 Vol 1 Para 5.1.1.4 serves as a recommendation for indicating wind direction, advising that at least one indicator should feature a circular band measuring 15 m in diameter and 1.2 m in width. Variations of 3-5% larger than the prescribed standards are observed due to construction work or maintenance. Further clarification is required regarding the acceptable tolerance for deviations from the prescribed standards.

2.1.4 Location distances for taxiing guidance signs

Further clarification is necessary to define the term "pavement edge" as referenced in Annex 14 Vol 1 Table 5-5, which outlines the perpendicular distances from defined taxiway and runway pavement edges to the near side of signs based on aerodrome code number. Specifically, it is essential to determine whether the pavement edge measurement begins from the outer side stripe markings or from the furthest point of the pavement's edge.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) deliberate the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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