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Aerodrome Design Manual

Part 1
Runways

Approved by the Secretary General and published under his authority

Third Edition — 2006

International Civil Aviation Organization

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AMENDMENTS

Amendments are announced in the supplements to the *Catalogue of ICAO Publications;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
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1	14/6/13	ICAO

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FOREWORD

The need for a manual providing guidance on the design of aerodromes was recognized by the Aerodromes, Air Routes and Ground Aids (AGA) Division of ICAO at its Sixth Session in 1957. The Air Navigation Commission, after considering the recommendations of that Division, together with other information from the Jet Operations Requirements Panel, the Third Air Navigation Conference and Regional Air Navigation Meetings, agreed to the publication of an aerodrome manual which was progressively revised and added to from time to time. The structure of the Aerodrome Manual was later revised and it now comprises three distinct documents: *The Airport Services Manual* (Doc 9137), *The Aerodrome Design Manual* (Doc 9157), and *The Airport Planning Manual* (Doc 9184).

This part of the Aerodrome Design Manual fulfils the requirement for guidance material on the geometric design of runways and associated aerodrome elements, namely, runway shoulders, runway strips, runway end safety areas, clearways and stopways.

Much of the material included herein reproduces and is closely associated with the specifications contained in Annex 14, *Aerodromes*, Volume I — *Aerodrome Design and Operations*. The main purpose of this document is to facilitate the uniform application of the Annex 14, Volume I specifications.

The manual has been expanded with the inclusion of guidance material relating to runway design, which has been relocated from the *Aerodrome Design Manual* (Doc 9157), Part 2 — *Aprons, Taxiways and Holding Bays.* Additional guidance has been added on the design of runway turn pads and the strength requirements of runway strips.

It is intended that this manual be kept current. Future editions will improve on this edition on the basis of experience gained and of comments and suggestions received from users of the manual. Readers are therefore invited to send their views, comments and suggestions on this edition, in writing, to the Secretary General of ICAO.

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Chapter 1

GENERAL

1.1 INTRODUCTION

1.1.1 In view of the vital function of runways in providing for safe and efficient aircraft landings and take-offs, it is imperative that their design take into account the operational and physical characteristics of the aeroplanes expected to use the runway, as well as engineering and economic considerations.

1.1.2 The aerodrome elements associated with runways which are directly related to the landing and take-off of aeroplanes are: runway strips, runway shoulders, stopways, clearways and runway end safety areas. This manual concerns the provision of runways and these associated elements and summarizes specifications and guidance material relating to their geometric design. Pavement strength design aspects are covered in the *Aerodrome Design Manual* (Doc 9157), Part 3 — *Pavements*.

1.2 EXPLANATION OF TERMS

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome elevation. The elevation of the highest point of the landing area.

Clearway. A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.

Displaced threshold. A threshold not located at the extremity of a runway.

Frangible object. An object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft.

Instrument runway. One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a) Non-precision approach runway. An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.

b) Precision approach runway, category I. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60 m (200 ft) and either a visibility not less than 800 m or a runway visual range not less than 550 m.

c) Precision approach runway, category II. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not lower than 350 m.