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## CALCULATION OF DECLARED DISTANCES

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Aerodrome Safety Publications are published by the CAAS for purposes of promulgating supplementary guidance materials to the Standards and Recommended Practices (SARPs) in the Manual of Aerodrome Standards. The publications are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means, of complying with SARPs. Aerodrome Safety Publications may explain certain regulatory requirements by providing interpretive and explanatory materials.

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## 1 Purpose

- 1.1 The purpose of this Aerodrome Safety Publication (ASP) is to provide supplementary guidance to aerodrome operators on the calculation of declared distances for each runway direction at a certified aerodrome. It provides guidance on what is acceptable to the Aerodrome and ANS Regulation (AAR) Division of Civil Aviation Authority of Singapore (CAAS) to demonstrate compliance with regulatory requirements in Section 6.2.8 - Declared distances of the Singapore Manual of Aerodrome Standards (MOAS).

## 2 Applicability

- 2.1 This ASP applies to all aerodrome operators certified under Paragraph 67 of the Singapore Air Navigation Order.

## 3 Cancellation

- 3.1 This ASP supersedes ASP 03/2017.

## 4 Effective Date

- 4.1 This ASP takes effect on 24 January 2019.

## 5 Introduction

- 5.1 Declared distances are the available operational distances notified to a pilot for take-off, landing or safely aborting a take-off. These distances are used to determine whether the runway is adequate for the proposed landing or take-off or to determine the maximum payload permissible for a landing or take-off.
- 5.2 Declared distances are a combination of the runway (i.e. full strength pavement), any stopway (SWY) and clearway (CWY) provided.

## 6 Objective

- 6.1 The objective of measuring and providing information on declared distances is to allow pilots to determine the allowable aircraft loading based on aircraft performance requirements.

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## 7 Definitions

### 7.1 Clearway (CWY)

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

### 7.2 Stopway (SWY)

A defined rectangular on the ground at the end of take-off run available (TORA) prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take off.

### 7.3 Take-off run available (TORA)

The length of runway declared available and suitable for the ground run of an aeroplane taking off.

### 7.4 Take-off distance available (TODA)

The length of the take-off run available plus the length of the clearway, if provided.

### 7.5 Accelerate-stop distance available (ASDA)

The length of the take-off run available plus the length of the stopway, if provided.

### 7.6 Landing distance available (LDA)

The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

## 8 Calculation of Declared Distances

- 8.1 The declared distances shall be calculated to the nearest metre for each runway direction. These declared distances comprise of the take-off run available (TORA), take-off distance available (TODA), accelerate-stop distance available (ASDA) and landing distance available (LDA).

8.2 Where a runway is not provided with a stopway (SWY) or clearway (CWY) and the threshold is located at the extremity of the runway, the four declared distances should normally be equal to the length of the runway, as shown in Figure 1.

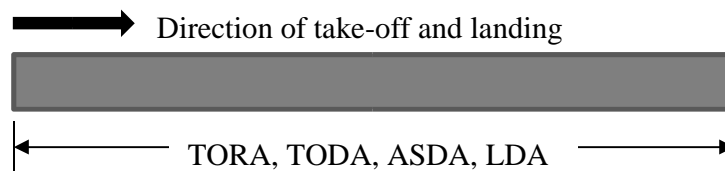


Figure 1

8.3 Where a runway is provided with a clearway (CWY), then the TODA will include the length of clearway, as shown in Figure 2.

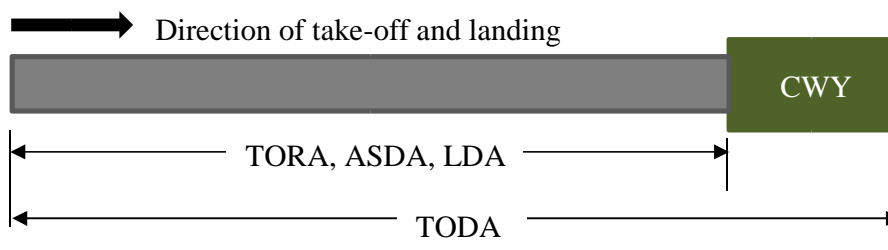


Figure 2

8.4 Where a runway is provided with a stopway (SWY), then the ASDA will include the length of stopway (SWY), as shown in Figure 3.

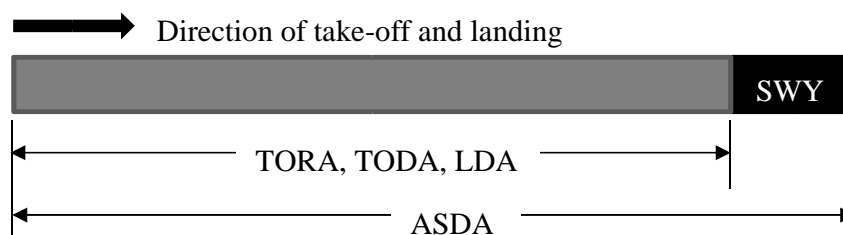


Figure 3

8.5 Where a runway has a displaced threshold, then the LDA will be reduced by the distance the threshold is displaced, as shown in Figure 4. A displaced threshold affects only the LDA for approaches made to that threshold; all declared distances for operations in the reciprocal direction are unaffected.

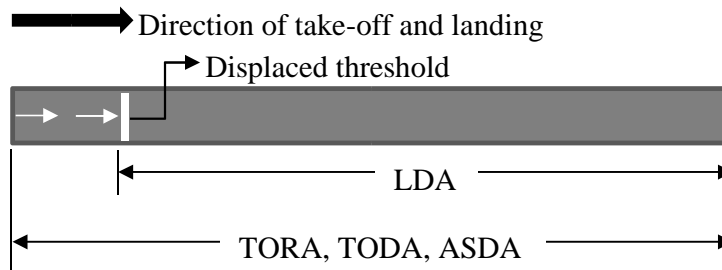


Figure 4

8.6 Figures 2 through 4 illustrate a runway provided with a clearway or a stopway or having a displaced threshold. Where more than one of these features exist, then more than one of the declared distances will be modified - but the modification will follow the same principle illustrated. An example showing a situation where all these features exist is shown in Figure 5.

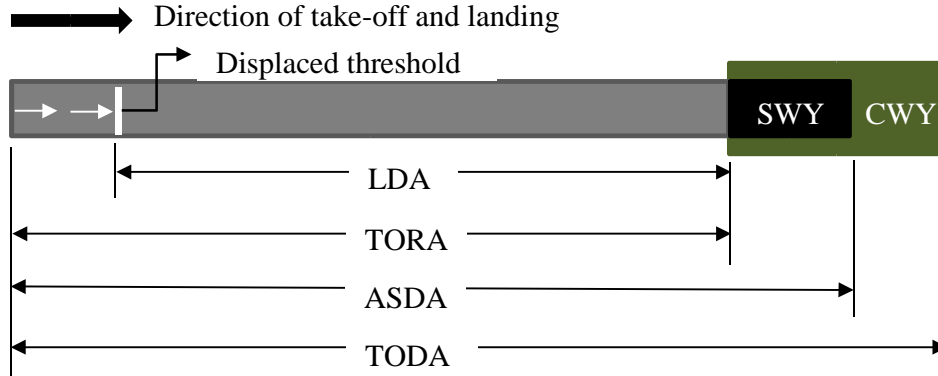


Figure 5

8.7 When intersection take-offs are performed, the datum line from which the reduced runway declared distances for take-off are determined, should be defined by the intersection of the taxiway centerline with projected runway side stripe marking as shown in Figure 6.

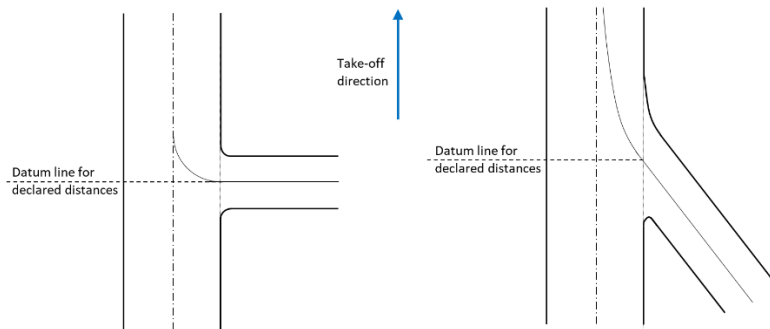
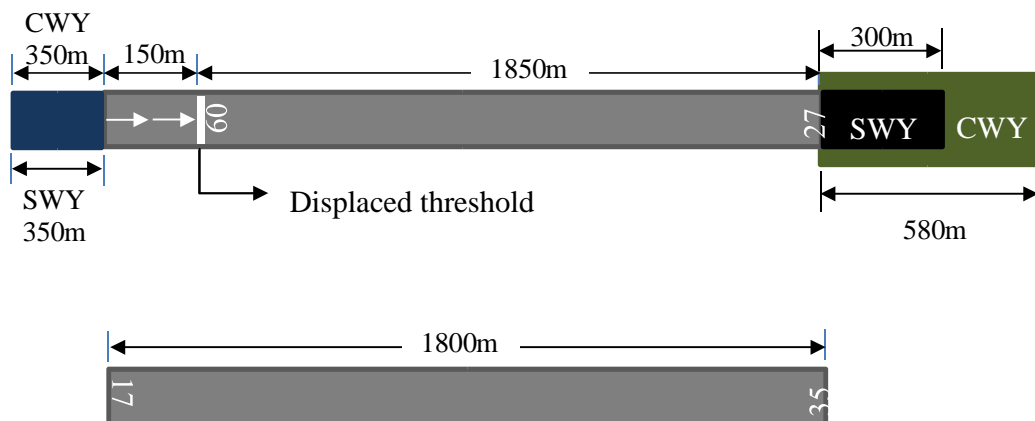


Figure 6

8.8 A suggested format for providing information on declared distances is given in Figure 7. If a runway direction cannot be used for take-off or landing, or both, because it is operational forbidden, then this should be declared and the words “not usable” or the abbreviation “NU” entered.



Runway	TORA(m)	ASDA(m)	TODA(m)	LDA(m)
09	2000	2300	2580	1850
27	2000	2350	2350	2000
17	NU	NU	NU	1800
35	1800	1800	1800	NU

Figure 7

## 9 Information to be reported to Aeronautical Information Services

- 9.1 Under Section 6.2 of the MOAS, the declared distances shall be calculated and reported by the aerodrome operator to Aeronautical Information Services (AIS). Such information should be subsequently made available to pilots via the Singapore Aeronautical Information Publication (AIP).

## 10 References

- 10.1 Singapore Air Navigation Order (ANO);  
Manual of Aerodrome Standards (MOAS); and  
ICAO Annex 14, Volume I

## 11 Queries

If there are any queries with regard to this Aerodrome Safety Publication, please address them to:

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