RA 3521 - Permanent Fixed Wing Aerodrome - Facilities

Rationale

The safety of operations at aerodromes is dependent on the quality of the various facilities available at the aerodrome. The facilities must be installed correctly if they are to have the desired effect. The promulgation of accurate information about the aerodromes facilities adds to the safety and accuracy of the Air Systems for which the aerodrome is intended.

Contents

Regulation 3521(1)

Air System Arresting Systems

3521(1) Heads of Establishments (HoEs) and Aviation Duty Holder-Facing Organizations (ADH-Facing Organizations) **shall** ensure that information regarding installed Air System Arresting Systems is promulgated to all aerodrome users.

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Air System Arresting Systems

1. Aerodrome Operators **should** promulgate arrestor system details in the relevant Aeronautical Information Publications.

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Air System Arresting Systems

2. Clearance for Air Systems to engage arrestor systems or trample cables is published in 'Release To Service' documents and Aircrew Manuals.

Regulation 3521(2)

Runway Visual Range Systems

3521(2) HoEs and ADH-Facing Organizations **shall** ensure that Runway Visual Range (RVR) measurement and assessment is provided for airfields that perform low visibility operations.

Acceptable Means of Compliance 3521(2)

Runway Visual Range Systems

3. **Instrumental RVR (IRVR)**. An IRVR system **should**:

   a. Consist of transmissometers appropriately located along the length of the runway;

   b. Have an audited calibration of the forward-scatter meter trace and verified to a transmissometer standard; and

   c. Have the accuracy of the system verified over the intended operational range.

4. **RVR**. Where instrumented RVR is not available, RVR for the purposes of category I and non-precision instrument approach operations **should** be assessed by human observer. However, the human observer assessment of RVR **should not** be permitted for Category II/III and Low Visibility Operations. A standard RVR assessment system utilising the human observer technique **should**:

   a. Utilize appropriate observation lights, the order of preference for which is, in descending order:

      (1) Opposite side runway edge lights;

      (2) Opposite side special reference lights;

Acceptable Means of Compliance 3521(2)

(3) Same side runway edge lights; or

(4) Same side special reference lights;

(5) Where special reference lights are chosen, have reference lights:

(a) That are sited at approximately 60 m intervals from the observer to a distance of 800 m and at 100 m intervals between 800 and 1400 m unless otherwise restricted by airfield topography or layout;

(b) Separated from the runway edge lights by a maximum of 3 m;

(c) Pointed towards the observation point;

(d) Individually controlled from the observation point. In the event of a control failure each reference light **should** remain on;

(e) Arranged so as not to present a confusing or dangerous appearance to pilots; and

(f) Whose position is accurately determined as part of the aerodrome survey.

b. Have a Runway Observation Point that:

(1) Comprises a cabin or similar facility mounted on a frangible tower;

(2) Is sighted in accordance with (iaw) Figure 1 and does not obscure a pilot's view of visual aids;

(3) Ensures the observer's eye-level is 15 ft above the ground;

(4) Is sited not more than 120 m laterally from the runway centreline and has had its position agreed upon by the aerodrome telecommunications officer;

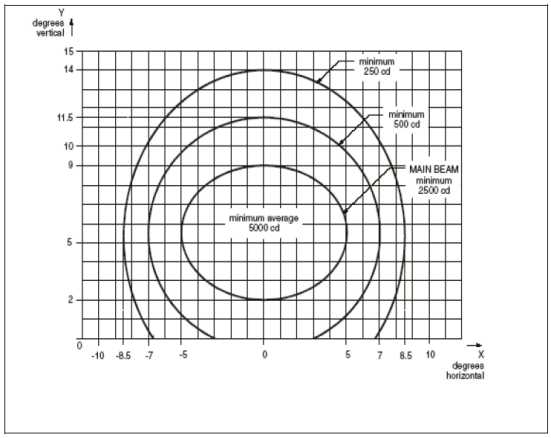
(5) Is fitted with an observation panel subtending an angle of at least 30^0 horizontally and 30^0 vertically about the observer's line of sight when viewing the landing direction;

(6) Has direct communication between the observer and Air Traffic Control; and

(7) Is marked and lighted as an obstacle, according to RA 3518[1].

c. Be sited iaw Figure 2.

Figure 1. RVR observation point sighting



Notes: 1. Curves calculated on formula. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

a	5.0	7.0	8.5
b	3.5	6.0	8.5

2. Toe-in 4°.

Figure 2 RVR Siting Plan

[1] ►Refer to◄ RA 3518 - Permanent Fixed Wing Aerodrome - Visual Aids for Denoting Obstacles.

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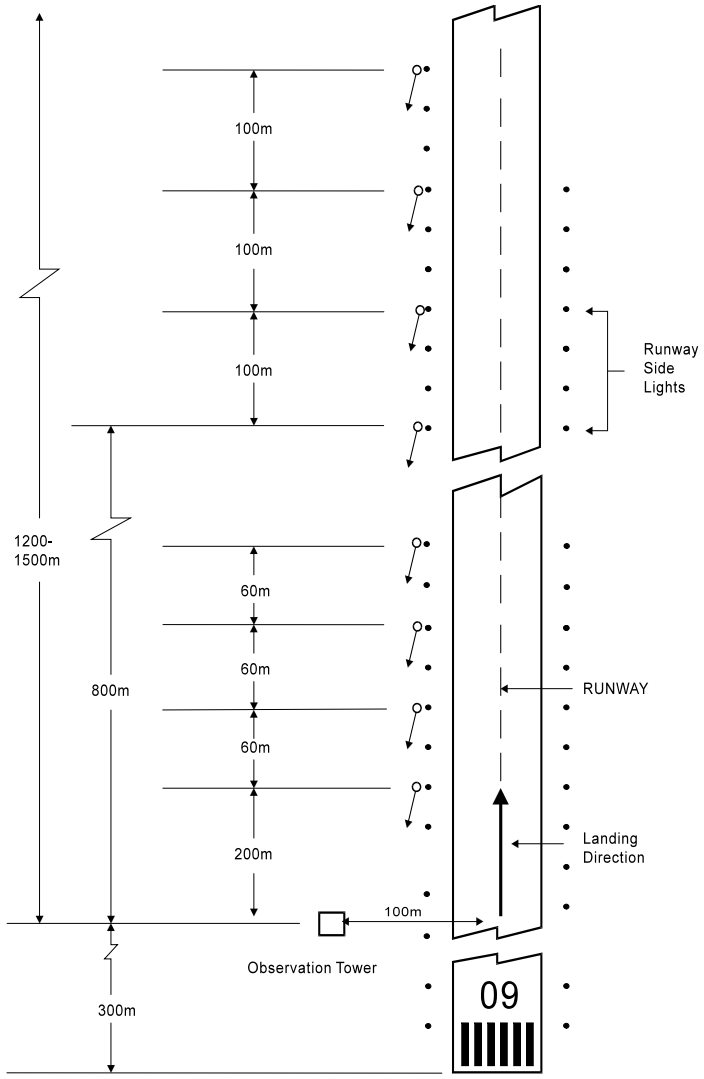

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Runway Visual Range Systems

5. Further information is contained within RA 3275[2].

Civil Equivalence.

6. This regulation is in line with International Civil Aviation Organization (ICAO) Annex 14 Vol I Annex 3.

Regulation 3521(3)

Compass Calibration Bases

3521(3) HoEs and ADH-Facing Organizations **shall** ensure that compass calibration bases are constructed to Class 1 or Class 2 requirements. The calibration base **shall** be an area of appropriate size to cater for the turning circle and all up weight of all Air Systems likely to be swung on that base and located sufficiently far from magnetic disturbances.

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Compass Calibration Bases

7. Classes:

a. Class 1 calibration bases **should** be utilised for Air Systems requiring refined or standard compass swings, as stipulated by the Air System operating authority.

[2] ►Refer to◄ RA 3275 – Runway Visual Range.

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b. Class 2 calibration bases **should** be utilized for standard compass swings only.

8. Construction:

a. The size of the datum compass circle **should** be sufficient to allow the safe operation of the largest Air System to use the base. Typical radii are:

(1) Large Air Systems (eg C-17) – 60 m;

(2) Medium Air Systems (eg Chinook) – 45 m; and

(3) Small Air Systems (eg Tutor) - 35 to 30 m.

9. The radius of the sterile area **should** be the radius of the datum compass circle plus 15 m.

10. The centre of the compass base **should** be at least 200 m from large buildings or continuous wire fences.

11. The compass base and access tracks **should**:

a. Be constructed of non-ferrous concrete or bituminous material;

b. Be protected against fuel spillage;

c. Be constructed free from any magnetic material;

d. Be capable of withstanding the all-up weight of the heaviest Air System to be swung; and

e. Have a maximum gradient not exceeding 1 in 80.

12. Magnetic Deviation Limits **should** be no greater than:

a. 0.1^0 at 1.5 m above ground level for Class 1 bases; and

b. 0.25^0 at 1.5 m above ground level for Class 2 bases.

13. No magnetic anomalies **should** be present in Class 1 bases.

14. The maximum allowable magnetic anomaly in a Class 2 base **should** be +/- 0.25^0 provided that;

a. The anomaly **should** be clearly marked on the surface; and

b. The size and shape of the exclusion zone **should** be determined during routine magnetic surveys.

15. The datum compass circle is a narrow pathway used to position the datum compass. It **should** be clearly marked. The datum compass circle **should** comprise a continuous painted line on non-reinforced concrete or asphalt.

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Compass Calibration Bases ►◄

16. Further information and guidance on the location and construction of Compass Calibration bases can be obtained from QinetiQ, Land Magnetic Facilities[3].

17. If a base will be used for Air Systems which have magnetic sensors below 1.5 m, a special survey may be required.

18. QinetiQ Land Magnetic facilities ►need to◄ be notified at the earliest opportunity of any planned work within 200 m of the centre of the compass base.

19. Periodic surveys of all compass bases will be undertaken by staff from QinetiQ, Land Magnetic Facilities. Class 1 bases will be re-surveyed every 5 years. However, Class 2 bases are normally subject to magnetic anomalies, the effects of which are liable to change with time; these bases ►need to◄ therefore be re-surveyed every 2 years.

[3] LTPAenquiries@QinetiQ.com.

Regulation 3521(4)

De-icing / Anti-icing

3521(4) HoEs and ADH-Facing Organizations **shall** ensure that Air System de-icing / anti-icing facilities are provided.

Acceptable Means of Compliance 3521(4)

De-icing / Anti-icing

20. De-icing / anti-icing facilities **should** be iaw in ICAO Annex 14, Volume I, Chapter 3, Section 15.

21. De-icing / anti-icing facilities **should** be provided either at Air System stands or at specified remote areas along the taxiway leading to the runway meant for take-off, provided that adequate drainage arrangements for the collection and safe disposal of excess de-icing / anti-icing fluids are available to prevent ground water contamination. The effect of volume of traffic and departure flow rates **should** also be considered.

22. The remote de-icing / anti-icing facility **should** be located outside of the obstacle limitation surfaces specified in RA 3512[4], not cause interference to the radio navigation aids and be clearly visible from the air traffic control tower for clearing the treated Air System.

23. The remote de-icing / anti-icing facility **should** be so located as to provide for an expeditious traffic flow, perhaps with a bypass configuration, and **should not** require unusual taxiing manoeuvre into and out of the stand.

24. The size of a de-icing / anti-icing stand **should** be equal to the parking area required by the most demanding Air System in a given category with at least 3.8 m clear paved area all around the Air System for the movement of the de-icing / anti-icing vehicles.

25. The number of de-icing / anti-icing stand required **should** be determined based on the meteorological conditions, the type of Air System to be treated, the method of application of de-icing / anti-icing fluid, the type and capacity of the dispensing equipment used, and the departure flow rates.

26. The de-icing / anti-icing stand **should** be provided with suitable slopes to ensure satisfactory drainage of the area and to permit collection of all excess de-icing / anti-icing fluid running off an Air System. The maximum longitudinal slope **should** be as little as practicable and the transverse slope **should not** exceed 1%.

27. The de-icing / anti-icing stand **should** be capable of withstanding the traffic of the Air System it is intended to serve, due consideration being given to the fact that the de-icing / anti-icing pad (like an apron) will be subjected to a higher density of traffic and, as a result of slow-moving or stationary Air Systems, to higher stresses than a runway.

28. A de-icing / anti-icing stand **should** provide the minimum clearances specified in RA 3511[5] for Air System stands. If the pad layout is such as to include bypass configuration, the minimum separation distances specified in Table 1, column 12, **should** be provided.

29. Where the de-icing / anti-icing facility is located adjoining a regular taxiway, the taxiway minimum separation distance specified in Table 1, column 11, **should** be provided (see Figure 3).

[4] ►Refer to◄ RA 3512 - Permanent Fixed Wing Aerodrome - Obstacle Environment.
[5] ►Refer to◄ RA 3511 - Permanent Fixed Wing Aerodrome – ►Physical characteristics.◄

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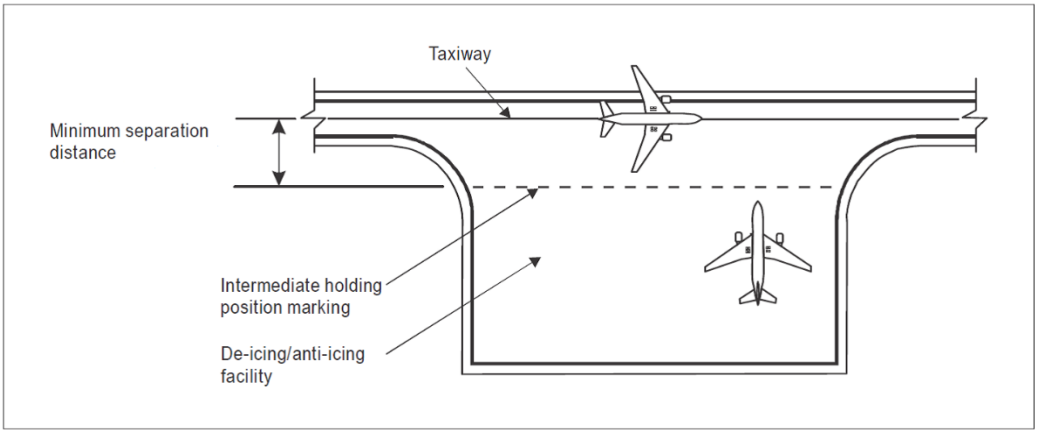
Table 1. Taxiway minimum separation distances

Code letter	Distance between taxiway centre-line and runway centre-line (metres)								Taxiway centre-line to taxiway centre-line (metres)	Taxiway, other than Air System stand taxilane, centre-line to object (metres)	Air System stand taxilane centre line to aircraft stand taxilane centre line (metres)	Air System stand taxilane centre-line to object (metres)
	Instrument runways Code number				Non-instrument runways Code number							
	1	2	3	4	1	2	3	4				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	82.5	82.5	-	-	37.5	47.5	-	-	23	15.5	19.5	12
B	87	87	-	-	42	52	-	-	32	20	28.5	16.5
C	-	-	168	-	-	-	93	-	44	26	40.5	22.5
D	-	-	176	176	-	-	101	101	63	37	59.5	33.5
E	-	-	-	182.5	-	-	-	107.5	76	43.5	72.5	40
F	-	-	-	190	-	-	-	115	91	51	87.5	47.5

Note 1 – The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is given in the Aerodrome Design Manual (ICAO Doc 9157), Part 2.

Note 2 – The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding Air System to permit the passing of another Air System on a parallel taxiway. See the Aerodrome Design Manual (ICAO Doc 9157), Part 2.

Figure 3. De-icing/anti-icing facility marking



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De-icing / Anti-icing

30. One of the primary factors influencing the location of a de-icing / anti-icing facility is to ensure that the holdover time of the anti-icing treatment is still in effect at the end of taxiing and when take-off clearance of the treated Air System is given.

31. Remote facilities compensate for changing weather conditions when icing conditions or blowing snow are expected to occur along the taxi-route taken by the Air System to the runway meant for take-off.

32. The jet blast effects caused by a moving Air System on other Air Systems receiving the anti-icing treatment or taxiing behind ►need to◄ be considered to prevent degradation of the treatment.

33. An Air System de-icing / anti-icing pad consists of:

a. An inner area for parking of an Air System to be treated; and

b. An outer area for movement of two or more mobile de-icing / anti-icing equipment.

34. Where more than one de-icing / anti-icing pad is provided, consideration ►needs to◄ be given to providing de-icing / anti-icing vehicle movement areas of

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adjacent pads that do not overlap, but are exclusive for each pad. Consideration will also need to be given to bypassing of the area by other Air Systems with the clearances specified in Table 1.

35. The excess de-icing / anti-icing fluid running off an Air System poses the risk of contamination of ground water in addition to affecting the pavement surface friction characteristics.

Civil Equivalence.

36. This regulation is in line with ICAO Annex 14 Vol I para 3.15.

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