RA 3500 - Aerodrome Design and Safeguarding

Rationale

An Aerodrome is intended to be a safe place for ►Aircraft◄ to operate from. Many factors need to be considered when constructing an Aerodrome. Standards that are not met could ►increase Aviation Risk to Life (RtL) and◄ be instrumental in ►Aircraft Accident or◄ damage. A safe operating environment, at MOD Aerodromes, can be provided by adherence to design standards and safeguarding processes[1].

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3500(1) Heads of Establishments (HoEs) and Aviation Duty Holder-Facing organizations (ADH-Facing organizations) **shall** ensure that Military Aerodrome Design and Safeguarding is in accordance with (iaw) criteria specified within RA 3501 - 3599[2].

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1. The Regulations contained within RA 3501 - 3599 **should** be applied to the new construction, modification and restoration of facilities at MOD MRP regulated Aerodromes in the UK and overseas.

2. 'Modification' **should** include the use of Aerodrome facilities for purposes other than their intended use at construction, such as the use of a runway for precision approaches that was designed to support non-instrument approaches only or use of Aerodrome surfaces by Aircraft larger or heavier than those for which the surfaces were constructed[3].

3. Existing facilities that do not comply with the Regulations contained within RA 3501 - 3599 may present Aviation Safety Hazards. Therefore each non-compliance **should** be logged in the Aerodrome ►Operators◄ Hazard Log (AOHL) and thereby communicated to relevant ADHs through the mechanism of the Defence Aerodrome Manual and managed through the Air Safety Management System[4].

4. The following **should** be included in assurance certification of major and minor work, where appropriate, to be presented at handover. A copy of the documentation in a suitable electronic format **should** be provided to the MOD Specialist:

   a. Aeronautical Ground Lighting (AGL) System Design and Installation Compliance Certificate.

   b. In situ AGL Photometric Test Certificate of Compliance[5].

   c. Apron Floodlighting Photometric Test Certificate of Compliance.

   d. Certificate of Compliance for provision of Secondary Power Supplies[6].

   e. Precision Approach Path Indicator (PAPI) Flight Check Form[7].

   f. Modular Control System Functional Test Certificate[8].

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[1] ►Refer to RA 1010(1): Head of Establishment – Classification Tier of Site, Establishment, Base or Building to assist with MAA Regulatory Publications (MRP) compliance.◄
[2] Refer to RA 3500 to 3599: Aerodrome Design and Safeguarding.
[3] Non-exhaustive.
[4] Refer to RA 1200 - Air Safety Management and the Manual of Air Safety (MAS).
[5] New, refurbished or modified installations where more than 25% of the system has been changed. All Runway Services and Taxiway Centreline only.
[6] Determined by Approach Category and Take-off Runway Visual Range (RVR).
[7] Where bases may have been affected or a PAPI unit has been damaged or removed and replaced.
[8] Full system check required after any work is undertaken. Compliance with Defence Infrastructure Organization (DIO) Policy Instruction 19/2006 is mandatory.

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g. Insulation Resistance Test Results[9].

h. "As Built" Drawings (including final surface levels).

i. Updated Airfield Lighting Schedule.

j. AGL Equipment Warranty.

k. Friction test results post completion.

l. Friction Test Certificate.

m. Operation and Maintenance manuals.

n. Pavement Classification Number (PCN) / Aircraft Classification Number (ACN) calculations.

o. Core logs and test pit data.

p. All test results for the project.

q. Details of asphalt and concrete mix design(s).

r. Updated Annex C1 and C2 from the latest Biennial Inspection Airfield Maintenance Inspection Report (AMIR).

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5. For the avoidance of doubt, there is no requirement for facilities to be modified solely in order to meet new standards introduced within the RA 3500 series, as routine or exceptional construction, restoration or Maintenance processes will enable these standards to be met in due course.

6. For existing legacy Aerodrome Design and Safeguarding non-compliances, there is also no requirement to apply for Alternative Acceptable Means of Compliance (AAMC), Waivers or Exemptions (AWE).

7. Where an existing non-compliance is managed through the AOHL, it is recommended that they are separated for clarity from other Hazards in the AOHL by means of an appropriate naming convention.

8. International Civil Aviation Organization (ICAO), Civil Aviation Authority (CAA) and North Atlantic Treaty Organization (NATO) publications may be consulted where they supplement RA 3501 - 3599 standards. If uncertainty exists, the MAA need to be consulted.

9. Procurement of airfield infrastructure services, whether new works or Maintenance, is the responsibility of the Defence Infrastructure Organization (DIO), less on deployed operational bases in Military Works Areas where the military is responsible, usually through the Royal Engineers.

10. The following may be consulted in support of the requirements of RA 3501 - 3599:

a. AP 100B-01 RAF Engineering Policy.

b. DAP 113A-0201-1 Earthing of Aircraft and General Support Equipment.

c. DAP 119J-1405-12 Rotary Hydraulic Arresting Gear Mk 1.

d. AP 119J-0100-1 Snow Clearance and Ice Control of Airfields.

e. Manual of Military Air Traffic Management (MMATM).

f. JSP 375 Management of Health and Safety in Defence.

g. JSP 317 Defence Fuels Policy, Organization and Safety Regulations.

h. DAP 119J-1400-1 Aircraft Arresting System, Operational Data and Aircraft Clearances.

[9] Results to comply with DIO Policy Instruction 29/2005 Annex B.

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i. ICAO Standards and Recommended Practices Annex 14 Volume 1 Aerodrome Design and Operations[10].

j. ICAO Standards and Recommended Practices Annex 14 Volume 2 Heliports.

k. ICAO Aerodrome Design Manual (Doc 9157).

l. ICAO Aerodrome Services Manual (Doc 9137).

m. ICAO Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).

n. CAP 393 The Air Navigation Order.

o. CAP 168 Licensing of Aerodromes.

p. CAP 642 Airside Safety Management.

q. EASA CS-ADR-DSN Aerodromes Design.

r. CAP 1168 Guidance Material for Organizations, Operations and Design Requirements for Aerodromes.

s. ►DIO Technical Standard: VA 01:2022 – Aerodrome Design Standard Visual Aids.◄

11. The NATO Standardization Agreements (STANAGs) implemented by RA 3501 - 3599 are shown in Figure 1:

Figure 1. NATO STANAGs.

STANAG Number	Title	Edition	Status
3158	Day Marking of Airfield Runways and Taxiways	9	Ratified
3316	Airfield Lighting	10	Ratified with Reservations
3346	Marking and Lighting of Airfield Obstructions	7	Ratified
3534	Airfield Lighting, Marking and Tone Down Systems for Non-Permanent / Deployed Operations	7	Ratified with Reservations *
3619	Helipad Marking and Lighting	5	Ratified with Reservations
3634	Runway Friction and Braking Conditions	4	Ratified
3697	Airfield Aircraft Arresting Systems	5	Ratified
3711	Airfield Marking and Lighting Colour Standards	3	Ratified *
7114	Helipad Clearance Plane Requirements	1	Ratified for Future Implementation
7131	Aircraft Classification Number (ACN) / Pavement Classification Number (PCN) – AEP 46(B)	3	Ratified
7134	Control of Lighting at Airfields During NVG Operations	1	Ratified
7174	Airfield Clearance Planes	1	Ratified with Reservations
7181	NATO Standard Method for Airfield Pavement Condition Index (PCI) Surveys – AEP-56	1	Ratified for Future Implementation

[10] Accounts to access ICAO documentation are available to MOD employees and contractors from http://portallogin.icao.int/.

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* Implementing Document is the STANAG.

12. Guidance may be sought from MOD specialists as per Figure 2:

Figure 2. MOD Specialists.

Subject	Address	Contact Details
Regulatory Guidance: Government Aerodromes	MAA Reg ATM2 ADInfra, Juniper 1 Wg 4 #5104, MOD Abbey Wood (North) Bristol, BS34 8JH	Tel: 0306 7984231 Email: DSA-MAA-Reg-ATM2-AdInfra@mod.gov.uk
Royal Air Force (Safeguarding)	BM Safeguarding SO2 DIO, Kingston Road, Sutton Coldfield, B75 7RL	Tel: 0121 3312237 Email: Air-11GpBM-SafeguardingSO2@mod.gov.uk
Royal Air Force (Aerodromes)	BM A35 Terminal SO2, Third Floor, Hurricane Block, Air Command, RAF High Wycombe, NAPHILL HP14 4UE	Tel: 0306 7701071 Email: Air-11Gp-SpBM-A35AirfieldsSO2@mod.gov.uk
Joint Helicopter Command (JHC)	SO2 JHC SA Safety Policy, HQ JHC, HQ Land Forces, Marlborough Lines, Monxton Road, Andover, SP11 8HT	Tel: 01264 381131 Email: JHC-SafetyPolicy-SO2@mod.gov.uk
Royal Navy	NCHQ CSAV SO2 ATC HMS Excellent Whale Island, Portsmouth Hampshire PO2 8ER	Tel: 02392 625748 Email: NAVYCSAV-ATCSO2@mod.gov.uk
12 (Force Sp) Engr Gp	SO1 12 (Force Sp) Engr Gp Building 408, RAF Wittering, Peterborough, PE8 6HB	Tel: 01780 417729 Email: 12ENGGP-DCOMD@mod.gov.uk
PJHQ	PJHQ CESO, PJHQ, Northwood HQ, Sandy Lane, NORTHWOOD, Middlesex, HA6 3HP	Tel: 01923 955043 Email: PJHQ-J3-CESO@mod.gov.uk
Safeguarding	DIO, Safeguarding, Safeguarding Officer (Statutory & Offshore), Kingston Road, Sutton Coldfield, West Midlands, B75 7RL	Email: DIO-Safeguarding-Statutory@mod.gov.uk or DIO-Safeguarding-Wind@mod.gov.uk
Pavements	DIO, Technical Services, Technical Authority (Pavements) Engineering and Construction, , Kingston Road, Sutton Coldfield, West Midlands, B75 7RL	Email: DIOTS-EngAPStdsAH@mod.gov.uk
Visual Aids	DIO, Technical Services, Technical Authority (AGL) Engineering and Construction, Electrical Infrastructure, Kingston Road, Sutton Coldfield, West Midlands, B75 7RL	Email: DIOTS-EngElecAH@mod.gov.uk
Compass Calibration Bases	QinetiQ, Land Magnetic Facilities MOD Portland Bill, Portland, Dorset, DT5 2JT	Tel: 01305 862022 01305 862000

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13. Responsibilities for military Aerodrome design, standards, inspections and surveys are as per Figure 3:

Figure 3. Organizational Responsibilities.

Responsible Organization / Responsibility	Staff Inspection	Friction Surveys			Maintenance Inspections	Measured Height Surveys	Works (Major & Minor)	Remarks
		Classification	Monitoring	Special				
APPROPRIATE MILITARY AUTHORITIES								
Assist Operations Staffs to set minimum standards	•	•	•	•	•	•	•	
Confirm requirement for special surveys related to flight safety				•	•	•		
Approval Authority for proposed deviation from Regulations	•	•	•	•	•	•	•	
Promulgate Staff Inspection Programme	•							
Approval Authority for friction measurement machines		•	•	•				With MOD Specialists advice
TOP LEVEL BUDGET (TLB) REPRESENTATIVES								
Set operational and design requirements							•	Seek MOD Specialists' advice
Sponsor, fund and programme any major projects / safeguarding		•	•	•	•	•	•	
Agree and promulgate the Inspection / Survey programme annually		•	•	•	•	•		From MOD Specialists' input
Identify safeguarding requirements					•	•	•	
DEFENCE EQUIPMENT AND SUPPORT								
Equipment Manager for in-service friction measuring devices.		•	•	•				Including those held by Specialist Team Royal Engineers (STRE) (Air Sp) when Authorized
Fund spares and calibration of in-service approved friction classification equipment held		•	•	•				Currently Mu-Meter Mk V
MOD SPECIALISTS								
Policy on construction materials and equipment (ie performance, characteristics, testing, etc.)		•	•	•	•		•	
Maintain Inspection / Survey databases for MOD Aerodromes		•		•	•	•		

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Approval Authority for Inspection / Survey procedures and agencies		•	•	•	•	•		
Draft / advise on Inspection / Survey Programmes		•		•	•	•		Annually
Arrange contract support to Inspections / Surveys		•		•	•	•		
DIO Safeguarding produce Safeguarding plans					•	•	•	
DIO implement the Safeguarding process					•	•	•	
STRE (Air Sp)								
Maintain and operate in-service friction measuring devices		•		•				When issued and authorized
Carry out operational Inspections / Surveys at Forward Operating Base (FOB)		•		•	•	•		

STATIONS								
Set operational and design requirements							•	Seek MOD Specialists' advice
Conduct Friction Monitoring Surveys			•					Stns without Mu-Meters to request surveys as required
Fund Inspections / Surveys		•	•	•	•	•		Except at handover of major projects when project pays
Request surveys as required				•				
Conduct periodic inspections				•				iaw the MMATM
Frequency of Inspections / Surveys (years)	1	4c	a	a	2	1d		

[a] As required
[b] Statutory
[c] Annually when Friction Level is below Maintenance Planning Level (MPL)
[d] Measured Height Survey annually, or at frequencies as determined iaw with CAP 232[11] or CAP 1732[12] as applicable.

[11] Refer to CAP 232 – Aerodrome Survey Information.
[12] Refer to CAP 1732 – Aerodrome Survey Guidance.