EGCC-I-AOPS-045 – ASI 045 – Management of Overloaded Airfield Pavements

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Table of contents

1. Introduction 2
   1.1 Definitions 2
2. Scope 4
3. Responsibilities 5
   3.1 Head of Airfield Operations 5
   3.2 Asset Lifecycle Engineering 5
   3.3 Airfield Operations Manager 5
   3.4 Airfield Operations Duty Manager 6
   3.5 Airfield Engineering 6
   3.6 Airfield Safety & Compliance Officers 6
4. Identification & Assessment 7
   4.1 Approval of continued use 7
5. Airfield Pavement Condition 8
6. Pavement Inspection Regime 9
   6.1 Level 1: Routine operational inspection 9
   6.2 Enhanced overload inspection 9
   6.3 Joint condition inspection 9
   6.4 Specialist engineering investigation 10
7. Management of Overloaded Pavements 10
8. Return to Normal/Revised Operations 11
9. Defect Reporting & Escalation 12
   9.1 Trigger Defects 12
   9.2 Immediate Response 12
10. Management of Change 13
11. Assurance & Governance 13

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1. Introduction

This Airside Safety Instruction defines the arrangements for identifying, assessing, monitoring and managing airfield pavement surfaces where the Aircraft Classification Rating (ACR) of aircraft using the surface exceeds the capability represented by the applicable Pavement Classification Rating (PCR).

The instruction establishes:

- ownership and governance of overloaded pavement locations;
- the process for assessing and accepting continued operation;
- minimum routine and enhanced inspection requirements;
- defect recording, notification and escalation arrangements;
- operational controls where deterioration is identified;
- engineering review and assurance requirements;
- the process for introducing, changing or removing an overload management plan;
- the evidence required to support continued use, restriction, repair, renewal or withdrawal of a surface.

The purpose of the instruction is not to imply that an overloaded pavement has failed or is automatically unserviceable. Its purpose is to ensure that continued use is subject to documented assessment, monitoring, operational control and engineering oversight.

1.1 Definitions

Pavement Classification Rating (PCR)

A numerical expression which indicates the bearing strength of a pavement for unrestricted aircraft operations.

Aircraft Classification Rating (ACR)

A numerical indicator of aircraft pavement loading characteristics.

Pavement Condition Index (PCI)

An internationally recognised indicator used to assess pavement surface condition.

Structural Condition Index (SCI)

An engineering measure of pavement structural performance.

Overload

A condition whereby the operating aircraft ACR exceeds the assessed pavement capability supporting the published PCR.

Overload Percentage

The calculated percentage by which the applicable aircraft loading exceeds the assessed pavement capability. The basis and limitations of the calculation shall be recorded in the relevant engineering assessment.

Overloaded Surface

A defined pavement location formally entered on the Overloaded Pavement Register following engineering assessment.

Overload Management Plan

A location-specific record defining the affected area, nature and level of overload, permitted operation, inspection requirements, defect triggers, operational controls, review frequency and accountable owners.

Enhanced Inspection

An inspection additional to the normal operational inspection regime, focused on known or potential deterioration mechanisms at an overloaded location.

Trigger Defect

A defect or change in condition which requires immediate escalation, engineering review or consideration of an operational restriction.

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Serviceable

A surface assessed as suitable for its intended operational use at the time of inspection, subject to any published limitations or controls.

Operational Restriction

A temporary or permanent control applied to an overloaded surface, which may include aircraft-type restriction, routing restriction, reduced movement frequency, towing requirement, marshalling or follow-me requirement, closure of part of the surface, or full withdrawal from use.

2. Scope

This instruction applies to all airfield pavement surfaces formally identified as operating under an overload condition, including:

- taxiways and taxiway links;
- aircraft stands and aprons;
- runway links and rapid exit taxiways;
- any other paved surface used by aircraft where an ACR/PCR exceedance has been identified.

The instruction applies from the point at which a potential overload is identified until:

- an engineering assessment confirms that the surface is not overloaded;
- the pavement capability is reassessed and formally updated;
- the permitted aircraft operation is changed so that the exceedance no longer occurs;
- the pavement is strengthened or reconstructed; or
- the surface is withdrawn from the overload management register.

General pavement inspections, runway inspections and routine taxiway operating procedures remain governed by the applicable ASI's. This ASI introduces the additional controls required for overloaded surfaces.

3. Responsibilities

3.1 Head of Airfield Operations

- Accountable for ensuring an operational control framework is maintained.
- Approves operational restrictions and significant changes to use.
- Ensures unresolved or increasing operational risks are escalated through the appropriate safety governance process.

3.2 Asset Lifecycle Engineering

- Owns the technical pavement assessment.
- Confirms the affected pavement limits, assessed capability and overload basis.
- Produces or approves the engineering content of each Overload Management Plan.
- Defines engineering inspection, testing and review requirements.
- Assesses deterioration trends and advises whether continued use remains supportable.
- Maintains the technical evidence supporting repair, renewal or capital investment.

3.3 Airfield Operations Manager

- Owns implementation of operational monitoring arrangements.
- Ensures inspection requirements are incorporated into operational instructions and records.
- Confirms that affected teams are briefed.
- Coordinates periodic review with Asset Lifecycle Engineering and Airfield Engineering

3.4 Airfield Operations Duty Manager

- Manages immediate operational response to reported deterioration.
- Ensures ATC and other affected parties are informed where a surface is restricted or withdrawn.
- Applies temporary operational controls where required.
- Ensures defects, decisions and notifications are recorded.
- Requests engineering attendance or advice where serviceability is uncertain

3.5 Airfield Engineering

- Responds to reported defects.
- Makes safe, repairs or provides interim mitigation where appropriate.
- Advises Airfield Operations of any limitations following repair.
- Provides completion information for the defect and overload records.

3.6 Airfield Safety & Compliance Officers

- Inspect overload locations in accordance with the applicable plan.
- Record positive confirmation that the required locations have been inspected.
- Identify, photograph and report defects.
- Immediately notify the AODM of trigger defects or uncertainty about serviceability.
- Must not declare a surface serviceable where there is unresolved doubt about its condition.

4. Identification & Assessment

A potential overload may be identified through:

- an ACR/PCR assessment;
- introduction of a new aircraft type or variant;
- a change in aircraft routing or stand allocation;
- increased frequency of an existing aircraft operation;
- pavement investigation or survey;
- identified structural deterioration; or
- revised pavement data or methodology.

On identification, Asset Lifecycle Engineering shall complete or commission a technical assessment. Until the assessment is complete, the AODM may introduce precautionary controls where there is uncertainty regarding safe continued use.

The assessment shall define, as a minimum:

- the surface build-up;
- the applicable PCR;
- aircraft type or loading generating the overload;
- scale and basis of the exceedance;
- expected frequency and operating pattern;
- existing pavement condition;
- relevant deterioration mechanisms;
- limitations of the available data;
- recommended monitoring;
- operational controls, where required

4.1 Approval of continued use

An overloaded surface shall not remain in unrestricted use solely because no visible deterioration has been reported.

Continued operation shall be supported by:

1. documented engineering assessment;
2. location-specific Overload Management Plan;
3. defined inspection and escalation arrangements;

4. formally recorded operational acceptance;
5. communication of any limitations to affected teams; and
6. inclusion on the Overloaded Pavement Register.

Formal acceptance of continued operation shall require the technical assessment of Asset Lifecycle Engineering and operational acceptance by the Head of Airfield Operations or nominated competent deputy. Neither acceptance replaces the requirement for immediate operational intervention where subsequent deterioration calls serviceability into question.

5. Airfield Pavement Condition

Manchester Airport maintains an extensive network of flexible and rigid pavements which support significant annual aircraft movements.

Current pavement assessments indicate that the majority of movement area pavements remain suitable for operational use and are managed through established inspection, maintenance and asset management processes.

However, a limited number of locations have been identified where aircraft operational loads exceed the pavement classification rating. These areas require enhanced monitoring and management pending future capital investment decisions.

The overload categories are:

- Less than 10%
- Between 10% and 25%
- Between 25% and 50%
- Greater than 50%

The existence of overload does not automatically indicate pavement failure. Management of these locations is achieved through enhanced monitoring, engineering review and lifecycle planning.

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6. Pavement Inspection Regime

Manchester Airport adopts a layered approach to pavement inspection comprising routine operational inspections, engineering inspections and strategic condition assessments. Overload assessments and management plans shall consider relevant available pavement information, including PCI, SCI, PCR assessments, engineering investigations, maintenance history and operational inspection records.

Records supporting an overload assessment shall be retained within the applicable controlled asset-management system.

6.1 Level 1: Routine operational inspection

- Incorporated into existing runway, taxiway and apron inspections.
- Confirms whether the surface remains visually serviceable.
- Includes positive confirmation that each designated overload location was viewed.
- Records any defect, FOD, loose pavement material, change from baseline condition or inability to inspect.

6.2 Enhanced overload inspection

- Frequency specified in the location-specific plan.
- Uses a defined inspection route or viewing position.
- Compares condition against previous photographs or baseline records.
- Records individual defect references and apparent change.
- Completed after specified triggers such as severe weather, abnormal aircraft loading, reported pavement material FOD or completion of repair.

6.3 Joint condition inspection

Completed by Airfield Operations with Engineering and/or Asset Lifecycle Engineering when:

- a trigger defect is reported;
- repeated minor defects are identified;
- repair material becomes detached;
- deterioration appears to be increasing;
- the permitted traffic pattern changes;
- the surface can no longer be fully inspected; or
- the AODM is uncertain about continued serviceability.

6.4 Specialist engineering investigation

May include:

- deflection testing;
- coring;
- materials testing;
- detailed survey;
- revised pavement classification rating assessment; and
- other investigation specified by a competent civil engineer.

7. Management of Overloaded Pavements

Overloaded areas are managed through a structured risk-based framework incorporating:

- Routine inspections.
- Enhanced monitoring.
- Engineering assessments.
- Condition trend analysis.
- Asset stewardship reviews.
- Lifecycle planning.
- Capital investment prioritisation.

No overloaded pavement shall operate without ongoing monitoring and engineering oversight.

Controls may include;

- exclusion of a particular aircraft type or variant;
- restriction to specific routing or pavement centreline;
- use only under tow;
- reduced movement frequency;
- one aircraft movement at a time;
- avoidance of known distressed pavement;
- restriction during high pavement temperature or other defined conditions, where supported by engineering advice;
- enhanced inspection before or after defined movements;
- temporary marking, lighting or barrier arrangements;
- partial closure;
- taxiway downgrade; or
- full closure.

8. Return to Normal/Revised Operations

A surface subject to a restriction or closure due to pavement deterioration shall not be returned to normal use solely because debris has been removed or a temporary repair has been completed.

Before return to service:

- the affected area shall be inspected;
- any FOD shall be removed;
- repair completion and limitations shall be confirmed;
- Engineering shall advise whether the pavement is suitable for the proposed use;
- the AODM shall confirm that operational controls are understood;
- ATC and affected stakeholders shall be notified of the revised status;
- the inspection, engineering advice and decision shall be recorded; and
- the Overload Management Plan shall be updated if the condition, restriction or inspection requirement has changed.

Where continued use remains subject to limitations, the surface shall be returned under those limitations rather than being described as unrestricted.

9. Defect Reporting & Escalation

Where an inspection identifies deterioration or a change from the recorded baseline condition, the inspector shall consider whether the surface remains suitable for continued aircraft use.

9.1 Trigger Defects

Trigger defects include, but are not limited to:

- pavement-generated FOD;
- loose or detached pavement material;
- new or materially increasing cracking;
- spalling or fretting;
- deformation, rutting, heave or settlement;
- deterioration or failure of a previous repair;
- significant ponding attributable to pavement deformation;
- movement or deterioration at pavement joints;
- any sudden or unexplained change from the recorded baseline condition; or
- any defect where the inspector is uncertain that the surface remains suitable for its intended aircraft operation.

9.2 Immediate Response

Where a trigger defect is identified:

1. The inspector shall immediately notify the AODM.
2. The defect shall be photographed and its location recorded.
3. The AODM shall determine whether temporary operational controls are necessary pending engineering assessment.
4. Where safe continued operation cannot be assured, the affected area shall be restricted or withdrawn from aircraft use.
5. Airfield Engineering and/or Asset Lifecycle Engineering shall be requested to assess the defect.

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6. ATC and other operational stakeholders shall be notified where the availability or permitted use of the surface changes.
7. The defect, assessment, decision and any controls introduced shall be recorded.
8. The relevant Overload Management Plan shall be reviewed where the findings materially alter the accepted condition or operating assumptions.

10. Management of Change

Changes to any of the following shall prompt review of the applicable Overload Management Plan:

- aircraft type or variant;
- aircraft loading assumptions;
- frequency of movements;
- routing;
- stand allocation;
- pavement capability;
- pavement configuration;
- engineering assessment methodology;
- operational restriction;
- inspection requirement; or
- planned infrastructure change affecting the location.

Where the proposed change materially alters the previously assessed operating condition, it shall be subject to the applicable Manchester Airport change-management and safety-assurance arrangements before implementation.

11. Assurance & Governance

The following records shall be retained:

- current Overloaded Pavement Register;
- approved location-specific management plans;
- technical pavement assessments;
- baseline and subsequent photographs;

- operational inspection records;
- engineering inspection and repair records;
- specialist investigation reports;
- defect and occurrence reports;
- operational restrictions and promulgation records;
- review decisions; and
- evidence supporting removal from the register.

A management plan must be reviewed:

- following a material change in pavement condition;
- following a trigger defect;
- after a significant repair;
- before introducing a new or heavier aircraft type;
- following a revised ACR/PCR assessment;
- where routing or stand usage changes;
- after specialist investigation;
- following a relevant occurrence; or
- before removal from the register.