

Workshop on Airfield Pavements November 4th and 5th, 2015

Call for ABSTRACTS

As part of the 25th World Road Congress organised in Seoul, Republic of Korea, November 2-6, 2015, a one and half-day workshop on *Airfield Pavements* is organised in the congress premises.

This workshop is composed of 3 sessions (see details in the attached note):

- Session 1: Functional requirements, Surface Characteristics
- Session 2: Airfield Design, Full-scale testing, Pavement rating system
- Session 3: Airfield Construction, Maintenance, Restoration and Management

This workshop will be held in English.

Presentations are invited on the topics covered by these 3 sessions, according to the following timeline. The proposals will be reviewed by the Scientific Committee of this workshop.

Accepted papers and Power Point presentations will be included in the proceedings of the XXVth World Road Congress published by the World Road Association (PIARC) after the congress.

27 th February 2015	Deadline for submission of abstracts
20 th March 2015	Acceptance notification of abstracts
22 th May 2015	Deadline for full papers and/or PPT presentation ¹
26 th June 2015	Acceptance notification of full papers and/or PPT presentation
November 4-5, 2015	XXV th World Road Congress (Seoul 2015) – Airfield Pavement Seminar

Abstracts must be sent to:

AirfieldPavement.PIARC@airbus.com

For additional information on the Workshop, please contact:

Cyril FABRE: cyril.fabre@airbus.com

For additional information on the XXVth World Road Congress:

<http://www.piarcseoul2015.org/wrcs/>

¹ Due to the short notice, authors could submit either a full paper according to given instructions or the PowerPoint presentation or both.

Workshop on Airfield Pavements November 4th and 5th, 2015

Outline of the workshop

SUMMARY FOR SESSION 1

FUNCTIONAL REQUIREMENTS / SURFACE CHARACTERISTICS

Although the same materials and machines are used for construction of both road and airfield pavements, the functional requirements for airfield pavements are such that it is necessary to adopt a separate approach for the design and specification compared to those used for roads and other trafficked areas. The four key requirements, which need special attention on airports, are:

- ✓ Surface cleanliness, integrity and durability in order to safeguard against FOD (foreign Object Damage) to aircraft.
- ✓ Sufficient friction to allow safe aircraft operations and in particular to allow aircraft to stop on the available runway-length after a rejected take-off.
- ✓ Good Roughness / Evenness to avoid unnecessary repeated loads/damages on an aircraft airframe and to allow safe operations, sufficient passenger and crew comfort during ground segment.

These requirements are mainly set due to the critical safety considerations for aircraft operations and especially the consequences if an incident or accident occurs during take-off or landing.

This session will discuss the primary issues that need to be considered in setting requirements and criteria in respect of the above.

Surface Integrity and Durability

The first part in this session will discuss a system of functional rating of an airfield pavement. The types of distress, severity and number of, will all have a different impact on serviceability. Pavements that ravel, spall or crack are a potential FOD risk to aircraft. This risk applies to all aircraft operations but is particularly critical for jet engine aircraft because of the potential for debris being blasted and sucked into engine intakes especially during take-offs. The cost of closing a runway in order to carry out maintenance/restoration work will invariably have a major impact on airport income hence the need for durable pavements.

Airfield Pavements must be resistant to jet blast, fuel, oil, hydraulic fluid and de-icing chemical/fluids and be strong enough to allow safe aircraft operations for the duration of their design lives.

Friction

Airport pavements shall provide a surface, which has sufficient friction characteristics when wet. Further the surface shall be constructed so that it minimises the potential risks of all forms of aquaplaning. As a recommendation in the ICAO Annex 14 Aerodromes there are a set of different

wet friction levels based on different friction devices that are used around the world. Most countries use these or the higher requirements laid-down by the relevant national aerodrome licensing authority or military standards authority. Other countries also publish macro texture requirements for the pavement surface on their airports.

This session will discuss and focus on different devices available for both wet friction measurements and macrotexture measurements. The setting of criteria for new pavements and the design considerations in respect of remedial actions for existing pavements will also be addressed. It must be noted that dedicated ICAO working group (Friction Task-Force, FTF) has recently completed the new global reporting format and any member of the group which would present this latest material will be welcome to make audience aware of what the change would modify airports/airlines practices and the associated benefits

The Session will focus on the last research initiatives in this area

Roughness – Ride Quantity Indications

Requirements for runway surface evenness and roughness are strict compared with most roads and other trafficked areas. The short wavelength requirement (using a 3m straight edge) is easy to measure during construction or if subsequently a localised unevenness/bump develops. Medium and Long Wavelength Roughness however is much more difficult to analyse and assess, but on runways especially, it can have a significant affect on aircraft response and airframe fatigue. This Session will discuss these aspects of runway roughness.

Reference shall be made to the minimum surface evenness requirements set out in the ICAO Aerodrome Design Manual Part 3 and where appropriate to the higher requirements set by the relevant national aerodrome licensing authority or military standards authority.

Ongoing work regarding roughness criteria and existing standards will be discussed in addition to ways of dealing with this issue from an airport owner's perspective.

SUMMARY FOR SESSION 2

AIRFIELD DESIGN / FULL-SCALE TESTING / MODELLING / PAVEMENT RATING SYSTEM

Structural Design, Evaluation and Load Classification of Airfield Pavements

Structural design and evaluation of airfield pavements can typically involve consideration of single wheel loads varying from 5 – 33 Tonnes and arranged in various combinations. There is also a wide range of tyre pressures typically up to 1.7MPa for civil aircraft and up to 2.5Mpa for military aircraft. These design parameters contrast somewhat with the standard axle load typically used for road design. Hence a separate approach for the structural design and load classification of airfield pavements has been used for over 50 years. Current ICAO recommended practices are still based on the CBR design procedure, but ICAO tasked its Pavement Sub-Group (ICAO-PSG) to entirely revised the ACN/PCN system by taking benefits of the multi-layered-linear-elastic analysis (ML²EA) widely used for pavement design. This Session will include presentations on the following:

- ✓ The evolution of design philosophies and aircraft load classification
- ✓ The ACN/PCN system with particular regard to recent developments,

- ✓ State of the art on airfield pavement evaluation including consideration of construction types and variables, test methods and test conditions, use of design/evaluation models and assessment of key material characteristics and PCN classification.
- ✓ Evaluation of airport flexible pavements – an alternative approach to the ACN/PCN procedure.
- ✓ Major research initiatives on pavement designs for very heavy aircraft.
- ✓ State practices on overload operations, pavement survey
- ✓ Environmental constraints

SUMMARY FOR SESSION 3

Case Studies related to session-1

Case studies related to session-2

This session could focus on the items below but any other proposal linked to S1 & S2 will be welcome.

Maintenance and restoration

The maintenance and restoration of airfield pavements utilises construction processes based on road technology but requires special considerations in respect of the following:

- ✓ Procedures and practices to enable pavements to be cost effectively maintained in a safe condition for aircraft operations and minimise disruption to aircraft operations.
- ✓ The management of aircraft operations/construction interfaces and the consequent constraints on construction methods.
- ✓ The focus on quality issues that the first two considerations necessitate.

With particular regard to the above issues, this Session will comprise presentations on the following:

Pavement Management Systems (PMS)

A pavement management system provides a means of determining maintenance needs having regard to operational requirements, construction practices, cost consideration and available resources. This in turn involves procedures and methods for carrying out periodic surveys and checks on pavements to assess their strength, skid resistance, surface integrity and general condition. This Session will consider these requirements for an airfield PMS with particular emphasis on surface condition and the timing of maintenance and repair regimes.

Resurfacing with Bituminous Materials

The speed and flexibility of construction of bituminous surfacing make them a common choice for the restoration of airfield pavements. This particularly applies to runways where possession times for construction work is often subject to severe restrictions at busy civil airports and military aerodromes. The special considerations that apply to runway resurfacing works highlight many of

the specialities of airfield pavement engineering. Apart from the logistical challenges, key design objectives invariably include non-susceptibility to FOD; long service lives with minimum maintenance and good skid resistance in adverse weather conditions. These in turn necessitate a special focus on the right material specifications for a given resurfacing project.

This session will present case studies, which highlight the key issues on runway resurfacing projects. It will also include discussion on the advanced of the options and properties of bituminous materials for airfield pavement works.

The maintenance and rehabilitation of concrete pavements.

Pavement Quality Concrete (PQC) pavements can provide long service lives, with relatively modest maintenance requirements even in demanding situations requiring high resistance to jet blast and fuel spillage, to indentation from parked aircraft having high tyre pressures and to a measure of impact from ground equipment. However the cost of replacement, the relatively long possession times required for the construction process and the onerous failure criteria in respect of surface integrity and FOD susceptibility necessitates special consideration in respect of rehabilitation strategies. This Session will address the following key issues:

- ✓ Maintenance strategies
- ✓ The lessons learnt from maintenance problems
- ✓ The selection of restoration treatments.