

SUMMARY

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EDITORIAL

Facing the new challenges: innovative techniques for airfield infrastructures 1
John Cook and Patrick Lerat

Airfield surface characteristics, design and evaluation

A rational design method for airfield pavements: the French *Alizé*-Airfield pavement software 4

Since more than twenty five years, *Alizé-Lcpc* is the reference software for the thickness design of road and motorway pavement in France. It is based on a mechanistic rational approach, including three main steps:
1- The computation of the resilient stresses and strains created by the traffic loads in the road structure by means of the multi-layer elastic linear model (Burmister);
2- The evaluation of the allowable stresses and/or strains according to the damage laws of the materials (fatigue criteria for bounded materials and rutting criteria for untreated ones and soil) determined from laboratory tests and specified by the standards, taking into account the cumulative traffic specified for the pavement over its whole service life;
3- The global adjustment of the model by means of the feedback from real network and ALT (Accelerated Load Testing of road pavements) experiments.
Jean-Maurice Balay, Cécile Caron, Patrick Lerat

Dynamic versus static testing of airfield pavements: a full-scale experiment in France 17

As part of a research program on airfield pavement testing and evaluation, the *STAC* (French Civil Aviation Technical Center) launched in September 2007 the construction of a 1,800 m² test facility in Bonneuil-sur-Marne (France). This test site is aimed at improving the data analysis of the Heavy Weight Deflectometer (HWD), the most commonly used device for non destructive evaluation of airfield pavements. The *LCPC* (Central French Laboratory for Public Works and Civil Engineering) and the *STAC* are collaborating to establish a new procedure for HWD data analysis based on a dynamic model (linear or non linear, possibly taking into account damping), as the current one is based on unsatisfactory assumptions (static load, elastic and linear material behaviour). Results obtained from preliminary simulations with this dynamic, more realistic, theoretical model are quite encouraging.
Michaël Broutin, Cécile Caron, Jean-Claude Deffieux

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The HWD of the STAC



Construction, restoration, case studies

Toulouse-Blagnac Airport Rehabilitation of runway 14L/32R 26

The Toulouse-Blagnac Airport is one of France's largest international airports. The scheduled traffic in 2006 was approximately 6 million passengers, a 2.7% increase compared to 2005. In order to cope with the increase in traffic as well as the upcoming arrival of heavier aircraft such as the Airbus A380, the Toulouse Airport ordered the renovation of runway 1 (14L/32R) which is usually used for commercial flights. This renovation was necessary in order to meet the security standards for surface characteristics, and to reinforce the load capacity of the runway. It involved laying a 0.07m-thick layer of Aeronautic Asphalt Concrete (AAC) on a 45m-wide central strip, leaving the 7.5m-wide lateral shoulders for a lighter, less-costly treatment (after the removal of daytime beaconing).
Julian Bilal, Yves Gimenez, Loïc Taulemesse

An experience of cold seal mix application at Cebu airport, Philippines 32

According to the World Bank, economic and social development is dependent upon the development of both transportation and communication routes, with particular and important needs in developing countries. This is the case for the Philippines, particularly with regard to airfields due to the geographical spread of this country across many islands. There are many small and medium airports that require funding for maintenance, accumulating as a big cost burden to the Country.
Laurent Porot, Byron Lim, Michael Son, Ann Marie Ballesteros, Allan Canedo

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The Mactan-Cebu International Airport, MCIA



Pristina airport (Kosovo) Polymer modified bitumen (PMB) for Airfields 36

Airfield pavements are exposed to special conditions such as the effects of runway and aircraft de-icing chemicals, which may result in accelerated deterioration of the pavement. Aircraft safety may be jeopardised through stones loosening from the pavement, causing damage to aircraft engines. Accelerated deterioration of the pavement also shortens pavement life, resulting in increased capital costs. Special requirements therefore are needed for airfield pavements and binders used in such pavements. In Sweden, polymer modified bitumen (PMB) frequently is used for asphalt concrete pavements on civil airfields. Special requirements specifications based on climatic conditions have been developed for such binders to ensure good performance as well as good resistance to de-icing chemicals.
Yiva Edwards

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The use of French airfield asphalt concrete in the UK 42

The need to construct more sustainable, durable and low maintenance airfield infrastructures has become very important in recent years due to the environmental pressure and customer expectation. The article reviews the use of alternative asphalt surfacing materials in UK airfield pavements to provide a better whole life solution and to address some of the above points. The use of the French Airfield Asphalt Concrete (*béton bitumineux pour chaussées aéronautiques-BBA*) surfacing and High Modulus Base (*enrobé à module élevé EME2*) were investigated. The materials' mechanical properties and their impact on pavement thickness design, constructability and maintenance requirements are reviewed.

Iswandaru Widyatmoko, Bachar Hakim, Carl Fergusson, John Richardson

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Sumburgh Airport



Colias UK

**State-of-the-Practice:
Rubbilization of Airfield Pavements**

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Rubbilization is the in-place process of fracturing an existing Portland Cement Concrete Pavement (PCCP) into small, interconnected pieces that can then serve as a base course for a new Hot Mix Asphalt (HMA) overlay. Because there are no hauling or disposal costs, and none of the existing pavement system is discarded, rubbilization is a very cost-effective rehabilitation method. Since the rubbilization process fractures the existing PCCP into small pieces, the underlying slab integrity that can cause reflective cracking is eliminated. All existing pavement layers remain to serve as critical structural support layers for the new Hot Mix Asphalt (HMA) overlay. The net effect of rubbilizing is to convert a deteriorating rigid pavement system into a new and well-serving flexible one.

Mark Buncher, Wayne Jones, Craig Rutland, James L. Greene

Accurate Measurement of Runway Pavement Geometries 65

Pavement unevenness brings safety risks. One example is that excessive Runway roughness impact negatively on winter operations, with increased ice and snow contamination reducing the aircraft's brake friction. When planning a costly pavement geometry repair, large savings can be made by optimal milling and levelling works. Accurate measurement of the existing pavement geometry is then a condition to relevant design and volume calculation.

Johan Granlund, Eric Wedin, Martin Claezon, Richard Lundgren, Nils-Erik Nyqvist

Use of recycled materials for the construction of Airport infrastructures

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In its strategic areas for development, Aéroports de Paris is committed to the sustainable development principle. This commitment is based on better management of its existing and future assets, in particular by means of a HEQ approach (High Environmental Quality) for recently launched operations such as the T2G terminal (opened to traffic in September 2008).

Re-use and saving of materials in infrastructure work sites, which has been going on for several years, is an integral part of this choice. This is a solution for the situation in the Ile-de-France region: low aggregate resources, with a very high demand for construction materials.

Philippe Pellevoisin, Eric Godard, François Jullemier, Laurent Brissaud, Marc Bousier

European satellite navigation system

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Galileo and its thousand offspring

The famous Italian philosopher, astronomer and mathematician, Galileo Galilei would have probably never imagined that one day his name would be associated with one of the most ambitious projects in the European Union: setting up an advanced and independent European satellite navigation system.

The reality of Galileo is inching every day closer. Just three months ago, in fact, the procurement tender was launched and the first proposals, originating from the private sector, are now in the process of being evaluated. Mr Antonio Tajani, Vice-President of the European Commission in charge of the transport portfolio, welcomed the new development by stating "with this procurement, the Galileo programme enters a new era and paves the way for completing a state-of-the-art satellite navigation system which should help address many of today's challenges".

Irene Fusco

Bitumen Emulsions

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Asphalt emulsion: worldwide trends

The bitumen emulsion technique has a long history, on which its undeniable reliability and proven success have been based.

Since it was created in 1993, the International Bitumen Emulsion Federation has worked for the promotion of this technique by the mean of seminars, symposiums and publications, thanks to the contribution of its members.

The world is changing fast. New challenges such as environmental constraints and pavement preservation issues are parameters for which bitumen emulsion offers some of the most reliable answers, optimizing the balance between cost, performance and HSE.

Etienne Le Bouteiller

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