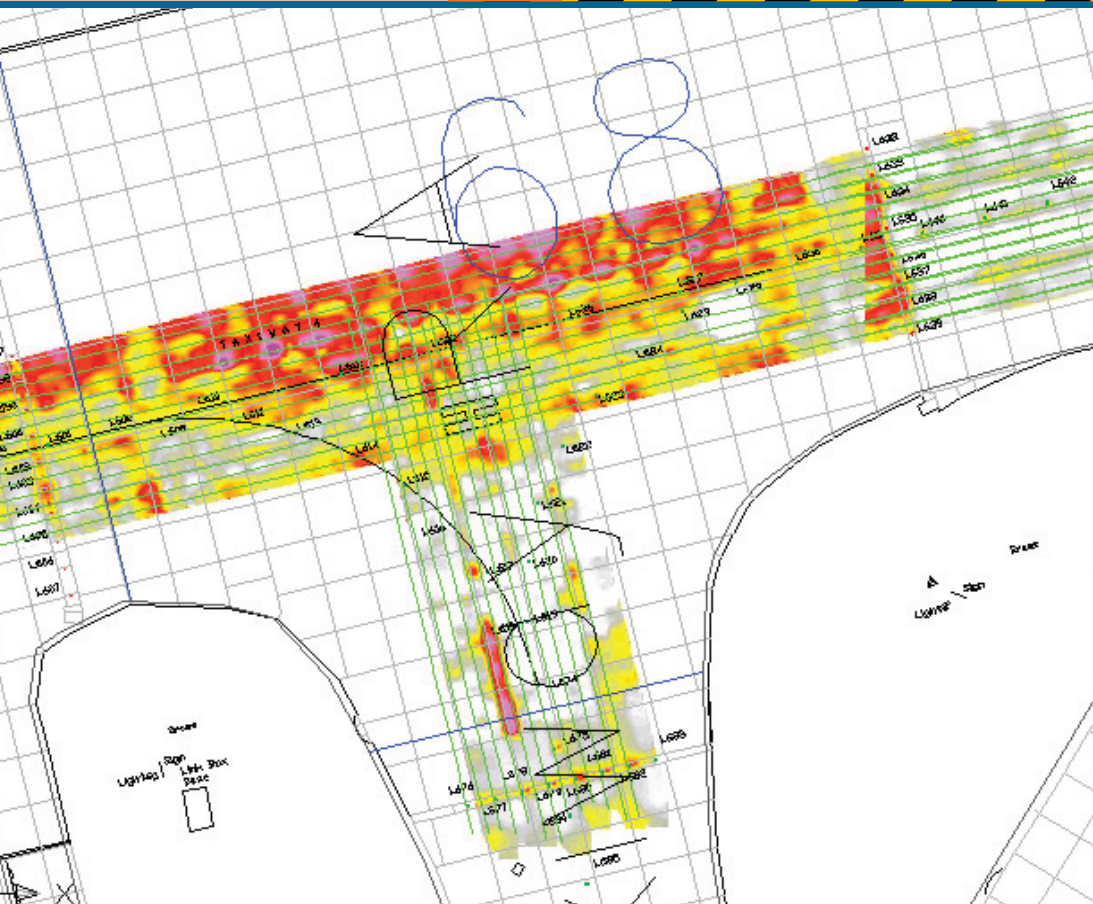


Specialists in non-destructive investigation and engineering geophysics

airports



- Pavement investigation
- Runway structure
- Runway condition
- Quality control
- Asset management



Part of the Fugro Group of companies with offices worldwide

   OVERVIEW

UNDERSTANDING PAVEMENT STRUCTURE

An understanding of pavement structure is the cornerstone of any maintenance or management plan. It's not possible to predict pavement capacity or residual life without knowing layer thickness. Rely on records and you will struggle where the structure has evolved over the years; rely on cores and you will be guessing what happens between each point. Take an integrated approach including Ground Penetrating Radar (GPR) and you will get much closer to the complete picture.

Fugro Aperio reports are tailored to the needs of different airport clients; data on pavement structure can be reported digitally to be fed into airport management software; overviews of pavement structure can be plotted onto plans, or detailed layer thickness data can be reported as cross sections. Meticulous planning, surveying and calibration means results can be cross-referenced to other test data such as Falling Weight Deflectometer to enable reliable structural assessment.

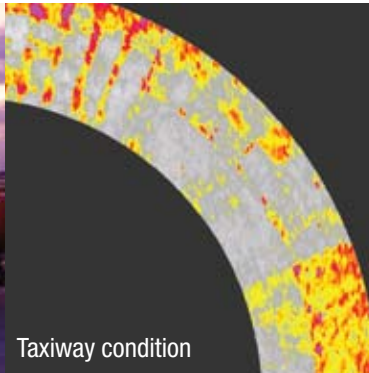


complete picture

1



Gatwick



Taxiway condition



Schipol



quality control

2

CASE STUDY



At a major UK airport a newly poured concrete apron began to crack and cores found voids in the concrete below the cracks. Faced with a potential replacement cost of more than £2m, the construction team called in Fugro Aperio to determine the nature and extent of the defects. High resolution radar mapping found a series of voids and these were verified by coring; crucially the problem was found to be limited to less than 10 bays. These were replaced at a cost of around 5% of the potential bill.

IMPROVED QUALITY CONTROL

Any maintenance, repair or construction work on an operational airfield must be completed in challenging conditions. Safety is paramount; time is scarce and quality must be right first time. Fugro Aperio bring the expertise and technology to prove that the job has been done right, and if not, to find the problems so quickly that their impact on cost and programme are minimised.



DE-BONDING AND FOD

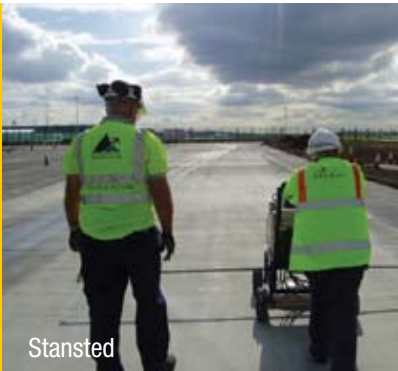
Wherever there is Foreign Object Debris there is danger and cost. US Air Force engineers have established that up to 40% of FOD arises from loose pavement surfacing. Wait for jet blast and wheel loading to create it and you have a constant maintenance task detecting and clearing it. Map de-bonded pavement materials before they actually break off the surface and you can remove many problems before they happen. Fugro Aperio high resolution radar mapping can detect de-bonded materials across wide areas so that defective areas can be re-surfaced on a planned basis.

The pavement management team responsible for a major UK airport has led the way in proactive management of pavement support. Having faced sizeable year-on-year reconstruction bills for a busy taxiway, the team commissioned Fugro Aperio to investigate the problem area in 2004. The outcome was so successful that a proportion of the asset management budget has been set aside for annual surveys that will cover all the major paved areas to enable more effective planned maintenance.

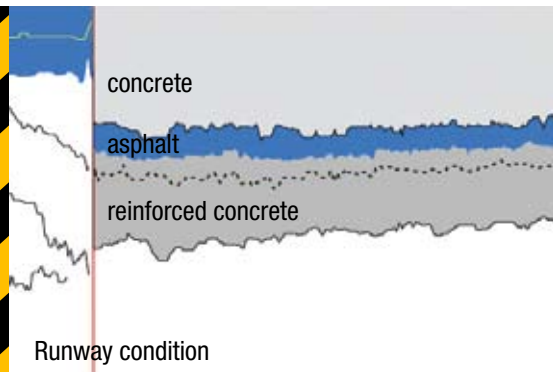
CASE STUDY



3 pavement problems



Stansted



Runway condition



Uralsk

4 proactive management



PROACTIVE MANAGEMENT OF PAVEMENT SUPPORT

There is a common requirement for cockpit vertical acceleration of $<0.3g$. This means that operators must act when paved areas become uneven, and one of the most common causes of problems is sunken or 'rocking' concrete slabs caused by wheel movement over defective joints or weak subbase materials. Once the problem has started it is possible for extensive voids to form below the concrete, and conventional repair by localised reconstruction is disruptive and costly. Operators are increasingly turning to a more sophisticated approach using GPR to map the voids with targeted injection of repair material to lift the slabs and restore support.



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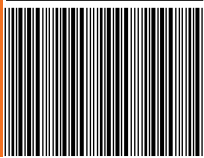


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Six good reasons to talk to Fugro Aperio

1. Growth in traffic and increased loading mean there is a greater need than ever before for information on the structure and condition of airfield pavements.
2. 'Conventional' investigation like coring is futile if you want a realistic picture of hectares of paved surfaces. Fugro Aperio provide more information in less time; return on investment is easily justified by reduced risk and lower repair bills, and the work is inherently benign compared to methods that involve digging holes out of the asset under investigation.
3. Any airport in the world can take advantage of Fugro Aperio's services because the equipment is so portable it is quick and cost-effective to mobilise anywhere.

4. Fugro Aperio has the expertise and experience to determine the structure and condition of terminal buildings, hangars, warehouses, control towers, car parks and roads – in fact just about any part of the airport infrastructure.
5. You will benefit from sophisticated technology in the hands of experienced people with an understanding of airport issues. The unique integration of geophysical instruments with precision positioning technology means more data with less setup time, and can provide results that are accurate to within 20mm even on the wide open spaces of airfields.
6. Reporting formats are tailored to be useful to engineers and asset managers; results can be delivered on drawings or in digital formats for direct input to your airport management system.

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