

AIRFIELDS

Concrete pavements at Heathrow's T5

The construction of the aircraft pavements for the new Terminal 5 at London Heathrow Airport presented a number of challenges not least of which was the London Clay subgrade on the site. This presented far lower strength than the adjacent gravel subgrade of the existing Heathrow airfield. The low subgrade strength together with the very high aircraft traffic loads that include the new generation go larger aircraft such as the Airbus A380 called for a significant pavement depth.

A cost model study proved that a rigid pavement, Pavement Quality Concrete (PQC) on a cement-bound base would provide the most cost effective solution. Initial calculations indicated that a PQC depth of 800mm, however, increasing the flexural strength to F7 grade concrete by reducing the water/cement ratio of the PQC significantly reduced this depth to 600mm, allowing the pavement to be slipformed in a single layer. Production trials suggested that the concrete batching and paving processes would have to be carried out as one complete system that included a dedicated PQC batching plant and tight control of aggregate moisture content, grading and PFA chemical properties.

Using F7 concrete reduced pavement depth and the use of recycled concrete in the cement-bound base and pavement, the working platform eliminated 27,000 truck movements. This use of cement replacement meant that cement production carbon emissions were reduced by 60,000 tons.

The need to cater for the new generation of larger aircraft called for significantly higher edge stresses on transverse and longitudinal joints. A new longitudinal joint detail, referred to as a 'tapered key', was developed to increase load transfer and reduce edge stresses. The tapered key joint included a foam top section to remove the risk of compression failures. The new joint detail is performing well in operation and BAA has adopted it for all its longitudinal joints constructed at Heathrow.

The aircraft pavements were constructed using a Gomaco four-track GHP-2800 slipform paving machine. This was fully able to accommodate the variable thickness of PQC required for the areas adjacent to the terminal buildings, taxiways and aircraft stands. For example, with the aircraft stand the trafficked sections were locally deepened compared with the rest of the stand. This approach provided further savings in concrete.

Abbreviated article from Gomaco News

Stansted clearance

The Civil Aviation Authority has awarded Stansted Airport, the UK's third busiest airport, Code F status meaning that the airport will be able to handle the new larger aircrafts such as the Airbus A380 and the Boeing 747-8. This will allow opportunities for passenger and cargo growth. Emirates have now named Stansted as its alternative airport if they are forced to divert.

There are significant environmental benefits of the new generation of aircraft. They are reputed to be more fuel efficient than a hybrid car and produces less noise at take-off than that experienced by a passenger inside a London Underground train.

