



While Jo'burg sleeps ...

O R Tambo gets a facelift

The next time you land or take off from O R Tambo International Airport, spare a thought for the contractors, Rand Roads and Black Top Surfacing, who have been working through the night rehabilitating the main runway and Yankee taxiway for a year. Planning and timing each night's shift was critical to ensure that not even the tiniest pebble remained on the runway at sunrise when the night's work had finished

AIR TRAVEL HAS become so commonplace today that we think nothing of it, nor of the myriad of activities that are essential to keep an airport and the airlines running efficiently. Runways take an extremely heavy pounding and, with passenger safety a top priority, it is essential that they are maintained in pristine condition.

Rand Roads, in joint venture with Black Top Surfacing, had already completed a runway for Johannesburg International Airport (now O R Tambo) in 2003 when it won two new contracts on tender. The first one, awarded in April 2006, was to rehabilitate the Yankee taxiway and the second, awarded a month later, was to rehabilitate Runway O3R/21L, upgrade the lighting system to meet International Civil Aviation Organisation (ICAO) requirements, widen the runway by 15 m and construct two new rapid exit taxiways (RETs) on the main runway.

Work on the Yankee taxiway was completed in November 2006, in time for the new Airbus A380's first visit to South Africa. The runway was completed in May 2007. Although the two projects

► Operations for secondary runway strengthening had to be carried out at night so as not to disrupt normal air traffic movements

overlapped, work was carried out by two separate teams with their own plant and equipment.

The jobs were both particularly challenging, considering that the taxiway and runway could not be closed down during rehabilitation. With the taxiway and runway fully operational during the day, contractors were only given access to the site at 21:30 each night, handing it back to Airports Company South Africa (ACSA) by 6:30 the following morning. Work actually finished at 5:30 so that each day an hour was spent tidying the site, painting markings and – most importantly – ensuring that not even the smallest stone remained on the surface. ACSA's Fire and Rescue Department would then inspect the section that had been worked on and give their approval before the site could be handed back to ACSA. Before the shift started, the Fire and Rescue Department would also inspect the runway for any damage that needed repairing. Repairs would be done at



► An aerial view of the main runway with the Yankee taxiway on the right and a rapid exit taxiway being constructed

the beginning of the shift.

Working in the dark under floodlights with flashing strobe lights from vehicles is never easy and surveying under these conditions as well as adhering to strict tolerances has proved particularly challenging,' says 'Rand Roads' project manager, John Hamilton.

Added to this, there were three paving teams (on each project) working in a small area – roughly 150 to 200 linear metres across the width of the runway – lots of plant and haulage vehicles which had to stay within demarcated lines, limited working time and often in extremely low temperatures. In winter the wind chill factor meant that all personnel had to wear special freezer suits; and achieving compaction on the premix at low temperatures was also a challenge.

Keys had to be milled on each side of the section being worked on both longitudinal and transverse, to tie in the new layers with the existing ones. Both the new and existing layers had to be surveyed to ensure there were no steps or gradients greater than 0,5%.

The three asphalt plants which supplied premix to both sites had to be ready before each shift so if it was raining or rain looked imminent, the suppliers could delay the manufacturing process. It was also vital that exactly the right quantity of premix was ordered for each shift so that all the scheduled tasks could be completed.

'Planning was the most important aspect of these projects,' says Gary Catin, Rand Roads' contracts director. 'A status meeting was held every evening two hours before the shift began with the foreman and supervisors to determine exactly what had to be done and by what time. An hour before the shift, ACSA's Fire and Rescue Department were informed at the "kick off" meeting, where work would be taking place, safety issues, contingency plans and

haul routes, and they in turn would confirm the hand-over time.'

While both projects were in progress, around 150 truckloads of premix had to make their way through tight security checks and demarcated lanes to the site. The two projects combined used 64 270 tons of asphalt surfacing 101 635 tons of asphalt base.

YANKEE TAXIWAY

This R63,5 million project comprised doubling the width of the taxiway from 30 m to 60 m, as well as repairs to the Delta apron. The taxiway is 3,6 km long and runs parallel to the 03R/21L runway.

'We worked on a new section of the taxiway every night. This involved milling and replacing the existing surface with a bitumen-treated base and overlay followed by an asphalt wearing course,' says Coen Naicker, Rand Roads' project manager. 'Allowance also had to be made for electrical ducts that were required every 15 m for new central line lights. Ducts had to be installed on the base course before the final asphalt wearing course was laid.'

The only differences between the Yankee taxiway and the main runway were that the taxiway did not require the same amount of central strengthening and the special ultra-thin friction course layer. As the taxiway was being substantially widened – 15 m on either side of the existing taxiway – considerably more excavation and earthworks was required. This was carried out by sister company Grinaker-LTA Roads and Earthworks, as was the case with the main runway and RETs.

The consulting engineers for this project were Arcus Gibb.

MAIN RUNWAY

The consulting engineers responsible for the design of the runway rehabilitation were Stewart Scott International. Both the

longitudinal and transverse grade of the runway was redesigned and the runway pavement strength had to be able to withstand the anticipated aircraft loading for the next ten years, including the Airbus A380. The value of the rehabilitation and new RET contract is R134,7 million.

Similar to the Yankee taxiway, the existing surface of the main runway, which is 3,52 km long, first had to be milled out in the centre (16 m) of the runway and a thick layer of bitumen-treated base was applied to strengthen this section. It was built up in levels so as to alter the transverse gradient to a 1,5% slope for better water run-off in line with international standards.

A special ultra-thin friction course layer with extra stone content was applied on the centre 58 m of the runway using a new spray paver purchased specially for this project. The paver applies the tack coat and asphalt in one operation. Although this has already been done on some South African roads, this was the first time it had been used on a South African runway. The main advantage is that it improves skid resistance and reduces maintenance. It also reduces spray from tyres during rain.

The new 7,5 m shoulders each side of the existing runway were required to accommodate the wingspan of the Airbus A380. Once the earthworks had been completed, the shoulders were constructed using an emulsion-treated base. This was done using an in-situ recycler which mixes gravel and cement and adds water and emulsion in one operation. This surface is then compacted. Similar to the taxiway, ducts had to be installed at 15 m intervals below the final layer of wearing course for the central line lights. Once the electrical ducts were in place, the area could be paved. Manholes on either side of the runway also had to be moved to make way for the shoulder.

RAPID EXIT TAXIWAYS

The two new rapid exit taxiways (RETs) are located on the western side of the runway and are approximately 2 000 m apart. They will allow more planes to land as those which have just landed can leave the main runway more quickly.

As these RETs were new, the site had to be excavated, base and asphalt layers added and temporary and permanent paint markings painted onto the surface. New centre line and lead-on lights were also required.

A new asphalt ultra thin friction course was also added to an existing RET (Echo taxiway) as part of the main runway contract.

'Working around live taxiways with a large labour force also increased the risk of an incident but there were no accidents during both these projects,' says Catin. □

Source:

[http://www.saice.org.za/downloads/monthly_publications/2007/
CivilEngSept2007/#/0](http://www.saice.org.za/downloads/monthly_publications/2007/CivilEngSept2007/#/0)