

SPOTLIGHT: CONCRETE

Heathrow's Terminal 2 upgrade will see capacity increase from 1.2M to 30M passengers a year. **NCE reports** on an time-saving construction method.



Bright plan: The new T2, pictured, will be able to handle nearly 29M more passengers per year than the original terminal was designed for

READY TO ROLL

Heathrow is the largest international airport in the world, measured by passenger numbers, with 67.7M passengers per year. The flight hub is currently undergoing a £4.8 bn investment in facilities by airport operator BAA, in the hope of providing some much-needed extra space and comfort to passengers.

One of the key facilities to be upgraded is Terminal 2 (T2). The old T2 was designed to handle 1.2M passengers per year, but was handling 8M by the time of its closure in November 2009. The new facility will eventually increase T2 capacity to 30M passengers per year, in anticipation of the continued boom in air travel.

The overall investment in T2 and facilities at the eastern end of the airport will be £2.2bn, with the new facilities to be built in two phases. The first phase will be completed in 2013 and will provide a total area of 180,000m². Phase two will be

completed in 2019.

The T2 building is one of the largest construction projects in the UK and certainly one of the most time critical, with Heathrow suffering from an urgent need to expand and upgrade passenger facilities.

To win time on the construction of the T2 building, main contractor Laing O'Rourke and engineer HETCo turned to Hy-Ten, suppliers of the Bamtec rollout steel reinforcement system. Under a £4M contract, Hy-Ten has supplied reinforcement for the concrete aprons that skirt the new building.

Two 1.2m deep concrete aprons, each with an area of 45,000 m². These required 8,000 of steel reinforcement bars. Conventionally, this would all be placed by hand with each bar being manually wired into position, a time consuming and slow process. Given the complexity and time-critical nature of the project the Bamtec rollout steel reinforcement system offered an opportunity to advance the

To demonstrate the speed and viability of the process a full depth, partial mock up was created at Hy-Ten's Liverpool works

programme.

The Bamtec system eliminates time consuming on-site manual bar placement. Instead, in a factory, reinforcement bars of the correct specification are pre-positioned by robotic spot welding machines. This creates a carpet of reinforcement. Each carpet is tagged, numbered and colour coded for easy positioning and rollout on site. This allows the steel fixing in a fraction of the time usually needed. Site labour demands are greatly reduced and the factory assembled system

also provides greater quality assurance. Contractors using this system are also more able to complete significant parts of the programme within the available weather windows.

To demonstrate the speed and viability of the process to Laing O'Rourke, Hy-Ten created a full depth, partial mock-up of the concrete slab reinforcement at its Liverpool works. This proved the speed with which the twin steel reinforcement layers could be positioned for the upper and lower zones of the floor slab.

Deep steel chairs were required to separate the upper and lower reinforcing layers in the deep slabs. Hy-Ten designed a bespoke roll-out device so that the upper layers of reinforcement could be placed by operators working at ground height, speeding the process and eliminating fall hazards. This device has now been patented and forms part of the Bamtec installation process.

Work on the aprons began in May 2010 and was



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» completed in February this year. Hy-Ten shipped up to 250t of steel reinforcement per week to the site with all deliveries precisely scheduled to meet the just-in-time steel placement programme. “There have been 72 concrete pours for the lower apron and for each pour we estimate that we have been able to reduce the steel placement time by two days compared to conventional steel fixing,” said Hy-Ten director Richard Webster.

“This is a large scale and complex project taking place in the middle of a major international airport. In addition to meeting the needs of Laing O’Rourke, Hy-ten have had to work within time access constraints imposed by the airport operator and meet stringent security criteria. We have met this challenge fully, and helped keep our customer on track for this phase of the project.”

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Hy-Ten director

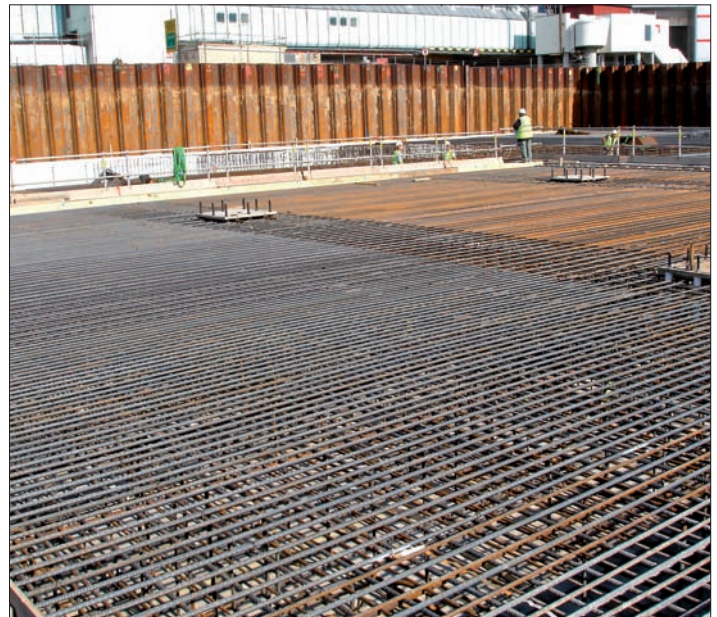


Steely determination: Keeping construction of the steel reinforcement of T2’s concrete sleeves on track was paramount

FACT FILE

Client: BAA
Project value: £800M
Main contractor: HETco, a Laing O’Rourke/Ferrovial Agroman JV
Start date: May 2010
End date: Phase 1: 2013
 Phase 2: 2019
Design: Foster and Partners

Principal work: Work includes excavation of the site, building the terminal’s foundations, and the main structure. HETco will also build the roof and facade of the terminal and 10 aircraft parking stands. It will also be responsible for the coordination of the baggage systems and the information control systems, both within the new terminal and the whole airport’s network.



Big steel: Each concrete apron covered an area of 45,000m² metres

Waldeck creates new off site manufacture role

Consultant Waldeck has merged its design and detailing expertise in precast concrete, insitu concrete, timber, structural steelwork, and facade engineering sectors into a new, niche Off Site Manufacture (OSM) department.

The new department is supported by a dedicated research and development team tasked with identifying and developing new products and systems.

Waldeck claims that its OSM engineers and technicians have cumulatively over 300 years of experience in producing innovative design solutions for the benefit of manufacturers, sub-

contractors, principal contractors and end user clients in concrete.

Its specialist team is now working on some major offsite solutions on Thameslink’s huge Blackfriars project, and the new Hilton Hotel at Heathrow Terminal 5.

Waldeck founder Paul Waldeck says that the consultant is living by the construction industry’s current “more for less” agenda.

“There is a fundamental need to drive value into everything we do as construction professionals. Our approach is focused on taking what is often a very good traditional solution and then

challenging the norm to derive potential opportunities to save time and money,” Waldeck says.

OSM enables production of building and civil engineering elements in factories where high levels of precision and quality control are achieved.

OSM is not weather dependent, and project waste is reduced in the factory and on site bringing cost and environmental benefits, alongside time certainty for those elements.

Waldeck use computerised BIM techniques to quickly establish 3D project models, thus ensuring that the elements will fit

perfectly together on site.

From this model, production drawings, in some cases solely an electronic tag instruction to computerised manufacture equipment, quickly follow.

Subsequent changes and modifications prior to manufacture can be easily accommodated, automatically revising drawings, part numbers, schedules or components.

Easy integration with clients own systems permits real-time tracking of elements allowing the benefits of just-in-time manufacture and delivery to be fully realised.