Specially adapted A-frame Hek mast climbers at work on the Terminal 5 project.

T5 access

The construction of the new Terminal 5 at London's Heathrow Airport is one of Europe's biggest construction projects. Access equipment is playing a major part in the project, especially in the installation of over 33000m² of glazing panels on the massive main terminal building. MURRAY POLLOK and PATRICK HILL report.

Terminal 5

PROJECT: 33000 m² glazing on main Terminal 5 (T5) building, Heathrow
CONTRACTOR: Schmidlin UK
CONTRACT VALUE:
Over £35 million (US$63 million)
ACCESS EQUIPMENT:

- Four specially-designed, twin-masted Hek work platforms designed and supplied by Hek Manufacturing BV (Alimak Hek), sold to Schmidlin.
- Eight JLG 1350 SJP booms, one JLG 450AJ, one JLG 1200 SJP and several scissor lifts, all rented to Schmidlin by Universal Aerial Platforms.
- Four Palazzani Ragno TSJ38 platforms, sold to Schmidlin by Powered Access Sales & Service (PASS).
- Four suspended platforms, built and supplied by Alternative Access.

CLIENT: BAA
T5 PROJECT:
The complete £4.2 billion (US$7.6 billion) project will add 30 million passengers/ year capacity to Heathrow Airport. The new terminal is scheduled to open in March 2008.

There are hundreds of aerial platforms providing safe access on BAA's Terminal 5 project at Heathrow, but one access story in particular deserves to be singled out: the combination of mast climbers, 'Spider' machines and big telescopic booms being used by Schmidlin (UK) Ltd to install over 33000 m² of glazing on the main building.

Schmidlin was faced with the task of affixing brackets to the structural steel and installing glazing units on the two 400 m long, 27 m high main elevations of the structure – each sloping outward from the base at an angle of 6.5 degrees – as well as the two 176 m long, vertical gable ends. In addition, the contractor is installing hundreds of sunshade units – 'Brise Soleil' panels – on the east facing elevation.

"This project is one of a kind", says Andy Turnbull, Schmidlin's contract manager on site, and one of over 4000 workers currently on the entire T5 project. Precise positioning and movements of large, heavy panels at height, requiring simultaneous activity on both sides of the façade was one factor. Another was accessing the façade with equipment: there are many openings in the ground, including a 90 m void above the excavation for the rail station under the terminal.

Scaffolding, both internally and externally, ▶

One of four Palazzani Ragno TSJ38 platforms sold to Schmidlin by PASS. The units are inside the building and being used in tandem with the external mast climbers to install the glazing panels.

was rejected early on in the process; "It wasn't feasible, due to the programme of the internal fit out" says Mr Turnbull, and of course scaffolding externally would have made it extremely difficult to manoeuvre the panels. With scaffolding ruled out, Schmidlin contacted London-based powered access specialist Universal Aerial Platform, along with Universal's sister sales company, Powered Access Sales & Service (PASS), to devise alternative solutions. As part of this process Schmidlin and the steel contractor Watson Steel temporarily erected a single section of the terminal elevation at a site in Thirsk in 2003 to trial different approaches.

One early option considered was to use a large deck Liftlux scissor with a modified Hiab loader crane on the deck to load and position the glazing and brise soleil panels. However, Schmidlin's favoured option, because of their stability and capacity, was always using mast climbers, and the company early on contacted Hek Manufacturing – part of the Alimak Hek group - to look at developing a specially-designed platform.

Here, the angle of the face was one potential difficulty, but more of a problem was the fact that the mast climbers had to be free standing, without any ties into the structure. "The most viable solution was the Hek units with modified A-frame – the first time it has been done", says Andy Turnbull.

For Ernst van Hek , president of Hek Manufacturing BV, "Designing the structures was well with-in our engineering capabilities, and now we offer the only rail-mounted mast climbing systems in the world."

The twin-masted Hek units – Hek MS ProMax platforms – are supported by additional sloped mast sections, creating two A-frames that are linked at the base by a single frame that runs along rails at 6 m spacings. This structure created the required stability for the platforms, while the rails meant that the platforms could be quickly positioned for each panel installation. There are three lengths of 72 m rails along each facade at any one time.

In all, four twin-masted platforms are being used, two on each of the long elevations: one installing the glazing units, the other simultaneously following on and installing the brise soleil panels. The brise soleil platforms are longer, with a platform length of 19 m, but did not require the same handling capacities as the glazing platforms.

The twin-masted Hek platforms are mounted on rails running alongside the terminal building.

Schmidlin (UK) Ltd has rented eight JLG 1350 SJP telescopic booms from Universal Aerial Platforms of London. The booms are used to install the brackets for the glazing units.

As many as 17 glazing panels a day have been installed by Schmidlin (UK).

The glazing platforms are 16 m long and have a specially widened central section to accommodate a vacuum-grip, panel handling 'robot' based on a Hiab loader crane. The base frame has a platform that can accommodate up to two days' supply of glazing panels. The glazing panels weigh 450 kg and measure 2 m (W) by 3 m (H), and the brise soleil units are 250 kg in weight and 6 m long and 1.8 m wide. All these panels are loaded on to the platforms at ground level by two Manitou MT1744 telehandlers, rented to Schmidlin by Universal.

2900 kg capacity

The Hek platform for the glazing installation has a capacity of 2900 kg, sufficient for the 1700 kg robot, a 400 kg allowance for four workers, and 500 kg for the glazing panel.

The work method was to divide each 400 m façade into 36 sections to coincide with the spacing of the movement joints. The glazing is then installed left to right in two 18 m runs, with the lowest two rows installed using telehandlers, during which the mast climbers installed the stainless steel glazing brackets above.

Getting the glazing units up to the installation position was just one aspect of the project, however. The other main challenge was to find an access solution inside the structure to allow workers to help with the final positioning of the panels.

The trial structure at Thirsk had allowed Schmidlin and Universal to test several solutions, including an ▶

One of the JLG 1350 SJP booms in action. Universal Aerial Platforms has an engineer/operator training specialist on site at all times.

E Falck Schmidt Spider TSB34 and the Palazzani Ragno TSJ38, with the latter chosen because it has a telescopic fly boom and a top-mounted cage, making it easier to access some of the more difficult spots.

The four Palazzani's are working with Hek platforms on each side of the buildings, and also being used to clean the inside of the buildings. With maximum working heights of 28 m the platforms are ideal for the task.

One modification to the platforms has been to allow a section of each of the front and two sides of the cages to drop to allow the platform to sit in close to the steelwork, and means the workers don't have to lean out over the edge of the cage. The change was checked with an independent consultant engineer and the manufacturer. "The Palazzani's have proved their worth on the job", says Andy Turnbull, "They have allowed us to get in tight to the steelwork."

The Palazzani's arrived on site during the summer of 2004 and have been working flat out. "They have done fantastically well", says Phil Lomax, director of PASS, "especially given the number of hours they've been doing."

The Hek platforms and the four Palazzani's have all been bought by Schmidlin. BAA has the option to buy the Palazzani's at the end of the contract – they might prove ideal for long-term cleaning operations – although Schmidlin has also negotiated a buy-back agreement with the supplier, PASS.

Also helping Schmidlin are eight JLG 1350 SJP booms rented from Universal. These are being used to install the brackets for the glazing panels, and are also working simultaneously at the two main elevations as well as the two gable ends.

Andy Turnbull says the system has worked as planned: Schmidlin achieved the target installation rate of ten panels a day on the second day of the project. The company has installed as many as 17 panels a day, enabling it to cut the project time by three months. However, there have ▶

Any Turnbull, contract manager at Schmidlin (UK) Ltd.

Close-up showing the vacuum handling unit mounted on the Hek mast climbers.

been challenges; “Having an understanding of the internal fit-out has been the main difficulty”, says Mr Turnbull, “[and] interfacing with the other large sub-project teams.” Helping make things easier is the fact that each contractor creates its own “clean, clear and safe” working zone where only its staff is permitted to work.

Suspended platforms

For the gable ends, meanwhile, the less complicated requirements – there is no slope to the face – meant that Schmidlin could use internal suspended platforms supplied by Alternative Access. (Mast climbers positioned internally were considered but rejected because of the floor loadings entailed.) The company designed and installed three heavy-duty platforms – measuring 7 m by 2.6 m and with 600 kg capacities – as well as a single lighter duty cradle for finishing work. These cradles are aided by workers using JLG 1350 booms on the outside of the building.

On a project of the size and importance, you would expect safety to be a high priority, and it is. Reflecting this, all of Schmidlin’s staff using the aerial platforms are IPAF-certified, and there is a full-time engineer from Universal on-site who not only looks after the machines but is also a fully-certified IPAF trainer.

Mr Turnbull says all the access suppliers – Universal, Alternative Access and Alimak Hek – have permanent staff members on site to provide engineering advice and back up, as well as training; “They become our engineers and safety employees, making sure that we use the equipment properly.”

By mid-July around 60% of the glazing units, and almost half of the brise soleil panels, had been successfully completed. The majority of the glazing units on the building will be in place by the end of the year.

For Universal and Alimak Hek it has been an extraordinary contract: £1.2 million (US$2.16 million) to Hek for the mast climbing system, and for Universal, one of its largest contracts ever, valued at £1 million (US$1.8 million) for sales and rental. Tony Gettins, Universal’s sales manager, says the project has also been significant for the focus it has given to the JLG 1350 machines – Universal is renting another three of the machines to other contractors on the T5 site; “The project has swallowed up the majority of the UK fleet of 1350s”, he says.

For Schmidlin, it continues to be a challenging project on one of Europe’s largest, high profile construction projects. As Andy Turnbull says, “This project is one of a kind.” AI

Keeping busy

The Terminal 5 project is helping keep UK access rental companies busy, with AFI, Panther Platforms, The Platform Company, Hewden, Universal Aerial Platforms, Hi-Reach and Nationwide Access all having machines on site when *AI* visited.

While Universal has the largest machines on the project – see main article – it is Nationwide who is the other major supplier, with over 130 machines on site in May and an additional 200 Genie GS-1932 scissors recently bought by the company for projects including Terminal 5.