

VERTICAL CONSTRUCTION: getting it right

It can take several stakeholders to bring a construction project to life, and for vertical construction developments, there are added complexities in the shape of space restrictions and intricate designs to support the upward structure. But help is now at hand, thanks to new technology





Above left: the Cooper's Hill luxury retirement village under construction (Photo: The Audley Group). Above right: The Topcon GTL-1000 robotic scanning solution being trialled by Balfour Beatty

With many and varied challenges in vertical (building) construction projects, it's no surprise that mistakes happen. But mistakes can quickly drain budgets and can take years to rectify. Thankfully, technology now exists that can spot mistakes before construction has even begun; create intricate as-built models for verification against the design - and do all this in almost real-time.

Avoiding mistakes is crucial in delivering a successful project and efficiency and productivity are key elements for any contractor. So it was that leading construction group Balfour Beatty turned to Topcon Positioning Group to change its workflow and verification processes with a more effective and efficient vertical construction workflow for a project in Surrey.

Cooper's Hill, a multi-million-pound refurbishment of a Victorian Gothic building most recently used as student accommodation, started in early 2017. The transformation includes re-purposing the original building by constructing new steel-frame structures and creating luxury retirement apartments on a 66-acre site (Magna Carta Park) at Englefield Green in Surrey.

Final piece in the jigsaw

Balfour Beatty's team, already proficient with verification technology and methods, found the usual process of scanning - with costly specialist contractors coming on-site, followed by waiting for data to be shared and then analysed - didn't meet efficiency and productivity marks. The business had already started investigating new technology and software to improve the process when Topcon's newest instrument, the GTL-1000 integrated total station and scanner, became the final piece in the jigsaw for a fluid and effective workflow.

Guy Murphy, site engineer at Balfour Beatty, said: "We've

done traditional verification on projects for a long time at Balfour, but previously there weren't the tools available for us to make this a quick and simple process. With Topcon's new GTL-1000 feeding into its data processing tech, suddenly there's a link between a decent, quick and effective scanning tool and an equally quick software environment for us to verify in near real-time."

Murphy, who started on the project in July 2017, beta-tested the new product as part of a full workflow including Topcon's MAGNET Collage and ClearEdge3D Verity software that analyse and verify scanned data against design models.

From scan to verification in record time

He said: "The GTL-1000 has enabled us to verify the project at any stage we wanted as it cuts the scan to verification process time dramatically. With the kit being dual-purpose it fits into a site engineers' daily work so it allows us to take on more capabilities without the need for thousands of pounds to be spent on scanning teams. It's so simple to use and I haven't needed any lengthy training courses to become proficient.

"We've used this workflow on the new steel frame build to compare against the design models and have been able to find and correct mistakes before materials were put in place. The Verity software shows us areas that are out of tolerance and enables us to consider designs and scans in much more detail than we've had the time or data to do previously.

"With the GTL-1000 and Topcon software we're capable of doing so much more and we're getting more value for money from our engineers. We can't exactly calculate the ROI because we haven't yet encountered any mistakes that can be compared against timescales or budgets. Yet the benefits we've seen from this new workflow and technology are already unquestionable. Absolutely worth it."

The GTL-1000 was officially unveiled

at Bauma in Munich in April 2019, featured at the GEO Business Show in London a month later, and was ready to go on general sale in September.

From reactive to proactive

Chris Emery, senior manager for vertical construction at Topcon Positioning Group, said: "The industry to date has had its hand forced in the way it deals with mistakes - there's been very little way to change the reactive nature to clashes and design issues. At Topcon, we knew the frustrations of engineers and contractors when it comes to verification - the time it takes, the money it costs, and the specialist training required - and so our full workflow solution now makes it quicker and simpler than ever while saving money on reworks.

"We're delighted that Balfour Beatty is so pleased with the results of this new solution, and it has been a pleasure working with its team to fine tune the workflow. The result is a solution that helps the construction industry fast-track vertical construction projects, saving time and money."

The Cooper's Hill project is the first to use the GTL-1000, with phase one due to finish on schedule this Autumn.

Nick Salmons, Balfour Beatty's principal laser scanning surveyor, said: "At Balfour Beatty, we are dedicated to driving innovative new working practices across our business as part of our '25 per cent by 2025' initiative. The new Topcon robotic scanning solution will increase productivity on site by accelerating the construction process and by identifying design challenges more efficiently than traditional methods.

"We are delighted to have collaborated with Topcon over the last 12 months to trial this new tool, which will significantly benefit the industry as a whole; reducing cost and programme duration for clients and contractors alike."