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## Project planning precision at Oxford University's Beecroft physics building



**Summary:** International engineering and construction giant Laing O'Rourke used Powerproject from Elecosoft for its planning and programme management on Oxford University's Beecroft physics building.

As principal contractor for the Beecroft Building it took a one team approach that sustained the client relationship, minimised environmental impact and ultimately delivered a multi-award winning project, and a stunning state-of-the-art science building for Oxford.

The precision of the programme management and delivery was one factor in securing its project leader a prestigious Construction Manager of the Year Award.

The spires of Oxford are home to some of the best physicists in the world and Laing O'Rourke has given the city a world leading physics building in which to work. This technically challenging project, which sank five storeys beneath the ground, not only saw deep excavation but involved tight tolerances. It delivered a beautiful, bronze and glass clad, timber rich, highly functional set of spaces within which scientists can explore the universe.

*"Powerproject is an important part of the job. We spend a lot of time using it and use it to plan not just construction but various stages including pre-planning, design planning and procurement. If you set it up right it really helps you monitor the job, which is a key element for project success."* Ola Odusote

The Beecroft Building at Oxford University has already won some of the most prestigious architecture and construction awards. Its successful delivery depended on very precise project and programme management, not just because of its complexity but also in the face of some massive risks to the completion time frame.

This was one of the factors that added another award to the roster. Project Leader Rob Cooper gained Gold in the Higher Education category of the Construction Manager of the Year Awards, sponsored by Elecosoft. He and Principal Planner Ola Odusote relied on Powerproject to plan, progress and manage construction to meet high expectations and some significant change needs.

## Part of the job

Tight programme management was essential on this complex 119 week project, which involved digging a 16 m deep basement (the deepest in Oxford), 155 m of high speed data cable, nearly 11 km of pipework, 72 km of electric cable, and 760 tonnes of steel.

Powerproject is one of the preferred planning software packages Laing O'Rourke uses across its projects. "Powerproject is an important part of my job, and I spend most of my time using it not only for construction but for planning the job from the start. It is a key element for success" explained Ola.

Rob continued: "We use Powerproject almost daily for communicating, sharing information, and for analysing scenarios to see the impact of changes. We are intensive users, because we are constantly reviewing the build programme, inputting changes and analysing the effect on the end date, in order to mitigate the impact of those changes on the programme."

## Technically challenging

The design for the 8,950 sqm Beecroft Building, which was extensively modelled in 3D, delivered a soaring five storey atrium above ground and five subterranean levels. It offers

collaboration, research and working spaces for more than 200 theoretical and experimental physicists and include many high specification laboratories designed for environmentally sensitive and atomic-level experiments. This meant accommodating very tight tolerances for light, vibration, and temperature control within the construction.

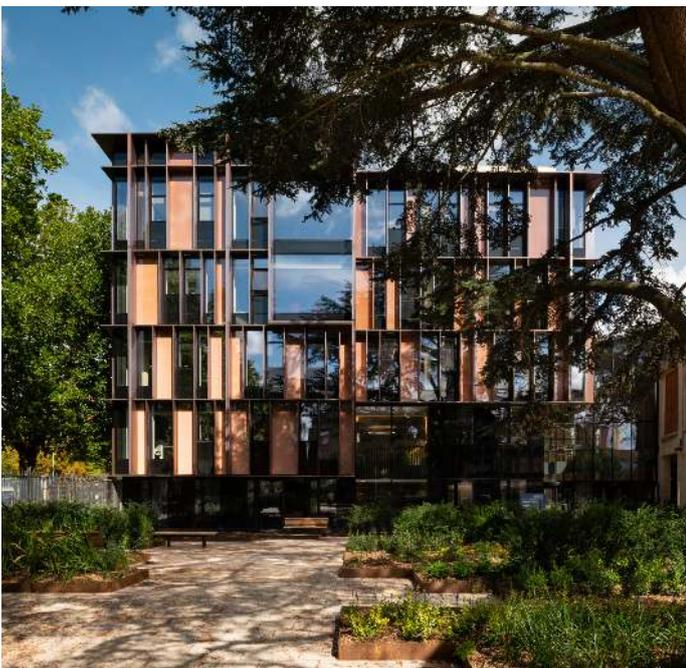
Through close monitoring during all stages, and constant vibration testing with a specialist provider, Rob ensured that vibration tolerances were met that would allow for nano-scale experiments, and also achieved temperature tolerances in the labs of +/- 0.02C which was well beyond the client's needs.

"We used the software to create the contract programme. From that we created a series of short-term programmes and targets that we used for day to day operations." He continued: "At the end of each week we would do a dropline and compare the contract and programme to build, to see exactly where we should be. If we deviated for any reason, we could highlight it, and straight line the progress to see the impact on the completion date."

Powerproject helped to support client communication and deliver a high level view of operations, as Rob outlined: "On a monthly basis we met with the client and presented the contract programme with a dropline on it which helped us paint a clear picture of exactly where the project was up to."

The in-depth detail was captured on a programme that ran to more than 25 pages each of more than 100 activity line items, but the project team appreciated that Powerproject could filter out the right level of detail for audiences that are less versed in programming.

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Rob Cooper receiving Gold award at the CMYA



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## When factories burn

In July 2017, just six months short of the handover date, the joinery supplier’s factory burned to the ground, along with vast quantities of timber beams, panels and staircases that had been a core element of the building’s interior design, particularly within the atrium. The impact on the programme timeline threatened to be catastrophic.

Laing O’Rourke pulled out all the stops to help mitigate the disaster, not just for the client’s project but for the supplier too. Calling in supply chain favours and contributing resource directly, it set out to help the supplier rebuild, catch up, and somehow meet the Beecroft Building’s timber requirements.

Rob recalled: “When our supplier’s factory burned to the ground, we had to work together to see how we were going to re-programme in order to finish the building with minimal delay. If we had stuck to the original sequence, the delay might have been six months or more. We broke the building into sections, spanning things we could finish and those that we couldn’t progress without the timber. Using Powerproject, we then created a series of short-term programmes that focused on finishing off everything that was possible to finish, listing out every element and how and when it would be done; we worked through each and used them to communicate across the team. In the end, we pulled the impact back to just 12 weeks.”

## The logistics of success

The innovative Beecroft Building was designed in 3D, and Rob and his team had to deliver reality from that vision. One of the ways that they used Powerproject to support that was

to plan out the logistics in huge detail. Rob said: “Logistics were a real challenge. One of the most important things in assuring delivery is getting materials designed and delivered at the right time. Never late, and never too early. Only when materials come in on time can you actually work the programme as planned, but it’s a delicate balance because if the guys don’t have the materials they need, they can’t do their job.”

Ola summarised the role that Powerproject plays on projects, saying: “Powerproject is an important part of the job. We spend a lot of time using it and use it to plan not just construction but various stages including pre-planning, design planning and procurement. If you set it up right it really helps you monitor the job, which is a key element for project success.”

“When you create a programme properly it helps you not just communicate the impact of any delays but mitigate adverse effects to get the project back on track and keep it there. Using it effectively means you can use it as an information base to advise the team about how to react not only to negative situations, but to take advantage of positive ones and maintain any gains of time you have achieved.”

The Beecroft Building was completed just 12 weeks after the original target date, despite the huge disruption caused by the interruption of joinery manufacturing. It was opened in September 2018 by World Wide Web pioneer Sir Tim Berners-Lee, alongside the building’s donor and the University’s Chancellor and Vice-Chancellor.

Bringing the building in effectively on time, and on budget, was a huge personal as well as company achievement, that was appropriately reflected for Rob Cooper and his team with the CMYA Gold award. We are sure that this development will gather many more accolades in the future.

## More information

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