CONSTRUCTING EXCELLENCE
in the built environment



demonstration project

The Bridge Academy, Hackney

Project Name:	The Bridge Academy, Hackney
Project Location:	London
Themes:	Building Information Modelling, Integration and Collaborative Working
Project team:	Bridge Academy Hackney Ltd (Department of Education and UBS) / Mace Plus / BDP / Watson Steel
Project Timescales:	January 2004- September 2008
Contract Value:	£50m
Type of Work:	Newbuild

The Bridge Academy in the east London borough of Hackney is a seven storey, terraced building on a small site. The academy's focus is on mathematics and music and the building was designed to encourage students to think about the relationship between maths and music and use the structure of the building as a learning tool. The "heart" of the building is suspended to provide maximum flexibility within the building allowing the Academy to change and adapt to future needs.

Drivers

The client wanted a final building that fulfilled the functional needs ie that contained the right number of classrooms of the right size and facility; that worked from the viewpoints of accessibility and through flow; that would be a practical and maintainable building; and would be an attractive and inspiring building for students. To maximise the flexibility of the space, the building was designed with the load bearing elements of the building on the outside. This complex design with intricate geometries meant that a new approach to detail design was needed. The design process began with initial drawings being sketched in 2D and handmade sketch models. Once the concept had been formed structural designs were developed using a Building Information Model (BIM) using Bentley systems as the basis. The client was unaware that BDP used a BIM but observed and accepted that 2D and 3D modelling tools were being used. This project was one of the first times BDP had used a BIM tool and they were unsure of how reliable the information produced would be. For this reason, BIM was implemented only on the key interface challenges of the building. The designers saw the potential that BIM had for future projects and saw this project as an opportunity to develop in house expertise.

The client believes that "skillful and thorough" design, which can be aided by the use of tools such as BIM, has benefits in the operation of the finished building, for example, in terms of accessibility of M&E equipment which needs regular maintenance. Successful design rests heavily on the experience of the designers and also the people they consult. UBS were the co sponsors of the Academy and had experienced facilities managers with experience of construction, engineering, security, catering, cleaning etc.

Use of Building Information Modelling

As the project design was begun over four years ago, BIM technology was in its early stages. Therefore the procurement of the supply chain did not include a requirement for previous experience using a BIM. The Design and Build Contract enabled the team to come together at a sufficiently early stage to ensure that the BIM can be used by all members of the team. The client saw no reason to take a detailed interest in the technical design as they trusted that the builders and designers would work well together and the team were contractually obliged to deliver a specified quality standard for a fixed cost by a fixed time.

The tool was used to model "pinch points" where the interfaces of mechanical and engineer services were particularly difficult. The benefit of this was that it helped to identify issues in the design which could then be rectified with little delay to the project. Although a full BIM model was not implemented, it demonstrated that BIM can be used in specific areas to overcome specific problems.

Model Ownership

One of the concerns that the design team had over using the new technology was the issue of design responsibility for the model. To overcome this, the designers maintained the model as a design tool. The model was then passed on to the fabricators "For Information Only". The steel suppliers imported the model into their own 3D steelwork detailing package, Tekla X Steel. The feedback from the steel suppliers was positive as they felt that it aided communication between the teams. The sub contractors were able to set up an online viewer for their model to ensure that all members of the team were viewing the same model.

Barriers

This was one of the first projects that the team had used BIM and it needed them to develop new ways of working together. As with any new methods of working there was some reluctance amongst some members of the team to change. The pressures of delivering a project on time meant that some people were uncomfortable with the new technology. As BDP offer an inter-disciplinary service the different teams were able to work together to overcome difficulties with the technology and understood the drivers for each individual team. BDP now has BIM representatives in each team so that there is expert knowledge across the firm.

The team experienced issues with software compatibility and interfacing between different teams. In some cases the 3D model had to be downgraded to 2D to interface with different formats. The team had to work with software vendors to explain the functionality they needed. This has helped the technology to move forward and enable future projects to use BIM more extensively.

The BIM was used for a specific function on this project. In other projects, BIMs have been developed so that they can be handed over to the client upon completion and used by Facilities Managers. However, on this project the client was not involved in the development of the BIM. Their use of the model post contract is likely to be limited to as-built information for any future alterations or repairs. It is unlikely the model will be used as part of a day-to-day maintenance strategy.

Benefits

The team did not attempt to quantify the benefits of the approach but felt that there were large qualitative benefits. They believed the value of the BIM was in the prevention of potential problems. They identified one of the primary benefits of the use of BIM was that it enabled rapid problem solving. Issues were identified at a very early stage and could be resolved before construction began.

The team identified three main additional areas where the BIM proved beneficial:

- Analysing the Design- Designing the building in the virtual environment meant that the team could be confident that the design was structurally sound. The model also helped the mechanical and electrical services, ETFE and curtain walling to be correctly interfaced with the steel structure.
- Virtual Modelling - The 3D model was used to convey the visual element of the design and helped to give the client confidence that the final building would suit their requirements.
- Manufacturing- Use of the model saved on time and materials wastage as all angles could be successfully worked out and handed over to the fabricators before work began on site. The fabricators could then use the model and develop it for their own benefit.

Conclusions

The team have been extremely pleased with the final building and have received good feedback from the Head Teacher. The students are proud of their new school and is has helped to regenerate the area. The team agree that due to the complicated design the building would have been extremely difficult and time consuming (hence expensive) without the use of the BIM. The success of this project enabled BDP to promote the use of BIM both to their internal team and also their present and future clients. They were also awarded a Bentley BE Award for the Best Use of BIM. The team have gone on to use BIM throughout future projects.

> *"it's just incredible – there's so much space. it's so easy to get around everywhere."*
>
> *"it makes me want to go out and say I'm from the bridge academy – which school do you go to"*
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> Bridge Academy Students, interviewed for BBC News

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