



Case study

Örebro Business School, Sweden

Background

Örebro Business School was founded in 2008 as part of the university at Örebro, a town lying 160km west of Stockholm. The school offers courses at undergraduate and graduate level, attracting both Swedish and overseas students. The University of Örebro is one of the fastest-growing universities in Sweden and has embarked on an expansion programme to meet its needs for more teaching facilities and accommodation.

The business school is one of the faculties to benefit from the programme. A university square is being created at the entry to the campus where land was available. The square will comprise three buildings, one of which is the new business school building with an auditorium seating 500, study rooms and open plan study areas, and offices. The client is Örebroporten, the municipal property services agency, who owns the project and will let the building to the university. The business school opens in October 2015.

The project

From the outset, the client, Örebroporten made open BIM a requirement. All the consultants and suppliers were expected to use BIM in order to achieve a smooth, error-free process. However, the client was aware that most of the consultants and suppliers did not have any experience of open BIM, though some had limited experience of proprietary BIM for particular functions. The size of the task ahead was clear from the fact that most were still operating in 2D CAD.

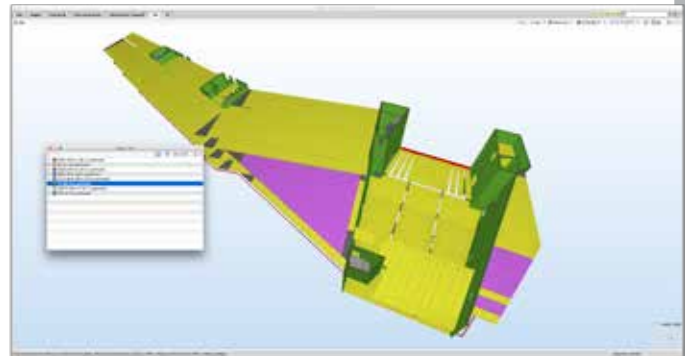
The client appointed architects Juul Frost as BIM co-ordinator at an early stage. Juul Frost is a Danish practice, based in Copenhagen and with an office in Sweden, and was chief architect for the project. Its first assignment was to prepare a BIM/CAD manual and organise a BIM seminar for all the parties involved. The manual set out the minimum requirements for the exchange of digital models and includes the use of IFC, so that the client was not bound to a specific software platform.

Tackling the problems head on

Exporting IFC files was not an issue. It was with importing that problems arose. Some of the suppliers found they could not import IFC models from other parties in the supply chain. How could these suppliers best be helped? The solution was to supplement the IFC model files with 2D dwg plans as a modelling underlay. All the IFC models were then gathered in a Solibri model checker, where consistency and collision checks were carried out.

At first there was reluctance among suppliers to share models. The answer here was to make a distinction between sketch work and the parts of the model that needed to be validated for collision control. Sketch work was exported simply as snapshots, so that other parties realised that they were

viewing work in progress. This solution brokered a more collaborative spirit, and thereafter models were



Clockwise from top: Örebro University students; BIM model of reinforced concrete; BIM model of air-conditioning; Visualisation of the business school. Images courtesy of Örebro University (top) and Juul Frost Architects (all others).



exchanged on a weekly basis. The first models to be exchanged were too detailed, giving rise to a high level of clash detection. It became clear that, in the early phases, simpler was better and that project participants should only export and co-ordinate what was needed in each phase.

Clash management was itself a difficult operation. At the start, clashes were listed on a single Excel spreadsheet, updated from week to week. Eventually, the list became unmanageable, so a system was introduced to filter the clashes by consultant and by location within the building. This response made it clear who had to fix which clashes, and the process became manageable again.

BIM Collaboration Format (BCF)

The buildingSMART standard, BCF was used in parts of the project, notably to exchange comments from Solibri model checker to the Solibri model viewer and back again. As BIM co-ordinator, Juul Frost regretted the fact that not all the software platforms involved were compatible with BCF but recognised the potential of BCF.

Manufacturers and IFC

The manufacturers of the prefabricated concrete and steel components also modelled in 3D and exported IFC models. Their models were then merged into the collaborative model – at which point a number of serious errors emerged. These errors would probably have been overlooked in 2D design, and the 3D IFC model helped significantly.

Communication

The initial BIM seminar evolved into regular workshops for clash detection and control. Because of the geographical dispersal of the consultants, the workshops were held as Skype meetings once a week. Subcontractors responsible for the building services (plumbing, ventilation and electricity) were also involved in their own co-ordination meetings. The processes for communication and co-ordination met the needs of the project.

Benefits of open technology

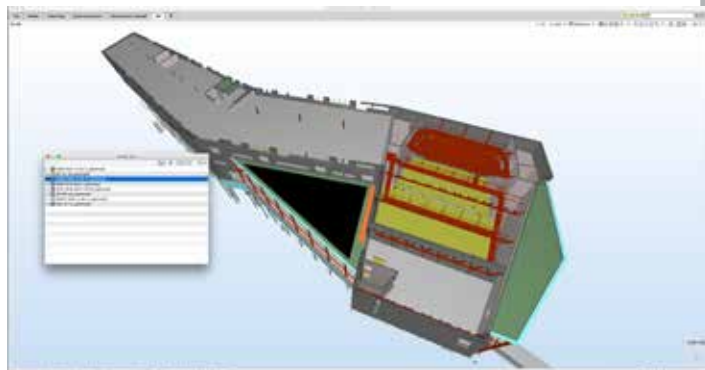
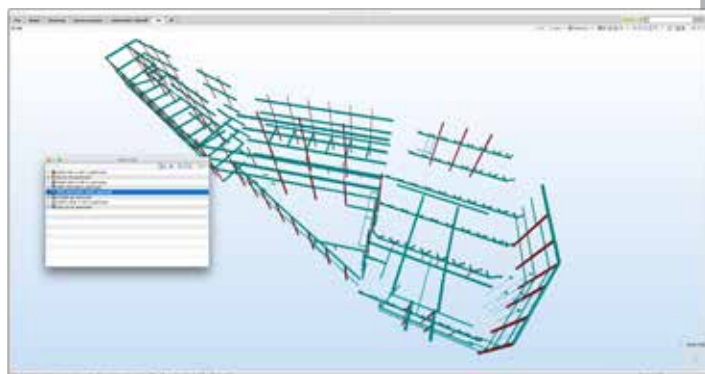
- Good co-ordination in 3D was achieved.
- The time taken to resolve problems on-site was materially reduced.
- The use of IFC 3D models made it possible to work accurately in the complicated and tight zones of the building.
- The time taken for the design and planning of the building services was reduced by 2–3 months.
- Through the use of open standards, the client had the opportunity to create a perfect collaborative environment – which they did.
- The ease of viewing the IFC 3D models in the computer was praised.

Going forward

The use of the BIM manual was essential, but it was clear that future manuals could with benefit specify that less detailed objects should be exported in the early stages. On this project, excessive information was exported too soon, hindering progress.

BCF, the buildingSMART standard which is leaner than the full data model, was used in parts of the project and offers excellent potential for the future. Juul Frost's experience showed that a greater range of software which supports BCF is needed.

The BIM seminar for subcontractors and consultants, held at an early stage, allowed working relationships to be forged – a success story that will be repeated in future. The collaborative environment, once established, was much appreciated, with a democratic feeling that time was better spent on creating or improving this environment than trying to dictate to others how they should work.



Images: (above) BIM model of prefabricated steel; (middle) Structural BIM model (below) Örebro Business School in construction, Sweden. Images courtesy of Juul Frost Architects

Heroes of Interoperability

This project gained a special mention in the 2014 Business Gain through Open Technology awards.



Acknowledgments

Thanks are made to Juul Frost Architects for the content of this case study.

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