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Sustainability by building SMARTER

The product imperative
Paris meeting brings major players together

A key piece of the buildingSMART jigsaw is to ensure that products and systems can link seamlessly into the building information model. Once this is achieved, design, procurement, operation and other functions will feel the benefits.

'A great deal of work has been done in this area and we need to explore common ground – and find a common way forward.' These were the words of Patrick MacLeamy, CEO of HOK Architects and chair of bSI as he opened a one-day international meeting in Paris on 27 January 2012. The event was hosted by Patrick MacLeamy, together with Patrick Ponthier, DG of the French building products umbrella organisation, AIMCC. This area of buildingSMART activity is now known as the Product Room – a welcoming, international virtual space for people wanting to standardise specifications and terminology – and is complemented by the Process Room, where business case standards (IDMs/MVDs) are developed.

Progress on the buildingSMART Data Dictionary (or IFD) was presented by Norwegians Jacob Mehus and Håvard Bell from the IFD group. The Dictionary is a multi-lingual tool, based on ISO 12006-3: 2007. 'We must find a way to connect the many databases containing construction information, even though they are structured differently,' said Jacob. The Data Dictionary has been developed independently by a small international group (members Standards Norway and Stabu and affiliate Catenda fielded speakers at the event) but is being integrated into buildingSMART. It is at the heart of Product Room activities and offers exciting possibilities.

In France, linking building products to BIM is seen as a strategic priority, and major players have taken the message on board. They include AIMCC, which hosted the meeting. With membership spanning around 100 trade associations and 7,000 manufacturers, it is a force to be reckoned with and has declared electronic data exchange a priority area. Adding its clout is Saint-Gobain, the giant global provider of building products, which has set up a working group on structuring data.

Earlier work in France on standardising product names had mixed results but offered valuable lessons. Research initiatives are now flourishing: standards organisation AFNOR, for example, is working on a project to create a draft standard on French terminology by 2013, and research institute CSTB has developed a tool called Elodie which uses environmental product declarations to do life-cycle analysis and calculate environmental impact.

From the UK there was news of a specification app called NBS Create, available from RIBA Enterprises. Other work from Norway included the IFD SignOn project, which helps users find products, and the Data Enricher (see page 2). The presentations also set out work being done in the US, Germany and the Netherlands, illustrating the rich confection of activities going on internationally. In summing up, Patrick MacLeamy praised the ingenuity of these smart solutions. 'Now is the time to extend these practices to a wider circle,' he concluded.

Where next?

Patrick MacLeamy, CEO of HOK Architects and bSI's chair, takes questions from editor Betzy Dinesen on strategic developments.

BSI has been doing a lot of work on strategy – for example, our Roadmap 2020 was published last year. What do you see as the most important areas for us, strategically, in the coming years?

To focus on two areas: the Product Room and the Process Room (see page 4), in addition to our technical work. This meeting in Paris is the kick-off for the integration of the IFD Library – or Data Dictionary – group and bSI. Together with AIMCC, we will try to widen the circle and build up a library or dictionary to connect products and processes.

BIM adoption continues to grow but we still have a divide between those who use a proprietary BIM and those who support open BIM. Do you think open BIM is gaining ground?

I do, actually. There is hard evidence from countries like Norway that are mandating the use of BIM. Larger countries haven't been so bold, but there's no doubt that BIM is the way forward. Proprietary BIM is limited to the parties grouped around those who own the solution, but open BIM – like the internet – is open to all.

In some countries, government and its agencies have made (or are making) open data-sharing a requirement? Do we need a government mandate to push the industry forward?

At buildingSMART, primarily through our chapters, we continue to press government to promote projects that use open BIM. Late last year, ExCom – along with the new chairman of the German-speaking chapter, Siggi Wernik – met the German building ministry – an example of our pro-active approach.

How effective have GSA requirements been in the US?

I would say that the effectiveness of GSA's BIM requirements has been limited. The requirements are too mild and we are continually encouraging them to be bolder and push BIM further.

Data Enricher offers breakthrough

BIM users often complain that the software available does not truly meet their needs. So the release of Catenda's Data Enricher in March 2012 will be welcomed by the industry.

The tool arose largely out of a recognition by buildingSMART Norway that there was no software that could put the Data Dictionary (or bSDD) into an IFC file. An application with this functionality was clearly needed and Catenda stepped up and agreed to deliver it at short notice.

In fact, Catenda had already done some groundwork, but a fresh impetus was given, with bS Norway sponsoring parts of the project – and these software components will be made available free to the wider community. 'This is a small tool but a giant step forwards,' says Steen Sunesen, MD of the chapter. 'It puts IFD – the Data Dictionary – into IFC. No other tool has done this to date.' A pilot with the Norwegian Homebuilders Association is testing both the content of the bSDD and the Data Enricher itself.

'The project BIM should be crystal clear about the information it contains,' explains Håvard Bell of Catenda. 'It can't afford to be blurry over the details – and the Data Enricher provides this clarity.'

More about the Data Enricher

Håvard Bell, CTO and head of sales at Catenda, answers questions from editor Betzy Dinesen.

What is the Data Enricher?
It's a way to enrich BIM with more specific information about your data, eg you can specify that a 'flow terminal' is actually a shower head or sink. You can also add properties to objects in your model, improving the process of product procurement. You add semantic information to your data model.

The Data Enricher allows users to attach IFD tags (panel, right) with detailed product information to the model, with further links (not shown) to the architectural model
Source: Catenda

And how does it operate in practice?
Basically, the software allows anybody to upload an IFC file, look at the model in the viewer, click on an object (say, a door) and tag it with IFD information. A door might be a fire door and an outer door. The IFC does not allow that kind of information to be attached, but it can be done using IFD.

What are the origins of the Data Enricher?
The tool was conceived around 2006–07 but was never progressed at the time: it was felt that it might tone down the concept of the Data Dictionary. In fact, the tool is likely to bootstrap the whole process and will be around for a long time.

Who is the market for the tool?
People who want a higher-quality BIM – owners, contractors and so on. And potentially house-builders, who are involved in the pilot. It allows them to procure more efficiently.

What difference will it make to end-users?
The building process will be less prone to error, and we can expect high-quality buildings and cheaper prices.

How has your experience as chairman of bSI influenced your policies at HOK? What benefits has HOK realised so far? What future benefits do you expect?

HOK has adopted very strong BIM policies internally and we fund R&D. We have developed our internal BIM guides to ensure the thoroughness and completeness of the BIM at every stage of the design. As for the benefits, well, we have seen a drastic reduction in the number of questions asked by contractors.

Countries are facing renewed recession, or at least a struggle. Will this be a setback for BIM adoption among medium-sized and smaller players?

Recession has put stress on both medium-sized and small players, but I have spoken to a number of smaller firms. Being small, they are more nimble and the thoughtful ones among them are making changes now, ready for when the economy heats up.

You mentioned earlier the strategic focus on the Product and Process Rooms. What prompted the need for a reorganisation?

We began to see that buildingSMART wasn't making progress in the non-technical work of architects, engineers and contractors. Our visit to the German ministry of building, along with enquiries from AIMCC, made us decide to change our priorities.

What advice would you give to companies who have not yet adopted BIM? What steps do they need to take?

The building industry is in the midst of rapid change. It is imperative for those companies to adopt and implement open BIM or they will be marginalised. The future is bright for those who adopt. As regards practical steps, I would say this: get acquainted with open BIM, visit our website, join a chapter. There are many possibilities online for companies to educate themselves about BIM. ∎

Case study

Building with BIM in Italy

Porto Nuovo in Milan lies just to the north of the city centre, close to the Garibaldi and Centrale railway stations. The area was severely run down and a regeneration project, with an emphasis on pedestrian access and green living, is underway. Architects Antonio Citterio Patricia Viel and Partners (ACPV), have designed the new cultural centre for the project: a three-storey 3,000sqm building which includes a library, offices and retail gallery.

The faceted roof and wall surfaces required close co-ordination with the structural engineer, and the Revit platform was used. This enabled both teams to develop design options, documentation, cost estimates and visualisations more quickly. The architectural model also helped ACPV collaborate with the exterior design consultant to develop a scheme for the building's glass façade that can be efficiently manufactured and installed.

'We use a BIM process for all of our projects,' says Paolo Emilio Serra of ACPV. 'Quality means not making mistakes. It means finding and correcting errors before the design process is completed and the construction phase has begun. That's how we save a considerable amount of time and resources. BIM makes it possible.' ACPV won an Autodesk BIM Experience award for its work on this and other projects.

At the leading edge in Finland

Finland has been pioneering the use of data sharing and interoperable working for over a decade, punching way above its weight for a small country. From 2001, a series of projects was carried out, using a shared building information model. Among them, Aurora 2 – a mixed-use facility at Joensuu University – showed how BIM offered the chance to create a less expensive, more energy-efficient building.
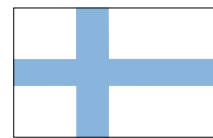
A milestone was passed in 2007 when Senate Properties, the Finnish property services agency, required the use of IFC-compliant BIM – open BIM in other words – in its projects. 'In the public sector, nearly all projects are built using BIM,' explains Tomi Henttinen of Gravicon and chairman of buildingSMART Finland.

Now Finland is approaching another milestone. In March 2012 new BIM requirements will be published. Existing guidelines, which cover architecture, mechanical and structural engineering, quality assurance, quantity take-off and HVAC, among other things, will be upgraded and made mandatory, while whole new areas of activity are being brought into the requirements.

'We will see BIM-based project management and the required use of BIM on-site and in FM,' says Tomi. The coverage is wide, taking in the whole building cycle, from planning permission to operations.

Finnish software companies are rising to the challenge and developing the tools the industry needs. Tekla has developed a new site collaboration tool (Tekla BIMsight), while Solibri released version 7 of its Model Checker in September 2011. Gravicon has developed a web-based management tool, Modelspace, which spans the different disciplines.

In the early days of BIM in Finland, a decade back, expectations were unrealistic. 'Many people thought you simply had to press a button to retrieve the information you needed,' adds Tomi. 'Today, we have moved from theory to practice, with a better understanding of how to use the main model and the discipline-specific models. The next step is to ensure our processes and the new technologies are aligned.'

Contact Tomi Henttinen, chairman of buildingSMART Finland, at: tomi.henttinen@gravicon.fi

Case study: Helsinki Music Centre

The Helsinki Music Centre, which opened in August 2011, has a high-profile central location close to the Finnish Parliament. The 36,000sqm building has a large light foyer with glass walls, a main hall seating 1,700 and five smaller auditoriums. Decorative copper cladding gives it a striking appearance. The Music Centre is home to the Sibelius Academy and used by the Finnish Radio Symphony Orchestra and the Helsinki Philharmonic Orchestra, in place of a concert hall designed by Alvar Aalto in 1971, Finlandia, whose acoustics were unsatisfactory.

The acoustic consultants, Nagata Acoustics, from Tokyo, were therefore – perhaps uniquely – appointed first, in June 2000, and architect LPR was selected via a competition on the basis of 2D drawings. In the early design phase, the 2D architectural drawings were converted into a 3D model. The lead developer, Senate Properties, required the use of an IFC-compliant BIM, and Gravicon took the role of BIM consultant. BIM played a key role in this phase as the floor area was distributed among the end-user groups whose requirements, as well as cost targets, had to be met.

Energy simulation was also carried out at this stage. Finnish HVAC design company Olof Granlund evaluated two types of glazing for the curtain walls, using its own interoperable tool, Riuska, which provided hourly simulation for all seasons for the exercise. Energy analyses were done for different units of the project.

Life-cycle analysis was also done, drawing on data from the BIM and other project sources. A tool known as BSLCA (Building Services Life Cycle Analysis) was used to compare the performance of two scenarios over a 50-year period. But what made the Music Centre project special was the use of BIM on-site. Construction company SRV used models in dozens of tasks, from scheduling to the checking of quantities billed by the subcontractors.

'At Senate, we believe that BIM is the key to cost-efficient and energy-efficient building and is part of high-quality design and proper FM,' says Kari Ristolainen from Senate Properties. 'The Music Centre has created a real buzz in the city.'

Software included: AutoCAD Architecture; MagiCAD; Riuska; Vico; ANSYS; ROOMEX; Tekla; BSLCA; Navisworks; and Solibri. A full-length case study of the Helsinki Music Centre appears in Eastman et al, 'BIM Handbook', 2nd edn, 2011

Helsinki Music Centre: (left) Exterior and main entrance; (above, top) lobby and areas for social interaction; (above) copper cladding and glazed canopy Source: Arno de la Chapelle

Movement for open BIM

OPEN BIM™

Ten software companies have joined forces to promote Open BIM. The collaboration is led by buildingSMART International, Graphisoft and Tekla, and supported by several leading software vendors including Nemetschek and Trimble. The buildingSMART strategy, Roadmap 2020, includes the promotion of Open BIM. 'As buildingSMART's open standards become more widely implemented, it is important that the value of open sharing and exchange of data is promoted across the global construction industry,' says Chris Groome, bSI's business manager.

The benefits of open (as opposed to a proprietary) BIM are clear. Project participants can work with the best-of-breed software solutions in their own field, co-ordination errors are greatly reduced, and data can be accessed throughout the life-cycle of the asset.

The companies involved are incorporating the promotion of Open BIM into their marketing efforts and collaborating with other organisations. Further companies are welcome to join the movement, both on the software and design/construction side. The group has trademarked its Open BIM logo, which can be used on products and projects as a promise that they meet the requirements of open collaboration.

Visit: http://www.openbim.com or contact Chris Groome (cg@ buildingsmart.org.uk)

News from Canada

The new Canada chapter, formed in 2011, has kicked off with a range of activities on different fronts. In September–October, a survey of BIM use in the industry was carried out, with results yet to be published. The findings will be made available on the website. A contract language working group is developing two documents, one on the principal terms used in contracts, the other, a list of supplementary provisions.

Meanwhile, a communications strategy has been drafted, intended to help the chapter reach out to industry. 'Our mandate is to lead and facilitate the co-ordinated use of BIM in the design, construction and management of the Canadian built environment. We also advocate that BIM needs to be implemented in a way and at a pace that enables the stakeholders to understand their roles and responsibility and to assess their capacity to participate in this process,' says Dave Pelletier, chair of IBC/bS-Canada. 'We are also working with major owners.'

The annual conference of the Canadian Construction Association takes place in March 2012 – and a BIM session is planned. The chapter recognises the importance of contractor participation in BIM, and the Institute for BIM in Canada (which hosts the chapter) is leading a session entitled, 'BIM: what contractors need to know'. *Visit: www.cca-acc.com*

Training survey – have you responded?

The bSI survey of training in the area of open BIM is underway. A questionnaire was sent out to all chapters in February 2012, asking about local training in open BIM. During March, telephone interviews will be held with a sample of respondents. The information gathered will inform future buildingSMART activities in education and training, and the findings will be presented to the International Council in London in May.

If you would like to be involved in the survey and have not received a questionnaire, please contact beryl.garcka@b-r-t.co.uk or Chris Groome (cg@buildingsmart.org.uk)

- Are education and training (E&T) courses purely technical?
- Do some courses contain aspects of process and management?
- Which institutions run courses?
- Who attends such courses?
- Is the learning delivered in the classroom, online or a mixture of both?
- Do such courses lead to formal qualifications?
- How do you see E&T developing in your country?

IFC4 on track

At an ISO meeting in Suzhou, China, on 17–20 October 2011, the next stage in getting IFC4 (IFC2x4) accepted as a full ISO standard was reached and the draft standard has now been submitted as a Draft International Standard (DIS). Balloting on the DIS is now underway – this entails a review and voting period, which runs during the first half of 2012. If successful, this will be the last stage before final acceptance.

Product Room and Process Room

The development of the new virtual Product and Process Rooms is very much a work in progress. Chris Groome, business manager for bSI, outlines the present state of play.

'The first area of reorgnisation is products, which includes the buildingSMART Data Dictionary along with the many other tools that are being developed all around the world outside the buildingSMART arena. The Product Room covers a wide spectrum, including tools for specification, environmental analysis and standardising terminology.

'The second area is the Process Room, which covers the Information Delivery Manual (IDM) – guidance on when and where specific information is needed during design and construction. The International User Group (IUG) will provide input into both Rooms.

'The term "room" has been adopted to convey an open inclusive approach: buildingSMART welcomes anyone doing work in these areas to share experiences and collaborate.'