The X factor
Celebrating in style at the tenth Construction Computing Awards

ConstructSim
Bentley’s Advanced Work Packaging

Structural change
Tekla transitions to Trimble

The Cube
Vectorworks 16 highlights BIM workflows

Revit in the Cloud
Autodesk expands Cloud-based collaboration
When an architect designed a living building that could move with the sun, it was Bentley who helped make his dream a reality. Find out how our BIM solutions made it possible - watch our film at Bentley.com/BIM.

BIM Advancements are the Difference
Efficient solutions
by David Chadwick

There is an emphasis in this issue on improving project efficiency, which is covered in a number of different ways across several articles - two of which also raise controversial points about the focus and direction of BIM.

You can improve efficiencies, cut running costs, enhance collaboration between project members and so on in a number of ways. CONJECT believes that improved information management is the key, with their conjecPC application providing a method of instituting a total document and information control system for any number of projects. This keeps all project members within the loop at all times. If you know what is going on soon enough, you can make informed decisions and keep projects on track.

Sitedesk introduces a more specific application which encourages the creation of Operation and Management data whilst the design and build process is underway. They argue that owner/operators need to be involved within the project from a very early stage, so that they can inform architects of exactly what needs to be delivered for them to be able to manage the building after handover.

Besides encouraging both sides to talk to each other - and after the first halting steps that will presumably become progressively easier - it ensures consistency of data throughout the project lifecycle, and removes any chance of misunderstanding through the disconnect of information and process history between design and build and facilities Management.

Bentley divides working processes using Advanced Work Packaging within ConstructSim, breaking and automating complex construction tasks into individual tasks for dedicated groups. Advanced Work Packaging facilitates best practice deployment across the project lifecycle, facilitating the exchange of information between engineering, construction, commissioning and handover, with the work packages serving as the unit of that information exchange.

We also look at Vectorworks, who have been bringing their users up to scratch and capable of delivering BIM Level 2 whilst adhering to accepted standards and protocols with a series of presentations that focus on the processes surrounding site development, and the achievement of Levels of Development 100, 200 and 300.

And then we have an article on Autodesk which focuses on collaboration between Revit users in the Cloud. All part and parcel of the need to improve working practices, seek out efficiencies and deliver projects on time and within tighter budgets.

Two of these articles raise alternative solutions to the handover of building information to the client and building ‘operators’. Whilst Vectorworks provides an impeccable example of how and when project data should be delivered to the client using COBie data drops at different levels of development, Sitedesk accumulates Operations and Management information throughout the life of the project, putting together exactly the same digital information to support maintenance of the building that one would hope to extract from the links within a COBie document (Sitedesk also offers full COBie output, if required).

Both methods of data handover are equally valid for facilities maintenance, although the Government supported route is, perhaps, ‘bullet proof’, with the need to conform to standards and protocols. I just remain slightly bemused at the need to insert a tabular document with quite a degree of complexity into a strictly digital and visual environment. To explain further, you could, conceivably, produce something like a COBie file to describe my car, but I wouldn’t want the car mechanic to use it to fix the engine. I await your passionate defence of either process with eager anticipation!
CONSTRUCTSIM 12
Bentley’s Advanced Work Packaging, a feature of ConstructSim, is the key to successful execution on complex projects.

THE CUBE 14
Achieving BIM Level 2 using Vectorworks was recently demonstrated by taking architects through the creation of a hypothetical project - The Cube - and the BIM processes related to it.

1.8: LONDON 17
The highlight of January’s Lumiere London Festival for any self respecting engineer was surely “1.8 London”, the ethereal Janet Echelman sculpture.

THE HAMMERS X 24
The winners of this year’s Construction Computing Awards may indicate a change in emphasis within the industry itself, writes David Chadwick.
In the hands of Tekla users, architect’s drawings evolve into constructable 3D models, that develop into real buildings. That’s made possible by Tekla software and Trimble.

Together we are shaping a smarter future for construction.

Join the evolution.
tekla.com/evolution

Aki Luntamo
BIM Master, Sweco
Tekla BIM Awards 2015 winner
TENDER IS THE SITE FOR CONSTRUCTION

TenderSpace is a newly launched web-based suite of tools developed for anyone involved in property or construction. TenderSpace makes it easy for Clients and their Advisors to efficiently manage projects and find Contractors, People and Resources, through the use of the TenderSpace ToolBox. It also gives Contractors, Specialists and Suppliers exclusive access to opportunities they would not otherwise discover.

The majority of the tools are free for anyone to use, and those looking to grow their business can use additional search functions at a fraction of the cost of similar services.

David Stapleton, Chief Executive of TenderSpace says: ""We have designed a comprehensive, intuitive and flexible suite of tools that will benefit a range of people involved with the property and construction sector. We hope TenderSpace will bring business together and ensure everyone in the industry is given access to the opportunities which are right for them."

www.thetenderspace.com

ONLINE BIM LIBRARY OPENS FOR BUSINESS

Programman has launched a free browsing library available at www.magicloud.com. MEP designers that need a wide selection of high-quality BIM products including those designers utilising Revit MEP or AutoCAD, can now access more than one million products from leading manufacturers.

In addition to browsing the full catalogue of intelligent products and accessing their technical data, many of the objects are also available for download enabling designers to use them directly in their projects. MEP designers do not have to be current MagiCAD customers to make use of MagiCloud.

The MagiCloud library is easy-to-browse so users can find detailed, accurate dimensions and comprehensive technical data for products by nearly 200 manufacturers, and 3D views are included for each product, which can be spun and viewed from any angle.

Designers can quickly select the components they need, downloading them into their Revit, Revit MEP and AutoCAD projects. Free download capability is possible for more than 50,000 products and this number is continuously growing.

www.magicloud.com

SHEFFIELD UNI HEARTSPACE GETS GO-AHEAD

Bond Bryan’s latest project for the University of Sheffield has just received planning permission, with work on site expected to start in 2017 for a 2018 completion.

Following the establishment of a Development Framework by Bond Bryan’s Strategic Team, and a successful design competition entry, this third phase of the St George’s Campus redevelopment is the culmination of Bond Bryan’s work with the Faculty of Engineering.

The Engineering Heartspace will sit beneath a dramatic undulating glass roof structure, providing a unique space for the whole of the Faculty. The four-storey atrium, inserted between the Grade II listed Mappin Building and the 1885 Central Wing, will house new highly serviced laboratories, offices and a café, as well as providing a ‘collaboration space’ for students and staff from different departments.

A connection to Portobello Street will provide an additional destination on the pedestrian route that links a range of campus facilities including the Students’ Union, the Information Commons (Learning Centre) and the University’s tram stop.

The design responds to both the historical heritage of the site as well as the ambition of the Faculty. The contemporary curved roof design contrasts with the existing formal brick buildings, floating across the tops of the existing roofs and creating a clear distinction between the old and the new.

However the design takes visual cues from the Mappin building’s original “Star of David” ventilation outlets with its own interlocking triangular glass and solid roof panels. The proposed new triangular steel tree columns are also deliberately positioned to frame key features of the existing buildings.

Matt Hutton, Associate Director and the projects concept designer said: “We believe that the honesty, of having a highly-engineered roof adjacent to the historic brick walls and slate roofs of the existing buildings, is about celebrating the engineering of both the past and the present, inviting the building user to look at both in more detail. This surely is what renovation and conservation is about, engaging with the user and the wider public, bringing these buildings back to prominence.”

The Heartspace development will provide the University with a total gross internal floor area of around 12,400sqm of combined new build, refurbished and reconfigured existing space.

www.bondbryan.com

INDUSTRY news
Thousands of free BIM objects from almost 300 manufacturers across Europe. Over 60,000 architects and designers are using these intelligent and configurable objects, with automatic alerts when objects change.

With clever BIMobject® APPs, the objects are available directly from within market leading BIM solutions including Revit, ArchiCAD, Autocad and SketchUp Pro. Other formats are also supported.

Make sure you’re not missing out by going to www.bimobject.com or, to find out more, enter BIMobject into search on YouTube.
TEKLA DELIVERS CONCRETE RESULTS

Max Frank Ltd, part of a leading international group which designs, manufactures and supplies a diverse range of technical products and services to the concrete industry, has recently invested in Tekla software in order to transform its existing workflows. By utilising the power of Tekla’s 3D modelling capability, quantity take-off tools and fabrication drawings, Max Frank aim to automate a significant proportion of its current 2D processes to revolutionise how it designs, costs and manufactures bespoke products. As MD Gerhard Bumes states: “By automating key stages of our design process with Tekla and using a single model to generate all the information we need in a timely and efficient manner, Max Frank are able to offer a much more responsive service to our clients. Additionally, the time that we save by reducing manual work can be spent value engineering our solutions, therefore offering an improved service to our clients.”

Bumes continued, “Tekla’s powerful reporting tools enable Max Frank to efficiently process information received from the client and return initial costings with greater clarity and accuracy. Additionally, the software has the capability to develop the model through to the manufacturing process. Fully parametric custom components are used, whilst all related material lists, drawings and schedules can be generated instantly in the required format for the company’s production team.”

www.tekla.com/uk

MAKERBOT AND STRATASYS PARTNERSHIP

MakerBot and Stratasys have announced a sales partnership program that allows both companies to extend the cross-selling of their products and open the door for sales partners to offer MakerBot and Stratasys 3D Printers.

“We believe that both Stratasys and MakerBot can greatly benefit from each other’s strengths - and so can our customers,” said Jonathan Jaglom, CEO at MakerBot. “This collaboration between the two companies gives our customers access to a larger suite of products that is designed to speed up the design process and lower costs. The partnership program also empowers sales partners to better consult their customers on how to make their product development processes more effective and gain a competitive edge.”

www.stratasys.com

PROPERTY PIONEER RECEIVES TOP HONOURS

An award-winning property professional who became the first woman to hold a top construction industry role has received a prestigious honour from Birmingham University. Louise Brooke-Smith has been awarded an honorary doctorate from Birmingham City University recognising her achievements across the land, property and construction sectors.

In 2014 Louise was appointed Global President of the Royal Institution of Chartered Surveyors becoming both the first ever woman, and the first person from the West Midlands, to hold the position in its 147 year history. Dr Brooke-Smith has nearly 30 years experience as a Chartered Surveyor and Town Planner and has worked across the globe, including on projects for the United Nations. "It is a genuine honour to have been awarded this Doctorate from a University where I had the privilege of studying, nearly 30 years ago," said Dr Brooke-Smith. "It is even more pleasing to be attending the ceremony alongside so many people who are at the start of their own journeys and preparing to go out into the world and begin their careers.”

www.bcu.ac.uk

SITE DIARY APP FOR CONTRACT ENGINEERS

The need for accurate and comprehensive records documenting a project’s progress are essential for establishing facts retrospectively in the case of disputes or other issues requiring investigation, such as health and safety or environmental incidents. An important part of this record is the daily site diaries kept by contractors, Site diaries are usually handwritten by engineers, reviewed and approved by managers and then scanned and archived. Photographs supporting diary entries are often taken but are stored separately to the documents that refer to them. The new Site Diary app addresses these challenges by providing uniform reporting across the organisation; real-time reporting and collaboration; photo capture and automatic data capture; improved engineer compliance and savings on procurement costs.

www.mobilesitediary.com

DIGITAL APPROVAL FOR CAD DOCUMENTS

The newly released SEAL Systems provides digital approval processes for CAD documentation. It is not always possible to complete a digital approval process for CAD documentation as the document often needs to be approved by several people, and so is printed and then signed by all parties. SEAL Systems simplifies and complements these approval processes with its automatic integration of a digital signature in the SAP workflow, making it possible to sign documents and have a record of their approval with just a few mouse clicks.

www.sealsystems.com
Evolution of an Industry

We asked Kenny Ingram, Director of Construction at IFS, to let us know what he considers will be the main issues in the Construction Industry in 2016 and beyond - apart, of course, from the BIM Level 2 deadline in April.

SKILLS SHORTAGE
IFS Prediction: Within five years we will see an increase of graduates in the construction sector by at least 20%

Context:
In the next few years we are going to see an increase in the intake of high calibre graduates into the construction sector due to the increasing demand for technology in the industry. As construction becomes more geared to Building Information Modelling (BIM)/Internet of Things (IoT)/3D printing and digital cities it will begin to attract more and more young minds into the sector.

As we move towards a truly digital world and digital asset lifecycle, construction will become a more technological based industry, thereby encouraging innovative people into the sector.

Example:
Take the UK as an example. It has an ageing construction workforce (like many other countries) with 25 percent over 50 and 15 percent over 60. This demonstrates that it’s now more important than ever to encourage bright young graduates into the business. The engineering, construction and infrastructure industry accounts for over six percent of the world’s largest economies from a GDP perspective and therefore must not be underestimated as a great career opportunity for young people. The construction industry builds some incredibly impressive assets including airports, high speed railways, tunnels under the ocean and sports stadiums. We need to show graduates that it’s hugely rewarding to see one of these assets being completed as a direct impact of their efforts.

TOPIC: 3D PRINTING
IFS Prediction: Within 20 years 50% of all buildings will use 3D printing technology

Context:
With housing shortages around the world and huge increases in population being predicted, technology can play a huge role in new ways to approach the construction of housing. With technology like 3D printing, houses can be built at a fraction of the cost, showing that you cannot solve the housing problem by simply deploying traditional building practices. In one fell swoop you can reduce the cost of building and speed up the rate at which houses are completed.

Example:
For example in China they produced 10 3D printed buildings in 24 hours. With this rate of production it’s impossible to overlook the impact it could have on housing shortages and increasing populations. Other areas of technology such as BIM in particular can facilitate greater use of 3D printing in construction.

At the heart of BIM is a CAD-driven, 3D design model that enables you to visualise assets in three dimensions. Many working in construction see BIM as a way to deliver projects faster and at a lower cost; similar expectations to those connected with 3D printing. As with 3D printing the crucial thing here is to demonstrate the capabilities of BIM to encourage the construction sector’s uptake of the technology.

TOPIC: WORKPLACE TRENDS
IFS Prediction: Telecommuting will increase by at least 100% in the next 10 years and by 300% in the next 20 years

Context:
In every large city around the world you have people living on the periphery who spend many hours commuting to and from the metropolis and in some cases this isn’t sustainable or healthy. As more and more young people come into the construction sector, particularly high calibre graduates, we will start to see a trend towards more telecommuting and flexible working. This will have a direct impact on the need for more infrastructure outside cities, for example more hospitals and schools and further advances to water and electricity in the areas. As mobility increases in the workplace this will have a further impact on the need to create housing outside of cities. In turn this will change the landscape of cities and suburbs. Population growth and changing working patterns result in a need for technology to drive fundamental change. For example Skype has made video conferencing possible for meetings with colleagues working remotely. In the next few years we expect to see many innovations that support telecommuting and mobile working.

The next generation of managers will have been brought up with technology their entire lives and will see the working environment in a new and different light to the generation above them.

www.ifsworld.com
Perhaps anticipated since its acquisition by Trimble in 2011, the New Year saw Tekla finally become a Trimble branded business. The rebranding also reflects the evolution of Trimble within the construction industry. Trimble is better known as a solutions based company, focused on applications requiring position or location - including surveying, construction, agriculture, fleet and asset management, public safety and mapping. This is in addition to utilising positioning technologies such as GPS, lasers and optics.

Trimble and Tekla share a common vision - to transform the building lifecycle through advanced, accessible and intuitive technologies, and to drive increased collaboration across the industry. With an open approach to BIM, the name change reflects the combined companies’ strong commitment to customers, providing the opportunity to tightly connect Tekla software to Trimble’s broad portfolio of design-build-operate (DBO) solutions.

Speaking about the transition, Risto Räty, general manager for the Trimble Buildings Structures Division said: “Trimble’s expertise, technologies and investment in research and development enables us to bring solutions to market that transform the construction workflow. The brand name is an important indicator of who we are and what we stand for. Together, we can serve the construction industry better as we tightly connect Tekla software to Trimble’s broad portfolio of DBO solutions."

BIM is a process that is being rapidly adopted by the world’s construction, engineering and architectural communities to produce, communicate and analyse building models. The tighter integration of Tekla’s BIM software solutions with Trimble’s building construction estimating, project management and BIM-to-field solutions will enable a compelling set of productivity solutions for contractors around the world. Clients can benefit from dedicated workflows and productivity solutions that are unmatched in the construction industry.

THE TRIMBLE LINE-UP
Visiting Trimble’s website is a bit of an eye-opener, as it lists the range of construction and other activities it is engaged in. Those that we are usually concerned with - architectural, structural and civil engineering and site construction, surveying and geospatial - are accompanied by a number of applications for the farming industry, including water management and, interestingly, marine construction - although sugar cane crop management might eclipse that in the surprise factor stakes.

Trimble Structures incorporates the traditional structural engineering and design solutions that we are all familiar with - Tekla Structures, Tekla Structural Designer and Tedds.

Tekla Structures is BIM software that enables the creation and management of accurately detailed, highly constructible 3D structural models regardless of material or structural complexity. The models can cover the entire building process from conceptual design to fabrication, erection and construction management.

Tekla Structural Designer provides an innovative approach to modeling by combining analysis and design into a single, seamless process. Sophisticated loading and analysis functionality, fully automated design, high-quality documentation, and seamless BIM collaboration allow engineers to more...
efficiently and cost effectively analyse and design multi-material buildings.

**Tedd**s is a powerful software solution for automating repetitive structural and civil calculations. Users can choose from one or more of its regularly updated calculation libraries or they can write their own, creating professional documentation every time. You can also combine your structural calculations with 2D frame analysis, all within Tedds.

Trimble Structures also includes Tekla BIMsight and SketchUp Pro, which has blossomed considerably since it was bought from Google by Trimble.

**Tekla BIMsight** is BIM software for model-based project collaboration. You know exactly what is being proposed in the project in detail. You can communicate your ideas and access structural, MEP and all relevant information. It’s available as a free download, enabling users to evolve design ideas and document modeling work in both 3D and 2D formats.

**SketchUp Pro** provides 3D modeling, layout, visualisation and communication tools all professionals involved in building construction programs. It’s included in Trimble Structures because Structural engineers, fabricators and detailers use SketchUp Pro to communicate complex structures visually, streamlining collaboration with other project stakeholders.

SketchUp Pro is also included in the architectural line-up, providing building professionals around the world with a powerful tool for putting together building concepts, visualisation, communication, and planning. SketchUp Pro is powerful because its intuitive and simple interface allows architects to quickly put together ideas and then incorporate them within standard applications for further development.

The BIM collaboration tool, Tekla BIMsight, likewise features as part of the set of architectural applications, alongside another package that is an unexpected inclusion in the group - Gehry Technologies.

**Gehry Technologies** provides web-based 3D project collaboration, BIM technology, and advanced project delivery services to owners, architects, engineers, builders, fabricators and industry professionals worldwide, allowing users to communicate more effectively, improve design and construction quality, and accelerate the project cycle.

**MEP CONTRACTORS**

Trimble's background in civil engineering puts a slightly different slant on MEP to that normally found in building construction. It addresses the complexity and installation of equipment, rather than the performance and placement of components, hence the inclusion of tools like 3D laser for collecting as-built data, pipe design software, the estimation of material quantities, and the placement of hangers.

Trimble addresses the demands placed on MEP contractors to do more with less, and is one of the few solution providers that have the suite of technology solutions that span the needs of the office to the field. In today's world, with its demand for renovation projects and compressed timelines, the MEP contractor needs tools that simply and easily address the entire workflow - from the 3D laser as-built scan to the final 3D as-built laser scan for plant handover - using tools like Trimble TX5, Trimble RealWorks, Trimble PipeDesigner 3D, Trimble AutoBid Mechanical and Trimble Field Link for MEP.

**REAL ESTATE & WORKPLACE SOLUTIONS**

Improving efficiencies in every phase of building construction and operation is critical, depending on accuracy and intelligence at every stage of the entire plan-design-build-operate lifecycle. Projects must be delivered on time, on budget and within a forecast economic window.

After handover, assets must perform as efficiently as possible. Trimble addresses these realities with a breadth of tailored solutions that deliver deep insight, from planning and design, through transactions, building occupancy and operations. Hence we come to Trimble Buildings, which is focused on solutions that optimise the complete Design-Build-Operate (DBO) lifecycle of buildings.

Trimble is dedicated to transforming the industry-increasing productivity, reducing waste and optimising schedules, budgets and real estate portfolios - with powerful solutions that streamline communication and collaboration.

These targeted solutions enable architects, engineers, contractors, owners and occupiers to realise greater agility, efficiency and insight. Used in over 150 countries around the world, Trimble Buildings’ solutions are transforming the way the world designs, builds and operates infrastructure and buildings. Trimble combines strong domain knowledge with a broad portfolio of technology and capabilities to develop customer-centric solutions that are transforming the planning, design, construction, maintenance and operation of buildings and civil infrastructure.

The integration of Tekla and Trimble's construction software portfolio will enhance the ability to amalgamate data throughout a project lifecycle, while eliminating costs through better accuracy and interoperability, providing customers with a broad and sophisticated BIM capability.

With the transition, Trimble's Tekla software customers can expect the same continued innovation and the best-in-class support and service as they currently receive.

[www.tekla.com/uk](http://www.tekla.com/uk)
Williams Energy Canada has selected Bentley’s ConstructSim software to assist them in implementing Advanced Work Packaging (AWP) for Canada’s first propane dehydrogenation (PDH) plant project. The company chose the software application after a careful evaluation of all the leading construction automation tools on the market. Through this comparative analysis Williams found ConstructSim to be superior to the other offerings in enabling the Construction Industry Institute’s AWP best practices. ConstructSim will be used throughout the design, build, and operation phases of the PDH project in Alberta’s Strathcona County. The plant will add value to western Canada’s mid-stream industry by converting affordable propane into 500,000 metric tons of polymer grade propylene, a valuable petrochemical feedstock used in plastics manufacturing.

The PDH project represents economic diversification and innovation for Alberta, and will be integrated with the existing and proposed neighbouring Industrial Heartland refining industries. The planned start-up date of the PDH facility is the end of 2019.

ADVANCED WORKFACE PACKAGING (AWP)

What is Advanced WorkFace Packaging, and how does it enhance a company’s control over construction planning. Work Packages are an integral part of ConstructSim, a virtual construction simulator that facilitates the exchange of information on a construction project between engineering, construction, commissioning, and through to the handover. Besides acting as individual units of work, the Work Packages serve as units of information exchange. Together they enable information interoperability and mobility between project members, and give managers unprecedented insight into planned and executed work, enabling them to increase project performance.

In practical terms, that means that Advanced WorkFace Packaging in ConstructSim is based on a virtual construction model which incorporates engineering data - such as models, drawings, materials lists, labour requirements, and procurement records - compiled using standard data transfer interfaces. Both construction and installation work packages are further defined based on work location, scheduling priorities and the sequencing needs of field installations, and on the actual availability of materials and resources.

The use of a virtual construction model enables project managers to visualise the construction process before it is physically commenced, giving them the opportunity to foresee and mitigate the effects of construction issues and risks. It provides an unprecedented level of control over construction planning.

CONSTRUCTSIM WORK PACKAGE SERVER

WorkFace packages are easily created using the ConstructSim Work Package Server, which, after setting them up facilitates their management, distributing engineering, construction, and installation work packages that contain the most up-to-date project information, construction progress, and material status.
The server is also used to manage overall construction and installation data, and to exchange project information from the office to the job site. It tracks the status of documents such as i-models, drawings, procurement deliverables, and specifications using Bentley’s cloud technology, so that managers can rest assured that engineers and field workers are using current information. It’s also used to progress, organise and manage engineering data, consolidating and organising models, drawings, and construction information, and all in one secure location. Workers in the office, on-site, or in the field need to have instant access to project information enabling them to respond to construction and engineering work packages, and to Integrate and report on construction progress, and to provide status updates from the field.

Being able to visualise project, material, and workflow status in a virtual model prior to construction enables managers to plan work based on estimated construction progress and material turnover priorities. Whilst the project is ongoing, they can also coordinate the construction process and minimise the possibility of rework by releasing packages to the field only when work is ready to be commenced.

The ConstructSim Work Package Server is supported by engineering and construction status reports and graphic display dashboards to illustrate the status of a project by monitoring key performance indicators. The reports generated can be used to plan work based on resource and material availability. It can even be used to track a contractor’s performance.

**SCHEDULES AND 4D SIMULATIONS**

Insight into construction activities is achieved by connecting project schedules and virtual construction models, with 4D simulation being used to gain better understanding of construction consequences. With a clearer understanding of the construction path users can maximise safety while meeting schedule requirements. Managers can also reduce change order delays by performing design constructability reviews before construction begins. With complete project information to hand, managers can more accurately prioritise installation sequences.

**WORK PACKAGING BENEFITS**

Work Packages aren’t new. What is new is the ease and speed with which they can be created within ConstructSim - mere minutes instead of hours or days. They can also be tracked more easily, ConstructSim being capable of matching the construction workflow by the quality of the supporting data, such as correctly tabulated quantities and precise labour hours. Greater visibility within a project allows project managers to meet project delivery requirements, the status of work and related workflows being simplified using colour-coded indicators. This unprecedented visibility into project progress extends work package automation right down to component installation level.

Matching the Work Package to the job is important. Virtual construction simulation enables planners to visualise and select related activities undertaken by different construction teams, and to manage them using the ConstructSim Work Package Server. This ensures that packages are ‘right-sized’, i.e. they are created to reflect a sequence of tasks that can be accomplished by a specific work group in a selected period of time, and that they are configured with the correct, project specific work rates and cost estimates.

Tracking the status of WorkFace packages relies on access to materials and other resource: equipment, installation equipment and access (availability). With all such information the construction and installation status can be assessed to calculate work rates, outstanding work and turnover status, together with any other factor that has a bearing on construction.

With greater project visibility, project managers can ensure construction crews are mobilised more directly and more effectively and that relevant materials and other resources are on site before work is scheduled to start.

Scheduling the construction of a large scale chemical plant is a complex business, as you would surmise from the image opposite. It is imperative, therefore, that contractors automate as much of the process as possible. Andrew Foy, Planning Coordinator at Williams Energy Canada confirms. “We consider the use of the Advanced Work Packaging methodology to be a key component of successful execution on the PDH project, and we selected ConstructSim as our automation tool in support of this goal. We look forward to working with the Bentley team, and to leveraging its experience and expertise in AWP, as we implement ConstructSim’s capabilities across the project. We will introduce ConstructSim early in the engineering phase, enabling us to take full advantage of AWP best practices and, thereby, help us meet our delivery commitments.”

This was reiterated by Harry Vitelli, Bentley Systems Senior Vice President, who said, “It is very gratifying to be playing a role in this milestone PDH project - working hand in hand with the world-class Williams Energy Canada team. We appreciate Williams’ recognition of ConstructSim’s superior capabilities and thank them for this opportunity to help advance infrastructure in support of accelerated economic growth in Alberta and beyond.”

www.bentley.com
An introduction to the workflows and practices within BIM was recently given to architects by Vectorworks. Entitled 'The Cube', it consisted of a hypothetical four storey project in the heart of London, and comprised two phases, the first being site development from imported Shape files, and the second, creating the building from a massing model, taking it through each of the design stages and ending up with the detailed construction model. Throughout, the relationship to BIM Level 2 requirements was emphasised.

The Cube was one in a series of live, educational demonstrations created by Vectorworks to answer client specific questions. This particular presentation concentrated on levels of development (LOD), first of all utilising a single software platform to create early massing studies (LOD 100), which were then refined to create concept walls, slabs etc. (LOD 200), and then further refined to show construction intent (LOD 300).

The presentation covered LODs for both geometries making up the virtual building model, as well as the information/ data attached to these objects (schedules, data extraction). 'Refine, not remodel' was very much the key principle here, but it also showcased some of the new features Vectorworks 2016 had to offer. Throughout, attention was paid to the many BIM standards & protocols and how they impacted the varying LOD's.

**EARLY MASSING STUDIES**

Vectorworks 16 was used throughout the presentation and proved very useful, as it provides site-modelling capabilities in a linked module. We started off with terrain survey data in the form of shapefiles - spatial data, provided by partner Promap - which was used to develop a highly detailed 3D model of the site, close to Soho Square, in which we could place the building. The shapefiles also contained vectors - lines, polygons and points - and attributes, which also gives them a close relationship with a BIM file.

Very simply, the shapefile along with its survey points was imported into Vectorworks, and the 3D points with their actual coordinates in Lat/Long and elevation in metres, and then converted with a few clicks using Landmark into a site model, which can be viewed in a number of formats. A further site model was imported from Promap that consisted of 3D polygons, representing the buildings and roads on site. Clicking on each polygon provided full details, including whether it was a natural feature or a man-made building. Creating reports from such data is easy.

The Vectorworks 'Modify by Record' tool was then used to edit the Promap polygons by applying colours to categories to simplify viewing. The site model was then ready to be populated, using the Vectorworks 'Massing Model' tool to very quickly create a 3D building. This was achieved by selecting one of the 3D polygons from Promap and modifying it through the object info palette, or by creating a new building using the 'Create Object from Shape' tool, and then extrapolating it to the required size. You can then apply selected properties, including '.floor usage data', a useful tool for defining the occupancy of each floor - residential, office, etc. - which allow it to be linked to the tables of massing model specifications which can be incorporated in the model.

Having designed the building, the next step was to create an adjoining road using the Roadway design tools in Vectorworks.
To create a road object from the imported shape, and applying road properties and a custom kerb from a selection of Object road properties - controlling kerb width and height and pavement thicknesses, etc. Vectorworks 16 also features an enhanced Hardscape tool that enables users to insert specific objects (such as slabs) and detailed components into the model. You can also use it to populate the site with street lamps, trees, cars, zebra crossings and other street furniture - all available out of the box with Vectorworks. Once the site model had been created, closer inspection of any element was achievable using the Vectorworks Clip Cube live section capabilities.

**ARCHITECTURAL DEVELOPMENT OF THE BUILDING**

The Cube presentation was also used to demonstrate BIM workflows within Vectorworks 16, refining the model as the demonstration went through each process. This dealt with the Levels of Development within BIM - the geometry of the model, and the data associated with it - both of which can be exported within an IFC file, making them capable of being understood and read by other platforms. The various BIM protocols and framework were taken into consideration, and the digital Plan of Work, looking at Level of Detail 100, which relates to Concept Design, Level of Development 200, which is Developed Design, and Technical Design which equates to Level of Development 300. The information generated was then fed into the Suppliers Information Exchange as COBie drops. This was correlated with the Product Delivery table (pictured above), an overview of deliverables which states what information has to be delivered at what point of development, and to whom.

**LEVELS OF DEVELOPMENT**

LOD 100 covers general spacing and massing. LOD 200 relates to concept walls and slabs, and LOD 300 comprises a fully integrated BIM model with the ability to extract construction intent detail. Typically, to assist in BIM project development, the Vectorworks 'Project Sharing' feature is used, giving users permission levels to control who is doing what, and who is able to edit and modify files.

Starting at LOD 100, it was recommended that everyone starts with spaces, as these are intelligent objects which have data attached to them so that reports can be extracted from them at a very early stage. Creating, for instance, the space for the stairs enables it to be seen immediately in both 2D and 3D. A live and dynamic space report can then be automatically generated from the created spaces.

In addition to the information we have about the spaces, we also have, for COBie purposes, assigned zones. Security areas for example - are they accessible by the public or are they private spaces? HVAC spaces can also be established here, and configured with all of the HVAC requirements for that space. This is alongside more general information like room dimensions, volumes, etc. Once created, the Clip Cube can be used to create Viewports.

Organisation is key in 3D modelling, especially when the next step is commenced - developing concept walls. The level of organisation most frequently used is Stories, which simply consist of a Slab level, a Finished floor level and a Suspended ceiling level. At concept level the entire wall will snap to one of these levels, but as the model is further refined, components within the walls will snap to varying levels - exterior walls going from the floor slab to the slab above and interior walls snapping to the suspended ceilings. Classification is another important factor. Using Uniclass 2015, you can either class walls as internal or external, or go into more depth and define components within the wall and the classes they fit into. At this early stage wall location, configuration and extent have been ascertained, but no information about construction intent has been supplied. We know how the walls fit at that point, but not what they are made up of.

During this stage, an auditorium space was configured on the third floor, with dedicated lighting. To understand...
Presenting Levels of Development information entirely within Vectorworks 16

Subdivision Modelling in Vectorworks 16

circulation and other factors, the model was populated with furniture and other components, again all supplied out of the box with Vectorworks. This included the automatic placement of rows of seats, created by defining a rectangle within the auditorium, and using the Object Info Palette, populated with seats, edited, offset, or arranged in a number of different formats. It also included intelligent components, such as a wall-mounted video screen which, with a further click, showed its coverage zone, without having to resort to mathematical calculations.

Stage decking was added out of the box in Vectorworks, and even at this stage we were able to produce a detailed rendered view of the furnished auditorium, utilising Vectorworks built in cinema 4D render engine. At the end of LOD 200, with refined spaces and the depths and thicknesses of walls established, it was possible to move on to developing construction intent detail. With defined walls at Concept Design level, we could select similar walls with the Magic Wand and replace them with predetermined wall styles. Defining final walls, it was seen that the entire wall didn't just snap to a storey height as before, but the individual components within the wall determined their own snap points (floor and suspended ceiling levels). Interior and core walls were similarly replaced. Amongst the tools used here was the intelligent wall join, which understood junctions and finished off walls for you.

Vectorworks has another interesting tool that could be used here, ‘Hide Details’, that allows architects to hide details in plan that they don’t wish to share with contractors. Part of the external walls used the Curtain Wall tool, a hugely editable tool that enables users to edit mullions, put slants on mullions and edit any other parameter within the curtain wall itself. It is also possible, again to select individual panels, possibly those covering stairs or suspended ceilings, and blank them out by giving them a fill.

ACHIEVING A LEVEL OF DEVELOPMENT 300 BIM MODEL

Some architects worry that you have to model every part of a building for BIM. Not so; at 1:50 or 1:100 scale you can copy the BIM section across, select the part you want to highlight, zoom into it, crop it out, and discard the cropped element and scale up the crop, showing model details. This can also be achieved using the Callout Tool. With the developed model we are able to isolate areas of it that we need to concentrate on - the structural shell, for example - and display these to focus on complex construction issues. This is possible because of the level of organisation we introduced early on in the model, in the form of design layers, stories and classes.

SUBDIVISION MODELLING

Other tools were also demonstrated. To create specific items, such as organically shaped furniture, Vectorworks has the Subdivision Modelling tool, used to create bespoke freeform elements. Clicking on it reveals cages that defines sections, and you can push/pull on any of these to extrude shapes. OpenGL uses realistic shadows in rendering, depending on your actual location, and ambient occlusion provides realistic shadows at corners and junctions, giving the model further depth.

The end result was that we had reached LOD 300 with a fully integrated building with associated views, with dynamic sections that will change as the model changes. The final demonstration looked at the space the building is located on, populating it with landscape features and trees. For presentation purposes, Vectorworks includes ‘White Card’ renders, which are ideal for showing a sophisticated model to the client.

From the same design model it is possible to create any 2D or isometric construction view and display it on sheets, with consistency of information throughout. Views can be shown as traditional or orthogonal, and are all editable within the Object Info Palette. Vectorworks also enables architects to create a wide range of special views, including exploded views of stories and other details - so you don’t have to go leave Vectorworks to produce special effects.

www.unlimited.com
Strung between buildings at Oxford Circus, the enormous net sculpture "1.8 London" was named after one of the astonishing impacts of the 2011 earthquake and tsunami in Japan. Such was the strength of the vibrations, the earthquake momentarily sped up the earth’s rotation and shortened that day by 1.8 microseconds - hence the sculpture’s title.

Using data from NASA, Studio Echelman turned this phenomenon into a 3D image, the basis of which was used to create the shape of the London sculpture. The soft surfaces of the sculpture undulate, making every breath of wind visible to the human eye. It appears lighter than air, yet was designed to withstand storms.

What makes dynamic installations like this possible is the use of lightweight polymer fibre ‘rope’ as the key structural element rather than rigid steel. The pre-stressed rope network supports, and forms an integral part of the sculpture. It also makes the installation visually light, in line with the artistic intention.

With such structures the form ‘finds itself’ as the elements and loads interact. It is new ground, and a US-based Arup team built a new Rhino plugin for adaptive form finding, using Oasys GSA for the analysis of the pre-stressed net. There was inevitably a lot of back and forth between the two during the project, but the ease of interfacing the programs and the speed with which Oasys GSA can test ideas simplified the process.

"Good design is always an iterative process," comments Peter Debney, Application Specialist at GSA developer Oasys, part of the Arup Group. 'Models might be amended and run countless times. The best software is designed to enable that constant querying and improvement, pushing the boundaries to bring ideas to life.' Janet Echelman’s sculptures are inspired by the fishing nets she encountered as an artist-in-residence in India. She has since gone on to exhibit her unique works across the world, and Arup engineers have been involved with most of these projects. These include the half-acre "As if it were already here" installed above the Greenway at the Rose Kennedy Centre in Boston, "Unnumbered Sparks" for the TED 2014 convention in Vancouver, and "The Impatient Optimist" at the Seattle campus of the Bill and Melinda Gates Foundation.

www.arup.com
www.echelman.com
www.oasys-software.com
One of the biggest issues in residential construction is the price of affordable accommodation in London and the Home Counties - unless you are a Russian oligarch or money laden overseas investor looking for a secure investment in these uncertain times. If you work in the capital and can’t afford to buy as a consequence of the high prices, however, you will also find that renting somewhere to live is pretty horrendous as well.

However, as remarkable as it may seem there will soon be an opportunity for young professionals to find somewhere to rent in the London area, provided by Essential Living, a well-capitalised developer which aims to offer a European style model of renting in the UK. Essential Living aims to rewrite the rules on rentals by building and operating a portfolio of affordable, large scale, professionally managed rental developments. Their immediate plan is to construct 5000 apartments across London and the South East as part of a £1Bn development programme over the next 10 years.

All other things being equal, if you want to provide affordable accommodation without compromising on quality, and to deliver it on time and within budget, then you need to establish a supremely efficient working environment, with all risks accounted for and working processes improved.

ESSENTIAL LIVING

Construction Director Ray Theakston, charged with the task of procurement and delivery of Essential Living projects, was asked to identify areas within the company that could be improved and made more cost effective. In order to deliver projects simultaneously, he recognised that all AEC data - designs, documents and drawings - would have to be shared with external contractors, enabling them to create the detailed design packages that the construction teams needed. Project members needed to find and ascertain the status of documents and drawings, and which folders and emails they related to.

Essential Living also had to retain control and consistency over brand design standards, as deviations from them, such as may occur with paper-based information management solutions, lacked accuracy and accountability. Theakston remarked, “Without a structured approach and system we would be faced with a disarray of folders, duplication of work and the potential for errors and mistakes.”

Theakston also recognised that with the lack of an accurate means of reporting, it would be difficult to assess the true progress of a project by piecing together design and progress reports from individual contractors. He decided that a collaboration system was required that was capable of managing workflows between architects, contractors and the supply chain, and provide a real-time view on the status of a construction project.

With this in mind he evaluated three potential suppliers, assessing their IT infrastructure, functionality, ease-of-use and reliability. Having found that conjectPC, a web-based tool developed by Woking-based CONJECT, scored highest on all counts, he proposed it to other members of Essential Living. It was readily accepted because several Essential Living team members had used it successfully in the past.

In July 2013 an enterprise deal was signed to use the Tendering Document, Workflow, Standards and Defects management functionality of conjectPC, supported by extensive reporting facilities. This would provide real-time results on the status of design packages, bespoke
processes, outstanding actions and supplier performance.

**SYSTEM CONFIGURATION**

Configuration of such systems is normally handled by the CONJECT implementation team, who had mapped out Essential Living’s internal processes and information management requirements. The software was set up to manage collaborative design and engineering processes, and to dovetail into Essential Living’s own bespoke workflows, creating a project information management template, which could be used for each individual project. Projects were set up as Project Zones within conjectPC, with drawing and design folders associated with each. Supply chain members were created in the system as users, and were assigned rights which allowed them to see project data relevant to themselves. To make it all run smoothly, courses and workshops were set up to acquaint project members with the software, and a training guide, unique to Essential Living, was created.

**DEPLOYMENT**

Essential Living selected an initial 5 projects to roll out the software. The initial response from external contractors and consultants was challenging, trying to encourage several of them to use the collaboration utility - and to use it correctly. To overcome this, it was decided to make its use mandatory, and to provide refresher workshops and support resources to get people up to speed.

Despite this, during the early stages of its use, and by the end of 2013, over 3,500 documents had been uploaded to the system by 115 registered users in 75 different organisations. In addition, 980 processes - such as a design query being raised and sent from one party to another - were raised.

The following year, construction began on multiple sites across the South East and the use of the system increased exponentially, adding many more contractors and sub-contractors to the system. All together 17 unique process workflows were established, to be repeated as standard across all projects during tendering and construction - and included additional processes such as receipt for issue, commenting and drawing mark-up.

By September 2015, Essential Living was handing 19 projects at once, enabling the project teams to review each project and programme status in real time, using the dashboard style interface, and to analyse their supply chain performance in terms of responsiveness, compliance, and numbers of defects. It was also used to identify trends and potential risks to the quality and progress of work using custom built reports.

The tally has increased dramatically, clocking up over 16,000 processes relating to over 20,000 documents, with 616 people working within 135 different companies. Registered log-ins by users has topped 43,000.

Ray Theakston adds some further thoughts. “A secure, well based document control system has helped both internal and external users to work more efficiently. They know where to find and check that they are working with the latest revisions. This has drastically reduced the need to send emails. Both time and money has been saved as a result of automation of key processes during tendering, design and construction.”

Ray added that Essential Living was able to identify a reduction in risk, and now produces an indelible audit trail and log within conjectPC.

In addition, the historic data captured by the system enables as-built information to be maintained, facilitating the transition from the construction phase through to Operational Management. This enables them to maintain their built assets in a centrally available resource, supporting their aim to bring high quality, affordable rental properties to the market.

www.conject.co.uk
Bringing it all together

You can create a single federated model to handle design, construction and Facilities Management using Sitedesk, says David Chadwick

It seemed like a good idea at the time - accumulating all building information up to the point of handover, and placing it in a common data environment, a spreadsheet, that can be used by the building operator to inform his engineers the steps required to maintain the structure. The thinking behind it was that maintenance engineers might not understand CAD, but they can easily find their way round a spreadsheet.

It's not just a simple spreadsheet, either, as it comes with links to every scrap of information the engineers require, 2D and 3D geometry, component information, maintenance manuals, standards and protocols - and even the name of the supplier if you need a spare. You all know what I am talking about, and it may be heretical to describe COBie in such terms, but I will leave it for now, and refer to it again at the end of this article. That is because there are other ways of ensuring that Facilities Managers have the right sort of information they need to 'operate' a building, taking advantage of recent advances in computing which weren't so advanced when the above was mooted. Or rather the tools were available but the mindset wasn't.

Now that BIM has burst the banks and we are all talking to each other, we can contemplate areas of collaboration that were, until recently, unthinkable. That is exemplified with Sitedesk, a Software as a Service (SaaS) solution which provides a BIM compliant and collaborative working environment for construction and engineering projects, that not only provides a Common Data Environment for all aspects of construction, but combines Operations and Management (O&M) within the same, single platform.

The O&M system is being put together whilst the project progresses, ensuring information accuracy throughout, eliminating data transfer issues and, most importantly, requiring input from the building operators from the very start of the project. An architect will be told right at the start of the Design and Build phase what information he would need to pass on regarding the boiler he is about to specify for the central heating system.

Is that of importance? Well yes, as it was explained to me by Rob Umphray and Michael McCullen at Sitedesk. Instead of populating a COBie spreadsheet with a lot of extraneous information, I could cut it down to the basics; what and where it is, its specs, operating conditions, and a couple more details. Once assimilated, that information would be refined over ensuing projects, benefitting both parties.

**SITEDESK**

Aiming to facilitate collaboration between all project members and clients, Sitedesk had to be simple to use with minimal training required to become fully competent. Its simplicity actually belies the size and complexity of projects it can handle. Large complex models can be imported from native files, IFC, or through a Revit add-in - using the software's ability to import data from multiple applications as a useful conduit. It uses the latest SQL and NOSQL technologies to handle large files and tabular data.

Projects are simple to set up and to populate with 3D models, using smart synchronisation to ensure the latest version is being used and associated documentation is updated. The federated building model comprises separate models for HVAC, electricals, plumbing and so on, which use simple colour coding to switch on or off or isolate for viewing purposes. Users can click on any element or component and view its specifications in detail, or select 2D plans and floorplans - with a further window to run a few measurements within rooms and other spaces. The building model can also be sliced vertically, horizontally or at an angle to create movable viewing planes, and to create views that can be saved for illustration purposes.

When navigating the building, tags, added to the model by the architect, depict the current location of the viewer - or alternatively, a scaled 'Google' avatar can be placed inside the building to check the human scale of the building. The simplicity with which this can be achieved is replicated in the quick and easy way with which digital documents can be added to elements, systems and spaces and can be used to create digital workflows - such as RFI's, inspection forms, quality management, service documentation, soft landing/handover performance recording and so on - with a rules based auto filing system to ensure it is kept in the right place.

Other content can be added such as video, audio and product specifications, and the digital form creator allows users to remove paper documentation from other projects and to use embedded photographs in forms, which can be exported as PDFs with embedded detail.

All of the above constitutes the sort of information that the FM operators are hoping to dig out of COBie. Sitedesk does have full COBie support and export capabilities, as it must, with documentation and content fully referenced - and the same can be said of the Sitedesk application itself. The Sitedesk cloud platform is also CESG...
compliant, fulfilling all European data protection requirements as well as PAS1192.

USING SITEDESK
I was provided with a sample Sitedesk project and let loose. It was extraordinary easy to log in and start viewing models, documents and activity. The Home screen provides a list of all activity with the most recent at the top. Everything is archived, providing a full audit trail so that all users can search asset and project data for the whole of the project lifecycle. Such access enables site operators to look at decisions made prior to handover which may have been lost in the disconnect between Design and Build and O&M. I was able to select any category from the colour coded list, bringing up secondary windows for editing, renaming, adding, looking up element details and other activities depending on the category. I was also able to switch instantly between the Dashboard and Model Views by clicking on convenient tabs each side of the display.

Adding documents to elements is just as easy. All letters, photos, specifications and maintenance manuals are held in the Sitedesk library. Those that are already attached to elements are indicated in the elements display, and I could click on these to see what they contain. I could also search the Sitedesk library using filenames or free text searches and link those relevant to the element, or upload documents from other applications. I could also review and edit documents with the appropriate permissions.

Searches are quite powerful, allowing searches on labels, types, dates, people or order - people obviously referring to standard project member management, defining responsibilities, permissions, communication between members and the assignation of tasks - the activities you would expect with such an application.

Tasks? From the Dashboard you can assign a maintenance job to a specific engineer, and specify which element in the model the task relates to and a date when it is to be completed. When the engineer clicks on the task they will be provided with everything they need in the form of model views, documents, manuals and instruction videos.

What more, then, is required? If there are special requirements in a project, the Sitedesk team will spend a day scoping the project to come up with problems that need addressing, on top of the workshop sessions they put on for key stakeholders.

The SaaS costs are very reasonable and are based on user numbers and projects, especially when you consider that customer feedback estimates cite improvements on contractor’s profit margins of between 30% and 50%.

www.sitedesk.com
StruSoft proves a towering success

The 34 Storey Victoria Tower in Stockholm has been designed using StruSoft FEM-Design

StruSoft FEM-Design was used for all of the structural factors that affect this type of building, including calculating the normal limit states, performing the overall analysis and for studying the various force distributions.

The main requirement for Integra Engineering was to determine the column reactions, loads and beam forces. Among the most important elements in the building were the two stabilising cores, one for the stairs and one for the lifts, where the engineers used StruSoft FEM-Design to do the stress analysis.

“We used StruSoft FEM-Design for nearly everything that relates to our involvement with Victoria Tower”, says Anders Klittmar, the project leader. “The building's frame has an eccentric centre of rotation, which means that it acts in different and complex ways”

“We put all the geometry we had into StruSoft FEM-Design” says Martin Reinholdsson. “By selecting part of the structure, seeing how it behaves, and then extracting what we needed out of the selected part, we iterated calculations to provide the correct dimensions, stresses, forces and geometry.”

Anders Klittmar added that one uses this type of program with respect. It requires experience to create an effective model to handle a structure of this complexity.

Has StruSoft FEM-Design met the requirements for such an advanced project as the Victoria Tower? "Absolutely" say Anders Klittmar and Martin Reinholdsson, adding “The program has everything one needs.” Both engineers believe that they wouldn't have had effective control of the design if they didn't have access to StruSoft FEM-Design. "To have an advanced but never-the-less simple and easy to use programme for 3D modelling is even more important when it comes to such major tall buildings as the Victoria Tower.”

Göran Nilsson
Best Scandinavian software for Structural Engineers

StruSoft FEM-Design is an advanced modeling software for finite element analysis and design of load-bearing concrete, steel and timber structures according to Eurocode.

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2015 awards

More power to the people
The winners of the 2015 Construction Computing Awards may indicate a change of emphasis within the industry itself, writes David Chadwick

With the 2015 Editors Choice Award going to a solution that focuses on simulating the flow of people through buildings, and thereby improving accessibility and security for all sizeable private and public projects, a category for health and safety on building sites, and the winners of the ‘One to Watch’ - company category providing secure access to building sites, we are arguably seeing a shift in emphasis in construction to the winners in all this - namely people.

The aesthetics of a project and the efficiency in how it is built and run remain of paramount importance, and we are pleased to be able to bring together the practitioners of best practice in both of these areas, but it is the customer and the contractor who are the true arbiters of success.

This is even more important as the building programme accelerates. The construction industry cannot deliver amazing projects unless it attracts the best people to work in it. A major theme of conferences over the last year has been the dearth of quality entrants into the industry - something we will be addressing in Construction Computing this year. Other global issues impact on the safety of public spaces - transport and sports venues being the most vulnerable.

I foresee increasing focus in both of these areas, despite the ‘last mad rush’ to get on board the BIM express - which leaves the station in April. In the meantime we’d once again like to congratulate all of the winners and runners-up of the 2015 awards, and wish them continued success in the year ahead.
One to Watch - Company
WINNER: Human Recognition Systems
RUNNER-UP: BPR Architects
We were thrilled to have won "One to Watch" Company of 2015, a fantastic confirmation of our position as a rapidly growing business at the forefront of innovation and expertise in the construction industry.
MSite, the biometric site access solution of choice for the UK's leading construction firms, along with accompanying products such as the MSkills competency management system, have become the high standard for advanced technologies in the field of cloud workforce management.
As we continue to make construction sites across the country more safe, secure, compliant and productive, we can't wait to see what 2016 will bring!

One to Watch - Product
WINNER: Vectorworks Inc for Vectorworks Architect
RUNNER-UP: Handshq - Innovative Compliance Solutions to Manage and Mitigate Risk
For the sixth year in a row, global design software developer Vectorworks, Inc. was honoured at the annual Construction Computing Awards, receiving the ‘One to Watch’ Product Award for its Vectorworks Architect 2016 BIM software. Architect delivers a suite of robust capabilities for a streamlined workflow that enables great design to materialise from inspiration, exploration and discovery. The software also offers BIM capabilities in a flexible, hybrid-design environment with great documentation and the intelligent tools needed to advance and communicate ideas in 2D or 3D.

Best Use of IT in a Construction Project 2015
WINNER: CONJECT with Essential Living for Apartment Construction Programme
RUNNER-UP: Fujitsu and Heathrow Airport Limited with Fujitsu Network Integration for New Terminal 2 Construction
We are delighted that Essential Living's use of our Common Data Environment platform to support their £1bn apartment construction programme has been recognised as the ‘Best use of IT in a Construction Project 2015.’ We are proud to have won this award two years in succession. The win is testament to the dedication that CONJECT puts into providing customers with efficient and effective supply chain management solutions throughout all phases of the asset lifecycle. - Steve Cooper, Managing Director.
www.conject.com
Email: enquiries@conject.com
Phone: 01483 712620

Best Use of IT in an Infrastructure Project 2015
WINNER: Costain for A160 Port of Immingham Improvements
RUNNER-UP: Synchro Software Ltd - Crossrail
These awards, principally in place for the recognition of Software computing providers working in the Construction sector, have over the last couple of years been expanded to recognise projects and teams that make the most effective use of the technology. As an early adopter of BIM for Highways England, the A160 team have been developing and working with new technology throughout the project. All of the works have been designed in 3D, 4D has been used to tie the model to the programme and developments have been made in 5D and 6D asset management. This award recognises the work that the A160 team have done in this use of Innovative techniques and how these can be brought into the construction industry. Representatives of the Costain team, Highways England, MMG contract assurance and the Jacobs design team attended the ceremony.
Collaboration Project of 2015

WINNER: Dome Technology Ltd for Vastint’s Strand East Development, Stratford, London
RUNNER-UP: CONJECT with The Merseylink Consortium for The Mersey Gateway

Winning the Collaboration Project of the Year award was a proud moment for us. 2015 became a defining year for Dome Technology Ltd. The ‘Gravity’ platform was born. Dome Connect was completely re-engineered to take advantage of Gravity. Gravity is a suite of web and mobile apps for document and data management. Dome Connect has evolved to become a complete project collaboration system.

Vastint selected Dome Connect as the project collaboration system for their Strand East development. Dome Connect will manage all project information from design, through construction, handover and beyond.

BIM Project of 2015

WINNER: Bond Bryan Architects for Bradford College and Beyond: OPEN BIM Research and Development
RUNNER-UP: maber for PSBP Schools in Hertfordshire, Luton & Reading

With UK-based design studios in London, Sheffield, Birmingham and Kent, plus representatives across the globe, Bond Bryan embraces the worlds of Strategic Property Advice, Masterplanning, Architecture, Landscape Architecture and Interior Design. Bond Bryan are at the forefront of BIM in the UK having adopted information modelling software over 20 years ago.

Associate Director, Rob Jackson commented ‘Open exchange of geometry and data are important to the whole industry and so its nice to be recognised for the hard work we invested in research and the sharing of this information on our BIM Blog and in public presentations.’

Team of 2015

WINNER: Sypro Management Ltd for Team Sypro
RUNNER-UP: RedSky IT for Sykes and Son Ltd Implementation Team

Sypro Management Ltd develops industry leading contract management software which can be used in the management of contract suites such as NEC3, JCT and FIDIC. Our in-house development team can also implement flexible solutions based on bespoke contracts, including frameworks such as Procure21+, Scape and others.

We’re delighted to have been part of the Construction Computing Awards and to have taken home the Team of the Year 2015 award. It’s great to receive recognition for the persistent hard work of the team over the course of the year, and to have our efforts rewarded at such a respected industry event.
Health & Safety Software of 2015
WINNER: Safetybank for Transforming Health & Safety Standards at Swan Housing
RUNNER-UP: Mobilengine for McGee Mobile Application Product Suite

Safetybank is delighted to have won the Health and Safety Software 2015 accolade at the Construction Computing Awards. The award’s judging criteria included effective teamwork to help and support customers on improving their Health and Safety, client collaboration over the past 12 months.

Jody Kennedy, Chief Technical Officer and Founder of Safetybank, commented on the award win: “We’re delighted to receive this unique award for Safetybank, at the most prestigious awards ceremony for technology within the construction industry. This is a true stamp of quality for Safetybank, after it revolutionised supply chain integration for construction firms and altered their attitudes towards mobile and on-site health and safety, for the better.”

Cloud Based Technology of 2015
WINNER: Asite for The Adoddle Platform
RUNNER-UP: Human Recognition Systems for MSite & MSkills

Asite’s revolutionary cloud platform Adoddle, was selected as Cloud based technology of the year 2015, at the Construction Computing awards 2015 Speaking on Asite’s win Chief Operations Officer Nathan Doughty said, “With the onset of the UK Governments’ BIM Level 2 mandate for April 2016 we are truly honoured to receive these awards that clearly indicate that the Adoddle platform is streaks ahead of its competitors.”
For more information visit: www.asite.com

BIM Product of 2015
WINNER: GRAPHISOFT - ARCHICAD 19
RUNNER-UP: Autodesk - Revit

We are delighted that for the fifth year running, Graphisoft ARCHICAD has won the prized ‘BIM Product of the Year’ award at the Hammers. Five years makes us very proud! ARCHICAD continues to lead the BIM sector for design and modelling - realising the collaborative promise of BIM with IFC data exchange and COBie. We work hard to ensure that ARCHICAD supports the wider OpenBIM movement whilst maintaining its leading BIM position.

Huge thanks go to the readership of Construction Computing for taking the time to vote for ARCHICAD as the BIM Product of the Year. Receiving this recognition from users of BIM solutions, and from our peers, makes it all the more special. To contact GRAPHISOFT about ARCHICAD please email: mail@graphisoft.co.uk or call: +44 (0)1895 876222.
2015 awards

Architectural Design Software of 2015
WINNER: Bentley Systems - AECOsim Building Designer
RUNNER-UP: GRAPHISOFT - ARCHICAD 19

AECOsim Building Designer provides a robust, scalable, and computational design environment that enables architects and engineers to easily and efficiently collaborate, integrate information, clearly communicate design intent, model anything, and simulate and predict real-world performance, including evaluating alternatives through conceptioneering at the project outset and optioneering throughout.

We, at Bentley, are thankful to the readers of Construction Computing and our users who recognise the value AECOsim Building Designer brings to empower multi-discipline teams to deliver high-performance buildings through BIM advancements across the world.

Structural Design Software of 2015
WINNER: Tekla (UK) Ltd - Tekla Structures
RUNNER-UP: Autodesk - Robot Structural Analysis Professional

Trimble Tekla UK Ltd is thrilled to have won the Structural Design Software of the Year 2015 award. This is testament to the work that we do to promote the fact that Tekla is much more than just a tool used in the structural steelwork industry - it is a well-established BIM solution for the entire construction industry. Thanks to all who voted for us - we really appreciate your support, including our customers who use Tekla software to design amazing and innovative structures. Many of these projects push the software to its limits and, in fact, a lot of the landmark projects in the UK and around the world involve Tekla software at some stage, for design, detailing or manufacturing, or during the construction phase. As a leader in digital construction, we will continue to work with our customers to help them achieve their goals of creating world class building projects.

Collaboration Software of 2015
WINNER: Viewpoint Construction Software - Viewpoint For Projects (Formerly 4Projects by Viewpoint)
RUNNER-UP: Aconex - Aconex

The Construction Computing Awards (The Hammers) are one of the most prestigious awards in the construction industry. We appreciate this recognition by Construction Computing and are proud that the market recognises our products are making a big difference in how the construction market brings projects to fruition.

I am incredibly proud of my entire team who consistently look to improve construction software technology for the betterment of our customers and the construction industry at large. 2016 will be the year of collaboration in the construction industry and by winning this award I hope that our reputation has been firmly cemented as a truly forward thinking company who provides a ‘best in class’ solution to a very exciting market place. Roll on the 2016 awards. - Alun Baker, Managing Director EMEA, Viewpoint Construction Software.
Document and Content Management Software of 2015
WINNER: Newforma - Newforma Project Center
RUNNER-UP: Bentley Systems Inc - ProjectWise

This award represents Newforma’s growing presence in the UK AEC market, as a leader in Project Information Management. The award is special in many ways, not least that it is our customers voting and demonstrates the confidence placed in Newforma as a critical component in their respective business operations.

Newforma sets itself apart from traditional document and content management systems to build a more connected project environment, which is uniquely non-invasive to existing working practices and information silos that exist on projects today. - Paul Daynes, Director UK Northern Europe at Newforma

Estimating and Valuation Software of 2015
WINNER: RedSky IT - Summit
RUNNER-UP: Exactal - CostX

A big thank you our customers for voting for us across the categories and for making Summit the best Estimating and Valuations Software product of the year 2015. This is a key module in the range of software the RedSky offer and has become an essential part of many of the businesses in managing their contracts.

RedSky IT were pleased to be recognised as the runner up in the Construction Accounting category, building on our previous awards wins for best product of the Year. We were also named runners-up in the Project Lifecycle Management and Team of the Year categories.

For more details contact us on 020 30028600 or visit our website for case studies and testimonials www.redskyit.com

Construction Accounting Software of 2015
WINNER: Eque2 Ltd - EVision
RUNNER-UP: RedSky IT - Summit

Eque2 was delighted to be awarded with ‘Construction Accounting Product of the Year’ for EVision at the Construction Computing Awards for the fourth year in a row! Voted for by software users, this award is testament to the user-friendly nature of the ERP software, and its ability to streamline contract management.

The Eque2 team is proud to have won this fantastic award and we would like to thank all of our voting customers, as well as the team at Construction Computing for a great night!
Project Management/Planning Software 2015
WINNER: Elecosoft UK Ltd - Asta Powerproject
RUNNER-UP: Synchro Software Ltd - Synchro PRO

Elecosoft is very pleased that our Asta Powerproject was voted best Project Management/Planning Product for the second year running and would like to thank all who voted for us. Our software has continually evolved with user input which has helped make it the preferred software of thousands of construction professionals.

Common feedback we receive is that users like Asta Powerproject because it combines easy to use drag and drop functionality with powerful feature rich capability. We have recently added improved functionality including enhancements to Asta Powerproject BIM for 4D planning.

www.astapowerproject.com

Project Lifecycle Management Software of 2015
WINNER: IFS - IFS Applications
RUNNER-UP: RedSky IT - Summit XCIPIO

Our win at the recent Construction Computing awards, in the best project lifecycle management software category, was validation that our solution is seen as industry leading. Beating out stiff competition, it was a real demonstration that our deep industry knowledge continues to be appreciated across the sector through our world leading construction companies like Babcock Marine, Clancy Docwra, MWH and Graham.

Moving forward, as business priorities like BIM increase in importance, we anticipate that integrated project and asset lifecycle software will become a vital investment for organisations looking to remain competitive and to grow profitably.

Mobile Technology of 2015
WINNER: Viewpoint Construction Software - Field View (Formerly Priority 1)
RUNNER-UP: Bentley Systems Inc - Navigator Mobile

I have been on the journey with Field View since day 1, so for this software solution to be recognised as the best is a very proud moment. As technology continues to drive forward, traditional industries have sometimes been slow on the up take of new ideas and practices. Companies who have already adopted mobile working practices and use software such as Field View are proving that this technology is great for business - it's proven to save time, save money and increase safety. The fact that an award exists for 'Best Mobile Product' is a clear message to the construction industry that as technology evolves so must it and by embracing change they can win more work and deliver it in much smarter ways. - Richard Scott, Director of Market Development, Viewpoint Construction Software.

Hardware Product of 2015
WINNER: Faro - Freestyle
RUNNER-UP: Leica Geosystems - Leica CS35 tablet

FARO Technologies, Inc. is pleased to celebrate the award of ‘Hardware Product of 2015’ for the new FARO Freestyle3D, Handheld Laser Scanner. David Southam, 3D Documentation Regional Manager Europe North, FARO Technologies UK Ltd. Said, ‘This recently launched, innovative 3D Handheld Scanner was designed to transform the way manufacturing, AEC, Law Enforcement, and other industries document 3D data, through easy to use and intuitive data acquisition. As it faced some stiff competition, all at FARO are extremely proud that the FARO Freestyle3D received the much coveted title of Hardware Product of 2015 at the Construction Computing Awards.'

This prestigious accolade reflects the product's phenomenal sales success since its recent launch and the fantastic feedback we continue to receive from satisfied users.'
**Channel Partner of 2015**

**WINNER:** Excitech

**RUNNER-UP:** Applecore Designs Ltd

As a channel partner, Excitech aim to provide our clients with tailored technology services and solutions that meet their specific business needs. The 'Channel Partner of the Year' award is voted for by customers and is therefore a testament to Excitech's commitment to excellence and customer service. David Hughes, Excitech Managing Director, says: "We are proud to receive this award for the ninth year running but refuse to become complacent. As industry innovations are developed, Excitech will continue to remain at the forefront, bringing the most up-to-date and relevant solutions to our customers." Excitech Ltd is the largest provider of technology and services for the AEC industry in the UK. The Company offers a range of IT services and products to enable its clients to deliver better design, construction and building operation management.

**Editor's Choice for 2015**

**WINNER:** Oasys for Flow: Pedestrian Simulation Software

Winning this award vindicates our faith that every architect, fire engineer, planner and designer is ready to take visualisation and proof of concept to new levels with working models, not just impressions. They know that design makes no sense without crowd analysis any more. Until last year, simulation of crowds and pedestrian behaviours were the preserve of big practices and big projects - now, with Flow, every designer can reap the benefits of the early development work and investment put into its parent product MassMotion. Packing in the levels of functionality we have included in Flow was a bold commercial move, but it is creating a paradigm change in the market. Winning this award tells us that the industry completely "gets it" and understands our commitment to bringing crowd simulation to the masses. - Nigel Rees, Commercial Director, Oasys Ltd

**Product of the Year**

**WINNER:** Asite - Adoddle

**RUNNER-UP:** GRAPHISOFT - ARCHICAD 19

Asite's Ateam celebrated a double award win at the 2015 Construction Computing Awards by winning 'Product of the Year' for the second year in a row! Speaking on Asite's win Chief Operations Officer Nathan Doughty said, 'With the onset of the UK Governments' BIM Level 2 mandate for April 2016 we are truly honoured to receive these awards that clearly indicate that the Adoddle platform is streaks ahead of its competitors.' For more information please visit: www.asite.com

**Company of the Year**

**WINNER:** GRAPHISOFT

**RUNNER-UP:** Bentley Systems Inc

Winning this Company of the Year 2015 award was immensely pleasing. It was a great honour and recognition of all the hard work and effort that the Graphisoft team have made over recent years. Coupled with our BIM category award, this shows just how much users see GRAPHISOFT leading in the Design, Documentation and Collaboration segment of the AEC industry with its innovative and interactive BIM tools. We want to thank Construction Computing readers for casting their votes to make GRAPHISOFT the Company of the Year 2015. To contact GRAPHISOFT about ARCHICAD please email mail@graphisoft.co.uk or call +44 (0)1895 876222.
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It's BIM up North

Liz Schofield outlines the agenda for the thinkBIM Spring conference, to be held on the 23rd of March at the Centre for Knowledge Exchange in Leeds

Whilst some might suggest Level 2 is the norm and the world of digital construction is up and running, here in Yorkshire we know that many individuals and businesses are still looking for advice, support and guidance, regardless of where they are on their BIM journey. Hence why thinkBIM, the knowledge exchange and home to the Yorkshire and Humber BIM Region, is bringing David Philp, Head of BIM Implementation in the Cabinet Office, back as a keynote speaker at our spring conference on 23rd March.

"I am excited to be returning to Leeds and the thinkBIM event for a day of learning, sharing and connecting with others on their digital journey," said David. "The events are key to helping raise awareness, build capacity and to help anyone on their journey towards digitisation of the lifecycle of a built asset. It is always interactive and most enjoyable (the keg of beer at the end is also worth staying the day for!). I am personally looking forward to giving an update on the BIM Task Group activities and the progress towards Level 2 and beyond."

With the event being held just 12 days before the official level 2 BIM fanfare, David will be talking about how the level 2 mandate has been achieved, what benefits have been drawn from it, and what comes next. Chaired by Stephen Harri of the NBS and RIBA Enterprises and sponsored by Tekla and Exactal, the conference will also showcase some of the best speakers from thinkBIM's illustrious five year history, and feature companies who have truly embraced the digital construction movement along the theme of "What good BIM looks like."

Now in its fifth year, thinkBIM is the network for Building Information Modelling advocates & leaders, based at the Centre for Knowledge Exchange (OKE) at Leeds Beckett University. It was set up in 2011 as a response to the Government Construction Strategy report published in May of that year mandating the use of BIM on all centrally procured projects by 2016. The Chairman of thinkBIM, Duncan Reed states "At that time local businesses were coming to us and asking what this signified for them, where do they start? Many we spoke to didn't even know what 'BIM' stood for. So the thinkBIM network was set up to support businesses to learn about and understand BIM, from the underlying principles and how they can adopt it into their existing processes."

ThinkBIM champion the acceleration of BIM adoption and change through focused events, training and online discussion groups. Since its first ever workshop, aptly titled "BIM issues, challenges and solutions," the thinkBIM network has now hosted over 50 events throughout Yorkshire and further afield, based around an annual three series formula that focuses on different stages of the lifecycle of a built asset: Design and Preconstruction, Construction and Assembly, and Operations and In Use. Each series featuring two twilight seminars and a half-day conference and the intention is still very much to do more.

Duncan adds: "ThinkBIM has grown significantly over the last few years, from running introductory events to showcasing the organisations, projects and specialists and practitioners who are leading the BIM revolution."

ThinkBIM is proud to have received a number of award nominations and accolades over the last four years including Best Virtual or Hybrid Event Award in 2013. The team were delighted to win this award as it recognised one of the keys thinkBIM strengths - the online presence of the network. As well as the seminars and conferences, the thinkBIM team are actively engaged on social media and events typically feature live tweeting, streaming and blog pieces. ThinkBIM conferences are global events with international keynote speakers linking to the events to illustrate how other parts of the world are making BIM work for them.

ThinkBIM is supported in its endeavours by a proactive group of sponsors, partners and individual ambassadors, all recognised regional and national as BIM leaders. The Steering Group draws from a wide group of professional organisations including WSP Bond Bryan Architects, BAM and Turner Townsend. ThinkBIM also benefits from strong links with the UK BIM Task Group, the Construction Industry Council, NBS and the Constructing Excellence BIM Group.

In recent years thinkBIM has also significantly extended its offering by delivering BIM consultancy to SMEs. ThinkBIM is a nationally approved trainer on with the CITB BIM and has so far delivered Introduction to BIM workshops across the country to over 400 individuals representing approximately 120 companies with more planned for 2016.

SO WHAT'S NEXT?

Despite the imminent arrival of the 2016 deadline thinkBIM believe there is still a massive need to demystify BIM to a large part of the market and that they are in a great position to do just that. The network has always been about helping to solve problems and we will continue to do this with the great team at Leeds Beckett University, the passion from the Steering Group and the support of the wider network. As one of our Steering group members says, "It’s BIM up North!"

Details about our spring series are here http://ckegroup.org/thinkbimbild/) or follow our Twitter @thinkBIM for updates. If you wish to attend our conference, please email us at ckevents@leedsbeckett.ac.uk.
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