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Editorial

Publishing Director: Martyn Day
Email: martyn@edaltd.co.uk

Managing Editor: Greg Corke
Email: greg@edaltd.co.uk

MCAD Technical Editor: Alistar Lloyd Dean
Email: al@edaltd.co.uk

Consulting Editor: John Marchant
Email: john.marchant@skilstream.com

Publisher: Geoff Walker
Email: geoff@edaltd.co.uk

Design and Production

Dave Oswald
Email: dave@edaltd.co.uk

Advertising

Group Advertising Manager: Peter Jones
Email: peter@edaltd.co.uk

Deputy Advertising Manager: Steve Banks
Email: steve@edaltd.co.uk

Accounts Director: Terry Wright
Email: terry@edaltd.co.uk

Subscriptions

Database Manager: Alan Cleveland
Email: alan@edaltd.co.uk

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EDA Ltd. 63-66 Hatton Garden, London EC1N 8SR
Tel: +44 (0) 20 7681 1000
Fax: +44 (0) 20 7831 2057

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At its recent User Conference, Bentley previewed its ISM, a new technology designed to act as a central repository for all of its structural engineering products. Greg Corke reports.

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It's good to get away from the AutoCAD side of the CAD world for a while. A tour around TurboCAD Professional left Martyn Day amazed at the value on offer.



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Liverpool-based design consultancy Uniform took a more abstract and visual route for its promotional 'Crystal' film for Foreign Office Architects' first UK project, the Trinity EC3 office scheme in the City of London.



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Oxfordshire-based Blink Image has built itself a strong reputation throughout the property industry for its high quality computer generated imagery and animations.



23 Technology The light fantastic

The way we see our world is thanks to the way light is absorbed and/or reflected by the objects around us. In Revit and 3ds Max this can be re-created by raytracing and radiosity rendering.



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As project-specific documentation becomes increasingly more difficult to manage, Union Square

Software's Workspace software transforms working practices for UK construction company Osborne says Linda More.



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Is it time for the AEC industry to get serious about project management asks Russell Henley of Deltek?



29 Case study Young at heart

Through its adoption of AutoCAD MEP, the building services-specific version of AutoCAD, Haden Young was not only able to cut its design cycle by weeks, but dramatically improve co-ordination.



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A budget workstation used to mean a huge hit in performance, but Greg Corke discovered your money can go a long way.

33 Hardware HP DesignJet T series

HP's new DesignJet T Series takes individual and workgroup printing to new levels, both in terms of overall productivity and print quality says Greg Corke.



34 Technology Keeping your data safe

How safe is your company data? Could you survive a catastrophic crash? From External drive to online storage, Rob Jamieson gives a whistle stop tour of backing up.

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Frank Lloyd Wright design reborn



Construction of the Massaro House, a building originally designed by Frank Lloyd Wright more than 50 years ago, was recently completed with the help of ArchiCAD.

The design of the house, which is located on Petre Island in the state of New York, was based on a limited series of

sketches from Wright and was fully modelled and documented by architect Thomas A. Heinz using Graphisoft ArchiCAD Virtual Building. Heinz an expert in Frank Lloyd Wright architecture as well as in the use of ArchiCAD.

"The challenge of turning the sketches into something build-able, both in terms of planning commission regulations, as well as considering Whale Rock, the huge boulder that we were building on, made the project particularly interesting," said Heinz. "Other programs don't understand how a building will actually stand up in its environment. With designs developed in the ArchiCAD Virtual Building model, you can really get the full feel and dimensions of the space. This became very important in the review and approval processes. We sped through approvals because everyone could immediately see what the building would look like, inside and out."

Meanwhile, Graphisoft has announced that it will cease its Macintosh Power PC support for ArchiCAD in 2009.

www.graphisoft.com

3D scanner monitors dam after UK floods



3D Laser Mapping, the UK-based specialist in laser measurement technology and software, used a state of the art survey system to monitor the risk of flooding amid fears a dam may fail following this summer's torrential rain.

Engineers from Arup trying to reinforce the embankment dam holding back the Ulley reservoir near Rotherham called on 3D Laser Mapping to undertake a detailed survey of the reservoir perimeter in order to maintain the current water level and calculate the capacity of the reservoir in advance of predicted rainfall. The 3D Laser Mapping team also demonstrated the use of SiteMonitor, a laser scanning system designed to measure and monitor the stability of man made structures, rock faces and landslips, for the ongoing observation of the dam. www.3dlasermapping.com

TurboCAD Professional tuned for AEC sector

TurboCAD Professional v14, a low cost CAD application for Architects and Engineers, has been launched by Avanquest Software. This latest version is claimed to deliver unparalleled design productivity and dramatic visual results with integrated 2D drafting, 3D photorealistic rendering and 3D surface and solid modelling.

Architectural CAD improvements include: parametric stairs, window and door schedules, and a new terrain tool. Straight, multi-landing, spiral and U-shaped stairs are now fully parametric and parametric rails also be added. Adding a window or door into a drawing dynamically updates the schedule and a building design can be placed on uneven ground by creating terrains from scratch or by importing standard Triangular Irregular Network (TIN) data.

Meanwhile, for those on an even tighter budget, TurboCAD v14 Deluxe is available for £79.99. The software features over 250 2D/3D design drafting tools for architectural and mechanical drawings and is also AutoCAD 2008 and Google SketchUp compatible. It features 2D drafting and 3D modelling and includes photorealistic rendering, lighting effects, camera views and parametric doors and windows. www.avanquest.co.uk

ARTVPS launches desktop mental ray renderer

The latest edition to the ARTVPS range of rendering solutions is the RenderServer DT. Incorporating AMD dual core processor technology and bespoke rendering software, the RenderServer DT is built to the same specification as the original RenderServer 64-bit mental ray solution, but has been designed specifically as a desktop device.

The system features a simple push button front panel display, and has a web-based user interface designed for fast set

up and configuration. ARTVPS' RP-MR File Manager, with a drag and drop workflow, allows users to view and manage multiple rendering jobs from any workstation on their network.

RenderServer DT comes complete with two 64-bit mental ray stand alone licences, ARTVPS' render management software and photorealistic material library. As an independent mental ray platform, multiple users can render to RenderServer DT using their preferred 3D application.

Dell introduces new budget mobile workstation



Dell has added a new mobile model to its line of professional workstations. The Dell Precision M4300 is different from all mobile

workstations that have gone before it insofar as it is being introduced at a price from £699.

The base machine features an Intel Core2 Duo 1.8Ghz T7100 processor, a 15.4" (1,280 x 800) LCD display, 1GB (2 x 512MB) DDR2 SDRAM memory, 80GB (5,400 rpm) Hard drive, an Nvidia Quadro FX 360M graphics card, DVD/CD-RW, and Intel PRO 3945 802.11b/g wireless card. www.dell.co.uk

BlueSky approved as OS mapping and data centre



Aerial survey company BlueSky has been appointed as an Ordnance Survey Mapping and Data Centre. As an Ordnance Survey Mapping and

Data Centre, BlueSky is an exclusive stockist of OS Landplan and OS Sitemap mapping. OS Landplan includes contours and comes at a scale of 1:10,000 making it ideal for site location. OS Sitemap has been specially designed to help with the submission of planning applications and to assist architects and engineers with development projects, typically at output scales from 1:2500 to 1:500.

www.bluesky-world.com

BlueCielo ECM Solutions unveils InnoCielo View '08



BlueCielo ECM Solutions (formerly Cyco Software), a Engineering Content Management (ECM) software provider, has released a new version of

InnoCielo View (formerly named AutoManager View). InnoCielo View 2008 is designed to help enterprise users to view, print, compare and annotate (engineering) documents. InnoCielo View 2008 can be used stand-alone tool or as a complementary solution to BlueCielo's ECM solutions InnoCielo Meridian Enterprise and InnoCielo TeamWork. A 30-day trial version can be downloaded at

www.bluecieloecm.com/products/icv

CADline to bring AEC training to south coast

CADline, the Autodesk design software specialist, has opened a new office in Fareham, Hampshire to cover the entire Southampton, Solent, New Forest area and beyond. The move is designed to bring specialised training facilities to the area for any AEC firm wishing to optimise its use of design software, particularly AutoCAD users wishing to cross-grade to a new solution developed specifically for their profession. www.cadline.co.uk

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Council adopts collaboration tool



Bristol City Council's Capital Projects Team has invested in Autodesk Buzzsaw, the on-demand collaboration solution, for one of its largest projects for many years. The solution will be used to give the council, its design team, main contractors and principal sub-contractors round-the-clock access to the latest project drawings and other documentation, helping to ensure this high-

profile scheme is completed within the deadlines and to budget.

Colston Hall is the largest concert venue in the South West – last year alone, over 200,000 people attended the venue's world-class classical, rock, pop or jazz events. The Victorian building is now being completely redeveloped and the council's Capital Projects Team is currently working on the first phase – a dramatic five-storey atrium and foyer complex with box office, rehearsal and recording facilities, education and workshop spaces, bars and restaurants, jointly funded by the Bristol City Council and the Arts Council England.

"One of our large sub-contractors recommended that we used a collaborative project management solution," explains Mike Davis, Colston Hall project manager. "After investigating the market and considering the options we decided Buzzsaw would best suit our needs. It's cost-effective and straightforward to use – an important consideration when around 50 people will be accessing the site. It will ensure that everybody will be working from the same information and are using the latest drawings, ensuring total transparency across the extended team."

www.autodesk.co.uk

Autodesk to acquire NavisWorks for £25m

In a deal worth \$25 million Autodesk has signed an agreement to acquire NavisWorks, the Sheffield-based developer of software for 3D coordination, collaboration and sequencing in design and construction.

"For more than seven years, NavisWorks solutions have helped design professionals across the construction, building, plant, and marine industries better collaborate, create more coordinated designs, and work more efficiently," said Peter Thompson, CEO of NavisWorks. "The combination of NavisWorks and Autodesk technology is an excellent match. Our products augment the coordinated, consistent, and computable information produced by the Revit platform for building information modeling, and can aggregate that information with data from other sources including AutoCAD, Inventor and Civil 3D, to build the most complete understanding possible of the overall project. We are excited to join the Autodesk family."

www.autodesk.com / www.navisworks.com

Robobat launches Robot Office V20

Robobat of France, a specialist in structural software, is rolling out Version 20 of its Robot Office software suite. This new version includes modular and interoperable programs for engineering professionals who want to simulate, calculate and design structures.

Robot Office 20 includes several programs with enhanced contents and performance, such as Robot Millennium 20.1, CBS Pro 20.1, ESOP 4.1, RCAD Reinforcement Concrete 7.1, RCAD Formwork 7.1 and RCAD Steel 7.1. Robobat has included tools for the dynamic data exchange of data between these programs, as well as the integration with industry-standard BIM solutions.

Robobat software has been used by engineers for projects such as the Stade de France (near Paris), the South Shanghai railway station (in China) and the Millau Viaduct (in southern France). Last year the company was set to be acquired by Autodesk for \$33 million but the deal was never completed.

www.robobat.com

CSC forms partnership with Mott MacDonald Group

The Mott MacDonald Group – one of the world's leading management, engineering and development consultancies – recently committed a significant investment into CSC's building design software for their UK offices.

In this partnering arrangement, Mott MacDonald's 'Building and Infrastructure' (BNI) Division will use Fastrak Building Designer/Wind Modeller for the automatic design of complex structural steelwork buildings; Orion for the automatic design of reinforced concrete building structures and 3D+ for AutoCAD-

based modelling and drawing production.

"The alliance that we have formed between Mott MacDonald and CSC is clearly fantastic news for both companies involved," says CSC's Barry Chapman. "I am confident that CSC can meet the demands of such a progressive company as Mott MacDonald, with our proven technical reputation, our capable backup and our ongoing innovation into software development. I look forward to exploring ways in which we can continually strengthen our relationship with each other."

www.csc-world.com

BOXX launches compact render farm series



BOXX Technologies has announced the new renderBOXX "Render Farm" Series, which provides high levels of processing power in a compact format fitting in a standard rack. A single renderBOXX 10,100 module delivers the rendering power of four Quad Core Intel Xeon processors, while a full rack of renderBOXXes features 200 Quad Core Intel Xeon Processors — a total of 800 cores.

www.boxxtech.com

GTX RasterCAD released for AutoCAD 2008



GTX Corporation, a specialist in raster editing and conversion software, has announced Version 11.0 of its GTXRaster CAD Series

for AutoCAD 2008. The GTXRaster CAD Series Version 11.0 includes four product modules: GTXRaster Tools for raster cleanup, GTXRaster CAD for hybrid raster and CAD editing, GTXRaster R2V for raster cleanup with raster to vector conversion, and GTXRaster CADPLUS for raster cleanup, editing and conversion.

www.gtx.com

Data Collection pioneers ground-penetrating radar



A new mobile radar system that sees through road surfaces has been launched by highways surveying specialist Data Collection. Using a specially designed vehicle that can survey at normal traffic speeds, the ground-penetrating radar creates a cross-sectional profile of the subsurface. Highways engineers can use this information to accurately assess the road's condition, providing vital information for planning repairs and re-surfacing.

www.datacollection.co.uk

Maxon unveils Cinema 4D R10 Architecture Edition



Maxon Computer has introduced the latest generation Cinema 4D package for architectural visualisations. In addition to the seamless connectivity to Allplan, the new Architecture Edition boasts such features as object and material libraries and the new Virtual Walkthrough tool.

The Cinema 4D Architecture Edition is accompanied by a Quickstart manual which gives architects valuable tips on lighting, texturing and how to set up objects and scenes for rendering high-quality images and animations.

www.maxon.net



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Bentley Architectural Research Seminar

As part of its yearly BE event, Bentley holds a full day of seminars demonstrating how computer aided design and manufacturing technology is being used by the more adventurous practices and students. **Martyn Day** reports.

I've lost count as to how many of these events I have now attended but I have to say it's the highlight of the architectural calendar, as far as design technology presentations are concerned. While the projects on display will blow you away, it's not so much the end product that's the focus, but how the design was achieved. Refreshingly, while this is at a Bentley event, those taking the podium were not always Bentley customers.

The seminars have been the brainchild of Bentley's Director of Research, Dr. Robert Aish and they have provided a platform to demonstrate his Generative Component (GC) technology which has been in development at Bentley for a number of years. Some of the willing early 'guinea pigs' also get to describe their experiences with the technology and these usually include industry luminaries from Foster and Partners, KPF, NBBJ, Arups and many others. Over the years the list of these interested parties has mushroomed, with this particular event now demonstrating the industry's enthusiasm for exploring new ways to use computers to assist in defining complex design.

The new ethos and demand from these practices is that CAD as a documentation tool is not good enough. And while the AEC market has been slow to adopt 3D, even these commonly available tools have been found to be lacking by the architectural early adopters. The main problem is that the current 3D tools are there to document the design in 3D and to ease the production of 2D drawings, not to enhance or optimise the model. If changes need to be made to the design, then it has to be, at best, partially rebuilt.

Traditional 3D models do not include user-feedback, interactivity, automatic generation or variational design. Generative Components is a programmatic environment, based on top of MicroStation, which allows designers to build simple parametric skeletons, derived from standard MicroStation geometry, to produce designs and forms that can automatically generate or update, depending on the input to this underlying 'frame' geometry. This isn't the 'walls, doors and windows' 'intelligence' of products like Architectural Desktop, which is essentially about quickly generating 2D general assemblies from a 3D model. Generative Components works at a much lower level and isn't bothered about the interaction of pre-defined recognisable building components. It simply concerns itself with geometry,

complex relationships, control and applying complex, user-defined computations to a design.

I have to admit it's not a technology for the faint hearted, as the learning curve requires some level of programming methodology together with an understanding of basic principles of geometry and a problem solving mind. It seems that most that have taken to using the tool are either young, ambitious and smart computer-literate architects or rocket scientists – both of which seem in plentiful supply in leading London architectural practices.

If you look at the projects that have really dictated the current leading edge architectural vocabulary,

Dostyk Business Centre, Almaty, Kazakhstan.



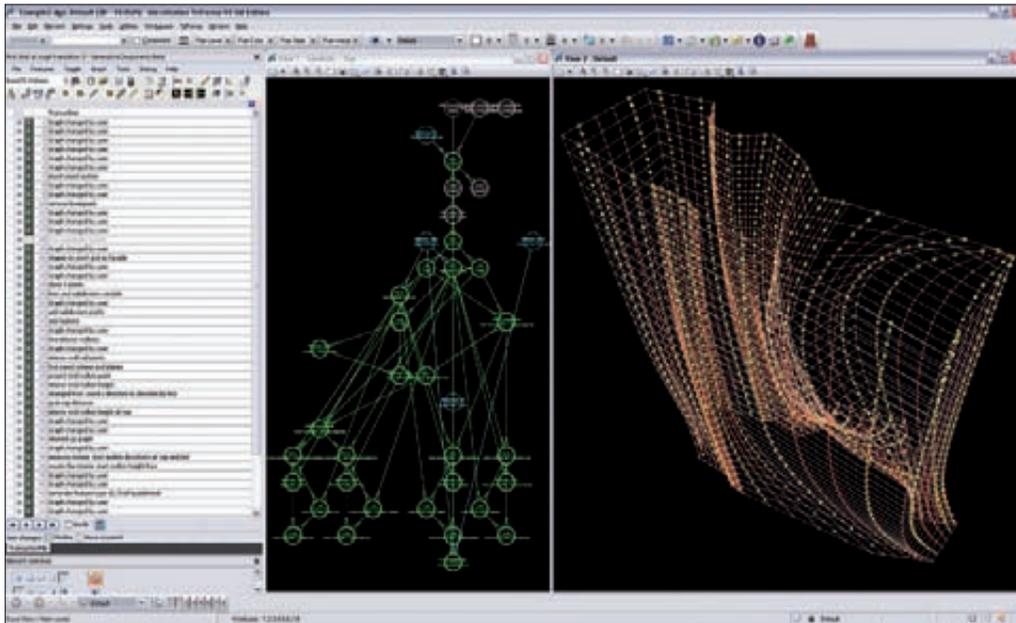
from the likes of Foster, Liebskind, Gehry and Zaha Hadid, it's obvious to see that the ability to model complex surfaces and move this to digital fabrication are essential in their processes. This can only be achieved with increasing reliance on CAD systems and is a key reason why Generative Components, even while in extended Beta test, has already been used in the design of some very large projects. As I write this, Bentley has in fact, just announced that the first official version of Generative Components has shipped as part of its Select Subscription.

Seminar program

To set your expectations, if you should venture to next year's Research Seminar, then plan for long day. The presentations kick off at 9am and should finish around 5.30, although this invariably runs over time as there's just so much fitted into the day. This year there were 13 presentations covering a number of projects, at various stages of completion. Here are some of my highlights.

The first presenter, Alastair Townsend from the intriguingly named Youmeheshe practice had the honour of going through how GC was used to design the first building to be built with the technology. The striking Cutty Sark Pavilion gets that 'first-built'





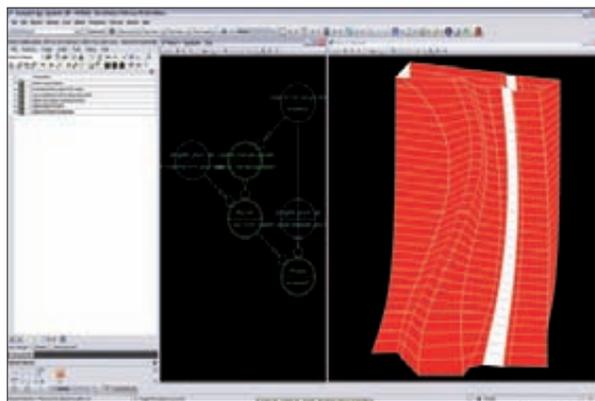
accolade, despite almost coming a cropper in the terrible fire that engulfed the historic tea-clipper in London a few months ago. The Pavilion is a stretched fabric design and miraculously escaped with a few minor burns which can be easily repaired. It was great to see how GC was used to optimise the building's form. We will be covering Youmeheshe and their design process in more depth in the next issue.

Having seen a GC-assisted building, the next speaker, Fabian Scheurer from 'designtoproduction' GmbH examined what I think is one of the more obvious missing links in this advanced computer geometry research, how do you fabricate your design? While there are many small rapid prototyping machines and CNC (Computer Numerically Controlled) cutters, the scale of architectural designs usually leaves current CAM strategies wanting. Architectural elements generated in the CAD system, need to be broken down into large numbers of smaller components so they can be manufactured. Scheurer gave a demonstration of how they go about automating and deriving these custom buildings systems for their CNC machines.

With two doses of real-world applications, Kaustuv DeBiswas a PhD student at MIT gave a demonstration on some fascinating and complex form finding work he had undertaken for dECO's Bankside Paramorph project. DeBiswas had developed a technique to use GC to run an algorithm to find quadrilateral geometry that matched doubly curved surfaces.

SOM is a practice that has been at the forefront of 3D. Its Freedom Tower is well publicised as being designed using Autodesk's Revit but it has also signed a massive deal for Gehry Technologies' Digital Project, the Catia-based modelling tool. Neil Katz from the company gave a two-part presentation, inspired by the beauty that can be generated with mathematics, first by examining how GC could be used in deriving artistic tiling and surface parametric effects. The second part of his talk covered 'morphology' and how surfaces can be generated to satisfy a variety of project requirements, including different materials and constraints.

Shane Burger of Grimshaws looked at the



Bentley's Generative Components technology can be used to derive complex forms from basic parametric relationships.

computer/human interface, giving us an insight as to how these associative geometry models work in a team environment, given that it's not a natural fit. Grimshaws are in the process of developing a new design team methodology system that would allow models to be passed to a project team for manipulation, together with input from consultants and clients. The practice has already used some of this knowledge on the Museo del Acero in Monterrey, Mexico and on competition projects.

NBBJ's very own Volker Mueller worked through various strategies researched for developing a complex façade for a project in Kazakhstan, to aid constructability as well as economic and maintenance factors. The GC model allowed immediate feedback as to the non-planarity of surfaces.

KPF's Lars Hesselgren didn't give a presentation in the Architectural Research Seminar this year. I felt this was noteworthy as Lars is one of the GC pioneers and always manages to get on the presentation list! Instead two of his protégées, Stylianos Ditsas and Mirco Becker stood in to give a commanding presentation on how they find form-oriented design an impediment to progress, preferring systematic approach to design derivation, being based on multiple performance constraints - radical thinking with beautiful consequences.

The design of the impressive Karachi Port Trust Tower was presented by Judit Kimpian of Aedas. GC was used to interrogate environmental, structural and architectural criteria and enabled the fine-tuning of

this highly sculptured building

Jeroen Coenders of Arup demonstrated the associative nature of structural systems built on GC. Jalal El-Ali of Buro Happold explored radical concept design using GC, with the model reacting to various environmental and structural inputs.

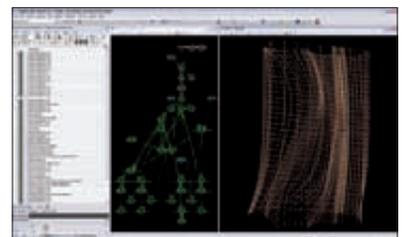
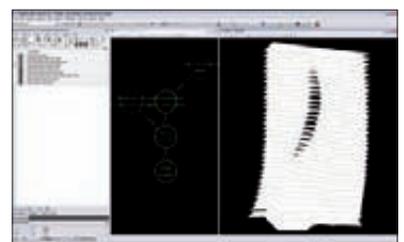
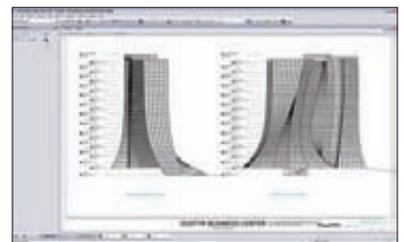
Foster and Partner's Francis Aish, who is part of the Specialist Modelling Group, gave a presentation on design workflows which allow for the complexity of data that systems like GC will bring. If the geometry is linked to form finding and rationalising algorithms, together with performance simulation and analysis tools, then new user interfaces are required if all this information is to make sense and promote rapid evaluation for better decisions.

Finally Axel Kilian, an MIT PhD and GC-scene regular gave a fascinating talk about his work on actuated structures – structures that kinetically adapt after construction, using pneumatic actuators. GC was used to build possible configurations of the structure to analyse the complex control system.

Conclusion

To sum up this year's research seminar, there was something for everyone and on reflection, with the plethora of GC users and applications on show, the event was a subtle but very strong sales pitch for the benefits of GC technology. There were projects that were built, experts in going direct to manufacture, conceptual designs, experiences in optimisation, first hand demonstrations on how GC eases complex geometry generation, fresh insights as to the impact on teamwork, applications in structural engineering, conceptual design and form finding. Put simply GC is allowing practices to experiment, interrogate and optimise designs that would not be feasible in any other out of the box' way and its application is extremely broad.

www.bentley.com / www.gcuser.com



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▶ Autodesk 2008 Product Portfolio

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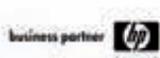
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Structural integration

Bentley's Integrated Structural Model is designed to act as a central repository for all of Bentley's structural engineering products. **Greg Corke** takes a closer look at this challenging project.

A few years back Bentley Systems had its sights set squarely on the civil engineering, plant design and architecture sectors - structural engineering never really appeared on its radar. But at the tail end of 2005 this all changed with the acquisitions of RAM International and the STAAD line of software from netGuru. Overnight, Bentley had become a major player in the structural design and analysis software sector, but with some 20 odd products in its portfolio, it also inherited the headache of how to get them all to talk each other and share data efficiently.

Data sharing is the foundation of Building Information Modelling (BIM). The industry usually talks about BIM in the context of the architect sharing

information with the building services engineering, sharing information with the structural engineer. But BIM is also about sharing information within disciplines, and using a master 3D model to drive the generation of GAs, sections and Bills Of Materials (BOMs). A last minute change to the design used to mean that the associated drawings and BOMs would have to be completely re-worked. With BIM an alteration can be made to the master model and the changes will be automatically reflected in the drawings and BOMs.

With the many facets of Bentley's structural software portfolio - from analysis in RAM and STAAD to modelling and documentation in Bentley Structural - the task of sharing and coordinating data is much

more complex. You have a lot of independent products which are tailored for different aspects of the structural design process and as such there is potential for a lot of duplication of data. The same design can often be recreated from scratch for design, analysis and documentation and any changes to the design are made manually inside each application

So how do you take all of the knowledge inside these applications and actually share it?

The simple answer would be use import/export to and from each product. There are already a number of links in place for this and one of these is 'round trip' import/export between Bentley Structural and RAM or STAAD. Here, an engineer creates a model in Bentley Structural and exports it to the RAM Structural System. The model is analysed in RAM structural system, some changes made and then fed back into the Bentley Structural Model to create the GAs and schedules. Conversely, the model could be started in the RAM Structural System and then taken in to Bentley Structural to automatically create the drawings from the analysis and design model.

While 'data-centric' workflows such as this mean that data can be re-used and the engineer or CAD technician doesn't have to recreate it from scratch, it is a manual process which needs to be carefully monitored. Plus, depending, on the quality of the links between the applications, model intelligence, annotations or markups can be lost along the way.

Bentley's ISM

In order to tie these applications together much more efficiently, Bentley is currently laying the foundations for a new 'database-centric' technology, which it calls the Integrated Structural Model or ISM for short.

In essence the ISM acts a Building Information Model (BIM) for structural engineers. Instead of everybody sharing 'point to point' integration data, the ISM is used as a central repository for all structural data, serving up 'select' data as and when it's required by each application.

For example, if an engineer decides to change the floor heights of a building in STAAD.Pro, the ISM can automatically notify the RAM Concept user that they have changed and will ask if he wants to automatically update his slab design. The ISM could then inform the connection designer using RAM Connection that the beam size has changed and even ask the detailer using Bentley Rebar if he wants to automatically update all of his fabrication drawings.

Unlike a manual import/export workflow where



The Manchester Hilton is currently the tallest post-tension concrete residential building in the United Kingdom. The 170 metre tower comprises 49-stores and Bentley's RAM and STAAD products were used throughout the project.

Bentley's structural portfolio

Bentley Structural

This is Bentley's MicroStation-based BIM (Building Information Modelling) solution for structural engineers and designers. Users can model structural systems for buildings, industrial plants and civil structure in steel, concrete, and timber. The BIM model can be used to drive the production of drawings, including plans, sections, elevations, plus BOMS and schedules.

STAAD

STAAD is a general-purpose structural analysis and design solution for steel, concrete, wood, cold-formed steel and aluminum. It can be applied to virtually any type of structure and comprises a total of five key applications:

STAAD.Pro is a general purpose finite element analysis and design tool which can be used for virtually any structure including stadiums, towers and bridges.

STAAD.foundation enables engineers to analyse and design isolated or combined footings, mat foundations, pile caps,

and strip and combined footings. It can be used as a stand-alone program or integrated with STAAD.Pro to obtain the geometry, loads and results from the model.

STAAD.beava (bridge engineering automated vehicle application) is a vehicular load generator which is integrated within the STAAD.Pro environment.

STAAD.offshore integrates with STAAD.Pro to provide analysis and design solutions for offshore structures.

Sectionwizard can be used for calculating section properties for standard and custom shapes. The section properties can be directly imported into STAAD.Pro.

Next year will see the launch of **STAAD.X**, which will be the last generation of STAAD.Pro. This will be a framework technology on which Bentley will build applications for specific verticals - STAAD.tower, STAAD.offshore, STAAD.plant, and STAAD.bridge - though users

will still have access to the general FEM engine for general modelling. The system will feature a completely overhauled user interface and a section property database will be used across all of the applications for consistency.

ProSteel 3D

A recent addition to Bentley's structural portfolio, ProSteel 3D is a structural steel detailing and fabrication solution that supports multiple platforms, including AutoCAD and MicroStation. It produces customisable detailed drawings and features direct links to CNC equipment.

RAM

RAM offers integrated building solutions for steel, concrete (including post-tensioning), cold formed steel and wood and features five core products

The RAM Structural System is specifically tailored for the design of both steel and concrete buildings. It automates the time consuming design tasks, such as gravity and lateral load generation. It includes RAM Steel, RAM Concrete, RAM

Frame, and RAM Foundation.

RAM CADstudio - provides what Bentley describes as the "missing link" between the analytical model and construction drawings and is fully integrated with the RAM Structural System.

RAM Concept is a special purpose finite element based analysis and design system for reinforced or post-tensioned slabs or mats.

RAM Advance is a general purpose desktop program for retaining wall design, continuous beam design, masonry wall design, and shear wall design.

RAM Connection is an integrated steel connection design and optimization tool for shear, moment and brace connections.

The others

Bentley Rebar, the MicroStation-based tool for reinforced concrete detailing and scheduling and RM 2006 for the structural analysis of bridges, through the acquisition of Austrian-based TDV.

users have to make sure they share the right data with the right people at the right time, the ISM can be set up to manage all transactions automatically. It can also manage the state of the transactions and keep a complete revision history including what was changed, who changed the design and when it was changed.

Not all information has to be made available to the ISM, and users are able to hold on to their private data and publish 'public' data. For example, while a Bentley Rebar user wouldn't be interested in the pipe locations in AutoPipe, he would be interested in

the location of the beams and columns, so only they would be made public by AutoPipe and published into the ISM.

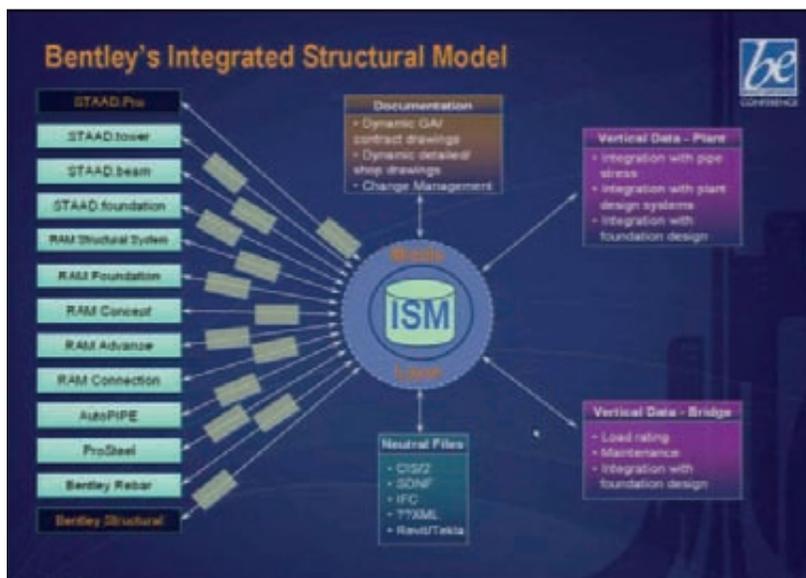
In addition to Bentley's core ISM structural software products, the ISM is also open to other products and disciplines. For example, The RAM structural system has a bi-directional integration with the Revit modeller so you can take in a Revit or start in RAM Structural System and go back and forth. Users can also work with vertical data - i.e. for bridges, plant design..

Conclusion

Creating an Integrated Structural model is a huge challenge for Bentley, but it is a logical response to the problem of solving interoperability between its many structural design/analysis/documentation solutions. With so many products in its portfolio, Bentley certainly has to take action in order to deliver a cohesive structural engineering solution.

And while amalgamating the 20 or so products into a single software application could be a long term solution, such is the diversity and history of the products on offer - each with different interfaces and workflows - that to introduce a 'master' structural system too soon would simply serve to confuse and alienate its customers.

ISM is due for launch next year and is designed to provide Bentley with the 'glue' to bring its products together, share structural project information efficiently and make it much easier to generate design documentation. And most importantly users won't have to keep track of which design changes will affect who - as the ISM will manage all of the transactions automatically. It certainly looks to be a very exciting technology, but Bentley needs to ensure that its products are not only talking the same language, but talking to the right applications at the right time about the right pieces of information. And it needs to be able to do all of this without making the whole system too complex to set up and manage. www.bentley.com



Bentley's Integrated Structural Model acts as a central repository for Bentley's structural engineering products



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TurboCAD 14

It's good to get away from the AutoCAD side of the CAD world for a while. A tour around TurboCAD Professional left **Martyn Day** amazed at the value on offer.

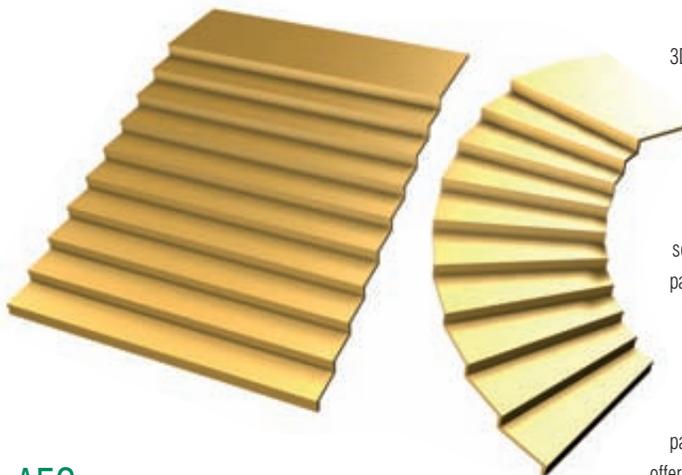
TurboCAD is one of those products that has been around for so long that most people have heard of it but not too many have actually used it. Having lived in the shadow of AutoCAD and LT, TurboCAD has never really got the airing it probably deserves, considering it has had a huge amount of software engineering work thrown at it. Despite this the package has sold hundreds of thousands of copies worldwide and has benefited from Autodesk really opting to walk away from the true retail market, having put AutoCAD LT's price into orbit.

TurboCAD development has been quite dedicated in following AutoCAD's functionality and offering a bigger bang for the buck. DWG compatibility is pushed forward in the company's marketing, together with developing support for Autodesk's LISP and ARX programming languages. While IntelliCAD claimed to be the AutoCAD clone, TurboCAD, based on the same DWG technology is probably the most successful in terms of copies sold. However, one question is how much these features are truly in demand. I can understand DWG requirements but with today's users I would have thought LISP was a declining talent and ARX is mainly used by professional developers.

TurboCAD 14

Probably the most confusing thing to understand about TurboCAD is the functionality related to the version you have. There are five flavours of TurboCAD – TurboCAD Delux, TurboCAD Professional 14, TurboCAD Pro Architectural, TurboCAD Pro Mechanical and TurboCAD Platinum. The Deluxe version is intended for home users or occasional users and doesn't include the powerful ACIS solid modelling engine. TurboCAD Pro 14 doesn't have any of the verticalised content but does 3D. The Architectural and Mechanical versions have content that is obviously appealing to each professional vertical and Platinum combines the functionality of all products, so it's the 'all rounder'.

TurboCAD is also available for the Apple Macintosh, although the versions here are currently at V2. On the Mac there are two flavours, TurboCAD Mac Pro v2 for 2D drafting and 3D modelling, and TurboCAD Mac v2 which only offers 2D drafting and design. There's also an additional application which contains over 12,000 2D/3D symbols and parts. It's a little odd that there is no specific architectural version for the Macintosh, which is probably the strongest vertical for the Mac platform.



AEC

TurboCAD offers all the standard and advanced options for straight 2D drafting. You will not be disappointed if using this tool to sketch out simple to complex ideas and models. However, the AEC version provides an extra suite of tools to build configurable architectural models.

TurboCAD Pro 14 Architectural Edition is aimed at professional users. It offers integrated 2D drafting,

The parametric stair generator in TurboCAD Pro 14 Architectural edition offers a number of different styles.

3D surface and solid modeling, together with surprisingly good 3D photorealistic rendering.

The new version of TurboCAD comes with over 50 enhancements - too many to list here - but the smart dimensioning, wall dimension tool, dynamic window and door schedules are particularly impressive. As is the parametric stair generator which offers a number of different styles.

TurboCAD AEC's flavour comes with all the usual architectural elements: walls, doors, windows, roofs and stairs, all of which are parametric and easy to edit on the fly. The system offers a series of wall openings with associated styles and all the walls self-heal in both 2D, 3D and curved form. As you would expect there's support for sections and elevations, which can all be laid out in paperspace for detailed drawings. TurboCAD can also generate rendered walkthroughs for playback. There's a new terrain import and modelling capability which can be used to place your design in digital-situ.

Conclusion

I was quite surprised at the depth of AEC features on show in TurboCAD Pro 14 Architectural. I haven't mentioned the price yet, but at £525, it's almost half the price of LT which wouldn't know a staircase from a polyline. It's also only £27 more than the vanilla version of TurboCAD Pro 14! The Platinum version, which has absolutely everything is only £10 more. It's quite astonishing. I knew TurboCAD was inexpensive but didn't realise just what a bargain it is.

So, there is actually a hell of a lot going for TurboCAD in both price and features. However the company has an uphill struggle to change the perception of what TurboCAD can do - after all, it's been around for ages. IMSI has long targeted Autodesk and AutoCAD but the DWG bandwagon doesn't appear to have slowed down any; in fact it appears to be accelerating. Autodesk has certainly been a dominating force but has oddly moved out of the retail markets as its products have accelerated in price. I hear that Autodesk is thinking of re-addressing this, so it will be fascinating to see how IMSI copes with renewed competition, especially as Autodesk will not be able to provide the breadth and depth of features that TurboCAD has, not without damaging sales of Inventor and Revit. It will be Autodesk's DWG compatibility vs TurboCAD's massive bang per buck.

www.turbocad.co.uk



Crystal clear

Liverpool-based design consultancy Uniform took a more abstract and visual route for its promotional 'Crystal' film for Foreign Office Architects' first UK project, the Trinity EC3 office scheme in the City of London.

Uniform has become one of the best of its kind offering design, film, brand and image services to forward-thinking clients in the architecture, retail, arts and fashion sectors. Some of its recent high-profile projects include marketing campaigns for Beetham Tower Manchester, the tallest residential building in the UK, and the Liverpool One development for Grosvenor; and branding and design for the Liverpool stand at MIPIM, a property exhibition in Cannes.

Uniform has spent the past two years largely focused on film projects for which it uses Autodesk 3ds Max 3D modelling and animation software and Autodesk Combustion desktop visual effects software. The company has recently produced a film, shot entirely in HD, to promote Foreign Office Architects' first UK project, the Trinity EC3 office scheme in the City of London. The development will consist of three glass office buildings and is being developed by luxury property developer Beetham Organization. The prime office scheme will also allow direct access to Aldgate tube station, a new bus station, as well as shops, restaurants and a 23rd floor panoramic conservatory with unrivalled views over The City.

Beetham Organization commissioned the film to help launch its proposal for Trinity EC3 at MIPIM 2007. They wanted a film that would inspire and engage people ahead of the building's completion in 2013. Beetham Organisation has worked with Uniform for several years but had never commissioned a film before. They were keen to see what Uniform could do based on its previous film and animation work for other clients. Uniform's creative director Laurie Jones explains: "Our approach with other clients has been to react to briefs in a creative and challenging way which isn't often the case in our industry. It's this

approach that ensures we're a design agency and not a visualisation company."

Inspiration

There was no set brief, rather an ongoing discussion between Uniform and Beetham about general criteria such as location, transport links, style, historical issues and floor space. These criteria were filtered down to the core purposes – which were to build the brand of Trinity EC3 as a high value, design-led development, and portray its location as part of the London City 'cluster'.

The three glass edifices will be highly noticeable and director of Foreign Office Architects Alejandro Zaero-Polo stresses: "This is not going to be another high-rise statement. The crystalline aesthetics create the possibility of playing games with reflection and transparency across surfaces that are not vertical – the default condition in the city. Tilt the surfaces towards the ground and they become more transparent; tilt them towards the sky and they reflect more light. This creates a kaleidoscopic world where different activities around the buildings and inside the buildings will be brought together as impressions of the City."

This gave Jones and the team at Uniform a breakthrough in terms of the creative challenge: "We discovered what we didn't have to show was as important as what we did have to show. This allowed us to take a more abstract and visual route with the film rather than it becoming an 'infomercial'. We then had the freedom to employ narrative and art direction that you'd normally find in broadcast commercials. And from a technical point of view it meant we were going to have to deliver the slickest looking visuals we've done to date."



The restaurant at Beetham Organisation's Trinity EC3 development.

The Crystal film

Uniform's 'Crystal' film plays on the architects' inspiration, the structural aesthetic of crystals. It follows three crystalline structures that explore the design features of the development using the City of London as a cinematic backdrop.

The viewer is taken on a journey through reflection, refraction and light as the transient crystals imitate, investigate and discover the shape and visual forms that create the fabric of the City and the Trinity buildings.





“This is not going to be another high-rise statement. The crystalline aesthetics create the possibility of playing games with reflection and transparency across surfaces that are not vertical – the default condition in the city.”

Director of Foreign Office Architects, Alejandro Zaero-Polo

The film plays on the architect's inspiration: the structural aesthetic of crystals and the reflection and refraction of glass. Uniform created a mood board using film references to develop the look and feel for the piece. They then created a storyboard and animatic in order to communicate this vision to the client.

The animatic consisted of a hand-drawn background with 2D animated crystals over the top to portray the basic idea of the film: three crystalline structures that explore the design features of the development and the architecture of London using the City as a cinematic backdrop.

The shoot

Before filming commenced, Uniform did a recce to get reference shots of appropriate locations within the City, which included iconic buildings such as the Lloyd's Building and the Gherkin. The day of the recce was a beautiful sunny day, it couldn't have been any more perfect, but the weather on the actual shoot wasn't as good. Filming took place over four days in September last year, and a lot of time was spent waiting for clouds to move. "In one or two of the shots we missed out on playing with the refractions and reflections of the crystals because of the lack of direct sun," says Jones.

Further footage was shot from a helicopter with a gyroscopic mounted camera which moves independently from the helicopter. Uniform also shot high dynamic range images (HDRIs) using a standard digital camera with a fish-eye lens and a tripod that spins around to shoot a perfect sphere. By doing this at different shutter speeds, it captures very dark and very bright colour values to produce HDRIs. These were used for the skylines created in 3ds Max and for reflections in buildings such as the Gherkin.

Grading

The team used Combustion to grade the footage to set the mood and match up all the shots. This proved to be one of the trickiest things to get right because of the different weather conditions. The colour tone varied hugely across the various shots and the helicopter footage was very hazy and tinted brown. As heavy grading creates noise, Combustion was also used to get rid of this.

"We used Combustion to convert the bit depth





of the footage from 8-bit to 10-bit to give more levels of colour and subtlety of lighting," says Sam O'Hare, senior designer at Uniform. "This allowed for finer tuning when neutralising the brown tinge and matching colour across the shots. We then did another grade to give the footage a cold, bluer tint for mood, pulling out the colour of the foreground, background and the Gherkin. Combustion's industry standard colour correction tools made this a swift process, even when working on uncompressed HD footage. The final colour of the piece ties it all together."

Modelling and animation

All modelling and animation was completed with 3ds Max. The crystals were modelled by hand in 3ds Max and Uniform used a technique from the games industry to morph the crystals as they move. One crystal was copied five times to ensure that all variations had the same number of sides, vertices and polygons. Using the morpher option, the different shapes could be blended together, creating an infinite number of shapes. Uniform used a Maxscript to create their own user interface to control how the crystals morphed.

The team used two techniques from the film industry to make the crystals and buildings more accurate and realistic. Camera maps were projected

An office at Beetham Organisation's Trinity EC3 development.

into the block modelled buildings and backgrounds behind the crystals. The Crystals then reflected these backgrounds, making them more believable. Since all you see in the crystals is refracted scenery, this was very important. The other film technique - matte painting - was used on a tight overhead shot of the building from the fish-eye lens camera to produce accurate reflections in the sides of the building.

Rendering

Separate render passes were created for every element: each of the crystals, reflections, mattes for reflections and other 'per-shot' passes such as the Gherkin's grid of windows. These were rendered using a variety of third-party renderers such as V-ray, Brazil and Mental Ray to get different looks and effects from the crystals, from caustic light reflections to realistically refracted light. Scanline was also used for producing mattes for the compositing process. All the passes were then composited using Combustion, with each shot being made up of four passes or more.

Multiple render passes were needed to get the crystals to match the background footage correctly and reflect realistically in the buildings. Tinted reflection mattes were used to cut through the existing reflections on buildings and allowed the rendered passes to be laid seamlessly over the top. This gave

much more flexibility to adjust the colours and tones to fit the footage perfectly, meaning less re-rendering.

Crystal is the first piece that Uniform delivered in full 1080p HD format so all of the scenes were much more detailed than usual. This meant that polygon counts were very high on some scenes. "We used the 64-bit support of 3ds Max 9 to make it feasible to render all these scenes at full resolution," says Jones. "The final result was played back on an LCD TV through a dedicated HD player and it looked great. It was definitely worth the extra time!"

Jones is delighted with the results: "It looks very realistic and reacts exactly how we wanted it to in terms of reflection and refraction. From a technical standpoint I'm very proud of the team's efforts with the imagery of the building itself - the Trinity scheme looks fantastic, particularly when matched into the aerial footage. The client was very pleased with the final piece and it had an incredible response at Trinity's launch at MIPIM, even better than we were hoping for. The trust and commitment from Beetham in commissioning the film has paid off which I'm really happy about."

The stunning film will no doubt ensure that Uniform upholds its reputation as one of the best design and digital media consultancies in the world.

www.uniform.net
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Profile: Blink Image

Oxfordshire-based architectural visualisation firm, Blink Image, was formed in 1998 by Mr Richard Birket and Mr Daniel Beinart after completing their diplomas in architecture at Oxford Brookes University. There was a strong focus on presentation throughout the course and both partners pioneered the use of computers to communicate the ideas behind their design projects. This enthusiasm led to the formation of Blink Image which started with an array of hand-built computers combined with a strong ambition to increase the quality of imagery/animations associated with the architectural visualisation industry.

Since then Blink Image has built a strong reputation throughout the property industry for producing high quality computer generated imagery and animations for planning and marketing purposes. Their architectural training, combined with their passion for design has been crucial in communicating with clients complex design issues, understanding their intentions and producing imagery that effectively explains projects to a wider audience. Blink Image's extensive portfolio of work not only excites but alleviates concerns and more importantly, sells a vision.

"We use many software applications and techniques to complete each project, and it is never

(ever) a case of just 'clicking render, job done'," explains Birket. "Contrary to widespread marketing hype, no one application can do it all - in fact, on average we use perhaps 8 or 9 software applications for a single animation project and four or five applications to complete a single image.

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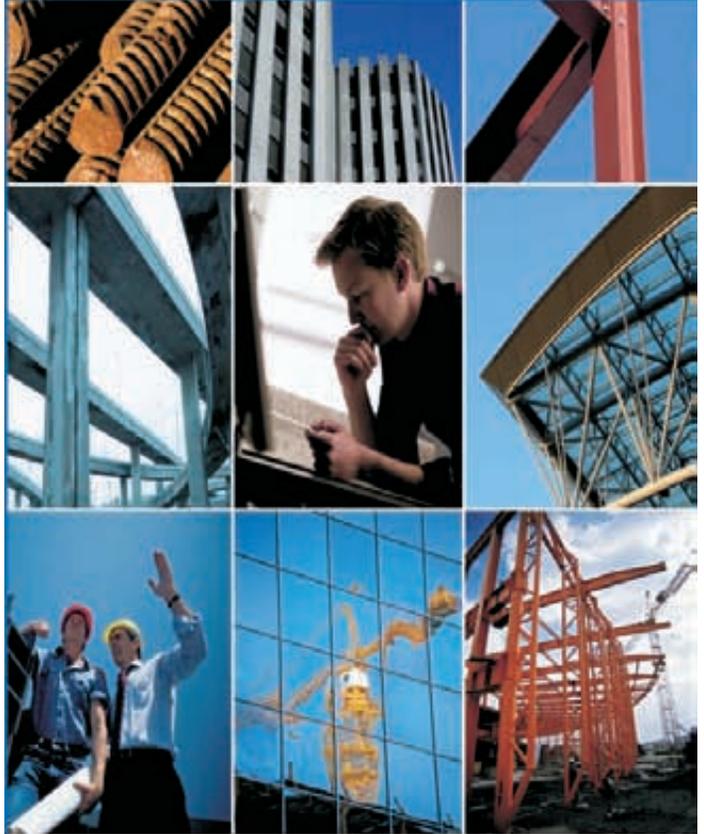
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The way we see our world is thanks to the way light is absorbed and/or reflected by the objects around us. In Revit and 3ds Max this can be re-created by raytracing and radiosity rendering.

When recreating photo-realistic images from virtual, modelled environments the concept of applying a texture or material to an object in order to represent the finish is generally understood, but the properties of absorption and reflection also need to be considered, and two pieces of jargon often banded around are Raytracing and Radiosity.

Raytracing is a common rendering algorithm used by software packages including Accurender, a cut down version of which powers the rendering of images from within Revit. Ray Tracing is a global illumination based rendering method; it traces rays of light projected from the eye through the image plane into the model scene. The rays are tested against all the objects in the scene to determine if they intersect any other objects. If the ray does intersect with an object, the pixel is then set to the colour values returned by the ray. If the ray misses all objects, then that pixel is shaded the background colour. This technique handles shadows, multiple specular reflections, texture mapping, reflective surfaces, and transparent or opaque materials. However there are limitations to this technique when it is used in isolation.

Radiosity is a method of illumination which takes into account distribution of energy via reflection and absorption of light. The first pass will identify the sources of light within a scene. After the first pass each surface is treated as a light source whose intensity is defined by the energy distributed from the first pass sources, minus the effect of the surface finish. The process is repeated until the residual energy falls below a certain tolerance and the lower this tolerance is set, the higher the level of realism achieved. High-end visualisation packages such as Viz and 3D Max are able to 'bounce' light until the eye cannot distinguish the result from a photograph.

In rendering packages such as that within Revit, raytracing may be performed on its own but will be significantly enhanced by the use of radiosity, with a couple of provisos:

- Radiosity is only used for internal scenes, this is because light needs surfaces to bounce from; using an external scene will cause the light to bounce around infinity, causing unrealistic illumination and also very high white spots in places.

- Radiosity is not very good when used in animation as it requires exposure controls which can cause flickering in a movie. Accurender appears to suffer quite badly from this phenomenon, whereas Max and Viz have got some exposures that are more suited to animation.



Figure 1 - Revit scene rendered with raytrace (no radiosity)



Figure 2 - Revit scene rendered with radiosity and raytrace



Figure 3 - Revit scene rendered with Radiosity (no raytrace)

If the situation suits the use of radiosity then this should be carried out first and the resulting light model is used to influence the results of the raytracing and provide more realistic shadows.

For example...

To further understand the process, consider the simple example of a shiny red ball sitting on a white surface. Light striking the ball casts a shadow which is obvious enough, but a certain quantity of light energy is reflected by the ball which then acts as a secondary emitter, sending an amount of red tinted light to the surrounding surface. The result is to give the otherwise white surface a reddish hue within the immediate vicinity of the ball. This effect is often referred to as 'colour bleeding' and subtle as it is, we are accustomed to the result in the real world; hence radiosity helps to create the illusion of realism within computer renderings.

The radiosity process produces a 3D light model of the scene with basic colour and absorption/reflection properties assigned to geometry. The light model is then used to enhance the image produced during the raytrace procedure.

The next two images show how radiosity calculations applied in conjunction with raytracing produce images with more subtle and accurate lighting than those rendered with raytracing alone.

In **Figure 1**, an image produced using raytracing alone, light is emitted and intersects with the objects in the scene lighting them and casting shadows beyond, but due to the way that the light rays are tested and returned, the scene appears unnaturally dark as objects are only lit by rays coming directly from the primary light source. Similarly shadows are only created where rays do not hit an objects surface.

In **Figure 2** when radiosity is used in conjunction with raytracing to calculate the scene lighting the results are much more realistic. Light is reflected back from the surfaces and bounced - or to put it in more technical terms, re-gathered - around the scene, whilst 'bleeding' colour from the objects as it goes. Shadows also appear more subdued as light is reflected from surfaces behind objects where before, no direct light fell. In **Figure 3** you can see the effect of using Radiosity on its own without raytracing.

Revit uses a highly simplified version of the Accurender rendering engine and the interface has been designed with architects in mind, so unlike specialist rendering products on the market, users need not be visualisation gurus with pony-tails; it is easy to use and still produces good results,



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albeit not in the same league as more advanced applications. With almost no user intervention, the engine calculates indirect light, hard / soft shadows, colour bleeding, blurry / sharp reflections, translucency, transparency, depth of field, attenuation and reflections.

The down side

Using Radiosity does require additional processing time for still images, although for animation, the same light model applies for the entire scene so a new Radiosity calculation is not required for each frame. Also, as it creates a static, 3D light model, any alteration or movement of objects within the scene make the light model obsolete and the Radiosity solution must be re-calculated.

There are some other issues for consideration associated with using a radiosity solution besides the render time; anomalies within an image are often referred to as artefacts.

One of the most common types of artefact is Light Leakage which is due to light seeping between surfaces. Imagine a fish tank whose glass sheets butt up to one another without any sealant; water would seep between the joints.

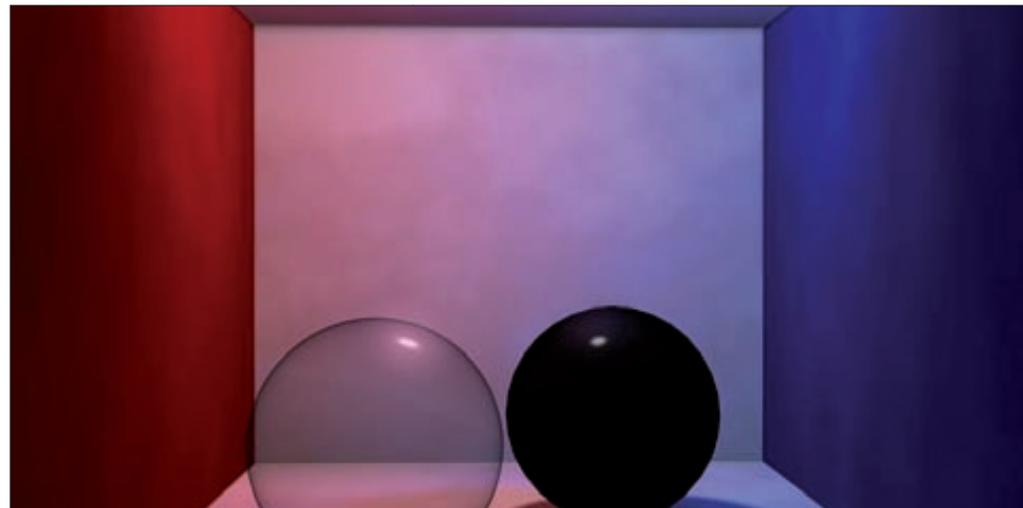
Advanced options

The results of the radiosity calculation can also be used to analyse the designed lighting of your building.

Revit allows for accurate lighting data from the manufacturers to be attributed to a Revit light fitting to replicate the illumination provided by certain designs. For example, the Erco web site allows you to download IES data files for every light fitting in their catalogue. The IES file contains all the photometric data for a particular light fitting such as the hotspot angle, falloff, etc. and when a lighting fixture family is directed towards the file it applies this information to the light model.

Conclusion

So as well as being one of - if not the - most powerful design package for the building design industry, Revit allows the user to generate photo-realistic images of the concept with accurate lighting. The most important



factor in this however, is that the rendered images produced are a by-product of having developed your design and hence produced your plans, elevations and schedules etc. Many Architects that adopt Revit are so used to having to outsource the production of presentation graphics that they overlook a very accessible and useful aspect of Revit, assuming it to be overly complicated. What this article attempts is to explain some of the concepts of rendering, but also to encourage users to have-a-go. A full-colour well-lit scene can speak volumes to a client.

That said of course Revit-produced images will not compete with the quality achievable in advanced visualisation packages such as 3ds Max, and for the really important images, it is still relevant to

Example of rendering with raytracing off (top) and on (bottom)

incorporate such requirements in your plans, but at least the Revit model can be imported into Max without having to re-model. The Radiosity calculation from Revit can also be saved as an external file, and then re-used within Max to save re-calculating the scene (although, if any materials are edited, or objects moved within Max, then the scene should be re-processed to reflect the changes made).

Revit really is a one-stop design tool for architects and designers, offering the ability to not only design buildings quickly and accurately, but also to show the concept off to its best advantage with still images, walkthroughs and panoramic vista with little additional effort or skill required!

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Knowledge management

As project-specific documentation becomes increasingly more difficult to manage, Union Square Software's Workspace software transforms working practices for UK construction company Osborne. **Linda More** reports.

Osborne is a £250 million turnover privately owned company specialising in building and maintaining railways, roads, homes, hospitals, schools and offices. With over 1,000 staff employed on projects as diverse as major office construction & refurbishment, the design and construction of next generation sites for mobile telephone operators and civil engineering work to strengthen the nation's roads and rail bridges, it is essential for Osborne to create an easily accessible system for all business information – from project documentation to customer records and guidance procedures. "We are a neighbourhood contractor building things for the benefit of a community and we've just celebrated our 40th anniversary", says Lester Handley, Divisional Director.

Secure storage

With ever expanding filing systems in its local offices and on project sites, concerns were being expressed about the secure storage of its documentation. "There was a danger that valuable paper-based information could potentially get lost", explains Handley. "Particularly at the close of a contract when several individuals' paper filing systems are consolidated to form a project set for archiving."

In addition, Osborne was experiencing delays in sharing documents and information. Revisions of drawings, instructions and other paper-based documentation required copying prior to circulation, which could take up to two weeks to reach all the relevant sites and people. "In some cases there were real risks that we could be building to the wrong specification because of the time lapse in circulating the up to date information", says Handley. "Increasingly we were using email to communicate additions to specifications and instructions, with no way of referencing them back to the main project documentation." With vital information sitting on laptop hard disks, many of which were on building sites with a higher possibility of damage or theft, Osborne was concerned about the potential loss of this valuable information.

Information anarchy

For core documentation and internal contact information Osborne had already set up an intranet, however pressure of work and difficulty in updating it meant that people often reverted to using their own little black books of contacts. At the time, technology offered limited options in providing a solution that

would meet the diverse needs of the company. "We had numerous demonstrations of systems including extranets, document management, but all they tended to solve was the project filing system and they didn't address the central company issues", says Handley. "Another concern was that many of the systems didn't address the archiving issues. We need all our data stored in a logical, searchable fashion, as well as being readily accessible."

Then chance took a hand and Union Square's Workspace software was spotted at a conference by an Osborne director. One of the biggest concerns Osborne had about selecting a new technology was to ensure that it provided a cultural fit with the business. "Too many software systems demand changing working practices, and that wasn't how we like to do things. We know our processes work and we wanted a technology that would fit our business. Union Square doesn't constrict the way we like to do things, and it actually can provide opportunities to enhance our working practices", says Handley.

Web-based portal

Osborne implemented the Workspace portal to enable 750 users to access project information in real-time, irrespective of their location. Due to its flexibility Osborne has been able to customise and configure the software to meet the particular needs of the business as a whole as well as the individual divisions. The result is a customised Workspace portal for the company that has been named iGO.

Workspace has become a system central to our business", says Handley. "Using one portal for all business and project-specific information is helping us to deal with clients more efficiently whilst also providing productivity improvements." Users no longer have to waste time trying to work out which document is the latest version, and centralised documentation has reduced courier costs and time delays moving information around the business.

Email integration

Set as the browser homepage for every computer user in the company, the iGO portal is becoming the default mechanism when looking for information – whether contract details, the latest revisions of drawings or simply a contact number. "The iGO system will continue to grow and become even more useful as we integrate information from other sources – finance, HR and marketing for example", states Handley. iGO



also increasingly helps to manage important email. Rather than reside in personal email folders, emails are increasingly being stored within the project filing system to ensure that vital communication, which often forms part of contracts and specifications, does not simply disappear as a result of being deleted or misfiled.

For Osborne, the Workspace solution has given them everything they wanted – from long term storage and easy retrieval of their project records and documents, to email capture and centralised business information. When documents arrive at the company they are immediately added to the iGO system and made available to anybody who needs them. "We estimate that we save at least a week in document distribution time, plus by default users always see the latest version of the document first – and that reduces risk and delay in our processes", adds Handley. "In addition if you are waiting on a new version of a document or plan, it's easy to set an alert and as soon as it arrives you get an email notification message." Furthermore, Workspace reduces the pressure on the IT infrastructure; as each document is published a link appears to the central copy, rather than sending out the whole document to a group of people.

One of the big challenges for Osborne when distributing documents was to manage them. Now Workspace not only distributes documents, it also provides an automatic register of which revision was sent to whom and when. Even if the documents are sent in paper form, they are accompanied by an electronic audit trail, managed from iGO, that captures and demands receipts as proof of delivery.

A platform for the future

For Osborne, Workspace is a technology that really does fit its business and one that will continue to do so in the future. "We will continue to develop iGO as our portal – a system to make it easier for us all to do our jobs, by helping us get at information that until now has been locked away", says Handley. From the business perspective iGO is a platform that can be built upon and in the future Osborne hopes to extend the information delivery capability to include partners up and down its supply chain. "We can't yet quantify any cost savings", admits Handley. "However we now have a joined up approach to our business and the efficiencies we have gained mean that we are in excellent shape to achieve our challenging growth targets and meet the changing needs of our clients. For us, Workspace has delivered superb value for money."

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Mission control

Is it time for the AEC industry to get serious about project management asks **Russell Henley** of Deltek?

Now that the new Wembley Stadium is open for business, perhaps the UK construction industry can be allowed to improve its reputation in the minds of the general public. No matter that the project was a global one, that politics and business played important roles in its delay and that thousands of other UK building projects are delivered on time and to budget every year. In the country's collective consciousness, large projects spell hold-ups, huge expense and loss of face.

Consequently, the industry is under scrutiny like never before. At the same time, there is an abundance of opportunities to be involved in larger projects and AEC firms wanting to move up a level have their chance to shine. If, that is, they show themselves to be capable of keeping a tight rein on their work.

So, perhaps it is time for the industry to take the tools that can help them do this more seriously. As well as looking at innovations in actual design and construction, consultants and contractors should also be looking at new ways to manage projects, perhaps moving away from piecemeal project-by-project products and considering integrated solutions that encompass their entire operation, so helping use every resource in a synergistic way.

It is also valuable to consider the way other industry sectors handle time and budgets, particularly those, such as defence and the public sector in general where transparency and control are fundamental to success.

For a start, faced with the prospect of managing a prized contract, homegrown project management solutions such as a clutch of Excel spreadsheets begin to look inadequate. Lack of integration with ERP and accounting functions mean data has to be re-keyed several times, there are no audit trails and ultimately no spreadsheets can be easily altered.

Likewise, stop-gap and disconnected IT applications throughout the organisation start to appear distinctly second rate. They can leave project managers grappling with inconclusive reports, inefficient financial and accounting systems and overall lack of information needed to make effective business decisions.

These days, many big name companies have invested in some kind of solution that can help control projects, even when no one person can be totally hands-on all the time. Increasingly, smaller firms are following their lead, recognising that a good solution can not only help ensure the success of projects, but can also help the firm punch above its weight in winning new business.

The best solutions look after the entire project process, from bringing new business in the door, to capturing billable hours, increasing employee



utilisation, streamlining management tasks, enhancing collaboration and sharing knowledge throughout the organisation. They also identify that communication between various disciplines and interested parties is key to steady progress. For example, the latest solutions offer visualisation capability as a powerful management tool. These provide simple displays depicting mission-critical information about a firm's entire business including project performance, status, trends and risks using colour, graphs and diagrams to alert users.

The global architectural firm, Swanke Hayden Connell International (SHCI) has recently invested in this type of software. It is using Deltek Vision to manage its financial and project accounting, billing, time and expense and resource planning across its Sheffield and London offices.

To manage its entire project portfolio, SHCI is deploying the solution's visualisation module to quickly transform its data into easily comprehensible and actionable information. This will provide SHCI's senior executives with an at-a-glance, top-line summary, enabling them to keep abreast of developments across the firm in real-time.

"Prior to Vision, we'd been accessing data from three different sources across the company – a cumbersome and inefficient way of doing business," says Neil Tullis, SHCI director of finance. "With Vision, all managers will be able to control their projects and resources via accurate real-time information. As a result, they will be able to significantly improve project control and reduce manual data entry."

It is this integration of enterprise functions with project activities that really helps to solve the management and operational challenges of more complex projects. It eliminates the "silo mentality" that can destroy real efficiency and transforms days of searching through files or databases into a quick search that involves only a couple of clicks of the mouse.

For example, the Manchester-based engineering services provider, the Wilde Group, was looking for a new system to help manage its growth across its four

Kings Mill Acute Hospital, Mansfield, Notts, designed by Swanke Hayden Connell Architects.

different companies, including its civil and structural engineering operations. However, it had to go through a rigorous market research programme of at least 15 different software packages before it found one that integrated both accounting and project management.

As the whole industry, including smaller firms, matures in its use of project management tools, it may well begin to look further afield at further ways to keep control. At first glance the AEC community does not seem to have much in common with the defence industry. However, some market commentators predict that the proliferation of large construction and infrastructure projects could lead to an interest in earned value management or EVM, a method of management more commonly used on large government contracts.

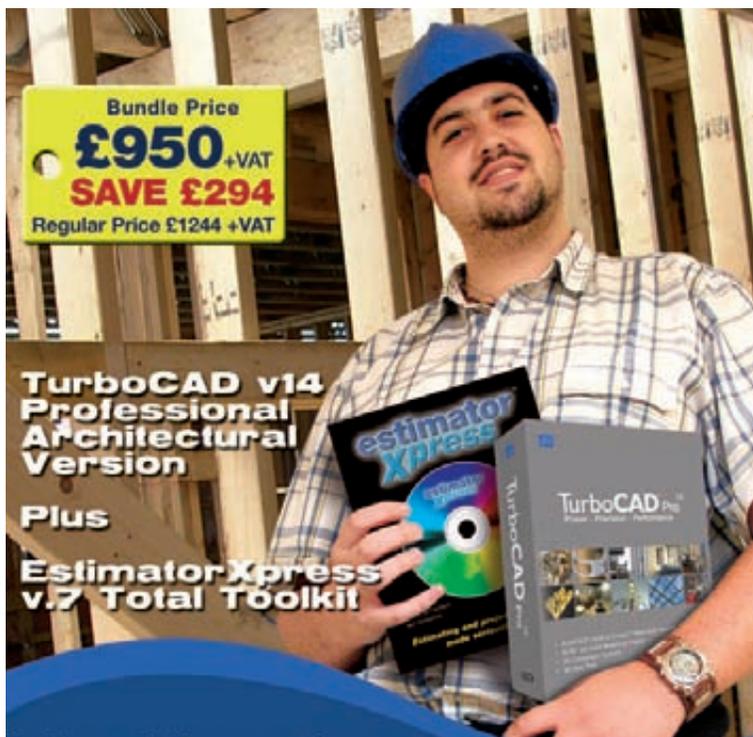
"EVM has been bubbling under in the AEC industry for around eight years now," says Jim Malkin who is on the Association for Project Management's Earned Value Specific Interest Group. "At the moment it is still mostly the big name operations who are implementing EVM systems particularly those connected with the regeneration of infrastructure prior to the 2012 Olympics."

For example, BAA's new Terminal 5 is currently held up as a template for project success. Here managers have not been afraid to implement new methods of design, collaboration and project organisation and, as a result, EVM has been able to prove its worth in this profitable mix.

"However, we are still talking about huge corporations here. But, I believe smaller companies can learn from their experience and invest in making EVM work for them too."

It is clear that to transform the perceived image of the AEC industry, a radical solution is needed. But it's not just about what other people think; it's about maximising profit margins, maintaining good relationships, delivering quality work and keeping promises. Important issues need serious solutions.

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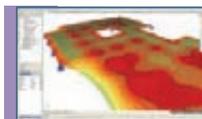
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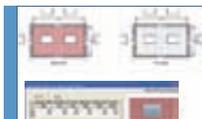
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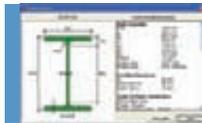
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Young at heart

Through its adoption of AutoCAD MEP, the building services-specific version of AutoCAD, Haden Young was not only able to cut its design cycle by weeks, but dramatically improve co-ordination.

We expected our first job using AutoCAD MEP (formerly Autodesk Building Systems) to take longer than usual. In fact, it took the same amount of time – and we did so much more,” says Phil Holland, CAD manager, North West area at major building services contractor, Haden Young. The company is gradually rolling out the software across its UK offices and is finding it offers many efficiencies over previous methods of working – particularly the way it improves co-ordination.

But Haden Young is keen to test AutoCAD MEP to the full. It is now well on the way to being the first UK contractor to customise the solution for its own requirements and also the first to link it with fabrication spool drawings. Early testing has proved this is entirely possible and that it could save around two weeks in fabrication DWG production times.

One solution

With over 1,600 staff and operatives operating out of four regional organisations with ten offices across the country and major sites, Haden Young is one of the leading building services organisations in the UK. Offering extensive building services expertise in air-conditioning, heating, plumbing and fire protection installations, together with power, lighting, data, security and building management systems, Haden Young works with some of the country's biggest construction companies, as well as many commercial, industrial and public sector clients.

Holland explains how his team in the North West were using a combination of AutoCAD and 3rd party software. This worked well, but when it came to upgrading, they discovered there were advantages to combining the two functions in the one software.

“AutoCAD MEP could do the job for one subscription cost only,” he says. “And, from a workflow point of view it eliminates the need to keep re-creating data and for time-consuming manual input.

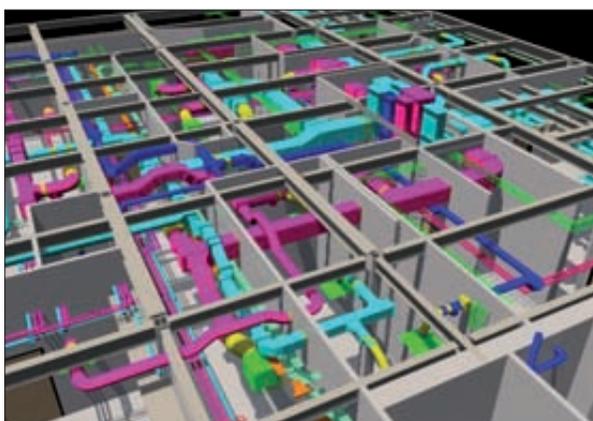
“At first we were looking for a good co-ordination tool to enable us to check the way the different services fitted together and that there were no clashes,” he adds. “It was clear that AutoCAD MEP would do this for us.”

Holland began by implementing six seats at the Warrington office and soon increased this to ten. Haden Young's Tamworth office followed close behind.

His colleague, Pete Wakeman, the CAD manager at Tamworth explains: “In reality, the experienced CAD co-ordinator has always thought in 3D. However, previously it was difficult to recreate that image in 2D format.



By modelling its designs in 3D Haden Young is able to check everything is in the right place much more easily.



“Using AutoCAD MEP gives you great spatial awareness. For example, the first job we used it on was a new plant room at the Addenbrooke's Hospital in Cambridge. We used the architect's design as a base and created a 3D model which made it far clearer to us how everything fitted together.

“As a result we could view the entire design as a whole and also from various angles. Now we can even do walkthroughs which enables us to see the design in a different way and really check that everything is in the right place.”

Haden Young works in a complete range of sectors, including education, commercial, industrial, leisure, sports and retail. However, at the moment, hospitals and other healthcare buildings feature highly in its project portfolio and the company is part of the NHS ProCure21 partnering programme which encourages best practice and excellence in design.

“From Warrington we began by designing the building services for a new day case theatre at the Blackpool Victoria Hospital. Out of this came a series of other hospital projects such as a cardiology and surgical unit at Stepping Hill, Stockport and other major sites,” says Holland. “AutoCAD MEP has come into its own on these projects.”

“Working on the Blackpool project we were able to



model up the structure of the building so we could check co-ordination. This was a level of validation that we wouldn't be able to reach with a traditional CAD drawing.

“There were occasions when AutoCAD MEP change management was a real life-saver. On one job, the builders wanted to reduce the ceiling heights. Previously this would have been an extremely time-consuming task, but using the solution's automatic co-ordination, it was both straightforward and accurate. The model also highlighted the areas where the new dimensions wouldn't work and we were able to adjust the design accordingly.

“It has also helped us demonstrate co-ordination issues at the tender stage, which helps when costing a project.”

Pleased with what the team were achieving with the new solution, Holland demonstrated AutoCAD MEP to other offices, showing them how it could help save both time and money. The Tamworth office now has around 16 licences split between themselves and the Bristol office and this year, Haden Young bought its two Scottish offices and the Leeds and Newcastle operations on board.

Since it began working with the solution, Haden Young has launched Modular Systems + , the company's off site building services module manufacturing operation. “We're currently creating a catalogue of our actual fittings rather than generic ones and aim to get to a point where we can get actual material listings from the model.

“This is going to save an exceptional amount of time. At the moment the calculations and ordering are all done manually which adds many extra man hours to the project and also introduces the potential for human error. With faster and more accurate fabrication drawings we can order sooner and more precisely, giving us a big advantage,” says Holland.

It is clear that Haden Young has recognised the potential of AutoCAD MEP and will continue to build on significant, early gains. This includes, not only cutting the time to produce fabrication drawings by weeks, but also taking advantage of the head start in ordering this allows. They can truly say that AutoCAD MEP puts them in front of the game.

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Workstation reviews

A budget workstation used to mean a huge hit in performance, but **Greg Corke** discovered your money can go a long way when you're looking for a machine for under a grand.

CAD 2 Imagine Q64

CAD 2 has packed an incredible amount of technology inside its sub £1,000 workstation - so much that we had to double check the price. It's the only machine on test this month to offer a Quad Core processor and it does this without scrimping on clock speed either. The 2.4GHz delivered by its Intel Core 2 Quad Q6600 provides plenty of power to run single threaded applications, but you also get the an additional cores to play with as you will.

Four cores will be music to the ears of rendering users with multithreaded tasks to solve. It breezed through the 3ds Max rendering test we threw at it and concurrent CPU intensive tasks were dealt with little drop in individual application performance.

The graphics is provided by a Quadro FX1500, Nvidia's excellent mid-range card. Mid-range CAD users are in safe hands here, and even those dabbling in design visualisation should enjoy good 3D performance.

The 4GB of RAM inside the system gives you a

built in upgrade path to 64-bit Operating Systems, which is a more than viable option for a machine of this specification. For those who are already bottlenecked by memory in their 32-bit OS, however, Windows XP Professional x64 Edition and Vista are also available, though check compatibility with your applications first.

In terms of storage, CAD 2 has opted for speed, rather than redundancy, with two 160GB Seagate 7200.10 S-ATA drives configured as a single drive through Raid 0. This will give you near on 320GB in total, with the data shared across both hard drives, but should one hard drive fail you'll lose all of your data, so regular backing up is essential with this configuration.

We found the machine to be very quiet in operation, even when hammering all four cores for an extended period. Removing the side of the compact solid chassis reveals the reason for this - one big CPU fan pushing all the air through to an adjacent fan at the back of the case. This seems to be the standard setup adopted by most workstation manufacturers today in order to reduce noise and it works very well indeed. Elsewhere inside the machine, there is excellent

Specifications

CAD2 Imagine Q64

- Intel Core 2 Quad Q6600 (2.4GHz)
- Nvidia Quadro FX1500 (256MB)
- 4x1GB PC2-6400 800MHz Dual Channel
- Intel D975X chipset motherboard
- 2x 160GB Seagate 7200.10 S-ATA (Raid 0)
- 18x Dual Layer Dual Format +/- DVD-ReWriter
- Windows XP
- £950



attention to detail with all cables carefully routed around the case.

If there's a downside at all it's that the hard drives are hard to get should they ever need replacing, and there aren't any memory slots free on the Intel motherboard - though you wouldn't really expect this in an entry-level machine and 2GB memory modules would push the price up considerably.

But this begs the question "is the CAD 2 Imagine Q64 really an entry-level machine?" If you told us a year ago that you'd be able to buy a four CPU workstation with mid-range professional graphics, 4GB RAM and a high performance disk system for under a grand, we simply wouldn't have believed you. The fact that you can today still beggars belief, and with CAD 2's Imagine Q64, you'll not only be buying a machine that can satisfy your mid-range CAD requirements today, but well into the future as your needs (and the needs of your software) grow. www.cad2.com

Dell Precision 390

Before we get into the 'meat' of this review, we'd like to assure you that the following 400 words or so on Dell's latest Precision workstation are free of typos (well certainly as far as the price is concerned). Yes, you can buy yourself a fully certified CAD workstation with professional 3D graphics for under £500, and in case you were wondering it's actually quite good.

In order to deliver a workstation at this previously unheard of price, Dell has scrimped and saved in two main areas, the CPU and graphics. What remains though is still a very capable machine and the Intel Core 2 Duo E6420 CPU boasts two CPU cores run at

a respectable 2.13GHz, which is more than enough to run most CAD applications. The same is true of graphics, and users with small to medium CAD models will have no problems with ATI's 128MB FireGL V3400 card. Frustrations are likely to grow as frame rates slow on larger models, but for many CAD tasks you simply don't need more power.

Elsewhere, the 390 performed surprisingly well in OpenGL mode inside 3ds Max, and this largely down to ATI's custom Max driver. Graphics performance could be boosted further by upgrading to a higher performance card. An additional £149 for a 256MB FireGL V7200 could be money well spent, but upgrading to a 1GB FireGL V7350 for £799 would leave you with an unbalanced system. Your money would be much better spent upgrading the CPU and indeed the memory. This stands at 2GB DDR2 ECC, which for a system of this specification is just about right. There are two memory slots spare should you wish to make an upgrade to 4GB and beyond, but it's unlikely that you'd want to move to a 64-bit Operating System anyway as there wouldn't be enough power inside the system to support such large models effectively.

At 80GB, the S-ATA hard drive is conservative in its size, but should still be adequate if you're working in networked design environment. If storage capacity is critical you can always upgrade to a 160GB S-ATA



drive. You could also add a second hard drive at a later date and with easy access to the two drive bays inside the chassis this is an absolute doddle.

With this Precision 390, Dell is re-defining the budget workstation. And at £499 it offers a truly compelling argument for mid-range CAD users to buy into a certified workstation, rather than an off-the shelf PC. www.dell.co.uk

Specifications

Dell Precision 390

- Intel Core 2 Duo E6400 (2.13GHz)
- ATI FireGL V3400 (128MB)
- 2 x 1GB DDR2 667Mhz ECC Dual Channel
- Dell motherboard
- 80GB 7200 S-ATA
- 16x DVD +/- R/W > Windows XP
- £499

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HP DesignJet T Series

HP's new DesignJet T Series takes individual and workgroup printing to new levels, both in terms of overall productivity and print quality says **Greg Corke**.

HP's dominance in the wide format inkjet printing market is widely reported and its DesignJet 800 Series and DesignJet 1000 Series have set the standard for individuals and workgroups for some years now.

However, not one to rest on its laurels, HP has just released a new generation of 'Technical' DesignJets to replace these now ageing products. The DesignJet 'T Series' is comprised of two models, the DesignJet T610 and DesignJet T1100 - the key difference being that the T610 is classified as a personal printer, while the T1100 is targeted at workgroups.

As you'd expect from a technical printer, the DesignJet T series is optimised to deliver excellent line drawings and renderings, but also produces first rate photo prints on glossy paper.

Both the T610 and T1100 are available in 610mm (24") and 1118mm (44") sizes, which accommodate A1 and A0 (oversize) paper respectively and each machine holds a single roll (though sheet feed is also available). Six 130ml cartridges provide the ink.

Print quality

Moving on from a traditional four colour print system, the DesignJet T Series features 'three blacks', which is a technology borrowed from its graphics art printers. Three blacks means that users not only have access to the traditional matt black which has always been incorporated in technical printers, but also get photo black for true black on glossy paper and a separate grey to help achieve better grey tones. This means better colour accuracy for black to white transitions, metallic parts, and concrete, for example, which were previously made up from a combination of Cyan, Magenta and Yellow.

The Cyan, Magenta, Yellow, Photo Black and Grey are all dye-based inks for added vibrancy, while the matt black is a pigmented ink design for longevity - making it suitable for archiving line drawings, for example.

In addition to more accurate colour reproduction, HP has made great strides in its definition of vertical and horizontal line widths. These are now much more accurate and consistent than previous DesignJets, with line accuracy +/- 0.1% and line width as fine as 0.0423mm. This fidelity is apparent on even standard inkjet paper.

Print head monitoring is also featured in the T Series. Here, if one of the many print nozzles stops working, the machine automatically detects and



HP Designjet T1100 family, 24 and 44 inch.

re-directs to another nozzle so you don't get a white line across your print.

Performance and speed

In terms of raw print speed, HP says the new T Series is twice as fast as an 800 Series and anywhere from 50% - 100% faster than a 1000 Series depending on the type of prints. However, in addition to enhancing the speed of putting ink on paper, HP has also concentrated on improving overall productivity.

This is most apparent when carrying out multiple prints. The T1100 features on board processing through an embedded work server, so if you send ten prints to a T1100, for example, your total throughput time will be the time it takes to process the first print, plus the time it takes to print all of the rest of them. This is because it can process the next job while printing the one before.

T610 vs T1100

With print engines identical in both the T610 and T1100 the main difference between the printers revolves around personal vs workgroup printing. The T610 is a personal printer designed for small studios of one or two users. It doesn't have a network interface

as standard, and it doesn't have a hard drive for job queuing.

The T1100, on the other hand, comes with a hard drive for print job spooling and HP's JetDirect card, which means it can plug straight into the network offering managed queues, remote job submittal, and job accounting.

Another difference between the two is the amount of built in memory. The T610 features 128MB while the T1100 has 256MB. This shouldn't make a difference on most print jobs, but if you're printing complex files, such as renderings or full colour maps, the T1100 will certainly be more efficient.

However, even with the 610, you'll never be left in a situation where you can't print as there's always the option to process on the computer if your files are too complex.

The T1100 also has a neat feature that will notify users when their job is at the top of the queue. This is particularly useful when one off prints are required on glossy paper. In this situation, if the machine is loaded with standard coated paper it can notify users, via a pop up, when their print is at the top of the queue. The printer will then pause and allow them to load up glossy for their print.

If it's not convenient, however, they can either tell the system to ahead and print on the media that's loaded, or to put the print job on hold until they're ready. This should put an end to wasted hours hovering over the printer waiting for your print to come.

Of course, in high volume print environments a DesignJet 4500, which has capacity for two media rolls, is a more effective solution, though you'd expect this from a production level printer.

For those who deal in PDFs, a postscript version of the T1100, the T1100ps, enables users to send a batch of PDFs directly to the printer without having to first open them on their workstation.

Conclusion

So there you have it, yet another impressive DesignJet printer from HP. The six ink print system in the T Series sets new standards in black and grey reproduction and line definition on even the most detailed of drawings is superb. However, it's in the areas of overall productivity that HP has made greatest strides. While on-board processing on the T610 will help boost print performance, the T1100 with its additional memory, hard drive, managed queues, remote job submittal, and job accounting, continues to close the gap between workgroup and production printing - though the DesignJet 4500's faster print speed, multiple media rolls and higher capacity ink cartridges still make a huge difference.

www.hp.com/designjet

HP Designjet T610 including optional stand and bin to collect drawings.



Keeping your data safe

How safe is your company data? Could you survive a catastrophic crash? From External drive to online storage, **Rob Jamieson** gives a whistle stop tour of backing up.

After recently damaging my laptop when I fell asleep on a flight and the laptop took its own flight into the cabin wall I started to check out my backup policy with all my data.

There are many ways to backup data but what is the best fit in relation to what you do and how much data you have? If you don't have a backup policy and think that your data is safe on your mechanical hard disk, think again. If I add up the amount of failures I have had over the years it amounts to over 50 disks. Yes, I was an IT manager, but it's very easy to get blasé about it, particularly as we are now told how reliable hard disks have become.

Backing up is about much more than just protecting against failures, it's for protecting against viruses and/or deliberate damage. This point is often overlooked and I often see that different revisions of files are stored over a network and considered "safe" but one self replicating virus could spread to all your storage areas. There is no substitute for offline "read only" backup. A burnable DVD is the cheapest backup with 4.7GB and disks are cheap. HD DVD and Blu-ray improve the size but are a little more expensive.

External drives: The simplest backup is an external hard drive. These can be very cheap but you are putting your data onto a mechanical device, and viruses on your computer can still infect your files when it's connected. Some of these devices come with backup software that can create a complete image on the drive which gives some protection and something I like, a snapshot in time. Incremental backups can save the backup time and space taken but it's very easy to introduce "bad" files so a policy needs to be implemented that every set period you have a complete image too. This is ideal for a one man band or somebody who is always out of the office like me.

What about Raid: You can implement multiple hard drives in a RAID (Redundant Array of Independent Drives) system such as RAID 1. This is where the data is 'mirrored' in case of a disk crash. This is a useful policy and with the more advanced versions you can hot swap out a hard disk if it fails while the system is still running. This is commonly used in a server environment. However, as it acts as an "instant" backup if you get a virus or corruption it is automatically mirrored to the other disks as well.

Web storage: The next cheapest option is online storage where a web server or ftp site is used to host your files. Local to the UK (BT British Telecom) will give you 20GB on a server for £4.99 a month. This is a safe option for data as it's off site and you can access it anywhere. A lot of the CAD vendors offer a tailored solution as well with 3D viewers and more



functionality. You have to be more careful with security but if your building burns down and you remember your password you still have your data.

Tape backup: The traditional tape backup is one of the safest ways to protect data. If your data is stored centrally then backing this up every night is the best action. However, some important points exist to make your data accessible. All designers want to be able to look at a previous design or drawing but the more you create the bigger the data storage requirement becomes. If you are not careful it can become slower and if you have implemented a PDM system it will keep every revision of a file (every save after a modification) and your data storage requirements have just gone x10. Archiving or exporting some of these revisions off to effectively slower storage is well worth



"If you don't have a backup policy and think that your data is safe on your mechanical hard disk, think again. If I add up the amount of failures I have had over the years it amounts to over 50 disks."

thinking about.

One important point is that if you backup there are "Scheduling Backups & Tape Rotation Methods" you need to adopt. A full system backup is the slowest and largest and then often in the week an incremental backup is done where the data that's changed is backed up. If you had a failure you would put on the full backup followed by the incremental one. Every month take a full backup out of the loop and store it. If you had a catastrophic virus that got onto your system and effectively got on your tapes then you could go back to the previous monthly tape. Also, it's wise to take a tape offsite so if the building burns down and your fire proof safe is crushed you can still function.

I haven't detailed backing up local machines or laptops if you are on a corporate network as I personally hate it when I go in the office after being away and the startup scripts run virus scan and backup the system. I have a problem with not being able to do any work for two hours so I prefer to do my own which is never popular with the IS.

I consulted with a company a few years ago and had a run in with the IT department when I found that all the CAD users were effectively running on one drop cable and it took ½ an hour to open a file in the morning. I forced them to check their backup status which they stated was fine. However, when we tried to restore the tape there was no data on the tape as the backup routine was pointing to the wrong directory. The IT hadn't noticed that it took only two minutes to run the backup as it was automated....

The MD stated in the wrap up meeting that I had earned my fee just for this point alone....

rjamieson@ati.com

Robert Jamieson works for the hardware manufacturer AMD. The opinions in the article are not necessary the opinions of AMD as a company..

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