BIM – making an impact

Architectural software is evolving rapidly from an 'automator' of two-dimensional drafting to a three-dimensional building simulator. The architect is becoming the creator of the virtual building as well as its caretaker, and BIM, building information modelling, is leading this revolution

"BIM software is changing the face of the architectural profession – not only in the way work is getting done, but also the role architects will play within the design and construction process," says Marek Brandstatter of Cadplan. "As a result of the BIM revolution, the architect's ability to construct a 'virtual building', to simulate the building's behaviour both before it's built and throughout its lifecycle, is changing the architect's design process, fee structure and relationship with the client, contractor and consultant. "We believe BIM presents architects with an incredible opportunity to position themselves at the centre of the building enterprise," he says.

"The benefits of BIM are clear," says Mark Patterson of Modena Design Centres. "Productivity improves with BIM, allowing firms to accomplish more work with the same resources. In many instances practices have reduced headcount yet have still been able to take on additional projects as BIM improves workflows between architects and engineers as well as coordination and communication with construction companies and owners and operators of the building."

Pic courtesy Autodesk and Peerutin Architects

Yet Patterson admits that moving over to BIM is not as simple as flicking a switch and the light comes on. "The migration requires some careful up front planning as well as some short-term hand holding and long-term support. Modena Design Centres are experienced in these migrations and we have helped many practices make it to the world of BIM," he says.

"BIM is a great opportunity for sustainable building," said Erin Rae Hoffer, international speaker at the Green Building conference at Vodaworld earlier in the year. "To design a truly sustainable building, important decisions about energy, water, site, materials and so on must be made early in the design process. Tools, such as Autodesk Ecotect help designers visualise annual incident

solar radiation or the impact of shadows when designs are created as building information models," she says. Hoffer, a practicing architect and industry programs manager for Autodesk in Boston, went on to say that, "In some firms, BIM is used exclusively. Other firms have adopted a hybrid approach which employs BIM and CAD for different parts of the design process. A CAD user can benefit from BIM by being able to create and analyse a design and share this with peers in the design team. As increasing numbers of firms migrate to BIM, this is clearly a useful skill for a CAD user who would then be able to advocate and utilise either approach as needed."

But what effects do advancements in design technology have on the printer market? According to Graficomp, due to the increased use of 3D packages, architects are having an increasing need for more powerful printers in order to print these images. And what happened to the long touted move away from a paper-dominated world into a more digital realm? "Architects still have to print their designs and drawings onto paper as many clients still like to see their buildings printed out," says Deirdre Fouche from Graficomp. "Also due to the advancements in media types, architects are able to print their designs in full colour and various effects making their presentations very graphic." *Leading Architecture* posed a few questions to the industry:

Q: Do you believe that CAD and BIM are mutually beneficial?

Marek Brandstatter, Cadplan: BIM is the natural evolution of CAD – technology doesn't stand still. CAD was designed to automate hand-drafting and make the most tedious part of the architect's work go faster, but it does not challenge his or her centuries-old methods. BIM software, such as Autodesk Revit, allows architects to produce 4D Building Information Models, where all project deliverables: plans, sections, elevations, perspectives, schedules, estimates and the like are merely by-products of the virtual building. BIM

simulates building rather than merely automating drafting. The architect is both the creator and caretaker of a virtual building, with competitive advantages for future procurements.

Eugene Barnard, Cadline: CAD has had at least two vital impacts on the issue of measurement and scaling in the construction industry. First of all, in the CAD virtual world, there is no scaling. Even now, many CAD users still don't get that basic concept.

Secondly, the standard of measurement is no longer such a vital issue of concern, since CAD allows one to switch instantaneously between measurement systems.

Errol Ashwell, Autodesk Africa: Autodesk's BIM technology provides all the DWG deliverables that AutoCAD can. Used alone, or in conjunction with CAD, Autodesk's BIM solution, AutoCAD Revit Architecture Suite, is a complete architectural design and documentation solution, which supports all phases of design and all architectural drawings and schedules required for a building project. The software enables users to benefit from the competitive advantages of BIM while protecting their investment in existing AutoCAD assets.

Pic courtesy Autodesk and Peerutin Architects

Q: What are the benefits of BIM?

Cadplan:

- BIM compels you to work better, earlier.
- The parametric building modelling technology of Revit has revitalised the architectural profession and brought the fun back into design.
- It improves the process of design and enables architects to understand spaces in three dimensions – similar to how they envision it in their minds.
- BIM compresses the overall project schedule and allows project costs to be fixed earlier.
- Demonstrates project approaches during marketing presentations.
- Offers the ability to identify collisions (e.g., identifying ductwork running into structural members).
- The ability to visualise what is to be built in a simulated environment.
- Fewer errors and corrections in the field.
- The ability to do more 'what if' scenarios, such as looking at various sequencing options, site logistics, hoisting alternatives and cost.
- The ability for non-technical people (clients, users) to visualise the end product.

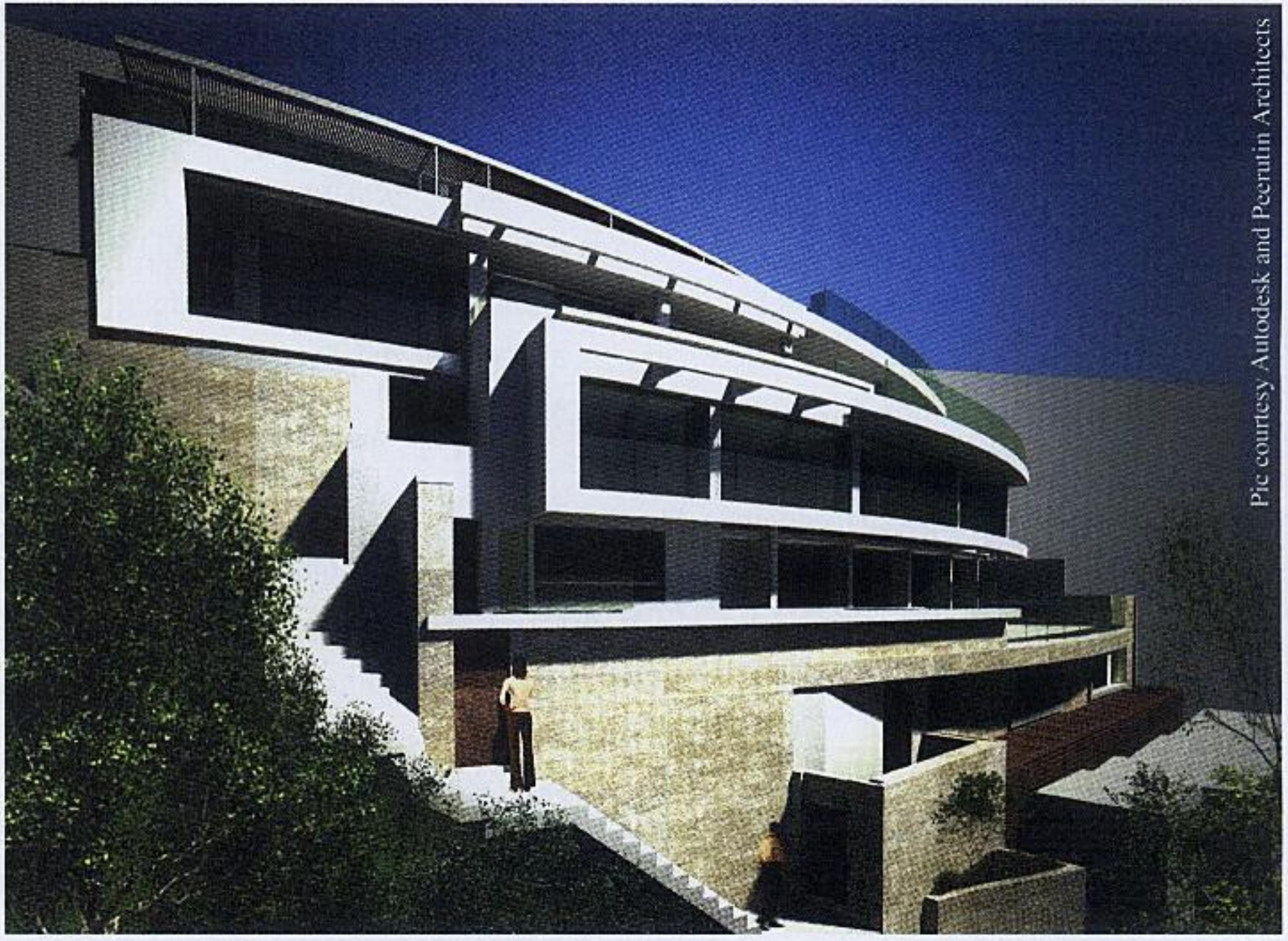
Cadline: CAD programmes themselves in their evolution to object-oriented drawings (BIM) are becoming more sophisticated in being able to portray an object at various scales and orientations of display. Most clearly, the chief advantage in fully BIM CAD products is the ability to coordinate between all views of a project. BIM allows the user to focus on designing effective, attractive and inspiring architecture. Once modelling is complete, BIM carries out some of the formerly painstaking work of construction drawing, materials calculation and the like.

Autodesk: One of the biggest benefits of Revit is that it is purpose-built

software for BIM. The building information model contains essential information about a project, so as one designs, Revit software automatically creates accurate floor plans, elevations, sections and 3D views, as well as area calculations, schedules and quantity takeoffs. BIM helps to minimise coordination mistakes, accelerates decision making and shortens production time. In addition, it supports smarter, more sustainable design through the analysis of materials, quantities, sun position and solar effects.

Q: Do you think that BIM can and will be a success in South Africa?

Cadplan: It already is. Cadplan was one of the first companies to take Revit to market in a vigorous way.



Pic courtesy Autodesk and Peerutin Architects

Cadline: It points to a trend for more global interconnection of information which is a core idea in BIM. The idea is that everyone's software systems would link into a single database structure. For CAD, for instance, everyone would define their building models according to a standard database structure to contain the information.

Autodesk: BIM is already succeeding in the South African market – our customer success stories are testament to the impact it is having on firms' businesses. Practices have selected different strategies for introducing BIM. Some have opted for a radical change, converting all their licences to Revit at once, while others have used pilot groups to introduce the software. Whatever a firm's style, what is essential is a mindset change. BIM requires a change in workflow, which is essential to its successful implementation.

Q: Is the training of student architects and designers on CAD programmes up to scratch?

Cadplan: At university level, probably not. At this level CAD and BIM should be part of the curriculum, i.e. a subject. At the moment it is a three or four day crash course. We don't believe this is adequate – it should be a study over the year as a technology in itself.

Cadline: We believe that students must have the opportunity to be exposed to all CAD programmes to enable them to choose what is right for them. Often students are partly trained in a single CAD programme and land up at an office which uses another CAD programme. This obviously means that their training has to start all over again.

Lisa Rautenbach, Educad: Autodesk, in partnership with Educad as its

educational dedicated partner for Africa, have done extensive work with the universities and leading design colleges in South Africa since 2005 to dramatically raise the skill levels regarding CAD/BIM. We currently have a database of over 2 000 students that have been trained by us in partnership with the various schools. I have seen a huge impact on the students, some deciding to carry on their studies because of a new motivation stirred on by the technology, others performing better all round than ever before and attributing their success to the training they have received. The architects of the future are so hungry for technology it's scary – they all see it as a very important communication tool.

Leon Pienaar from University of Pretoria: The Department of Architecture at the University of Pretoria believes in providing training in CAD software that is internationally competitive and gives the student the required skills to excel in the architectural profession. We are currently training our first year students in Autodesk Revit Architecture. The study year consists of three streams – Architecture, Interior Architecture and Landscape Architecture. Students enrol in a generic curriculum. It is already evident at this early stage that Revit can support all three streams as well as provide a synergy between student projects. In the third year, Revit supports specialisation related to the relevant academic streams. LAD

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