CIN
ConstructionIndustryNews.net
Essential construction industry news

A KEANE EYE: Tying it all together

Friday, 29 April 2005

THE power of computing potentially offers the construction industry scope for considerable improvements in efficiency, says Greg Keane.

A project, be it building or civil, will start as a concept and proceed through design to estimating, procurement, construction, operation, renovation and, ultimately, demolition (or deconstruction as it is more politely termed – suggesting the materials used in it can be segregated and recycled).

A problem has been that while designs can be three-dimensional, like the end product, two-dimensional drawings are generally used as working documents, and separate systems are used for other construction functions. Therefore, it is relatively easy for people to be working at cross purposes using different versions of the same drawing, with clashes discovered only during construction -- rework can be a time-consuming and costly fixture of many projects.

A few years ago, 3D-modelling and virtual reality simulation were the province of large and expensive high-end graphics computers, and out of the financial reach of most. Developments in processing power, memory (hard disk and RAM) and video cards (as well as in software) have seen such capabilities become achievable in a well-specified laptop computer, and greatly increase the accessibility of this technology.

At a seminar held by the CRC for Construction Innovation in Brisbane recently, a glimpse of the future direction of computing in the construction arena was revealed. Construction Innovation is a blend of academic, private and public bodies of the construction industry in Australia, with ties to similar groups around the world undertaking similar or complementary projects in their local environment.

The key to achieving integration is to have a common platform, and the 3D-rendering of a project seems a natural starting point. Having a common protocol for communication is part of this, and fortunately a 3D CAD image lends itself to this, as the International Alliance for Interoperability (a global alliance of building, construction and software companies in 20 countries) has developed Industry Foundation Classes (IFCs) as the standard file format for defining graphic data and 3D objects.

If that all seems too theoretical, consider Construction Innovation has developed a framework for software modules covering Define, Depict (sketch), Design, Detail, Deliver (project management) and Deconstruct. It has developed prototype LCADesign software, which allows designers to evaluate the environmental impact of a commercial building automatically, from CAD drawings. It has developed DesignCheck software to check 3D designs for compliance to building codes (this is currently working for AS1428 -- disabled access).

There is still a way to go to complete this suite, let alone commercialise it, but the potential for further development of software for the 3D-environment is enormous.

Simulation of construction methods is potentially a powerful tool in identifying "pinch points" ahead of time, and evaluating alternatives for overcoming them. It is not inconceivable that work methods could be evaluated for occupational health and safety compliance. Just seeing how something is supposed to go together is a powerful prop for a toolbox meeting.

Far from being big brother, this environment is something the industry should embrace in the future. Automated compliance checking is a protection in an increasingly litigious environment. In the way that 3D terrain models are combined with 3D machine control to achieve greater accuracy and productivity in civil construction, similar gains are possible in the building and civil structure arena through intelligent application of available and emerging technology.

How well contractors embrace this may well determine their long-term future.