Tekla Structures: How you can save money in construction

The Tekla Corporation, headquartered in Espoo, Finland, is a computer software engineering company that develops model-based products for the building and construction and infrastructure management industries. The corporation's pride and flagship product, Tekla Structures, is the first intelligent and, to date, the most advanced, 3-dimensional (3D) Building Information Model (BIM) software in the market, with technology that is tailored to the construction industry.

Tekla Malaysia director, Ungku Ibrahim Ahmad.

Highly-detailed "as-built" structural models that are created by Tekla Structures enable effective visualisation, and management, of any project, streamlining the workflow stages from sales, bidding, presentation, cost estimation and conceptual design to detailing, manufacture and erection. It provides for an accurate, dynamic and data-rich 3-dimensional (3D) multi-vendor environment where structural engineers, steel detailers and fabricators, concrete detailers and manufacturers and other construction disciplines share and see building information in one integrated model.

Successfully-completed mega projects of international repute that have employed Tekla Structures BIM as its building tool include the Beijing Olympic (Bird's Nest) Stadium, World Financial Centre, Shanghai and CCTV Tower, Beijing. Recently, B&I talked to Director, Ungku Ibrahim Ahmad and the Product Development team at Tekla Malaysia

B&I: It is said that an architect's dream is an engineer's nightmare. Would it be fair to say that BIM has effectively bridged this gap between the two domains? If so, what were some of the hurdles that Tekla Structures itself had to face and clear, particularly in the early days, in promoting BIM to the building construction industry?

Tekla: At the time, it was not really a problem in promoting Tekla Structures to the building construction industry because we were then already working with 3-D CAD and had our start with the steel industry and oil and gas business. The vision to develop and produce Tekla Structures 3-D BIM was in the pipeline a long time ago, noting that this kind of software was already is use in the steel industry in some distinct and separate disciplines, e.g., mechanical engineering and piping. We go back to Singapore in 1994 where Tekla Structures was introduced to a ready and anxious market, albeit of steel fabricators and contractors at that time, who were anticipating and looking forward to our kind of software. It was rather straight forward and uncomplicated for us to approach this market which was already into 2-D and 3-D environment and working, as had been their stock in trade, with drawings and, sometimes, plastic models for material take-off, centre of gravity calculations, linkages to CNC machines and so on.

The same situation prevailed when we made our entry into the Malaysian market. The "difficulty", if you want to make a point of it, was in explaining to and educating the industry in BIM as an effective tool for combining fragmented information on all aspects of construction into one package or model that could accurately produce drawings (general arrangement, sectional, etc), set and sort out material take-off and purchasing schedules, provide visuals for and to pre-empt clash-detection of building components, to name but a few features. Essentially, we just provided the industry a new tool to short-cut all of their work processes and time-honoured practices in construction. The challenge for us was in applying our software to a wider market e.g. building construction and we had to ensure that other involved parties in the industry, aside from steel detailers, would benefit, proportionately or otherwise, from BIM, for example,

architects, planners, QA personnel and projects engineers. Where once their inputs had been exclusive or compartmentalized, integration of inputs from all departments into one coherent Tekla Model allows for periodic work-in-progress review or remedial action (updates or changes), through the medium of shared information and experience. At the same time, parts of the Model may be assigned or transferred to or accessed by the respective departments for comment. In other words, everybody benefits from the Model.

B&I: Given that client concepts and designs vary from building to building, each project would, presumably, have to be approached on its own merit. Is this the case for Tekla or do you have a standardised and structured blueprint for projects in general? Either way, could you take us through the various stages of developing an end product for a particular client?

Tekla: As far as our software is concerned, it does not actually matter what the type or design of building is -- what matters is whether it is of steel structure or concrete, each of which have different configurations. All our clients get the same standardised functional and fundamental product, with the same structured foundation or blueprint. Training in software basic is provided followed by input of information, i.e., what is to be built, in steel or precast concrete or RC, etc. To suit the client's particular needs, some customisation may be required as well as consultancy, where we provide assistance as part of the annual maintenance and we are contactable for problem-solving and technical support. As you can see, we are actually always with our client, in a life cycle, as in the case of organisations like SEACAD who have been using our software for more than 10 years.

B&I: You mentioned maintenance. How is this maintenance provided?

Tekla: Maintenance is of the software, for which annual fee is payable aside from the product that has been purchased and licensed for use. Even as we speak, we have a group of developers working on 24/5 basis and software updates and innovations are passed on to clients with valid maintenance agreements. We would clarify, though, that there are those who apply for licences for a particular project or opt to rent or lease for a specific short term of, say, 6 months of a year and, consequently, are not obligated to renew their subscriptions. That is the direction the industry is taking more and more, i.e., flexibility in applying on a "need to" basis. However, in some cases, the option has been for perpetual licences, presumably when times are good. In any case, so long as the licence is in force, maintenance for the client will continue and the client is entitled to receive upgrades, improvements and/or changes to the software.

Shanghai Financial Centre – one of the projects using Tekla products.

B&I: "The potential for BIM extends beyond the building construction industry, with ready applications in other industries involving structural engineering and steel detailing and fabrication, e.g., ship building and ship repair and O & G (production platforms, living quarters, etc)". For Tekla, do these industries show promise and, if so, has there been product or software development in these areas?

Tekla: As yet, we are not looking into other areas at this time – this is related to how the product (software) is written; another aspect is marketing strategy, which has to be reformulated. As far as we know, the projection for the next 5 years is still the building construction industry

B&I: With emphasis on the building construction industry and for the benefit of our readers, what are some of the ancillary or support systems or software that may be interfaced and integrated into Tekla BIM so that to make

the construction process more efficient and how do these work?

Tekla: To start with, our software is running on Microsoft Windows platform which facilitates the integration of a number of 3-D tools or models which can be transferred into ours, e.g., software for engineering and financial systems. Similarly, you can integrate software for CNC machinery and logistics/materials procurement into Tekla Structures. Whatever software that has been imported or integrated remains the property of the party concerned, e.g., architect's input – it is used for referencing to form part of our complete model. Of course, building construction involves many other sectors, e.g. piping, air conditioning, etc - all these models are imported into one model, one environment. Subject to the usual protocols, the various sectors have access to the complete model, for curiosity's sake or for review of work done by other sectors that might affect their own. For instance, at project meetings, the architect may propose design changes after reviewing and noting that piping and ducting plans are affecting space. Alternatively, a relevant part of the main model can be exported to the architect for comment and suggestions for corrective action.

B&I: Being markedly different in concept and engineering, the Beijing Olympic ("Birds Nest") Stadium, World Financial Centre and the CCTV Towers, would have posed their own individual and peculiar problems in the course of construction. What were some of the challenges experienced by Tekla in these mega projects?

Tekla: Take, for example, Disney Concert Hall built some seven to eight years ago – it was designed with all curves and nothing straight about it and the challenge was to develop software that could manage so complex a structure. That was then, now we are quite confident that no matter how complicated the design, our software is up to it as in the case of the Bird's Nest Stadium which, in 2006, did not involve any new software. Come to think of it, transmission towers are more challenging as certain parts that are not necessarily exact and with twists and turns and therefore many different coordinates to account for and calculate.

B&I: What are some of the factors that you take into account and incorporate into Tekla Structures when you build, say, in Malaysia as opposed to quake and typhoon-prone Japan?

Tekla: As you know, Tekla Structures is sold globally, widely used in UK, South East Asia, Philippines, China and Japan, and its inherent features are universally standard, with wind and weather factors, quake and seismic effects and what-have-you built in. It is all there in the product at the user's option, whether sold in Malaysia or Japan, ie not customised for or exclusive to any particular geographical region except, possibly, in the language medium, ie English, Portuguese, French, Spanish, Chinese or Japanese. In other words, there is only one edition of Tekla.

B&I: Finally, a teaser here, what would you say, in 10 words or less, to convince a potential client to use Tekla Structures?

Tekla: "You will save money!" One thing is certain, you can make the construction process shorter – how much shorter depends on how complicated the project is. In design, you can also be very accurate and, therefore, create less waste in materials and workmanship. As the owner, you may visualise what the building will look like, floor by floor, instead of having industry professionals coming to you with 200 drawings for the same purpose. ■

NEWS UPDATE FROM TEKLA

Consistent with Tekla's long-term commitment to continually develop its Building Information Modelling (BIM) software to enhance user experience, processes and functionality, the R & D team at Tekla has come up with the all-new Tekla Structures 16 launched in February 2010.

In addition to Windows 7 compatibility and the introduction of several workflow benefits, the latest from Tekla is packed with: (a) improvements, eg better IFC (Industrial Foundation Class) data exchange, solutions for cast-in-place design and detailing (especially for Self-Performing Cast-in-Place contractors), better utilisation of reference models, numbering and model publishing tools, such as a free application to share the model over the Internet AND (b) new features, eg updated Master Drawing Catalog, better object-level settings and new filtering and instant graphics on drawings and improved usability by snapping tools and by zooming to selected parts.

What's more, Tekla Structures 16 has been built in accordance with Microsoft's requirements for Windows 7 certification and the Tekla Structures product box, if needed, is now made from recycled material – "a small step forward towards greener installation".

For more information Tekla Structures 16, visit www.teklastructures.com