

CASE study



Irons and Steel

The Heritage Golf and Country Club, scene of next year's Irish Senior Open, has had a grand makeover in Steel with the assistance of StruCad

The Steel industry is doing rather well out of Sport these days, as the latest fashion for arenas and venues appears to be the erection of extravagant (and I use that word in its nicest sense) roofs supported by large amounts of steel tubing. One such venue is the Heritage Golf and Country Club in Laois, the Republic of Ireland, which has just had over 200 tonnes of steel detailing carried out prior to the club holding the European Senior Tour event next year.

Not on the scale of the grand arches they are inching over the Olympic Stadium in Athens at the moment, but still impressive enough, the structure is composed of six toblerone trusses, with a clear span of 46 metres, supported on toblerone framed columns - with all of the steelwork composed of tubular members. The structure was detailed by Walsh Draughting Services, working with Engineers Kilgallen and Partners, Architects John M Delaney and Fabricators McDonald & Patterson. The contractors for the project were Corrigreen Construction.

Golf courses are notorious for attracting perverse winds, as any experienced golfer will tell you, and a couple of modifications were made in contravention to normal practices to counter the effects of vicious side winds, (which, incidentally, made the overall design more economic). Normally the bottom chord of trusses in such a construction is discontinued before the support, and the truss is analysed as a simply supported member. However, by connecting the bottom chord to the inner column leg, the framed column and truss

behave in a similar manner to that of a portal frame, reducing the midspan moment considerably, and thus resisting horizontal wind forces.

The connection of the bottom chord to the inner leg incorporated a total of 10 members intersecting at a single node. To accommodate these members, a solution was proposed by Kilgallen and Partners. They suggested the use of a joint connection originating from off-shore technology, whereby large numbers of members intersecting at a node are connected using a large diameter tube, known as a 'can'. The 'can' provides a larger chord and simplifies the fabrication, ensuring that all member forces are transmitted centrally.

The whole project was detailed using StruCad, and Walsh Draughting Services were able to produce all of the drawings required for the model - fabrication, fitting, assembly arrangement and templates. WDS found the format of the StruCad drawings to be very comprehensive, and were particularly impressed with the latest version of StruCad.

STRUCAD STEEL DETAILING

StruCad is a 3D Cad steel detailing system that facilitates the creation of 3D models of steel structures in wireframe, or directly in solid form. The software uses intelligent objects that ensure that whichever method of display is chosen, any modifications, additions, or deletions from the full solid model are immediately and automatically updated, together with associated documentation.

Steel member components in a range of sizes are selected from extensive libraries

within StruCAD, or from customer defined catalogues. A range of connections are also available from the libraries or can be created in the software's powerful interactive environment. Working directly on 3D models offers significant productivity and efficiency gains over existing 2D CAD systems and manual production of drawings for steel structures, and at the same time guarantees accuracy of output to eradicate erection problems on-site.

StruCAD contains a number of modules to handle the various disciplines that relate to steel detailing, including a reduced version of the software for the smaller steelwork fabrication company - StruCAD Lite. StruCad Lite provides the same wireframe and solid modelling facilities as StruCAD Classic - the core software programme - and comes with a library of standard macros to detail connections.

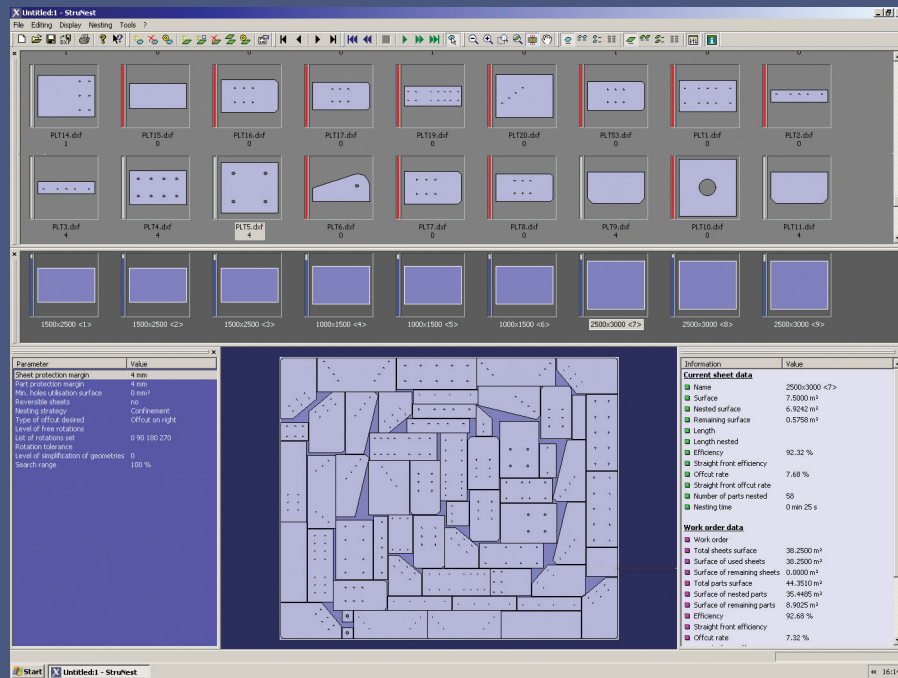
It can also generate GA drawings and shop fabrication details automatically, and provides automatic material listings and clash detection.

StruCad Engineer allows engineers to take the analysed model into the StruCad Engineer package. The 3D model then generates itself in StruCad Engineer, complete with all relevant member sizes, grades, offsets and endloads (for connection design). This enables them to be viewed in either full solid or wireframe while giving immediate access to "walk through" colour-rendered, animated views.

StruCad Checker is a read-only package, with view only access to the 3D solid model and full access to the 2D drawing environments. It allows the detailing man-

CASE study

StruNest: plate nesting system for optimising steel stock cutting schedules.



ager to allocate extra workstations to the tasks of checking the steelwork model and the modification/plotting of all drawings. Using the absolute minimum of software StruCam produces Computer Aided Manufacturing (CAM) data from StruCad structural steel models. The CAM data can then be sent directly to CNC machinery on the workshop floor, i.e. saw and drill lines, and punching and coping machines.

StruMac is the programming language for the CAD and connection macros development within StruCad. It allows users to create any new, or company specific, tools that may be required, such as CNC post processors, interfaces into third party software, custom drawing CAD commands, database extraction or new connection macros (which can be written with full design capability).

STRUCAD VERSION 10.2

The new version of StruCad that impressed Walsh Draughting Services - having investigated the market by asking fabricators in Ireland which detailing software they preferred - is Version 10.2, which provides enhancements to the software in a number of key areas.

The user interface has been enhanced, and now contains tiered, drop-down, menus, an improved main icon menu, and

a new interactive icon menu. The software now uses Windows-style dialogues throughout, and has standardised the appearance of the top and bottom status bars.

In the model space, the Z-axis is now shown in the wireframe environment and new commands such as Edlay, setlay, freeze, thaw, allLon and allLoff have been introduced. In addition, both 2D and 3D default snaps and cadmodes can now be saved globally and used as the defaults for all subsequent new models.

The ability to detail smaller and more complicated features in steel structures has been made easier by rendering the solid elements of load joints, providing users with a more realistic representation. Making views easier to interpret has also been enhanced by a dynamic transparency dialogue control that allows the setting of the transparency level for each part. Shading can now be hidden whilst in the interactive environment by using the F3 hotkey.

The Drawing output and Drawing Explorer have both been enhanced, making outputting, viewing and checking drawings easier and saving users valuable time. Enhancements to StruWalker give users better control over colours, the exportation and display of clash symbols and material grades.

STRUNEST

StruCad's steel optimisation software, StruNest, is now integrated within the new version of the software. StruNest is a plate nesting system, developed in collaboration with a French company to optimise steel stock by planning cutting schedules to calculate minimum wastage. The software lays out templates for steel components on steel sheeting, calculating the configuration that allows the maximum amount of plates to be cut using the least number of whole sheets.

Besides optimising cutting patterns, StruNest also includes advanced sorting and sheet selection tools. The cutting templates can be either imported or exported in DXF format, and the whole routine is accompanied by full reporting facilities.

Using StruNest, fabricators are able to cut down on steel wastage, increase the accuracy of the estimates of cost that they have to provide, and to reduce production costs and increase productivity. The software is designed to be fast, accurate and user friendly, allowing customers to maximise the efficiency of nesting systems.

StruNest can be installed as a stand alone product or can be integrated with other AceCad products to form the complete steelwork solution. **CU**

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