

THE WELDING INSTITUTE

EASTERN COUNTIES BRANCH



Event: Lecture preceding the AGM

Subject: *Creating the Kelpies.*

By: Tim Burton, Sales and Marketing Manager, S H Structures Ltd

Venue: TWI, Granta Park, Great Abington CB21 6AL

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Prior to its AGM the Branch was treated to an amazing presentation by Mr Tim Burton on *Creating the Kelpies*. Tim is Sales & Marketing Manager at SH Structures Limited a leading UK fabricator of complex structures. And they are complex, as evidenced by the examples given in the introduction. The curved compound composite 3D products ranged from bridges to memorials, from distilleries to the Cutty Sark and coffee shops to tower blocks. The skills of their work force and their involvement in other art work projects made them well qualified to undertake the creation of the Kelpies.



In 2003 the Falkirk Council, Central Scotland Forest Trust and British Waterways Scotland (now Scottish Canals), had the idea of transforming 350 hectares of land between Falkirk and Grangemouth into a unique outdoor green-space to be known as the The Helix. Chosen as a focus for this site was to be an art work based on the Kelpies, mythological transforming beasts possessing great strength and endurance.

The artist, Andy Scott, transformed this thought into the enormous 30m high head-up and head-down horses that now stand at the centre of The Helix complex. Tim took us through the processes Andy used to develop his vision from the study of working horses to the building of 10th scale Maquette - rod frames with myriads of small steel plates welded to give the skin (These beautiful models now have a life of their own and travel the world promoting the Helix). Andy also had to

produce even smaller models for use in wind tunnel testing.

The next stage was to digitise the Maquettes and to scale up full size 3D designs. There was then a phase of testing techniques for pulling full size laser cut stainless steel plates, which replicated several of the small Maquette plates, into the required shape. The approach worked and the plates were held in place using HuckBolts. Laser range finding was used to check shapes against the master design.

Tim then described how in October 2008 the Client asked them to cost for 300te of complex steel work? There then followed a call for compliant tenders against a particular internal design. Based on their experience SH Structures questioned the existing structural design and offered an alternative solution which ultimately generated savings in excess of £750,000.



A contract was awarded in May 2012. SH Structures used 3D design software which enabled them to consider how to modularise structures which was essential for fabrication and in turn helped with the planning the lifting and turning of units, and their transportation and site erection. Tim paid tribute to the 40 skilled platers and welders in the company who were instrumental in building the modules and

ensuring that all the many mating parts did so correctly. There were thousands of individual parts, often coming together in complex nodes (10 intersecting tubes!) and many transition joints linking the steel core to the stainless steel skin.

Eventually the 300 tonnes of steel were taken to site and erected by squad of skilled fixers in 754 days using 2 large cranes and 4 cherry pickers. While some elements were pre-clad of the stainless steel elements were added when the core was complete.

To complete the Kelpies the sculptures were artistically lit with changing coloured lights which made for some spectacular slides. One of the benefits of the tubular construction was clean interior which helped with both night and day time viewing. Some key statistics are: a Contract Value £5M, Structure height 30 M (Head Up), Base footprint 25m x 10m, Steel tonnage 300te, SS weight 300te.

Tim closed his talk discussing the success of the project and how it had brought business and visitors to the area, how social media and advertising were using the project and how schools were making use of the facilities.

This report does not do justice to the enthusiasm with which Tim presented this amazing art project to a very appreciative audience who applauded the way he gave credit to all those involved: from the Clients to the Artist, the other contractors and in particular to his workforce.

See also www.thehelix.co.uk and www.shstructures.com