48.3 SCAFFOLD DESIGN

THE PROJECT

The project involved designing a temporary, pedestrian bridge which would be erected over the River Witham while work on a nearby, permanent, rail bridge was carried out. The location of the bridge in Lincoln City Centre meant that providing convenient, safe and practical pedestrian access with minimal disruption was crucial.

The bridge would need to be craned into position so a modular system which could be constructed at ground level would be ideal. With this in mind the HAKI Bridge System (HBS) was selected for the project as it is ideal for creating temporary bridges, the components are safe, versatile and vitally for this project, are quick to erect.

At the time of designing, the HBS was an innovative, new system and hadn't yet been used for a bridge construction of this size before. The span required for the bridge was approximately 30 metres. The HAKI HBS program is only intended for estimating and pricing purposes, therefore the designers only had one option to validate the design by using structural analysis software.

They had access to information regarding the capacity of each component but to ensure viability for this bespoke design it was essential that the complete design was modelled using a system which would provide accurate, reliable models and calculations. SCIA Engineer Scaffolding Edition was the obvious choice for ensuring accurate and reliable calculations on this project.

Once designed and modelled it was possible for the contractors to pre-erect the bridge section which would then be lifted into position by crane.

THE ADVANTAGES OF USING CADS AND SCIA ENGINEER ON THIS PROJECT

• The ability to create an intelligent 3D scaffolding model where the design was beyond the scope of the system scaffold manual

• The flexibility to model any shaped structure or cross section of bespoke Aluminium members to accurately calculate loads and capacity

• Design and model scaffolding to European safety standards (EN 12811 and EN12810 for façade scaffolds).

CADS CUSTOMER:

48.3 Scaffold Design

LOCATION:

River Witham, Lincoln

SYSTEM:

HAKI Bridge System

CONSTRUCTION:

The bridge section was pre-erected in less than 20 man hours. The lifting operation took under three hours.

CONTRACTORS:

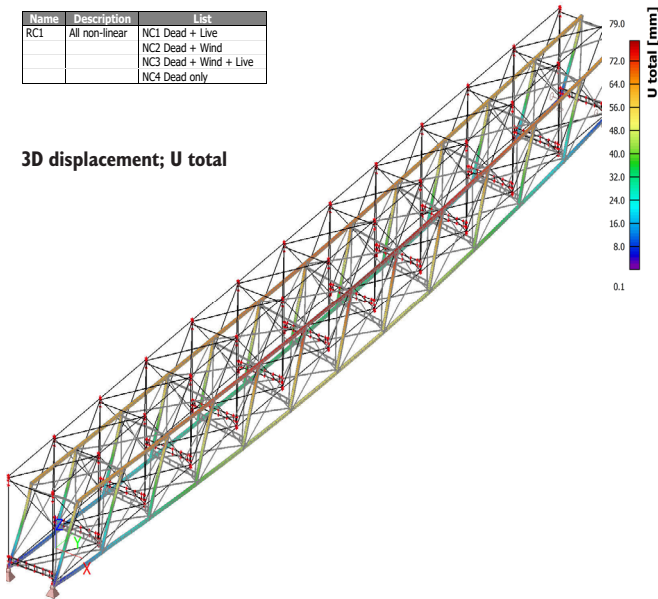SYS Scaffolding Contractors Ltd

END CUSTOMER:

AMCO and Network Rail

3D displacement; U total

U total [mm]

79.0
72.0
64.0
56.0
48.0
40.0
32.0
24.0
16.0
8.0
0.1

CADS

Established in 1974, CADS is a leading software developer specialising in solutions for civil and structural engineering design and detailing. CADS has an installed base of 6,000 customers using 60,000 licences in 90+ countries. CADS are SCIA's only UK partner and have also developed the Revit link and other functionality.
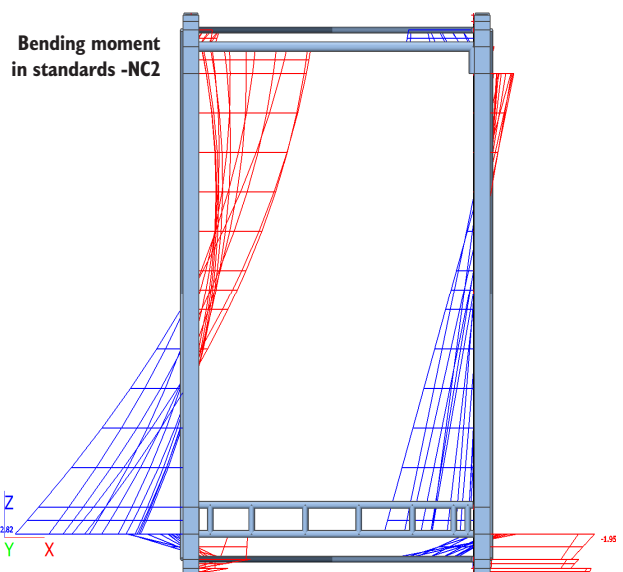
SCIA ENGINEER SCAFFOLDING EDITION

Scaffolds can be complex structures which require accurate design and modelling. SCIA Engineering Scaffolding Edition covers the whole structural design workflow for scaffolds from modelling, through to analysis, design, specific checks of tubes and couplers to the Eurocodes (EN 12810-12811), reporting and GA drawings.

The specialist edition of this software can be used to analyse any type of scaffold from modular systems to frame systems or tube and coupler scaffolds. In addition to the advantages the software brings in terms of accuracy and precision it also offers a time efficient approach to scaffolding design. Modelling can be done from scratch and changes can easily be incorporated.

SCIA ENGINEER SOFTWARE

The scaffolding edition is one of a range of specialist editions which belong to the SCIA Engineer suite of software. SCIA Engineer is a leading FE structural analysis software used to design all kinds of structures to UK, EC and international building codes. SCIA Engineer perfectly plugs into BIM workflows via a seamless link to Revit, developed and sold by CADS.

CADS AND SCIA ENGINEER

48.3 Scaffold Design have been using SCIA Engineer for about twelve months. SCIA Engineer was used on this project to model the entire concrete frame.

The software was used to develop a full FE analytical model for whole building analysis. The mesh generation for the model produced zero small mesh nodes, therefore eliminating the possibility of singularities within the model.

THE CLIENT

48.3 Scaffold Design is a specialist scaffolding design and training company. With offices in London, Leeds and Glasgow they provide designs for scaffolding projects which take into account buildability, use of materials and safety as well as providing scaffolding design training. They have built a reputation for offering innovative scaffold design solutions and for providing a complete service.

> *"We find the SCIA Engineer Scaffolding Edition extremely useful for more complex designs. On this project we were designing using a new component system, using SCIA Engineer was the only way to accurately model the design. We will certainly continue to use SCIA Engineer and its specialist scaffolding edition in the future and are currently planning to train more of our team to use the software."*

Ivik Masek, Principal Engineer/ Company Director

Bending moment in standards -NC2