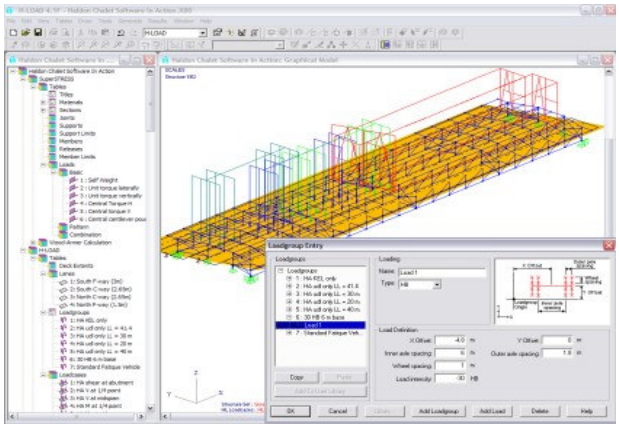
A380 Haldon Chalet Overbridge

The Project

Devon County Council's Bridge Office is part of the council's Engineering Design Group and employs 30 structural engineers and technicians. Its responsibilities include a programme of bridge assessments and strengthening schemes as well as routine maintenance and inspection work.

The proposed new 40-metre span bridge across the A380 south of Exeter has been the most recent challenge. A busy dual carriageway is crossed by a minor road at Haldon Chalet where drivers emerge into fast-moving traffic.
According to Senior Professional Bridge Engineer Andy Matthews, the difficulty of the crossing denies vulnerable users, such as cyclists, pedestrians and horse riders, access to the forest walks in the area.



The Problem

When the council decided to build an overbridge across the A380 to prevent accidents, traffic disruptions during construction were not an option. An aesthetically pleasing single span bridge that will need minimal road closures was designed.

"The design of the steel beams to take highway loading is relatively easy on this type of bridge. I knew from good design practice that bridges like this are cast in stages," said Matthews.

"It was how the bridge would be built which was the technical challenge. SuperSTRESS was my first port of call as it's flexible and easy to use."

The Solution

The initial step was to create a SuperSTRESS 3D model for the whole structure. Matthews made full use of the intuitive drawing input, paying close attention to the cantilever falseworks hung from the edge beams. However, this put a sideways force into the steel beams in addition to the normal vertical design movement from self weight.

"The cantilever falsework introduces a twist which you have to consider quite carefully. This was the beauty of SuperSTRESS. I very quickly set up a 3D model to see how the cantilever would twist the beams," said Matthews.

SuperSTRESS was also able to model the special loadcases for successive pours of concrete - working simultaneously from the bridge ends - were input using the graphical interface. As each SuperSTRESS analysis was run, the results were pasted into a spreadsheet for final checking. Adjustments were then made to the limits of the wet concrete loading to ensure the beams were not overstressed.

"It was very quick and easy to edit a loadcase, changing the way that the wet concrete was poured. It was the first time I'd used the new Windows version of H-LOAD and I found it very good. With SuperSTRESS you can call up a loadcase, see it on the screen, check it's in the right place, then hit the analyse button. An alternative concreting sequence could be checked in an afternoon," said Matthews.

So what happens if there's a technical query about using SuperSTRESS for such detailed investigations? Matthews says that he finds Graitec UK's support staff - all of whom are engineers - very friendly, responsive and knowledgeable. They're also keen to listen to suggestions for programme improvements.