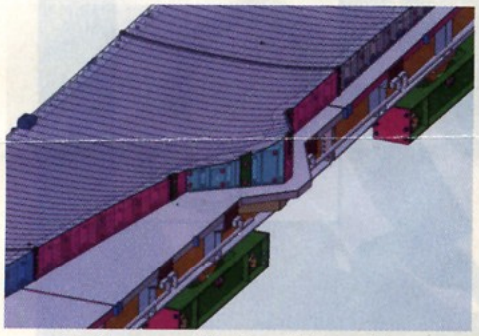
Technology update

A380 creeps closer

The **Airbus** A380 is an aircraft that is generating many engineering "firsts" and one of them involves creep-forming. The aircraft's upper wing skins at 23 to 33 m in length and up to 2.5 m in width are believed to be the largest components ever produced by the creep-forming process, according to Bennett Associates, who designed the tooling required. The company used CATIA Version 5 from **Dassault Systemes**. Airbus had standardized on CATIA 4 but Bennett chose Version 5 because of its greater flexibility when handling large quantities of data and its ability to run customized programs.

Bennett designed eight forming tools (one for each skin panel), each having a heavy-duty steel base on to which 280 ribs are mounted to produce the required finished shape. This concept allowed a large proportion of each tool to be manufactured while the final wing designs were being completed, and will also allow any future changes in design and materials to be accommodated relatively quickly and economically, according to Bennett. Each item is about 40-m long and has a mass of 50 t.

Airbus wing skin wrapping: the A380's upper wing skins are believed to be the largest components ever produced by the creep-forming process.



CAD image of the Panel 1 creep-forming tool designed by Bennett Associates for Panel 1 of the A380's wing skins. The dark gray aluminum skin rests on the forming surface, which is supported by laser-cut steel ribs. The pale gray forming tool stands on a steel deck. Bogie units (green) are used to move the assembly.

Wing data supplied by Airbus for the tooling design involved about 500,000 reference points for each surface shape. To enable the CATIA software to handle this quantity of data, Bennett used the product's application programming interface facility to run customized programs developed in-house to convert the data into workable files. Visual Basic software was used to read all the points, sort them, and do some smoothing and interpolation. A second analysis output file was then produced to compare the created surface with the original data.

Using CATIA in such a way made it possible to generate wing profiles and tool designs "very quickly," according to Bennett. Once final designs were complete, comprising file sizes of about 2.5 Gb in memory, the program was used to output manufacturing information to the laser profiler producing the ribs—around 280 for each tool and each one unique—that would determine the finished wing skin shape.

Eight weeks after the final designs had been received from Airbus, tooling was in place at Airbus UK's Broughton wing assembly facility, ready for production.

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