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Airbus wing skin production system

Completion of the first full set of wing skins — some measuring up to 33m in a single length — for the Airbus A380 'super-jumbo' marks a significant landmark for Bennett Associates, the Rotherham-based engineering consultancy (Tel: 01709 373782). The wings for the A380 are being built at a new factory in Broughton, North Wales, and the wing skin production system, which forms and handles aluminium-alloy panels from 5 to 25mm thick, 23-33m long and up to 2.5m wide, cost £7.7 million. As well as designing the equipment, Bennett also managed its manufacture and installation at Broughton; the project was completed on time and under budget.

Each wing skin is produced in four sections, using a process known as creep forming that results in very accurately shaped panels with little alteration to their mechanical performance. Project manager John Wadsworth says: "Creep forming creates a finished skin with very little inherent stress, which allows the designer to minimise weight and achieve the required performance."

The creep-forming tooling incorporates several innovative features. For example, it can be adjusted to fine-tune the shape of the wing skin. This allowed the tooling to be manufactured before the aero-dynamic design process had been completed, greatly reducing the overall project lead time.

Bennett also carried out intense testing with equipment suppliers to ensure that profiles cut straight from the CAD production drawings could go directly to a final laser profile check, without any need for intermediate checks or full trial assembly. This not only produced the secure supply routes required by the project but also reduced lead times and costs.

As well as the creep-forming tooling, Bennett designed and project-managed the installation of systems for checking and handling the aluminium-alloy panels before and after they are formed. Checking the form and edge profiles on the wing skins takes just 1hr, whereas much smaller wing skins have previously taken a whole day to check.

"The facility, delivered to budget, is the first of its kind and was taken from initial concepts to a production-ready unit in under two years. This is a major achievement when taking into account that the final aerodynamic shape of the wing was being developed in parallel with the manufacture and installation of the tooling."