

## Rolls-Royce

# Reducing cost and material wastage

### Customer challenge

During Rolls-Royce's SAMULET II flow forming project, preforms were machined from forged billets which resulted in a considerable amount of material waste. Forged billets provide a very high quality of material, both before and after the flow forming process. There are, however, high costs and significant waste material associated with this manufacturing route.

### How did the AFRC help?

The AFRC worked with Rolls-Royce to investigate and assess the potential for using extruded material to generate flow forming preforms.

The centre's engineers conducted forming trials to understand the effect of this starting condition on the final formed component. Nickel and steel based alloys, and sourced in extruded and bar material states for comparison. Several components were formed with the extruded outer surface left in a non-machined state, to assess whether or not final machining would be required on the outer surface prior to forming.

These trials concluded that the extruded material behaved very similar to the bar material in terms of formability and post-forming material structure. When analysed with the optical microscope, there was very little discernible difference in average grain size and distribution

### Business impact

**The use of extruded material for the manufacture of flow forming preforms was shown to be a viable alternative to bar/billet material.**

**Due to the current supply chain, a major limitation of this process route will be the size of the required material in terms of both inner diameter and wall thickness, in addition to the type of material required.**

**However, from a technical viewpoint, this route for material sourcing is one which can be considered for future projects and could reduce cost and waste.**



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