

Advanced Forming Research Centre Boeing and TIMET

Project background

Project type: Core research

Funding: Advanced Forming Research Centre (AFRC) tier one membership

Background: Tier one members, Boeing and TIMET worked with the AFRC to investigate the benefits of cold forming processes with titanium alloys.

Problem

AFRC researchers conducted a study into cold forming processes of titanium alloys in order to investigate the benefits it can offer over hot forming. The research focused on complex shaped parts and how cold forming techniques could potentially offer a significant cost reduction to the customer.

What we did

AFRC researchers formed a dome shaped part made of commercially pure titanium 50A. This shape was manufactured at room temperature using the process of incremental sheet forming.



Result

The research demonstrates that incremental sheet forming offers an opportunity for manufacturers to make a significant saving on their current forming costs for titanium alloys. Manufacturing of the parts using this technology helps to shorten time to market, reduce development costs, reduce production cost and energy usage, and obtain desirable parts in a small series.

AFRC researchers have proven that a complex shaped 3D part could be successfully formed using cold forming processes. This, in turn, confirmed the suitability of the titanium 50A alloy as a material for room temperature forming. In addition, a plastic die from Boeing was manufactured by utilising advanced three-dimensional printing technology.

Dr Evgenia Yakushina, senior manufacturing engineer at the AFRC said: "We are very satisfied with the results of our research. This research proves that incremental sheet forming offers energy and cost saving benefits to our customers. We look forward to utilising our advanced technologies and expertise at the AFRC for further research in cold sheet forming."

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We were greatly encouraged by the formability of this alloy. The material was formed to very steep angles and over 100mm in depth. This opens the door to transitioning titanium forming from existing hot processes to the room temperature incremental sheet forming process."

Mr. David Heck, Boeing technical representative to the AFRC