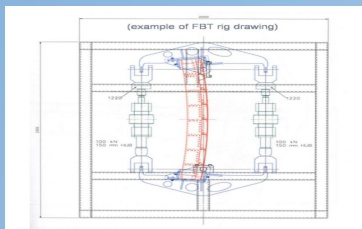


Vacuum Testing Technology Project Overview

The Technology

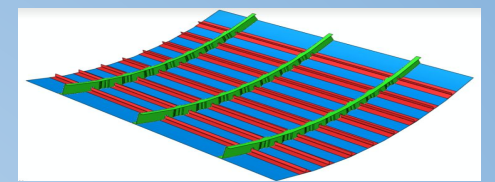
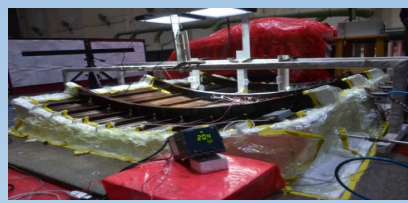
The Frame Bending Test (FBT) of fuselage panels is plagued by complex design at load introduction regions, high workload for assembly of specimen to test rig and the need for disassembly for access to stiffened structure. An alternative to the FBT was explored by the application of vacuum on skin side of panel using a metallic fixture while frame side of panel is subjected to atmospheric pressure.



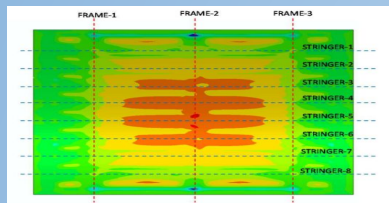
Conventional Frame Bending Test



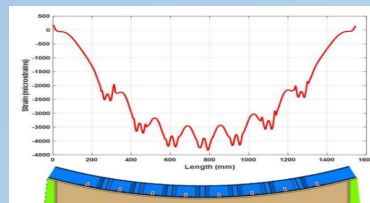
Vacuum Testing



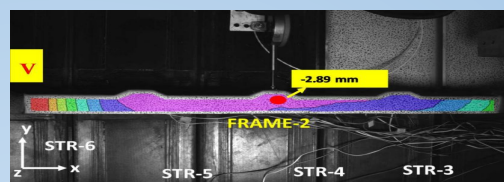
Cocured fuselage panel



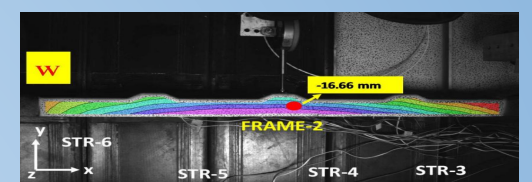
Skin Strain In Hoop Direction



Frame Strain In Hoop Direction



Lateral Deformation Of Frame Inner Flange



Out Of Plane Deformation Of Frame Inner Flange

The Scope

Integrated work plan

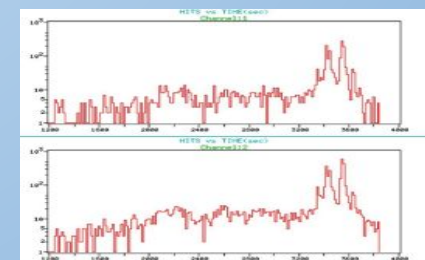
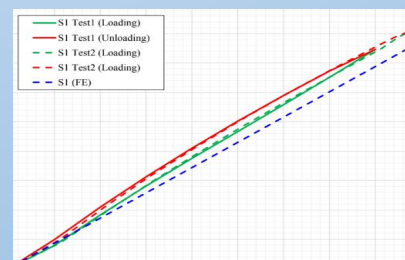
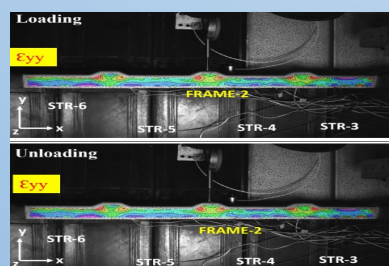
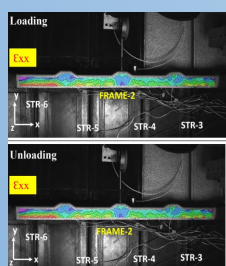
Demonstrate that vacuum testing methodology is simpler to setup, more cost effective and can introduce strain levels that are comparable to conventional frame bending tests. Failure studies are out of scope for the moment.

Customer focused technology development

Out of cycle R&T development.

Test Measurements

Strain gauges, digital image correlation (DiC) and acoustic emission were used to monitor the response of the system.



Design

Self stiffening corrugated frames which are directly in contact with the fuselage eliminating the need for clips. Benefits are a wider fuselage cross-section and reduced assembly time

