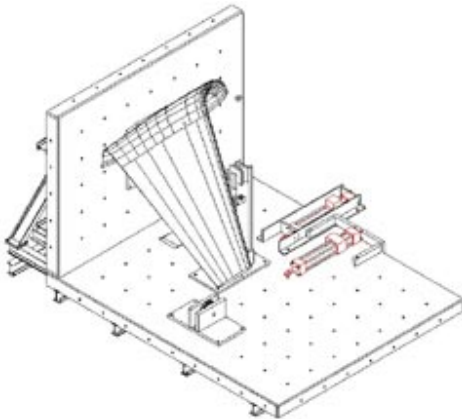


Blended Winglets: The Latest in Performance for Commercial Aircraft



Intec recently completed a successful full-scale certification test program for APB's 737-BBJ blended winglet. Blended winglets are currently available for Gulfstream II's and BBJ's and are being evaluated on all versions of Boeing commercial aircraft. The 12' winglet was designed to improve the performance of the BBJ.

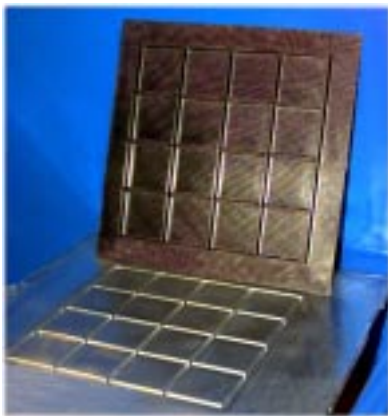
The certification tests were performed on Intec's strong back and load floor, and consisted of these load cases: up, down, and torsion. Multiple actuators applied load through 3 wiffle trees and up to load pads to simulate aerodynamic loads. Intec designed and built all load introduction and reaction fixturing. Solid models of both fixturing and test articles were used to simulate placement and interference while modeling (FEA) load introduction and reaction for stiffness and strength. Reaction fixtures were designed for more than 500,000 in-lbs. bending

moment with less than 0.02" overall deflection. Over 100 strain and deflection transducers were monitored while an MTS dual slaved control system supplied a fail-safe load environment.

As part of certification, the winglet must demonstrate its ability to carry the critical load conditions with no permanent damage or deformation at limit load. After successful limit load verifications, the winglet was ultimately loaded to failure. The specific aim of this test was to show compliance with FAR 25.305 (a)(b) and 25.307.



VARTM Grid Stiffened Engine Deck¹



Intec's manufacturing group recently completed phase I of the Grid Stiffened Engine Deck Program. The goal of the program was to evaluate and demonstrate technologies that would replace the current machined titanium iso-grid engine deck. Program goals include the ability to survive a 15 min. 2000°F single-sided fire (without burn through), overall structural service temperature of 180°F, and a weight/cost savings of at least 50% over baseline. Intec selected a VARTM approach using a recently developed epoxy system that not only has low viscosity at room temperature, but also meets the service temperature requirements. Titanium foil with a thermally insulative fabric, co-cured with the composite substructure, was identified as a potential flame barrier. Several part constructions were produced using the VARTM process cured at 250°F. An iso-grid tool along with a caul sheet was used to achieve a smooth outer surface to both the tool and bag side. Vacuum was reduced during curing to eliminate porosity. VARTM parts performed equivalently to RTM parts of similar construction in panel shear and bending tests performed. Intec's manufacturing group continues to work with its clients and resin manufacturers to develop new VARTM resin system and structures.

Intec's ProWall® Shipping Containers



Intec introduces new container sizes and military colors to its line of ProWall® shipping containers. Starting July 2000 Intec will be offering containers in a variety of colors using a newly developed integrated coloring

system (ICS). The ICS integrates coloration into the outer layer of ProWall® material system. The ICS process eliminates surface scratching and discoloration along with chipping that can occur with typical painted containers. The ICS is currently available in Military tan, olive and desert camouflage. Customer colors and patterns are available upon request.

Intec's engineered container systems are designed to perform over a wide range of requirements and environments. Our engineering group is highly experienced in designing containers that specifically meet weight, shock, durability, and environmental isolation requirements.

ProWall® is an advanced lightweight thermoplastic structural material system that can be formed into a continuous shell. This unique combination of continuous fiber fiberglass in a hybrid thermoplastic matrix is extremely rugged and demonstrates excellent impact resistance with good mechanical characteristics. Container designs have ranged to more than 3 ton in capacity.

Typical Configurations Can Include the Following Options:

- Integral pressure regulation
- Humidity control
- Integral container tiedowns
- Integrated internal material tiedowns
- Integral fork lift tubes
- Indexing pads for container stacking

Advantages:

- One piece construction eliminates seams and sealants that leak over time
- Polypropylene lined Interior for easy clean-up
- Made from 100% recyclable materials
- Lightweight (typically less than 1/3 the weight of comparable containers)
- Highly impact resistant materials (including a level of ballistic protection)

Larger Containers Can be Pre-wired for:

- Lighting
- Electrical
- Translucent Roofing for Sunlit Interior



Plasma Display Screen Testing

Intec recently completed a series of tests for Aircraft Cabin Systems (ACS) of Redmond, Washington in accordance with FAA (UL 1418) safety requirements for large gas-plasma display units.

Intec subjected Aircraft Cabin Systems' 42" flat video display units to a steel ball impact test^a (pictured left) and a series of five 300-pound static abuse load tests applied at various locations on the glass screen. The static abuse tests^b are designed to simulate heavy, blunt object loading of the screen. The ball impacts^a simulate small, high velocity, hard impacts to the glass surface. Should either loading case cause glass to shatter and separate, the large amount of glass contained within a screen of this size could pose a very real threat to passengers if it were ejected into the cabin.

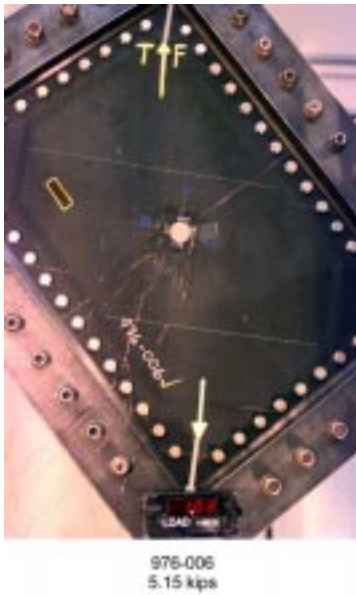
The ACS 42" Plasma Screen passed all tests and will soon be available as an option for installation in your own personal business jet. Please note that similar tests will be required if you decide to install a backlit, transparent dance floor in your personal 777, as is currently being done for a Boeing customer. For more information about gas plasma screens contact ACS at 425-883-8008.

^a Tested in accordance with FAA Issue Paper
^b - UL 1418



Steel Ball
Impact Test

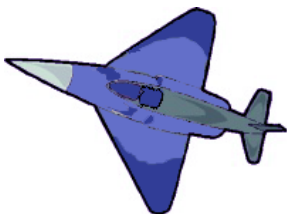
Keeping Combat Rotorcraft in Service



Intec recently participated in a Boeing NRTC (National Rotorcraft Technology Center) program that performed composite damage tolerance testing and post-buckling behavior research for rotorcraft structures. The project's focus was to develop the engineering data necessary to return battle-damaged rotorcraft to flight as quickly as possible. Currently, a damaged helicopter or tiltrotor returning from a mission is generally unavailable for new combat missions until structural repairs can be made. The goal of this program is to show that the damaged composite skins of a rotorcraft can be cut away, leaving a clean edge. Removing existing delaminated material should reduce damage growth. The aircraft can then be returned to limited service before the final repairs are made.

In this program, circular cutouts were made in thin-gage composite panels (panels that closely represent skin structures of the V-22 Osprey and RAH-66 Comanche rotorcraft). These circular cutouts simulate a quick removal of damaged/delaminated structure that can be made at a landing site. The panels measured 20" x 14", with a 1 to 5" diameter hole. Intec tested the panels in shear as shown in the photograph above.

Preliminary analysis shows that the structure is capable of sustaining a high percentage of its maximum service load even with a 5-inch diameter section removed. This test data shows that current repair analysis guidelines, generated using analytical models, are far too conservative. Boeing hopes this test data will help set new repair guidelines that quickly return combat rotorcraft to service.



..... Visit our website
at www.in-tec.com



22310 20th Ave. SE
Bothell, WA 98021

www.in-tec.com

Personnel Profile Charles Elder

A familiar face to Intec, Charles Elder has re-joined the Intec team as Manufacturing Division Manager. Charles' first experience with Intec was in 1993 where he served as Laboratory Manager. He united with Intec again in January 2000 with two Masters degrees (Mechanical Engineering and Business Administration) plus several years of engineering and management experience with Northwest Composites and Aerocell. Charles' education coupled with his hands-on experience makes Charles a perfect fit in Intec's rapidly growing Manufacturing department.

Charles and his wife of 10 years, Melanie, have two boys Mark (6) and Craig (3). On September 14th, 2000 Charles and his wife became the proud parents of a baby girl - Sarah. Charles enjoys taking his family on various outdoor adventures including snow skiing, windsurfing, camping, and building driftwood forts on the beach (see photo below). Charles aspires to be a contestant on "Survivor", and lives by the "Survivor" motto "outwit, outplay, outlast".



Training for "Survivor"
Charles and his boys Mark and Craig

¹Technical tasks described in this document include tasks supported with shared funding by the U.S. Rotorcraft Industry and Government under the RITA. NASA Cooperative Agreement No. NCCW-0076, Advanced Rotorcraft Technology, Aug. 15, 1995.

Phone: 425-487-2888

Fax: 425-485-3981