Boeing has invested over $5,000,000 in this development.

- Weight saving is 9% of body weight, or 20% of participating structure
  ( = 3870 lbs. for 767-81D).

- Fatigue resistance is significantly increased.

- Replaces skin, stringers and frames of conventional structure.

- Design and development based on a 747 Section 46.

- Full scale test section is designed and supported by an allowables test program.

- Some fabrication is completed toward the full scale structural test.

- Boeing meeting August 3 regarding full scale structural test program.

Attendees:
Additional work is needed on:

- Durable structural adhesive system (20 year life).
- Electrical/electronic characteristics and practical details.
- Structural allowables testing.
- Mechanical joining methods.
- Cost effectiveness.
- Damage repair methods.
- Full scale body test.
# Aluminium Honeycomb Body

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$1,098,000  $577,000  $578,000  $388,000
CAG STRUCTURAL BONDING DEVELOPMENT PROGRAM

BONDED TEST SECTION ASSEMBLY PANEL BREAKDOWN

R. H. PANEL STA. 1420-1480

UPPER PANEL STA. 1420-1480

UPPER PANEL STA. 1480-1800

R. H. PANEL STA. 1740-1800

L. H. PANEL STA. 1420-1480

L. H. PANEL STA. 1480-1800

LOWER PANEL STA. 1480-1800

4 - 21 - 70
CAG STRUCTURAL BONDING DEVELOPMENT PROGRAM

DOOR CUTOUT

ADVANTAGES
No body frame overlap or offset
No door step overhang
No door hinge cutout
No auxiliary frames

Basic Skin with Machined Doubling Incorporated

Frame

Skin Splice

Door Inset Frame

SECT. B-B

Stabilizing Intercostals

SECT. A-A (TIP . B PLACES)
WEIGHT SAVINGS PER WINDOW INSTALLATION

APPROXIMATELY 3 LB USING SANDWICH CONSTRUCTION
APPROXIMATELY 2 LB USING WINDOW FRAME EDGE INSERT
(APPLICABLE TO PRESENT AND NEW CONSTRUCTION)
BONDED ALUMINUM FUSELAGE DEVELOPMENT PROGRAM

HOT
BONDED PANEL
SPICE

DOOR PANEL
EDGE MEMBER

COMPOUND CURVATURE PANEL
(SIMILAR TO 747 #5 ENTRY DOOR)

MECHANICAL JOINT DETAIL
Figure 6
BONDED HONEYCOMB PANEL REPAIR AT FRAME TEE
CAG STRUCTURAL BONDING DEVELOPMENT PROGRAM

SOME PROBLEMS TO BE RESOLVED BEFORE COMMITMENT
TO A BONDED HONEYCOMB FUSELAGE AIRPLANE

Design and Analysis
   Electrical Continuity
   Line Changes and Repair
   Installation of Systems and Fairing
   Secondary Shell Bending Effect

STM
   Primary Structure Adhesive System
   New Material and Process Specification
   Potting Material
   Core Splicing Material

Allowables
   Shear Panels with Voids
   Adhesive Fatigue
   Normal Shell Static and Fatigue

Manufacturing
   Assembly of Quadrant Panels
   Double Contour Feasibility Panel
   Facilities Plan
   Production Planning Study - Cost Effectiveness
   Spray Clean and Prime Line
   Increase Part Handling Automation

Quality Control
   In-Process Automated Controls
   Proof Loading Techniques
   Continued Development of Ultrasonic NDT
   Airline In Service Inspection