

# **Difficult Areas For Burnthrough Implementation**

# Objective

- Include methods of compliance in the AC for all configurations in airplanes.
  - Same safety standard worldwide
  - Same safety standard from all airframe manufacturers
  - Address certification issues early on

# Overview

- Testing Issues
- Unique Configurations
- Summary

# Testing Issues

- The Advisory Circular gives detailed instructions for testing burnthrough designs when blankets are installed between and over frames. Depending on the airplane 20% to 80% of insulation cannot match configurations currently in the AC.
- Minimal direction is given for unique configurations that cannot be attached as stated in the AC currently.
- Many configurations do not fit the test apparatus.

# Unique Configurations

- There is not an identified method to certify unique designs to the flame penetration test
- Attachments in some areas are unable to meet burnthrough requirements
- Examples
  - Upper cheek – Main deck floor beam and frame intersection
  - Main Deck Entry Doors and Hatches
  - Blankets Surrounding Main Deck Entry Doors
  - Lower Lobe Cargo Doors
  - AOE doors and linings
  - Airstair door
  - Aft Pressure Bulkhead
  - Nose Bulkhead
  - Cargo Bulkhead
  - Nose wheel well bulkhead/Bilge
  - Over-frame support beams
  - Sloping sidewalls
  - Bilge
  - EE Bay Hatch and walkway

# Unique Configurations



- Upper cheek – Main deck floor beam and frame intersection
- Situation:
  - Not able to clamp over frames due to floor beams
  - No other attachment method known that meets rule
  - No method for testing



# Unique Configurations



- Main Deck Entry Doors and Hatches
- Situation:
  - Contain blankets that are installed into pockets, retained with bond-on pins or hook and loop
  - No overlap possible – must maintain door functionality.
  - Cannot add holes for screw though pins
- Allow burnthrough materials with best design solution – no testing required



# Unique Configurations



- Blankets Surrounding Main Deck Entry Doors
- Situation:
  - Unique structure around doorways does not allow for use of screw-through pins or clamps
  - Blankets are attached to structure with hook and loop
  - Overlap of blankets is not possible – must maintain door functionality.

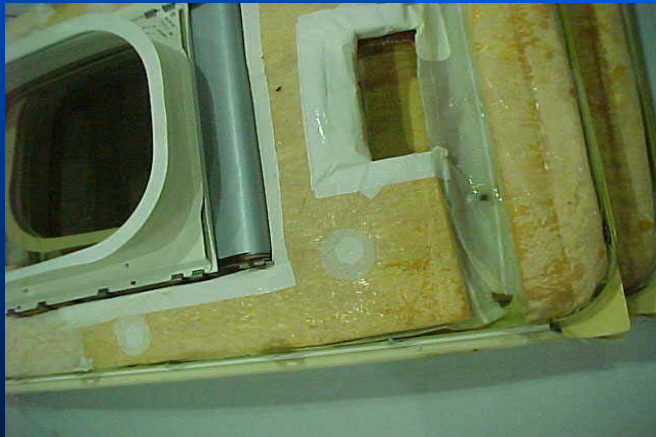


# Unique Configurations



- Lower Lobe Cargo Door
- Situation:
  - Foam is attached to outboard side of cargo liner with adhesive.
  - Insulation attached to door with hook & loop
  - No method for testing

# Unique Configurations



- Automatic Over-wing Exit (AOE) doors and linings
- Situation:
  - Unique structure around doorways does not allow for use of screw-through pins or clamps
  - Blankets installed on liner with double back tape.

# Unique Configurations



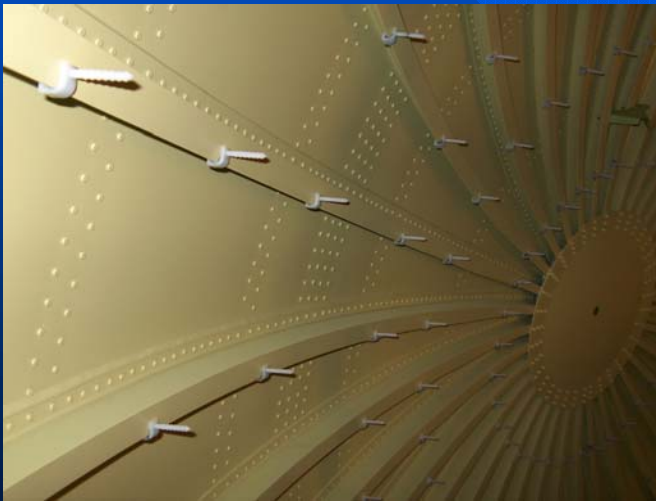
- Airstair Door
- Situation:
  - Unique structure around doorways does not allow for use of screw-through pins or clamps
  - Foam pad glued to aluminum skin (shown left of door) and is attached to inboard surface of door using velcro.



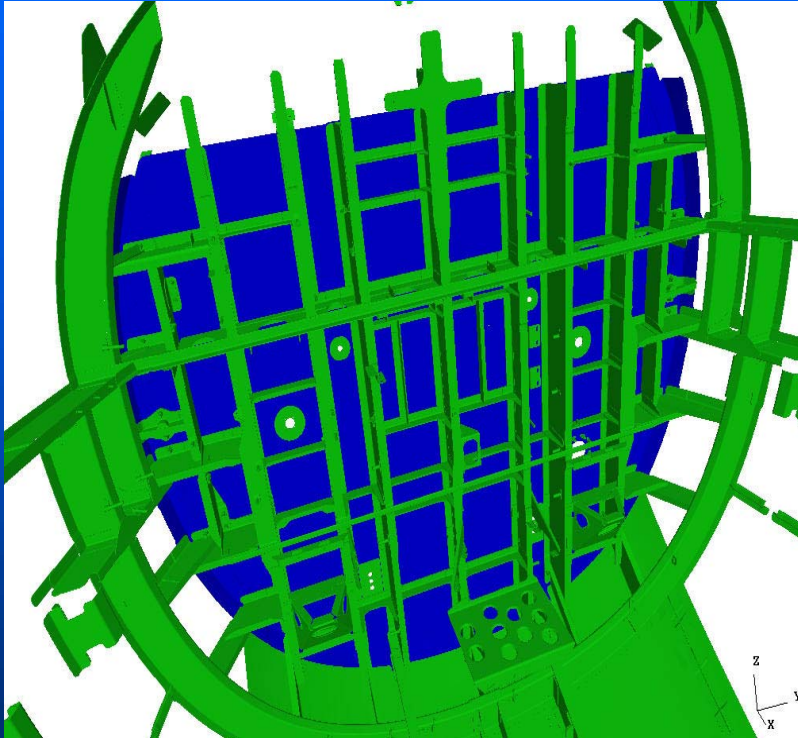
# Unique Configurations



- Aft Pressure Bulkhead
- Situation:
  - No frames to attach to
  - Stringers will burn away in less than 4 minutes leaving no method of attachment
  - No method for testing



# Unique Configurations



## ■ Nose Bulkhead

### ■ Situation:

- Blankets are attached using hook and loop or bond on attachments
- Not able to use clamps around perimeter locations

# Unique Configurations

## ■ Nose Bulkhead





# Unique Configurations



## ■ Cargo Bulkhead

### ■ Situation:

- Blankets are attached using hook and loop or bond on attachments
- Not able to use clamps around perimeter locations

# Unique Configurations



- Nose wheel well bulkhead/Bilge
- Situation:
  - Unique structure does not allow for use of screw-through pins or clamps
  - No testing method known

# Unique Configurations



- Over-frame support beams
- Situation:
  - Certification is undefined due to slits needed to overlap frame.



# Unique Configurations



- Sloping sidewall
- Situation:
  - Blankets do not overlap frame because of cargo liner attachment
- Allow cargo liner as part of the burnthrough configuration

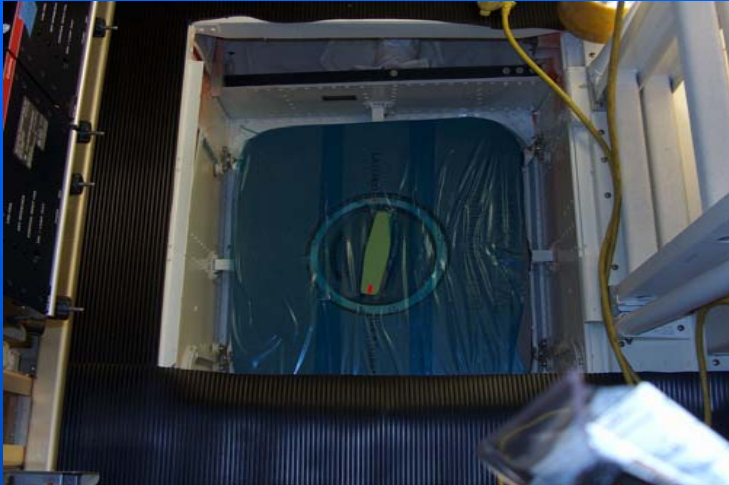


# Unique Configurations



- Bilge
- Situation:
  - Blankets do not overlap frame
  - Airplane geometry requires splice at frame - skin intersection
  - Bilge frame up to 2' deep
  - No method for testing

# Unique Configurations



- EE Bay Hatch and walkway
- Situation:
  - Unique structure around hatches does not allow for use of screw-through pins or clamps
  - Foam bonded or attached with velcro to interior surface of EE bay hatch and walkway



# Unique Configurations



- Nose Wheel Well
- Situation:
  - No method of testing large blankets in test rig
  - No method of testing box corners
  - No attachment method known for this geometry

# Summary

- Many areas of the airplane have blanket configurations that are not depicted in the proposed scenarios of AC 25.856-2X
- Many airframe designs are not depicted in the proposed AC. Methods of testing these designs and attachments are not well defined.
- Certification method for areas not depicted in the AC is not well defined.