FAA
Aircraft Fire Safety
Research and Development

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OUTPUTS

- Improved Civil Aircraft Fire Safety Regulations and Means of Compliance
- Interior Materials Fire Test Methods and Criteria
  - Fire Hazards
  - Protective Barriers
  - Aircraft Material Fire Tests Handbook
- Fire/ Smoke Detection and Extinguishment / Suppression Criteria
- Other Regulatory, Advisory or Policy Actions (AD's, AC's, TSO's, etc.)

AIRCRAFT FIRE SAFETY

Areas of Concern

Postcrash Fire

In-flight Fire

POSTCRASH AIRCRAFT FIRE SAFETY

GOALS AND OBJECTIVES

- Reduce Fire Hazards (Increase Time Available for Escape)
- Increase Evacuation Rate

Improve Postcrash Fire Survivability

IN-FLIGHT AIRCRAFT FIRE SAFETY

GOALS AND OBJECTIVES

- Minimize Ignition
- Rapid and Reliable Detection
- Suppression and Containment (Until Landing at Nearest Airport)

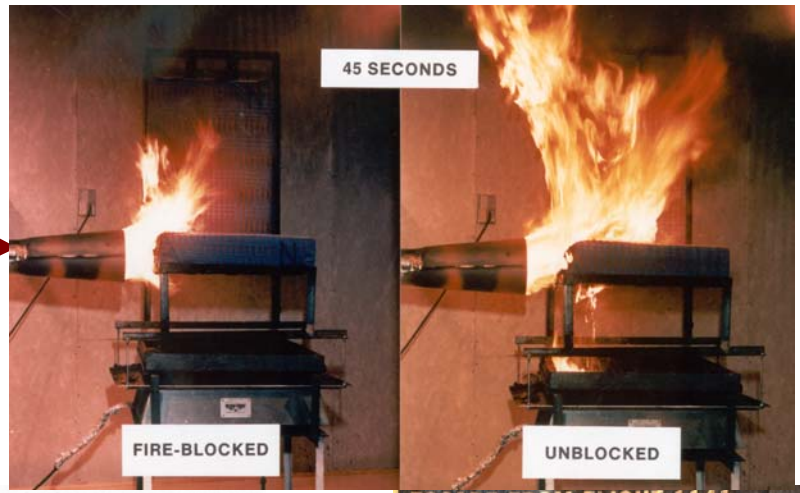
Prevent In-flight Fire

POSTCRASH FIRE SAFETY REGULATORY PRODUCTS

- Seat Cushion Fire Blocking Layers
- Low Heat / Smoke Release Panels
- Floor Proximity Lighting
- Heat Resistant Evacuation Slides
- Fire Resistant Flight Data / Voice Recorders
- Burnthrough Resistant Insulation (Proposed Rule)

SEAT FIRE BLOCKING LAYER BENEFITS

Fire Test Standard



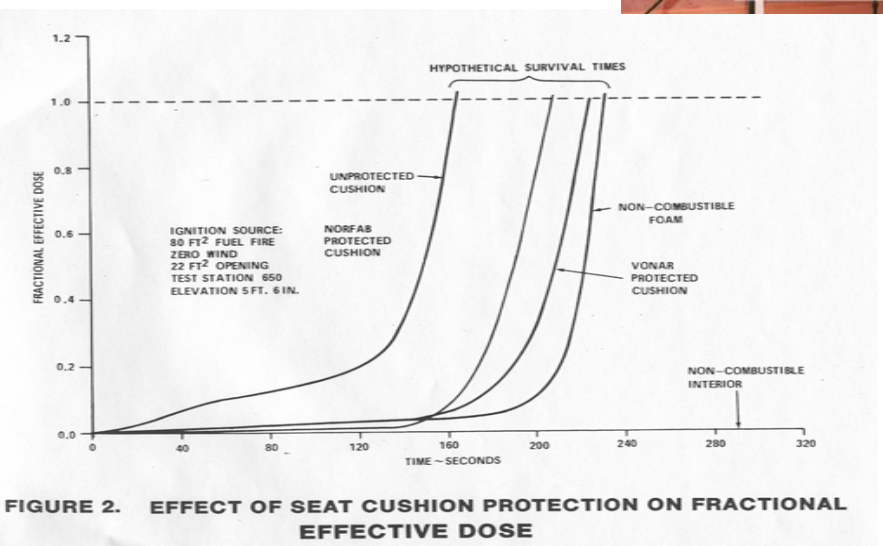
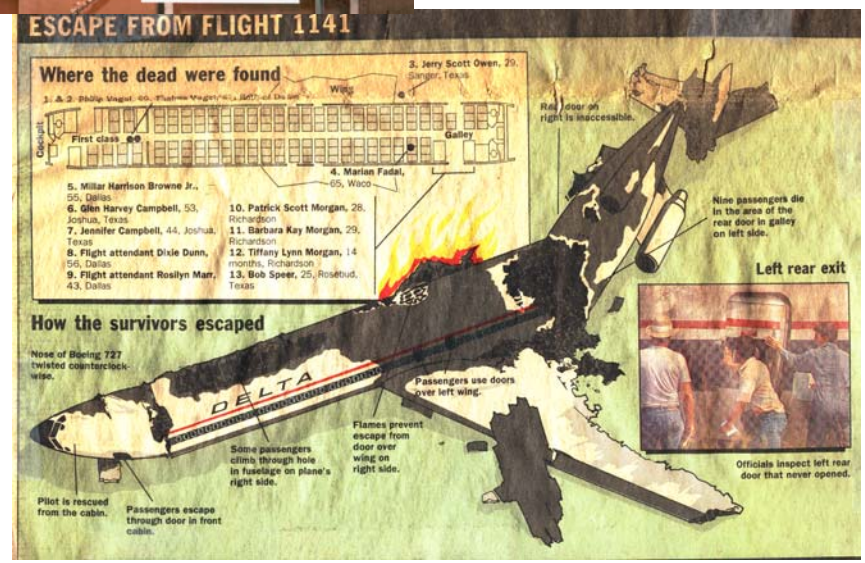


FIGURE 2. EFFECT OF SEAT CUSHION PROTECTION ON FRACTIONAL EFFECTIVE DOSE



Full-Scale Test Benefit

Accident Benefit

IN-FLIGHT FIRE SAFETY REGULATORY PRODUCTS

- Burnthrough Resistant Cargo Liners
- Halon 1211 Hand-held Extinguishers
- “Combi” Fire Protection
- Cargo Compartment Fire Detection and Suppression Systems
- Fire Resistant Insulation (AD/ Proposed Rule)

CARGO COMPARTMENT

DETECTION & SUPPRESSION SYSTEM BENEFITS

ValuJet Reenactment

Exploding Aerosol Can

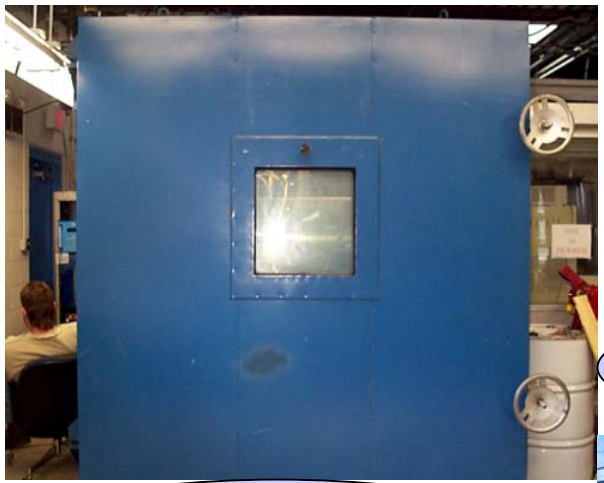
FULL-SCALE FIRE TEST FACILITY (BLDG. 275)

Fuselage Test Articles

Postcrash Fire Test

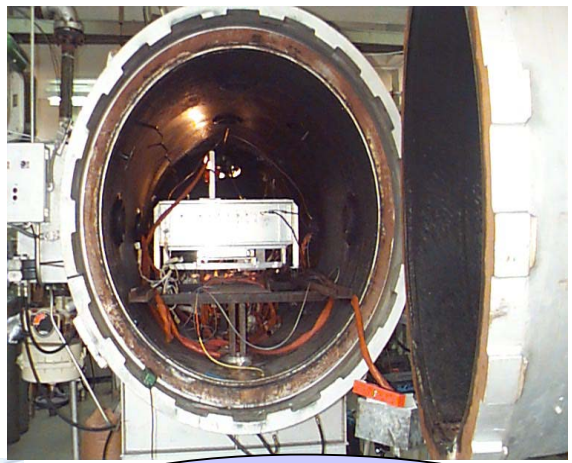
Control Room

ENVIRONMENTAL CONDITIONS TEST COMPLEX (BLDG. 204)



Environmental Chamber

Wind Tunnel



Pressure Vessel

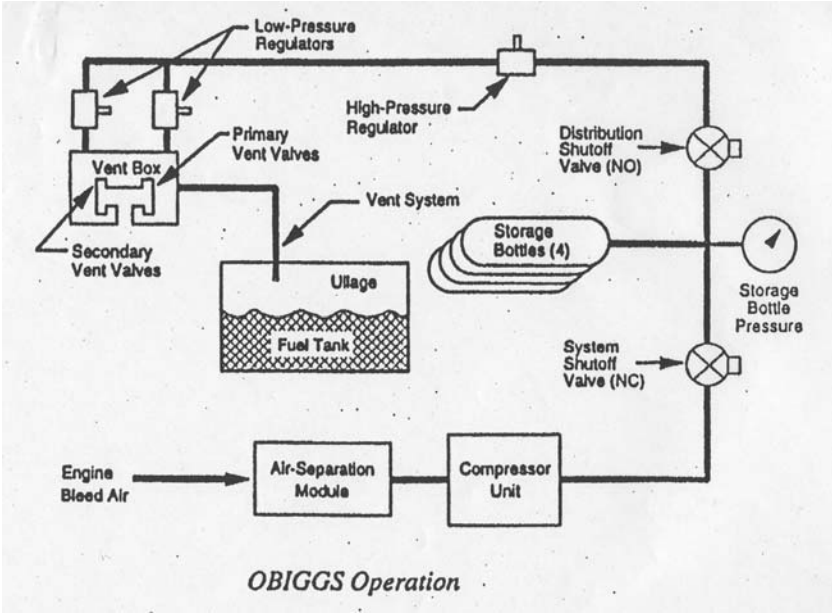
COOPERATION AND COORDINATION

- NASA & FAA Partnership
- International Working Groups on Material Fire Tests and Systems Fire Protection
- Cabin Safety Research Technical Group (FAA, JAA, TCCA, JCAB, and CASA)
- FAA & NIST Collaboration on FR Materials
- Research Cluster on Fire Safe Polymers and Composites (UMASS)
- Interagency Working Group on Fire & Materials
- Formal and Informal Partnership with DOD (Navy& Air Force)

CURRENT R&D PROJECTS

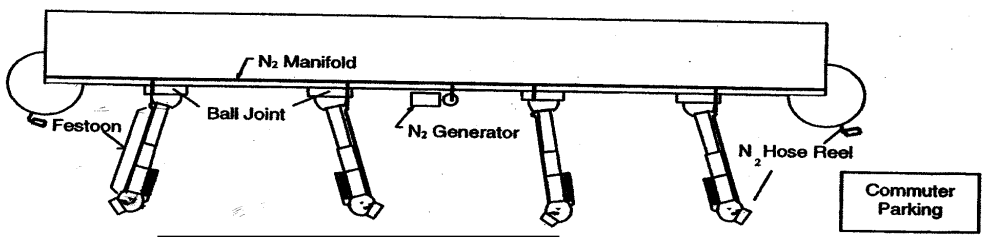
- Fuel Tank Explosion Protection
- Halon Extinguishing Agent Replacement
- Smoke Detectors
- Regulatory Support / Accident Investigation
- Ultra-Fire Resistant Materials

FUEL TANK INERTING



OBIGGS Operation

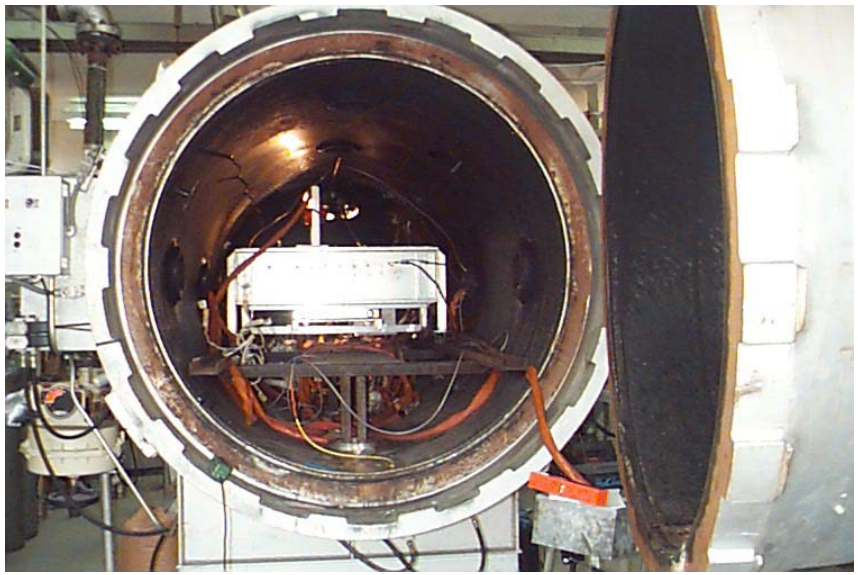
OBIGGS



GBI (Airport)

GBI (On-Board)

FUEL TANK PROTECTION REQUIREMENTS



Reduced O_2 Inerting

O_2 Outgassing

HALON REPLACEMENT

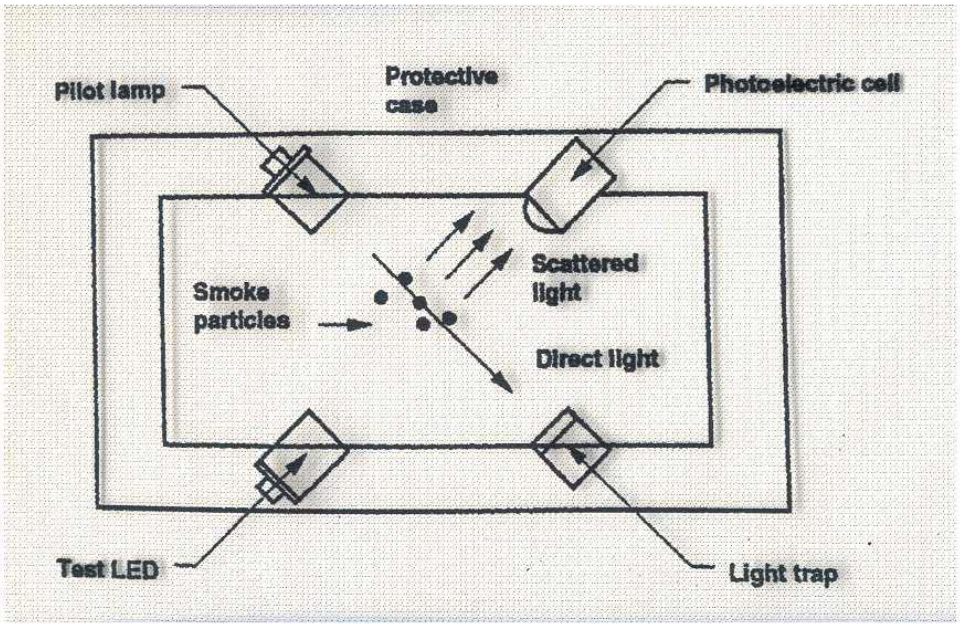
Lavatory

Hand-held Extinguishers

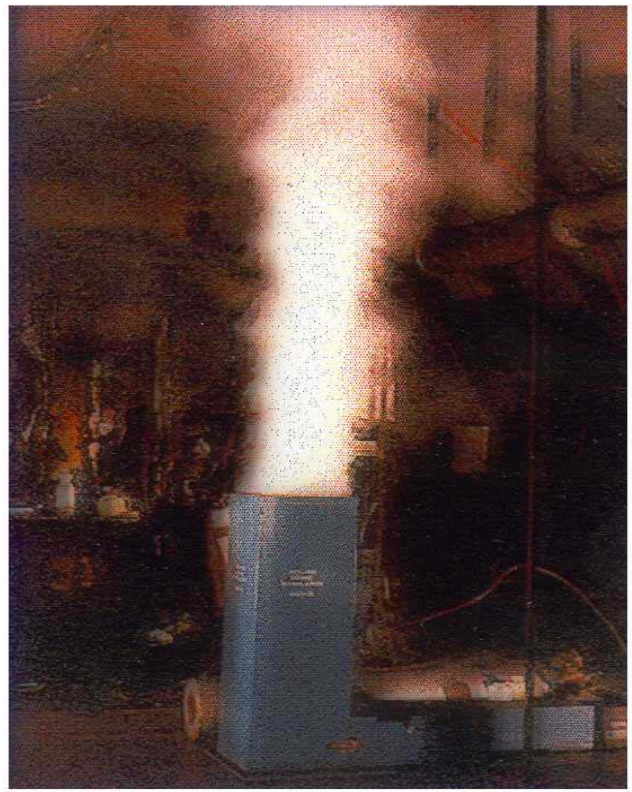
Cargo Compartment

Engine Nacelle

FIRE DETECTION



Photoelectric Smoke Detector



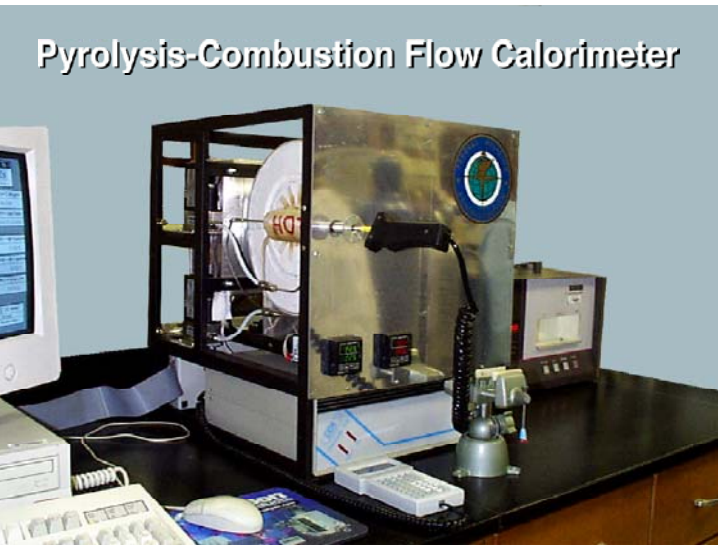
FAA Buoyant Smoke Generator

REGULATORY SUPPORT / ACCIDENT INVESTIGATION

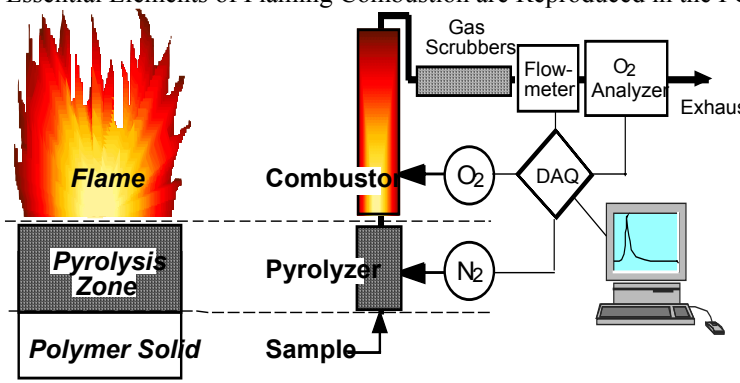
Radiant Panel Test

Thai Air 737 (3/4/01)

ULTRA-FIRE RESISTANT MATERIALS



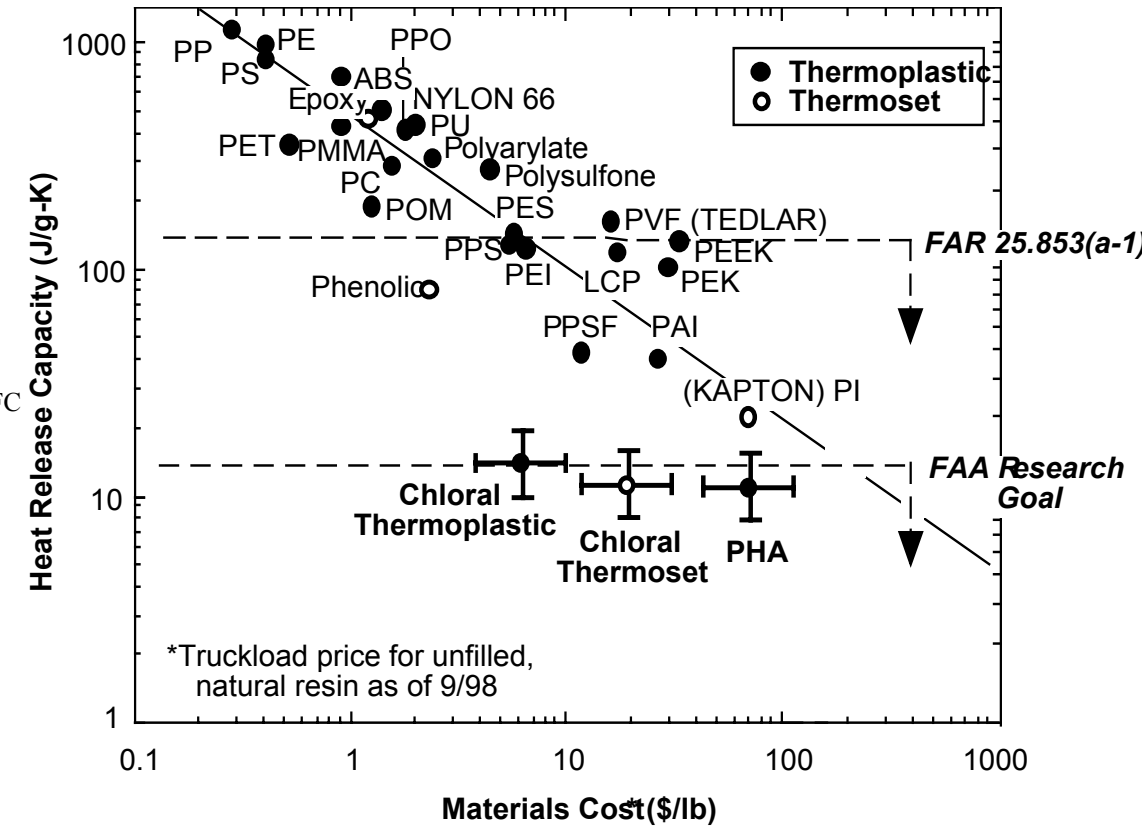
Essential Elements of Flaming Combustion are Reproduced in the PCFC



Flaming Combustion

Pyrolysis-Combustion Flow Calorimetry

MATERIALS COST AND FIRE SAFETY



Supporting Sciences

Advanced Polymers

FUTURE R&D PROJECTS

- Hidden Fire Safety
- Very Large Transport Aircraft (VLTA)
- Oxygen Systems
- Cabin Water Spray

HIDDEN FIRE SAFETY

Air Tran DC-9, 8/8/00

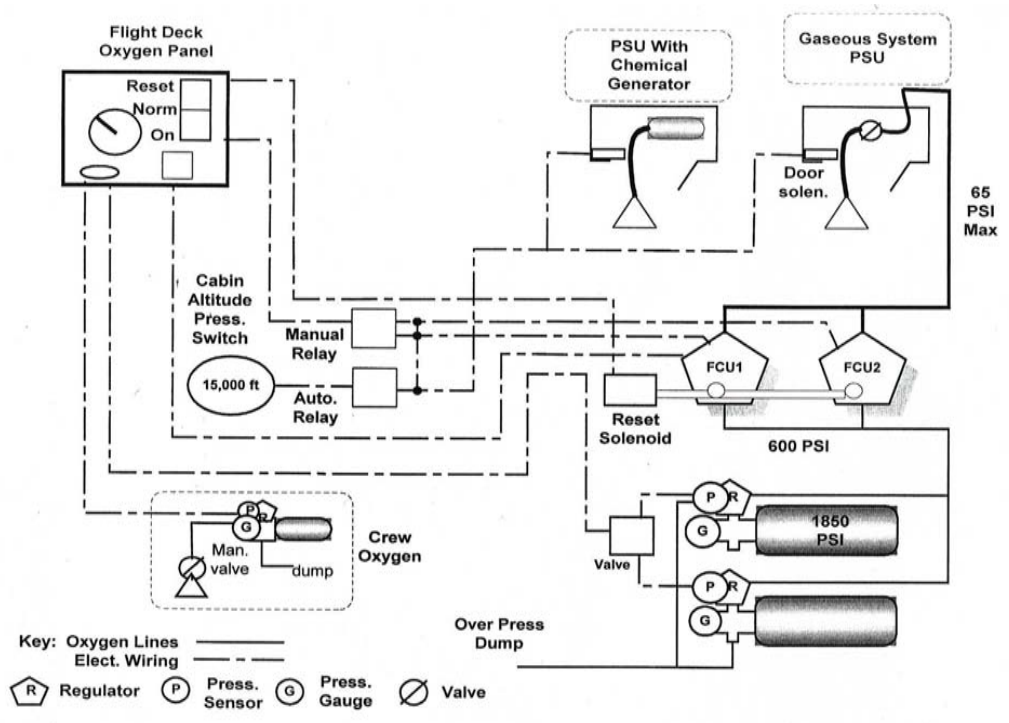
American MD-80, 11/29/00

VERY LARGE TRANSPORT AIRCRAFT (VLTA)

Test Article

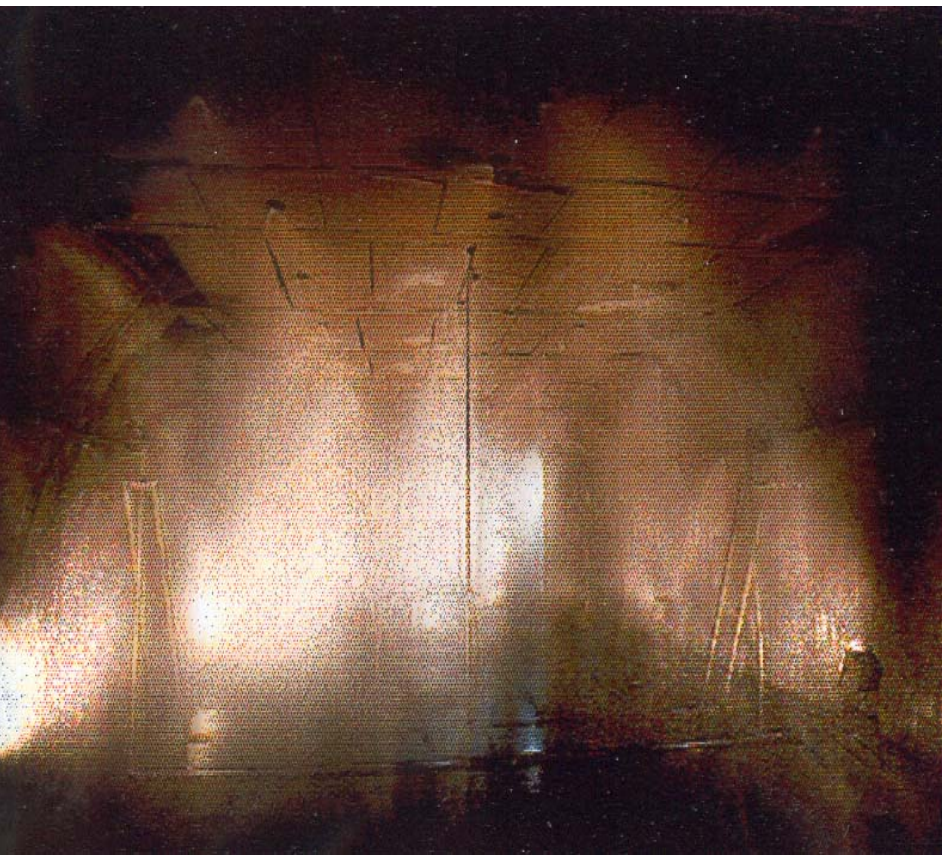
OXYGEN SYSTEMS

Oxygen System Malfunction

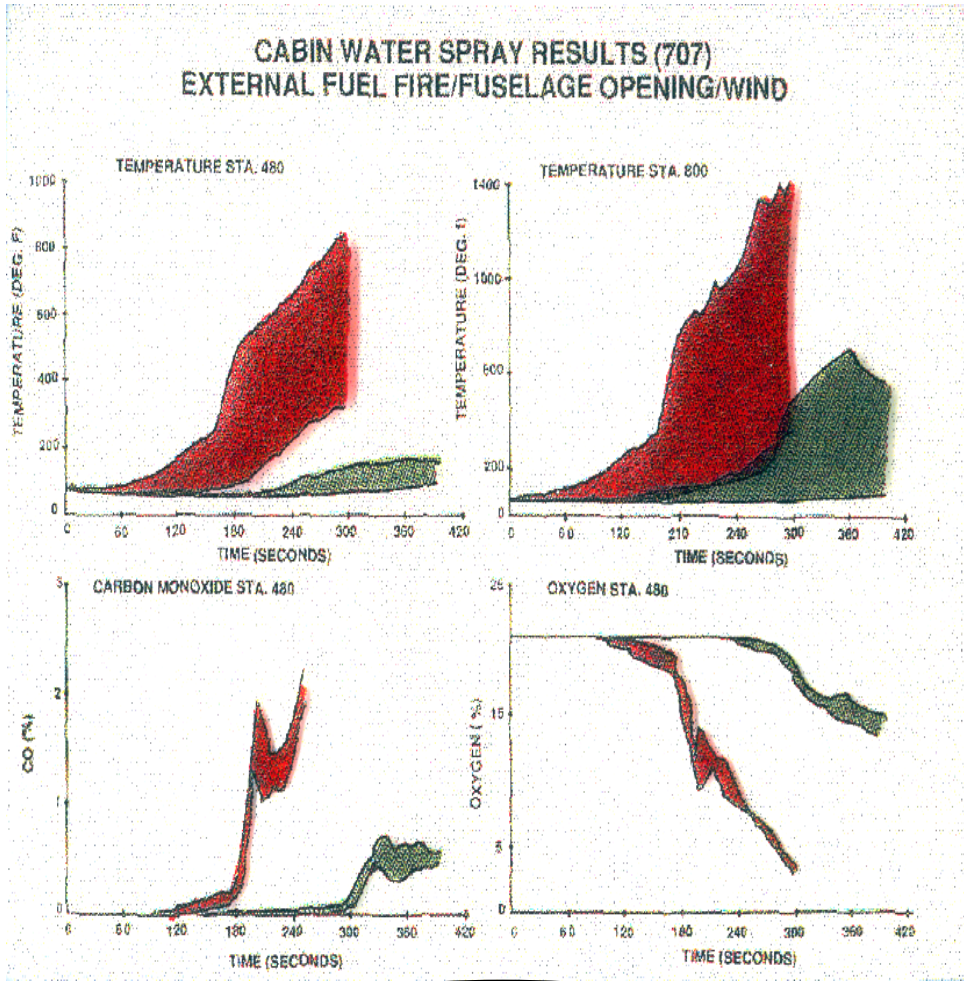


Schematic of the Oxygen System

CABIN WATER SPRAY



On-Board Spray System Discharge



FAA Fire Test Data

FIRE SAFETY SECTION

WEB SITE

www.fire.tc.faa.gov