

DIRT Bag™

Deployable Isolation Repair Technology

Great Ideas Competition 2008

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Composite DoD Aircraft

Composites increasingly prevalent

1980s-early 1990s: <10% structural weight

Today: 50%-90%

1.16 million pounds of composite structures annually



<http://www.globalaircraft.org>

Composite Repairs

Susceptible to impact damage

Lightning strikes

Runway debris

Tool drops

Bird Strikes

Service vehicle collision

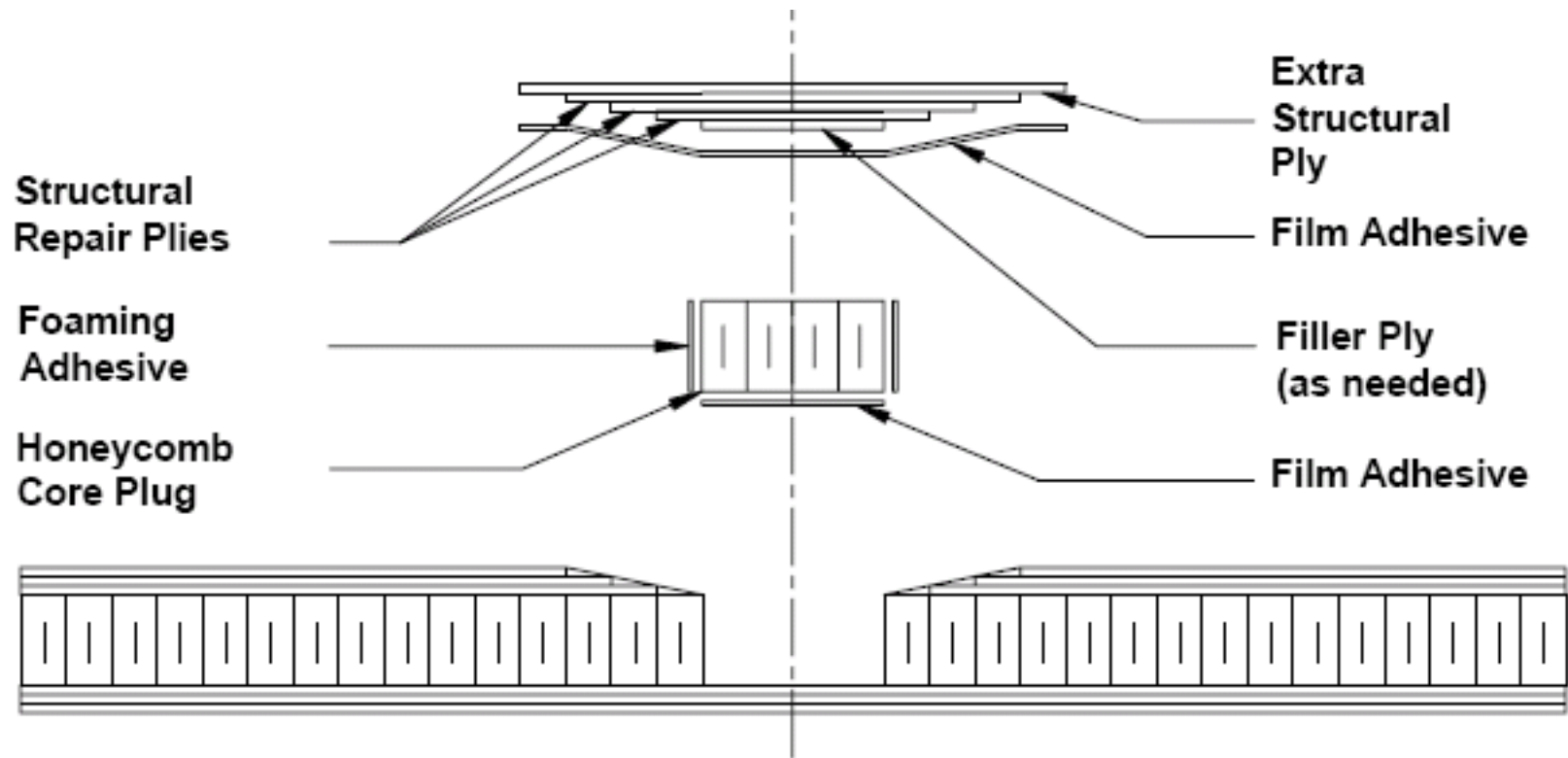
Hail

Require sophisticated repair techniques



<http://spacepug.files.wordpress.com/2008/05/lightning-plane.jpg>

Repair Process



Repair Concerns

Contamination of repair surface

Airborne debris

Sand

Oil

Engine fumes

Moisture

Temperature



www.amtonline.com

**REPAIRS CAN'T ALWAYS BE DONE IN A
CONTROLLED ENVIRONMENT!**

DIRT Bag™



Deployable Isolation Repair Technology

DIRT Bag™ - Support Structure



Collapsible for storage
>80% volume reduction



**Conformable to
curved surfaces**

DIRT Bag™ - Bagging

Optically clear

Tear resistant

Chemical-resistant

Water-proof



DIRT Bag™ - Hand Ports

Inspired by CRG designed medical seal

Seals around forearm

Filters air entering structure



DIRT Bag™ - Bottom sheet

Strong, non-residual PSA

Adheres through grease/dirt

Perforated inside of adhesive ring

Pristine interior prior to repair



DIRT Bag™ - Material passageway

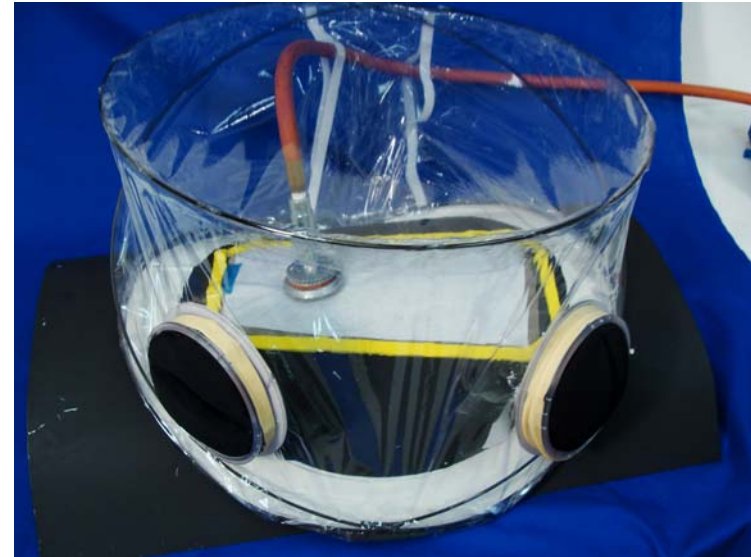
**Double pocket,
hook-and-loop fasteners**

**Introduction of materials,
tools, and hoses**

**No direct path from bag
interior to ambient**



In Use



- 1. Adhesive backing is removed**
- 2. DIRT Bag™ is applied to repair surface**
- 3. Restraining band is removed**
- 4. After repair, unit is removed and disposed of**



Future Adaptations

Hose ports

Material passageway “box”

Customizable system

**Environmental Control
System (ECS) compatibility**

Other Applications

Painting and Coatings

Controlled environment
Weather independent
Volatiles contained

Electronics

Sensitive circuitry

Commercial MRO



<http://homepage.mac.com/lesposen/iblog/B80495344/C475525321/index.html>



Advantages

Reduction in maintenance costs

Rework minimized

Fleet readiness

Aircraft repaired in the field

Part repaired in place





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