

High Energy Wide Area Blunt Impact – Airline Perspectives

Composite Damage Tolerance Workshop
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Presented by:

Ray Kaiser, DAL

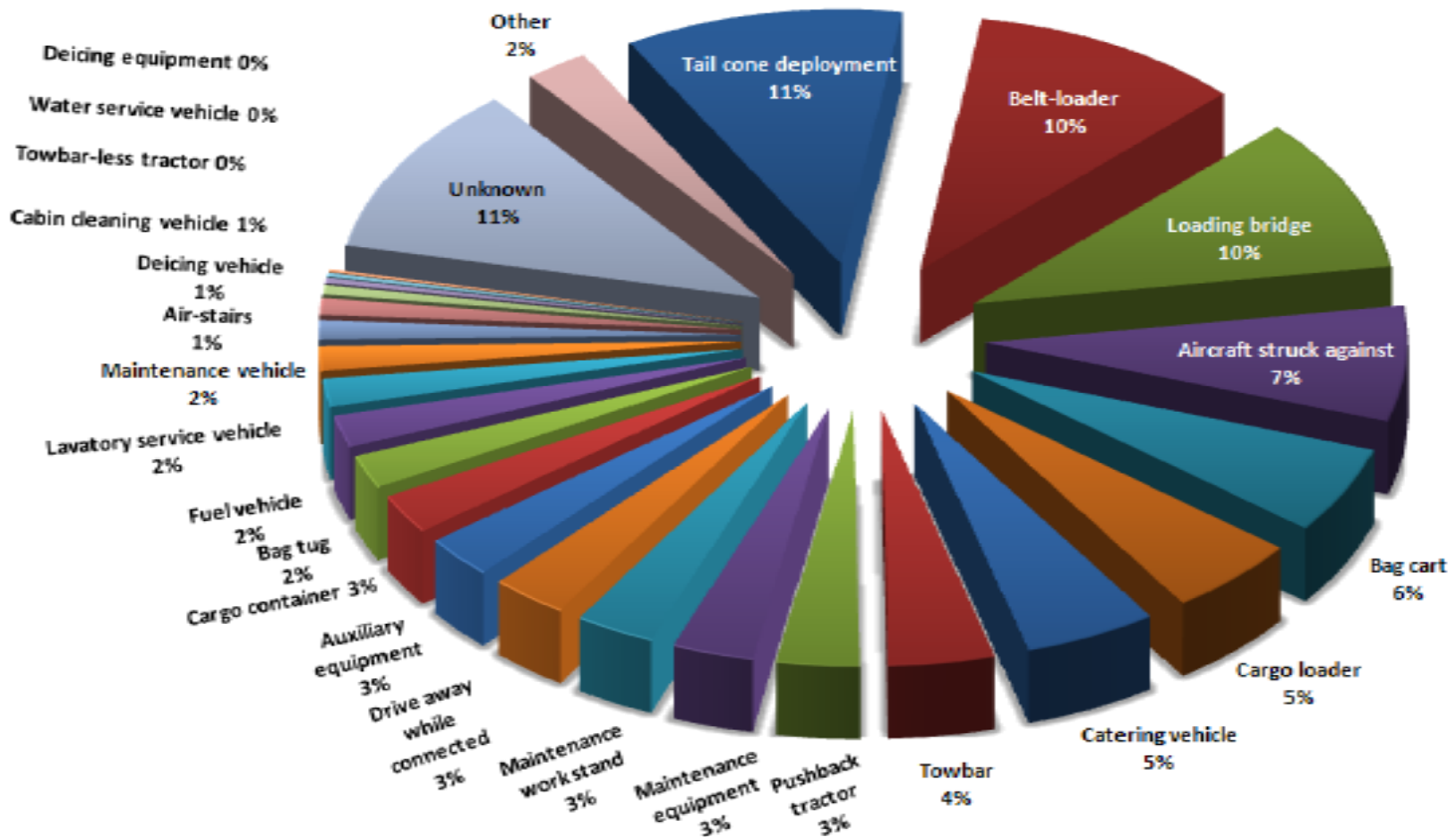
Eric Chesmar, UAL

Threat Sources

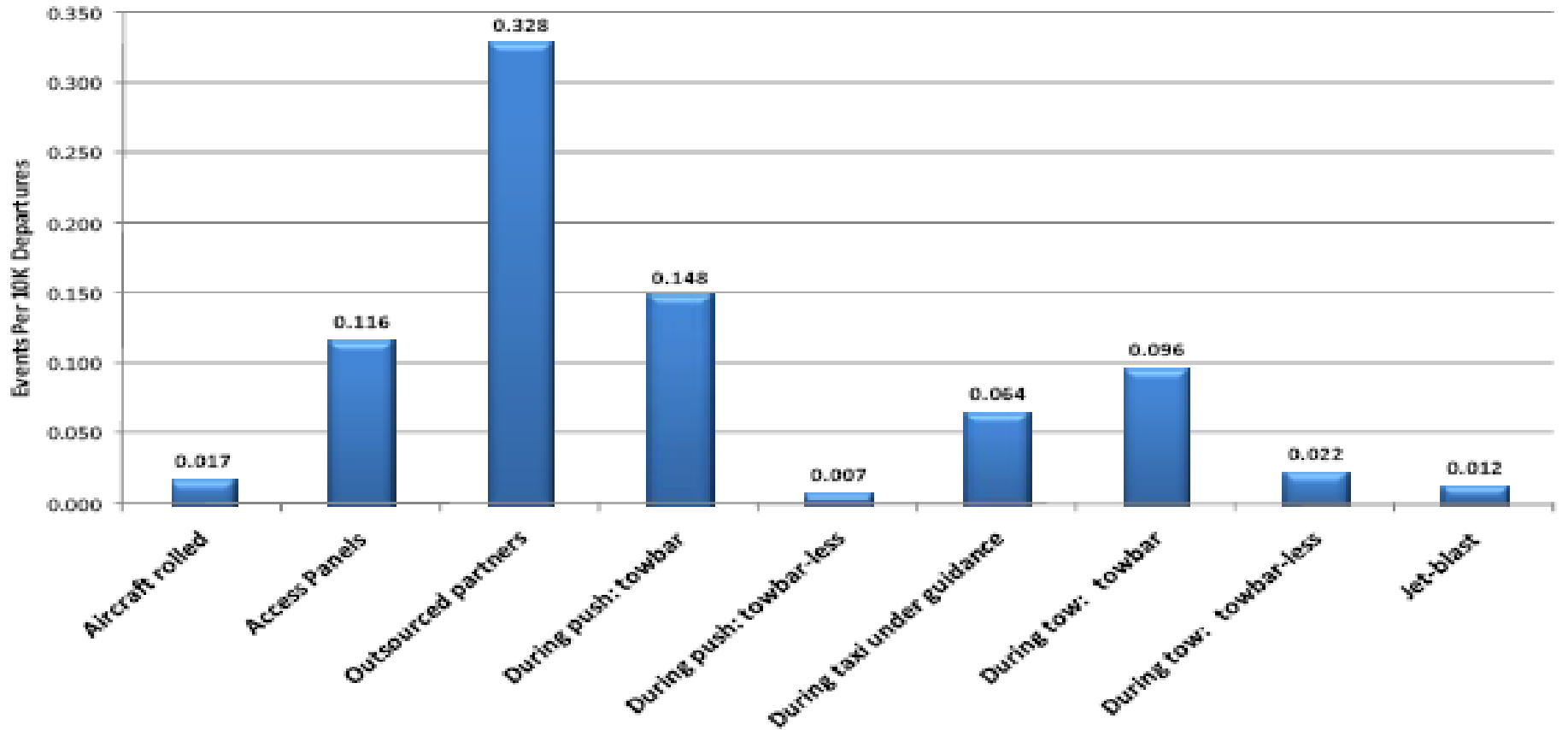
- Jetbridge/ Airstairs
- Tow/Pushback
- Belt loaders
- Maintenance vehicles/Equipment
- Other Aircraft
- FOD
- Water/ Lav Vehicles/ Equip

Event Frequency (% by source)

TOTAL AIRCRAFT GROUND DAMAGE CATEGORIES
2008 Cumulative Totals - 13 carriers, as of September 30, 2008



**AIRCRAFT GROUND DAMAGE RATE BY CATEGORY PART 2
13 CARRIERS
CUMULATIVE 2008 TOTALS (1/1/2008-9/30/2008)**



Threats versus AC Locations

- Doors
 - Cargo
 - Belt loaders, containers, tugs
 - Boarding
 - Jetways/Airstairs
- Access Panels
 - Service Vehicles: fuel, waste, water, air
- Radomes
 - Tugs/ Towbars
- Nacelles/Engines
 - Services vehicles

Event energy

- What is a high energy event?
 - Greater than 1200 inch pounds?
 - High kinetic energy
 - Vehicle impact (Typical?) 6000lbs 5mph
 - K.E. = $\frac{1}{2} mv^2 =$
 - Area of Impact
- Estimated less than 10% of events could be considered HEWABI

Mitigation

- Airlines are working to actively reduce the chances of a HEWABI event causing undetected/unreported damage



Vehicle specific training

Belt Loader General Operating Characteristics & Controls

Driver Controls And Operating Procedures

Use the following on the job training checklist to teach the employee about belt loaders. It is very important that every service check point, operating control, handling characteristic and potential safety hazard be covered. Discuss the general characteristics of the vehicle (size, capabilities, limitations or restrictions). Initial each step as it is covered. If there are facility restrictions in the operating environment such as aircraft engine clearance, high traffic, or restricted maneuvering areas, related to this vehicle, be certain to discuss in detail with the students.

Characteristics	Details
Operator Seat	Verify that the seat is in good condition with no exposed wires or splinters (if wooden). Inspect condition and operation of seat belts. Ensure operator utilizes seat belt while operating equipment.
Ignition/Starting	Locate the ignition control. Demonstrate the starting process.
Accelerator	Locate the accelerator pedal. Demonstrate how the pedal operates and if there are any safety related items associated with this item.
Brakes	Locate the brake pedal. Demonstrate how the pedal operates. Demonstrate proper brake check. Identify and discuss possible failures (i.e. soft pedal). Emphasize the pedal should be firm when stepped on.
Hand Brake	Locate the hand brake. Demonstrate the hand brake check, how the control operates and the direction (push / pull / up / down) to accomplish the action. Place the hand brake on, step on the brake pedal, start the engine, place transmission in drive, and slowly remove foot from brake pedal. Identify shrink wrap and function.
Transmission	Locate the transmission lever/control. Demonstrate how the control operates and if there are any safety related items associated with this item. This is especially important when training on more than one vehicle make and model.

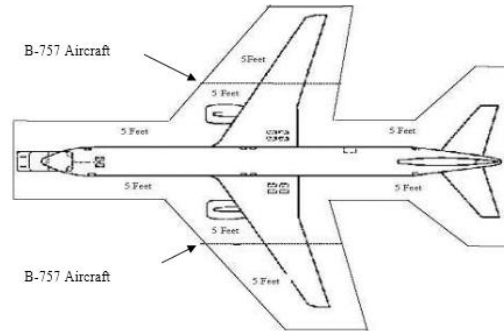
Aircraft No Drive Zone

VEHICLE RESTRICTIONS AROUND AIRCRAFT

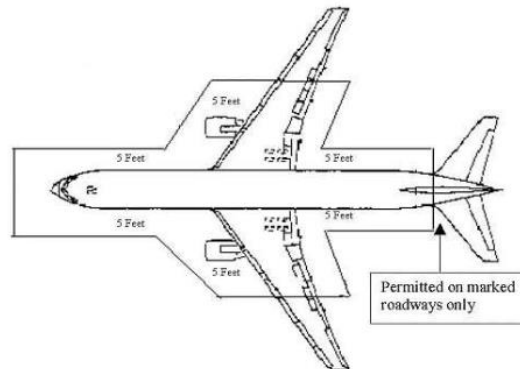
.5 ILLUSTRATIONS (cont)

.1 RESTRICTED OPERATIONS AREA

.1 Narrow-Body Aircraft



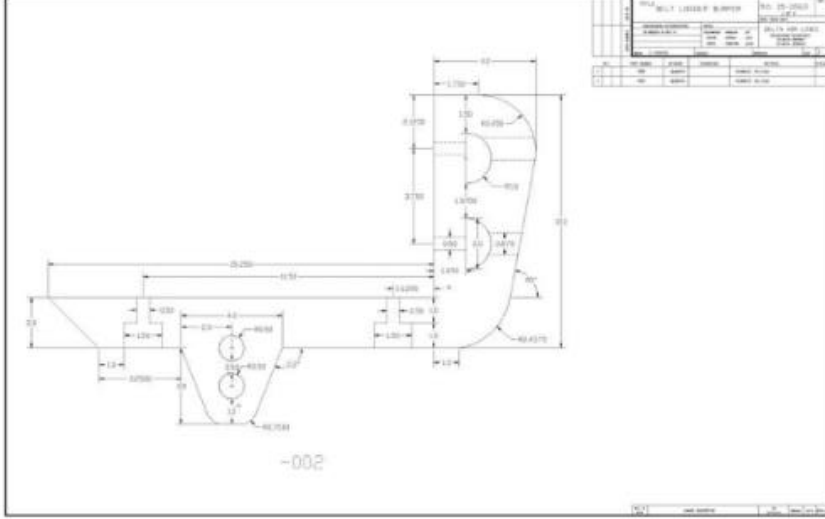
.2 Wide-Body Aircraft



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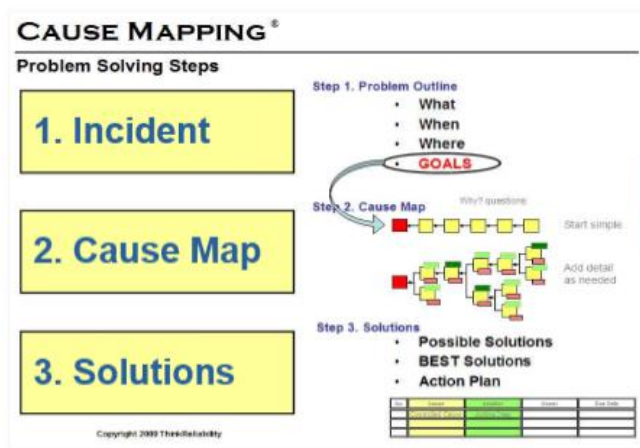
Redesigned Vehicle Bumpers at Aircraft Contact Points

Non-Wedged



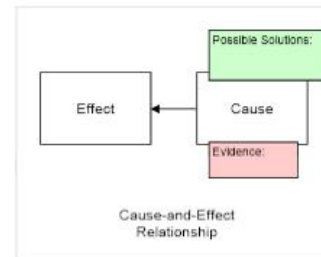
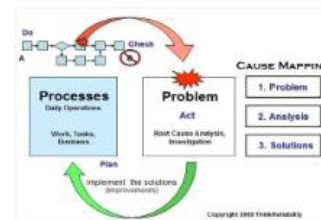
Detailed Standardized Event Report Forms And Cause Mapping

Cause Mapping is a visual, systems-based approach that focuses on fundamental cause-and-effect relationships supported with evidence. The three basic steps of Cause Mapping are shown below.



Additional Tools

- Timeline
- Diagrams/Photos
- Process Maps



Comprehensive Investigation

The 3 basic steps of Cause Mapping are done for every investigation, though the level of detail is dependent on the severity of the incident. On some issues it may be helpful to incorporate the additional tools above into the Cause Mapping process.

1. Write the Problem Outline (CM Step 1)
2. Develop a timeline
3. Begin building the Cause Map (CM Step 2)
4. Review/Capture the work processes involved with this issue (Move between 2, 3 and 4 as needed to capture all relevant information)
5. Identify specific actions to be taken to improve the existing work processes (CM Step 3)



ACS SAFETY, SECURITY & COMPLIANCE

Anonymous reporting tools

Employees are provided access to multiple tools to report events

- STARS/SafetyNet
 - DAL web based reporting tool
- ASAP Aviation Safety Action Program
 - FAA Advisory Circular 120 120-66B
 - FAA ASAP website
- NASA ASRS Aviation Reporting System

Culture

Put Safety First Always

- **Why report a hazard?**
 - 1– Not Punitive—2500 reports submitted
 - 2– Visibility to hazard trends that may be in other areas
 - 3– Eliminating hazards reduce future incidents
- **Open disclosure of events via ADA (Aircraft Damage Alerts)**
 - Provides event description, Corrective Action, and Personal Takeaways
 - » Allows employees to learn from events and encourages proper safety actions to prevent reoccurrence

