National Transportation Safety Board

Fire Safety: An NTSB Perspective

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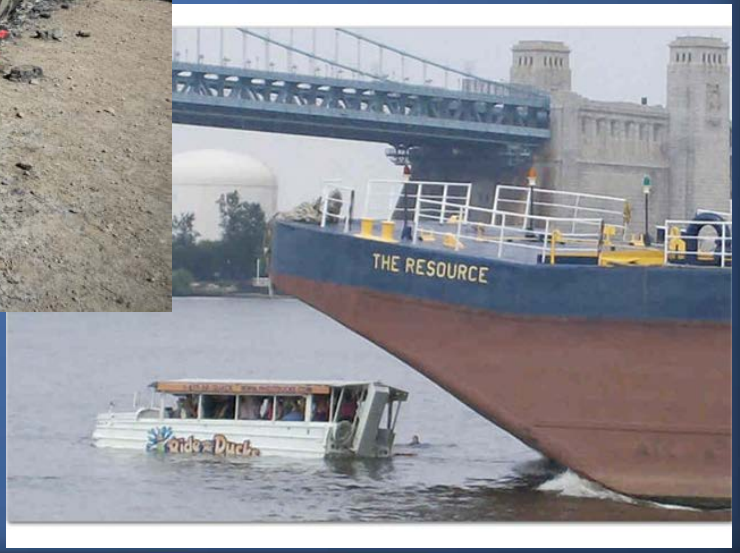
Board Member

The Seventh Triennial International
Fire & Cabin Safety Research Conference
December 2, 2013

1) determining the probable cause of transportation accidents

2) making recommendations to prevent their recurrence

All Modes

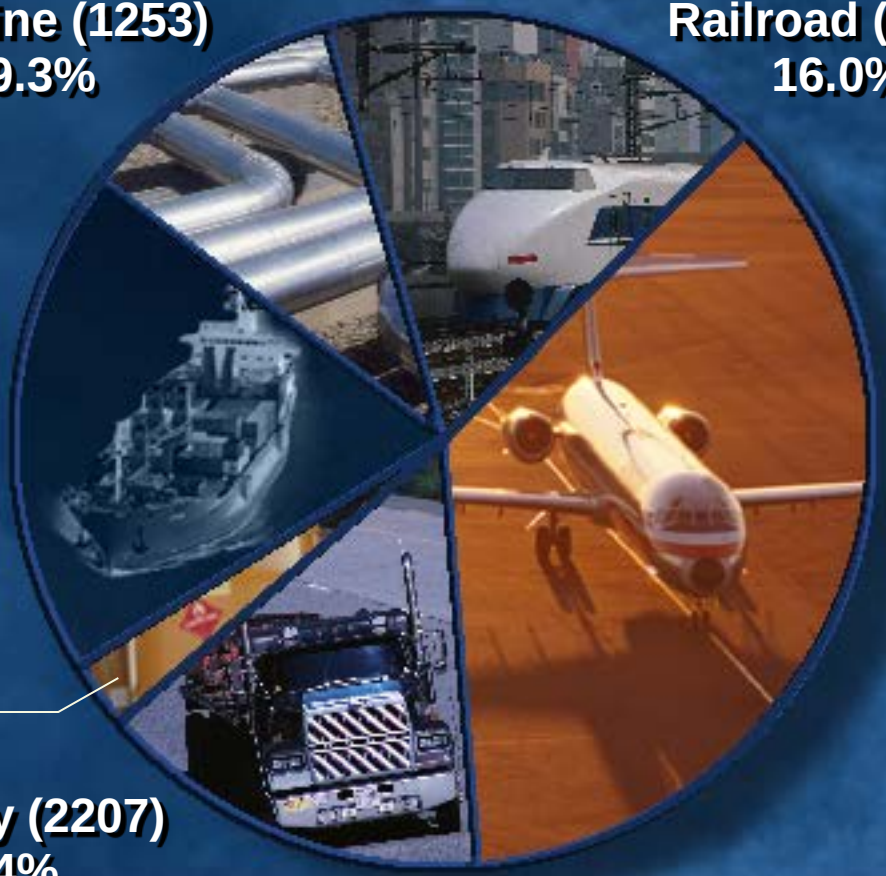


NTSB

Independent Federal Agency: Created in 1967

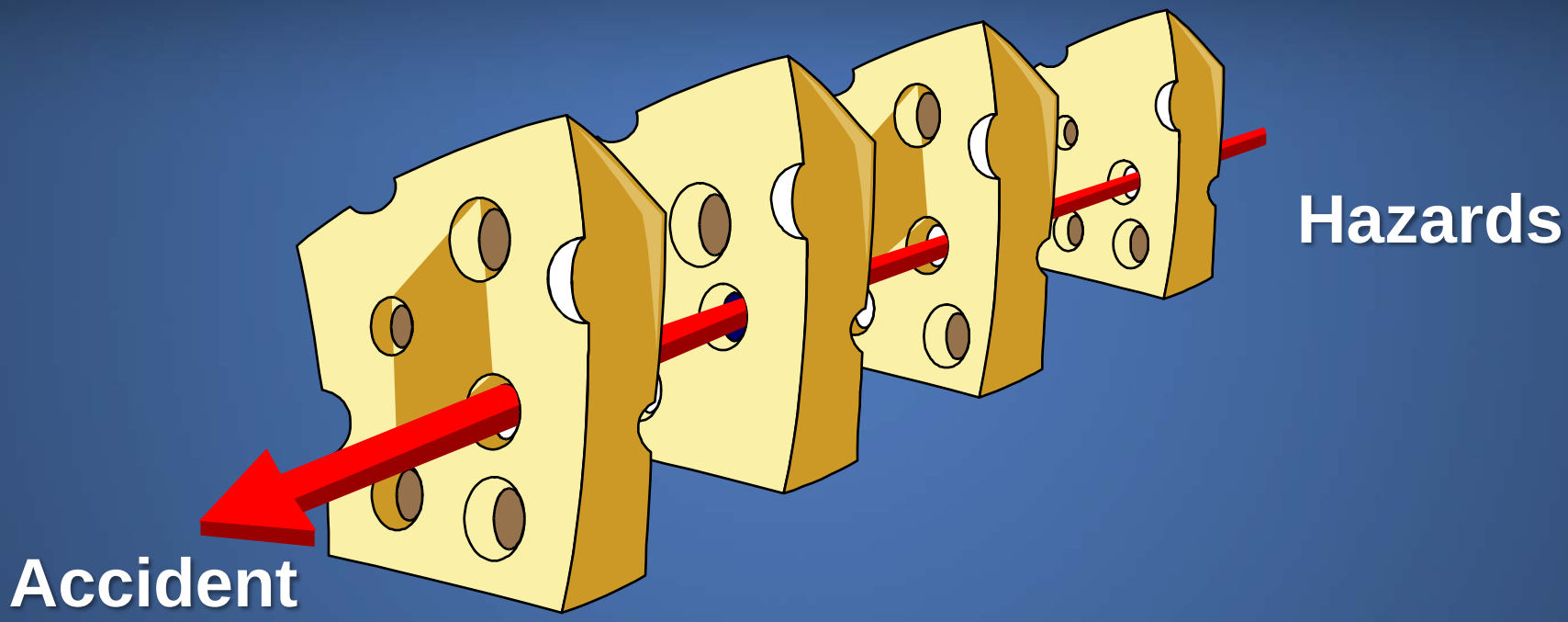
- >132,000 accident investigations
- 13,500+ safety recommendations
- ~ 2,500 organizations/recipients
- 82% acceptance rate

13,454 Safety Recommendations issued since 1967



Rev: July 1, 2011

“Swiss Cheese” Model (Reason)



Successive layers of defenses, barriers, and safeguards

Most Wanted List

Most Wanted List

The Most Wanted List represents the NTSB's advocacy priorities. It is designed to increase awareness of, and support for, the most critical changes needed to reduce transportation accidents and save lives. Link for Most Wanted List Press Conference Video

NTSB

Fire Safety

- Prevention (materials, design)
- Detection (early)
- Suppression

Fire Safety: Highway

Figure 4. Motorcoach tire on fire, witness photo from I-45 frontage road.
Courtesy of Dallas County Sheriff's Office)

Tire/Wheel Well Fire
Wilmer, TX
September 23, 2005

23 lives lost
2 serious injuries
19 minor injuries

NTSB

Fire Safety: Marine

Figure 6. Smoke damage to outside of Massachusetts's main deck, starboard side.

Engineroom Fire
Boston Harbor, MA
June 12, 2006

NTSB

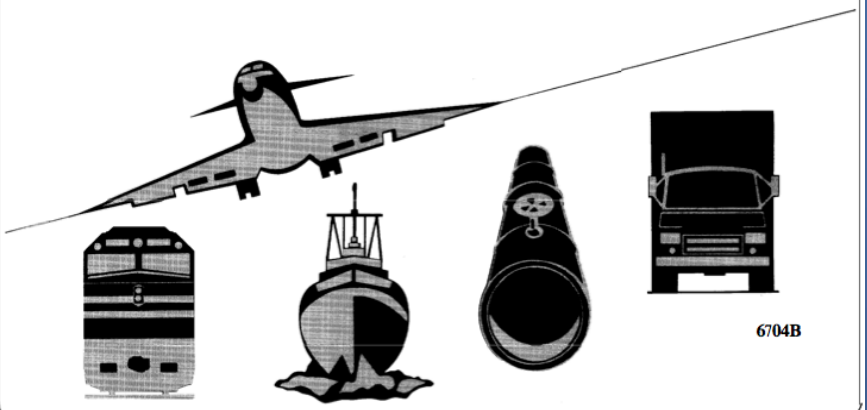
PB97-910406
NTSB/AAR-97/06
DCA96MA054

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

IN-FLIGHT FIRE AND IMPACT WITH TERRAIN
VALUJET AIRLINES FLIGHT 592
DC-9-32, N904VJ
EVERGLADES, NEAR MIAMI, FLORIDA
MAY 11,1996



6704B

NTSB

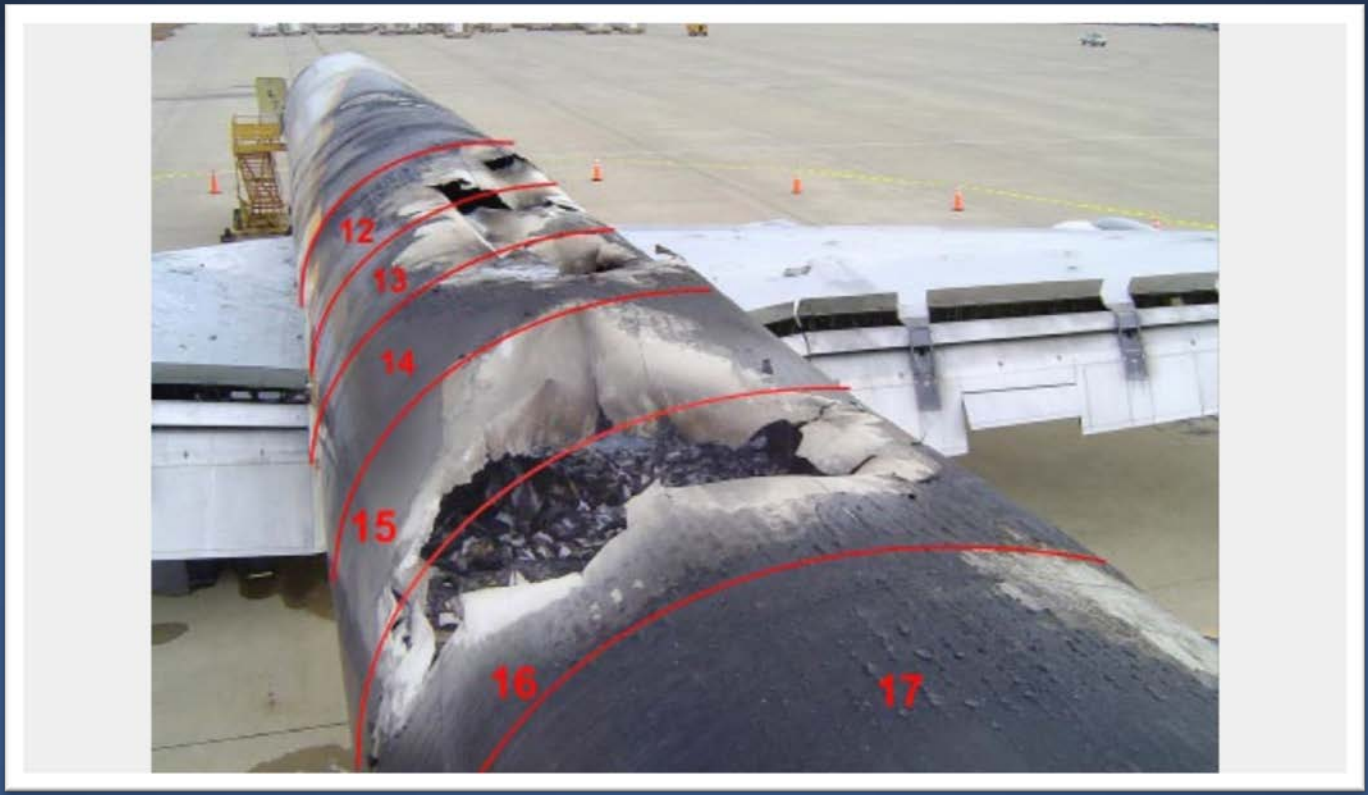
TWA 800 (July 17, 1996)

Figure 29. A photograph of the right side of the large three-dimensional reconstruction, with the support scaffolding visible.

Recommendations: A-96-174, -175, -176, -177

NTSB

Fire Safety: Aviation



UPS 1307
Philadelphia, PA
February 7, 2006

Container fire, unknown source

NTSB

Fire Safety: Aviation

Figure 2. Fire Damage to Top of Airplane

ABX Air 1611
San Francisco, CA
June 28, 2008

Oxygen system: hosing age, proximity to electrical

NTSB

Lithium Ion Batteries

- Cargo
- Aircraft system
- Passenger
  - (carry-on, checked bags)

Lithium Ion Battery Recommendations

- **To the FAA and PHMSA:** In collaboration with air carriers, manufacturers of lithium batteries and electronic devices, air travel associations, and other appropriate government and private organizations, establish a process to ensure wider, highly visible, and continuous dissemination of guidance and information to the air-traveling public, including flight crews, about the safe carriage of secondary (rechargeable) lithium batteries or electronic devices containing these batteries on board passenger aircraft. (A-08-01)

Lithium Ion Battery Recommendations

- **To the FAA and PHMSA:** In collaboration with air carriers, manufacturers of lithium batteries and electronic devices, air travel associations, and other appropriate government and private organizations, establish a process to periodically measure the effectiveness of your efforts to educate the air-traveling public, including flight crews, about the safe carriage of secondary (rechargeable) lithium batteries or electronic devices containing these batteries on board passenger aircraft. (A-08-02)

B787 Battery Event

JAL, Boston, MA
January 7, 2013

NTSB

April 11-12, 2013

3 panels
18 panelists

UPS 6, Dubai, UAE (September 3, 2010) NTSB Testing (2012)

Most Recent Fire Safety Recommendations

- **To the FAA:** Develop fire detection system performance requirements for the early detection of fires originating within cargo containers and pallets and, once developed, implement the new requirements. *Supersedes A-07-98* (A-12-68)

Most Recent Fire Safety Recommendations

- **To the FAA:** Ensure that cargo container construction materials meet the same flammability requirements as all other cargo compartment materials in accordance with 7 Title 14 *Code of Federal Regulations* 25.855. (A-12-69)

Most Recent Fire Safety Recommendations

- **To the FAA:** Require the installation and use of active fire suppression systems in all aircraft cargo compartments or containers, or both, such that fires are not allowed to develop. (A-12-70)

Queen of the West (April 8, 2008) Columbia River, near Rufus, OR

Figure 1. The *Queen of the West* under way. Photo by Majestic America Line.

Engineroom fire

NTSB

Survivability

- Probable Cause (includes)

  Contributing to the survivability of the vessel, and to the absence of injury or loss of life, was Majestic America Line's voluntary installation of an automatic fire detection system and a fixed fire suppression system.

Asiana 214 (July 6, 2013)
San Francisco, CA (SFO)

NTSB

FAA Technical Center: Fire Safety

Fire Safety Branch Manager: Gus Sarkos

Fire Safety Advances

fuel tank explosion protection

fire-resistant flight recorders

heat-resistant evacuation slides

halon hand-held extinguishers

cargo compartment fire detection and suppression systems

low-heat and smoke interior cabin panels

lithium battery fire safety

burn-through-resistant cargo liners and aircraft insulation

Fire Safety Advances

- What's next?

National Transportation Safety Board