Context and Implications of the Boeing 787 Grounding

Presented at:
Business Advisory Committee Meeting
Northwestern University
Transportation Center

April 25, 2013
January 16, 2013: 
AD Grounding U.S. 787s

April 19, 2013: 
Approval Granted for Resumption of Service
Events Leading to the Grounding

• January 7 incident on JAL 787 after arrival at Boston; NTSB cites “heavy smoke and fire coming from the front of the APU battery case”

• January 16 ANA 787 main battery overheating and failure in flight; aircraft diversion
The Incident Aircraft

<table>
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<tr>
<th>Airline</th>
<th>MSN</th>
<th>Line Number</th>
<th>Registration</th>
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<td>ANA</td>
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<td>1-14-2012</td>
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<td>JAL</td>
<td>34839</td>
<td>84</td>
<td>JA839J</td>
<td>12-20-2012</td>
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</tbody>
</table>

Source: AviationWeek.com/787battery
Background

- Development of the 787
- Certification Process of Li-ion battery system
787 Goals

- Lower operating costs
- Monolithic composite structure
- Fuel efficiency (20% better than similarly-sized jets)
- 30% maintenance cost savings vs. 767
- Greater range than existing medium-size widebodies
Washington Dulles Welcomes
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PAST, PRESENT AND FUTURE

Africa's first 787
DREAM LINER

Ethiopian
A STAR ALLIANCE MEMBER

August 15, 2012

50th DULLES ANNIVERSARY

B O E I N G

Ethiopian

THE NEW SPIRIT OF AFRICA

METROPOLITAN WASHINGTON AIRPORTS AUTHORITY
“When the FAA initially approved Boeing's lithium-ion battery system in 2007, it lacked rules to govern their use on planes, and set "special conditions" for Boeing to follow to ensure they would be safe.”

Source: “FAA sees lessons from Boeing 787 battery woes”, Thompson Reuters, April 13, 2013
Chronology

- April 2004 order by ANA (All Nippon Airways)
- Initial deliveries expected in 2008
- Rollout July 2007
- First flight December 2009
- First Delivery (ANA) September 2011
- Entry into Service October 2011
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- Grounded by FAA January 2013
Implications for Airlines

• Availability of alternate aircraft
  – Existing services
  – Planned new services

• Possible passenger acceptance concerns

• Impact of ‘fixes’ on economic characteristics of the aircraft
Implications for Manufacturers

• Are there reasonable alternatives to Li-ion batteries, if needed?
• Airbus’ reaction; smart move, or rush to judgment?
• Can this technology
  – Achieve required safety profile?
  – Demonstrate this in a reasonable time?
  – Maintain acceptable economics?
Historical Context

• Earlier aircraft type groundings
  – Piston era
  – Comet
  – DC-10
• A non-grounding: L-188 Electra
• On balance: groundings have been overcome
Fixing the Problem

Three Main Safety Layers:

• More safeguards to prevent cells from overheating
• More space and insulation to prevent a failed cell from damaging adjacent ones
• New containment system as well as venting system changes

Source: Aviation Week  March 4/11, page 36
Pressure to Resume Service

- Carriers already suffered through delays
- Expensive assets not being used
- Penalty payments?
- “Footsteps”; the A350XWB
“The NTSB and Japan Safety Board (JTSB) continue to pursue their separate investigations into the Japan Airlines (JAL) and All Nippon Airways (ANA) battery incidents this month that prompted the FAA’s Emergency Airworthiness Directive.”

Source: Aviation Week  January 28, 2013, page 30
Regulatory Issues

“Adding to the intensity are questions on the FAA’s original certification for the battery that were posed on Feb. 7 by U.S. National Transportation Safety Board Chairman Deborah Hersman. …the NTSB is evaluating the validation methods used for certification of the battery as well as testing of field-replacement batteries.”

Source: “Next Step”, Aviation Week, February 18, 2013, page 32
“...since this time around the process will also involve testing to a far more stringent level than when the 787 was first certificated.”

Source: “Changing Back”, Aviation Week, March 18, 2013, page 28
“Yet since the last of the 50 in-service aircraft shut down its engines on Jan. 17, conclusive indicators of the problem’s cause and how to fix it remain elusive.”

Source: Aviation Week  January 28, 2013, page 30
A More Prudent Approach?

“Japan won’t make a final decision on allowing the resumption of 787 flights until after two-day National Transportation Safety Board hearing ends on April 24, Shigeru Takano, a director for air transportation in Japan’s Civil Aviation Bureau, says in telephone interview.”

Source: Bloomberg, April 22
Summary & Conclusion

• Desires of stakeholders (manufacturers, airlines) need to be balanced with assurance that problem will not recur
• The aviation community (Boeing, Airlines, Regulators) must get this right
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• The aviation community (Boeing, Airlines, Regulators) must get this right

• The alternative is unthinkable
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