The Dreamliner's Battery Nightmare

USA
Beginning January 2013

On January 16, 2013, the Federal Aviation Administration issued an emergency directive grounding all Boeing 787 Dreamliners operated by United States carriers during the investigation into two recent battery fires. This emergency grounding is an unusually extreme step, especially given that the Dreamliner is a new plane with only six operated by US carriers at this time.

**Effect**
- Short time in service
- Customer Service Goal
  - Impacted
  - Bad publicity for the Dreamliner
- Schedule Goal
  - Impacted
  - Dreamliners grounded in US during fire investigation
- Safety Goal
  - Impacted
  - Potential for deaths/injuries
- Evidence: Two battery fires have occurred
- Evidence: The FAA has grounded all Dreamliners in the USA until the battery issue is fixed. Many other nations have also grounded the plane.
- Evidence: The Dreamliner is designed with backup system to prevent this type of battery fire.
- Evidence: The 787 has been designed to be 20% more fuel efficient than the 767 it is.
- Evidence: Two battery fires have occurred: one at Logan International Airport in Boston and one caused an emergency landing in Japan.

**Cause**
- Backup systems failed
- Manufacturing issues?
- Problems with the design?
- Very different from previous designs
- Very tight deadlines
- Economic pressures
- Most outsourced plane ever built
- Spread the economic risk of a new design
- Lighter plane
- Better fuel efficiency
- Only mid-size plane that can fly long-range routes
- Evidence: Lithium-ion batteries are used as the auxiliary power unit, which provides power on the ground or if the main engines quit.
- Evidence: Lithium-ion batteries are lighter
- Evidence: Most outsourced plane ever built
- Evidence: Boeing's own employees manufactured just 35% of the plane prior to assembling it.
- Evidence: Lithium-ion batteries are particularly dangerous
- Evidence: Lithium is highly electronegative
- Evidence: Lithium is the least dense of all metals
- Evidence: Lithium-ion batteries are lighter
- Evidence: Lithium-ion batteries are used as the auxiliary power unit, which provides power on the ground or if the main engines quit.
- Evidence: Lithium-ion batteries use less fuel
- Evidence: Lithium-ion batteries are lighter
- Evidence: Lithium-ion batteries are particularly dangerous
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"The expectation in aviation is to never experience a fire on an aircraft. There are multiple systems to prevent against a battery event like this. Those systems did not work as intended. We need to understand why."

- Deborah A. P. Hersman, The National Transportation Safety Board’s chairwoman