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# NTSB Raps Some Knuckles With Boeing Battery-Fire Report

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Photo: Saul Loeb/AFP/Getty ImagesThe burned-out battery case from a Japan Airlines Boeing 787.

In a report released this month, the U.S. National Transportation Safety Board (NTSB) found plenty of blame to go around when reviewing a lithium-ion battery fire inside a 787 Dreamliner passenger aircraft in January 2013.

The board's report in particular singles out the plane's manufacturer (Boeing), its contracted battery supplier (GS Yuasa), and the Federal Aviation Administration (FAA) as falling short in ensuring public safety. Last year during NTSB hearings, Boeing Vice President Mike Sinnett called their self-policing policy with FAA "in retrospect… [not] conservative enough."

The NTSB apparently agrees. Its report says FAA provided "insufficient guidance" for its own certification engineers to develop testing for rechargeable batteries used in a commercial jumbo jet. (Such conclusions are also consistent with other criticism of FAA, as noted in a 2013 investigation by the *Wall Street Journal* that the agency today "has neither the budget nor the expertise to do extensive testing on its own.")

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David Zuckerbrod, CEO of Baltimore-based Electrochemical Solutions, praises NTSB's thorough report. Zuckerbrod says he was shocked that the metal battery containers' design had not taken into account the rare but often devastating thermal runaway fires well known in the cellphone, laptop, and portable electronics industry.

"Even the battery box design was poor," he says. "No one had engineered for cascading failure— one cell going boom and taking out the next cell and the next cell and the next cell. Battery folks know that [can] happen. Have you ever googled 'laptop battery fire'? These folks never watched that movie."

Press coverage at the time suggested that the 7 January 2013 Japan Airlinesbattery fire, which fortunately only ignited after all passengers and crew had disembarked at the gate at Boston's Logan Airport, might have been caused by overcharging, external heating, or environmental conditions surrounding the battery pack.

However, NTSB has concluded the battery caught fire because of an internal short circuit, possibly arising from either a manufacturing defect in the cell or from temperature spikes allowed by a poorly designed battery management system.

Zuckerbrod says NTSB's report found lax battery manufacturing protocols that are not up to the best industry standards.

For instance, he says, battery manufacturer GS Yuasa wasn't sufficiently careful in keep welding debris and other metal filings out of the battery cells. Moreover, cell assembly involved winding battery materials around a cylindrical mandrel and then flattening the cells by hand into a squashed oval shape that was then compacted into the battery container.

"I was surprised that GS Yuasa wasn't doing a better quality job on those cells, because they were going to be used in aircraft. When you have [military] spec stuff, they drive the vendors crazy with their specifications. It becomes a gigantic portion of the work to deal with the quality control. But the way they were assembling the cells was a little bit high-risk."

"It seems like they took [a battery design] off the shelf that in retrospect wasn't aircraft grade,"*—David Zuckerbrod, Electrochemical Solutions*

One number in the NTSB report in particular really took Zuckerbrod by surprise, he says. According to the report, GS Yuasa "stated that less than 1 percent of manufactured [battery] cells were rejected."

If this number is close to 1 percent and accurately reflects the battery's potential failure rate, he says, then it should give considerable pause. By contrast, he says, the industry standard 18650 lithium-ion battery cell has a typical failure rate of about one-in-ten-million (0.000001 percent).

"It seems like they took [a battery design] off the shelf that in retrospect wasn't aircraft grade," he says.

And while it's not known yet how much of the NTSB's Dreamliner recommendations have been adopted, Zuckerbrod says he thinks the agency's and media's scrutiny has made it likely they'll be taken seriously.

"There's a lot of good stuff in the report, with a big list of things they could do better," he says. "Some of which are easily adopted. We got lucky this time."