

## **Air Safety Group Urged Tougher Battery Tests**

By ANDY PASZTOR

Shortly after the Federal Aviation Administration issued safety rules in 2007 for using lithium-ion batteries on Boeing Co. BA -0.39%'s 787 Dreamliner jets, an industry standards-setting group called for stricter testing to prevent battery fires on aircraft.

Boeing and FAA officials decided that since design and testing of the plane was so far along, mandating the tougher standards would disrupt years of joint safety work and unfairly delay production of the cutting-edge Dreamliners, said people familiar with the details.



***NTSB Materials Engineer Matt Fox examines the casing from the battery involved in the JAL Boeing 787 fire incident in Boston.***

Now, with all 787s grounded indefinitely due to two incidents of burning batteries earlier this month, Boeing and the FAA are analyzing what it would take for the planes to comply with the tougher standards, these people said. The reassessment is part of the FAA's review of the plane's design and assembly.

No final decision has been made about running more tests, these people said. And experts agree it isn't clear whether the tougher tests would have prevented the battery fires on the 787. The National Transportation Safety Board hasn't identified the root cause of the fires after three weeks of investigation.

The FAA reiterated Sunday that it was looking into the 787's "critical systems with the possibility of further action pending new data and information."

Boeing spokeswoman Lori Gunter on Sunday said the 787 had "the most rigorous test program in Boeing's history and the most robust certification program ever conducted" by the FAA. The statement also said the industry group's "standards were not designed for the 787" and didn't "take into account the robust Boeing requirements and specific 787 design features."

The industrywide standards for lithium-ion batteries were approved in March 2008 by nearly two dozen members of a committee set up by **RTCA Inc.**, a nonprofit organization that serves as the FAA's main adviser on certain technical issues. The tougher standards included testing to ensure that even if various backup circuits protecting the battery systems all failed, the batteries wouldn't explode, burn or rupture.

The standards adopted by the FAA for Boeing's 787, by contrast, determined that the likelihood of such multiple failures on Dreamliners was "extremely remote" and therefore no such testing was necessary, according to FAA documents and people familiar with the details. Those standards were published in October 2007 in the Federal Register.

Ms. Gunter, the Boeing spokeswoman, said Boeing "validated through extensive analysis and testing" that the likelihood of multiple failures of backup systems was extremely remote.

RTCA, founded in 1935 as the Radio Technical Commission for Aeronautics, said that "until further details are known," it won't comment on the battery incidents.

The differences between the RTCA's standards and those used for the 787 haven't previously been reported. The standards show that prominent government and industry experts were concerned years ago about "the worst case scenario" for large lithium-ion batteries. Such batteries, which are potentially flammable, had never been used in such a way in passenger jets before the 787.

Global regulators this month grounded all 50 Dreamliners in service in the wake of fires in planes operated by Japan Airlines Co. 9201.TO +1.37% and All Nippon Airways Co. U.S. and Japanese investigators continue to look at whether an internal battery defect, external electrical problem or some combination of the two was responsible for the dangerous incidents.

Experts agree it isn't clear whether stricter testing years ago could have prevented the recent incidents. But testing under the RTCA standards could have shown the potentially catastrophic result of battery problems in conjunction with such failures of safety systems.

The RTCA standards were developed on a separate track and never intended specifically to cover the 787, although some of the same FAA and Boeing officials participated in both efforts and the industrywide group was co-chaired by a Boeing battery expert. The FAA and Boeing weren't obligated to adopt the tougher testing requirements for the 787, although the FAA eventually incorporated the RTCA battery-testing requirement into some of its safety documents and advisory circulars that could apply to models following the 787 family of lightweight, fuel-efficient jets.

The Dreamliner was originally set for delivery in 2008. But a series of production snafus and other problems delayed the first commercial flight until late 2011.

NTSB Chairman Deborah Hersman told reporters Thursday "there are multiple systems [on 787s] to prevent against a battery event" like the one that occurred on the Japan Airlines aircraft at Boston's Logan International Airport. "Those systems didn't work as intended." On Sunday, the NTSB said its recent laboratory tests haven't produced any "significant findings"; it also said it was looking into the FAA's original battery-safety standards. Without a clear timeline from investigators, airlines are girding for uncertainty and flight disruptions from the Dreamliner's problems that could stretch weeks, or perhaps months.

Stanley Whittingham, a chemistry professor at the State University of New York, Binghamton, who worked on some of the first lithium-ion batteries in the 1970s but isn't involved with the 787, said designers should consider what happens if redundant safety circuits don't do their jobs. For starters, he believes the batteries should be enclosed in a more robust container to limit fire damage. "I believe the batteries should have a container as a backstop against fire," he said. "This would seem to be an obvious step to take."

The RTCA's 2008 move was intended to ensure uniform testing of all large lithium-ion batteries installed on future aircraft. The document spells out some testing methods when "all internal or external active protection circuits shall be disabled or bypassed." This test sequence, according to the document, "is designed to demonstrate the extent of a battery failure under a worst-case

scenario" in order to help determine proper size of wiring and circuit breakers.

The test also is intended to show if any flames shoot outside a faulty battery for a period of up to three hours, or if debris or toxic chemicals escape.

Another test, also with protective circuits disabled or bypassed, is intended to mimic an internal short in the battery and show "the effects of the battery going into thermal runaway"-in which the temperature spikes dramatically and spreads to other cells.

The NTSB has identified such a sequence of events aboard the Japan Airlines plane.

The heading above that test reads: "WARNING: Attention is drawn to the possible risk of fire or explosion involved when performing this test."