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Corrosion may have contributed to shuttle disaster

Sea air on launch pad blamed for pinholes in wings

BY SETH BORENSTEIN
Washington Bureau

WASHINGTON — Experts have told NASA for years that simply covering the wings of a space shuttle while it sits on the launch pad could prevent a problem that investigators now think may have contributed to the destruction of the Columbia.

But NASA ignored the recommendation, one of those experts said Wednesday, even though the idea had been endorsed by top materials researchers inside and outside the space agency.

Their suggestion was simple: Drape the equivalent of a painter's drop cloth over the shuttle's wings to protect them from corrosive sea air and prevent tiny pinholes from forming on the edges of the wings.

Those pinholes began to appear on the leading edges of shuttle wings in 1992, first in the Columbia, then other shuttles. Pinholes develop after about 10 flights. The oldest shuttle, the Columbia, broke apart at the end of its 28th flight, and it had far more pinholes than any other shuttle, according to NASA technical reports.

The Columbia accident investigation

board is looking at the pinholes as a possible contributing cause of the Feb. 1 disaster that killed seven astronauts, board member Maj. Gen. John Barry said Tuesday.

Investigators are trying to find the cause of a breach in the Columbia's left wing that allowed hot gas into the shuttle as it re-entered Earth's atmosphere, starting the fatal break-up.

At least five studies by NASA researchers and outside contractors have looked at the pinhole problem since 1995. The most recent ones blame the salty sea air at the Cape Canaveral, Fla., launch site, compounded by flaking paint chips from the launch platform.

Salt interacts with silicon on the carbon

surface of the leading edge of the shuttle's wings to form sodium silicates, which melt at a much lower temperature than the carbon, experts said. The addition of zinc-based paint chips doubles the salt's corrosive effect, top NASA materials researcher Nathan Jacobson wrote in a 1998 study.

Ted Paquette, president of Refractory Composites in Glen Burnie, Md., a materials scientist who helped design the wings' leading edge, said the covering solution makes sense: "It wouldn't take an awful lot, if you had some sort of sticky Saran Wrap, if you wrapped it over the leading edge."

NASA still does not cover shuttle wings and has not changed the paint's composition, said spokesman Bruce Buckingham.