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'Blue Ice' Lays Waste in Paths of Jetliners

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The first thing that struck Charles Stiegler when he stepped into his Westlake Village home that night last May was the smell, a pungent mix of raw sewage and toilet-bowl cleanser.

Following his nose to the master bedroom, he found the ceiling drenched and sagging menacingly. A foul puddle was seeping down from the attic, dripping putrid, aqua-colored water all over his new mattress.

At first, Stiegler thought the bathroom pipes had burst. But the basketball-sized hole that he discovered the next day gaping in his roof suggested something more freakish.

The culprit, deduced Federal Aviation Administration investigators called to the scene, was a quirk of physics and flushing known as the "blue-ice phenomenon."

Although it has been more than 50 years since airlines last dumped sewage midair out a hatch in the bottom of a toilet, waste water does occasionally leak through damaged drain plugs onto the outside of the plane, FAA officials explained.

The liquid-tinted blue by a Tidy Bowl-like concoction-freezes at high altitudes. As the plane begins to descend, the icy blobs loosen and plunge to the ground.

"It was like winning the lottery," said Stiegler, 33, a Mercedes-Benz sales manager. "Only backwards."

More than 15 years after federal aviation officials began calling attention to its hazards, blue ice continues to be one of the jet age's nagging foibles.

Although the FAA keeps no official records, estimates from the agency's eight regional offices suggest that a frozen chunk lands somewhere in the country on the average of nearly once every two weeks.

Just last Thursday, blue ice was suspected of knocking off an engine of a Northwest Airlines jet cruising at 35,000 feet, forcing its emergency landing in Tampa.

Investigators found broad blue streaks and a faulty drain valve on the belly of the plane.

On at least two other occasions, blue ice has done the same thing—once when the motor was struck by a blob breaking loose, and another time when frozen waste on the engine's fan blades threw the motor off kilter and wrenched it loose from the bolts.

In all three cases, the jets landed safely. But in 1985, the FAA fined American Airlines $1.5 million for a string of suspected maintenance violations, including the leaky drain valve believed responsible for one of those incidents on a Boeing 727 headed to San Diego.

Los Angeles County, with some of the nation's most crowded airways above 4,079 square miles of suburban sprawl, ranks among the top recipients of those random droppings.

In the last two years, there have been at least six blue-ice incidents here—in Venice, Whittier, Bell Gardens, Lynwood and Westlake Village. The latest occurred Nov. 1, when a chunk of the stuff broke a rain gutter and some terra-cotta tile off the garage of a Diamond Bar home.

"It shouldn't happen, but it does," said Mitch Barker, spokesman for the FAA's Northwest-Mountain regional office in Seattle, which investigates about two or three incidents a year.

Recent improvements in plumbing technology and more frequent inspections of airplane lavatories have helped reduce incidents to a small percentage of the more than 7 million commercial flights in the United States annually. In fact, there is a greater chance of being struck dead by lightning, which happened to 72 Americans in 1988.

Yet the reality of a blob of frozen effluent the size of a cantaloupe roaring toward Earth at speeds approaching 100 m.p.h. is still disquieting enough to keep a Chicken Little on his toes.

Although there has never been a report of an injury, the ice—which can range in size from an egg to a beach ball—has slammed to the ground just a few feet from where a would-be victim has been sitting in his kitchen or bedroom or car. Last November in Italy, for example, the Rome-based daily Il Tempo reported that a chunk crashed through the window of a convent, spraying glass and sending startled nuns scrambling for cover.

"Chances are you're going to win $1 million before you get hit on the head by blue ice," said Bill Eyre, program manager for the FAA's flight standards office in Los Angeles. "But we do take this seriously and treat it as a danger to the public."

At Boeing Commercial Airlines, the world's largest airplane manufacturer, a 29-year engineering veteran named Jim Likes thinks he has come up with a solution.

Normally, waste water is stored in giant 25- or 50-gallon tanks that are emptied by unscrewing a drain plug on the belly of the plane, hooking up a hose to the valve and pumping out the sewage.

But the rubber seal around the lip of the drain can eventually break down from the constant opening and closing by ground crews, allowing water to leak out and freeze around the outside of the valve. Likes, director of payload systems at the Seattle plant, has helped invent a stainless steel valve that houses those seals internally so that they are no longer exposed to rough handling.

"The biggest drawback has been that the seals can be damaged or knocked off during servicing," Likes said. "With this, I think we've got a design that takes the human element out of the equation."

Yet his valve so far is being placed on only a few new models in the country's largely aging jet fleet; just 125 of the 3,880 jets in commercial use have been upgraded with the device.

Even so, airline industry officials say a tight inspection schedule—one that requires lavatory plumbing to be checked every 200 flying hours—has nearly quelled the problem on its own.

"I don't think what you're seeing is a system failure," said Clyde Kizer, vice president of engineering and maintenance for the Air Transport Assn., which represents all 21 major airlines in the United States. "If something does occur, it would have to be a totally random event."

While there are no records of the first blue-ice incident, waste disposal has been a concern for the airline industry ever since Orville and Wilbur Wright made history in 1903.

Obviously, there was no need for a lavatory during Orville's 12-second flight over Kitty Hawk, noted Donna Corbett, aviation historian for the National Air and Space Museum of the Smithsonian Institution.

But by the time commercial air travel was off the ground in the 1920s, Corbett said, railroad-style toilets that simply dumped waste through a hatch in the bottom of the plane were in common use.

"There was a misperception that anything dropped from high altitudes would automatically disintegrate before it hit Earth," said Corbett, a specialist in the history of U.S. air travel. "All kinds of things were routinely tossed from airplanes."

By the 1930s, the airline industry realized that objects weren't vaporizing in midair. Falling cigars and cigarettes occasionally sparked forest fires when thrown from low-flying crafts, and the U.S. Department of Commerce responded by issuing frequent

warnings to pilots. It probably wasn't until after Dec. 10, 1958, however, when a Boeing 707 made the first jet flight in the United States from New York to Miami, that the blue-ice era was ushered in.

Engineers say the temperature outside an aircraft drops by about three degrees Fahrenheit for every 1,000 feet gained in altitude, making the air at 35,000 feet a frigid 65 below. With planes able to cruise for hours at heights where water freezes speedily, the leaky lavatory became a bona fide safety threat.

One of the first reported cases occurred Oct. 10, 1974, when a block of ice plummeted through the roof of Erma Schuon's apartment in Lansing, Mich., missing the retired real estate agent by about six feet.

"It was like an atom bomb," said Schuon, now 77, recalling that the dropping made Walter Cronkite's evening newscast. "Two months later, I had a heart attack. I kept thinking of that terrible, terrible noise. It's something you never forget."

The next year, the National Transportation Safety Board recommended that the FAA order changes on airplane drain valves to limit such hazards. But after considering the proposal, the FAA decided in 1978 that heightened awareness had decreased the number of incidents and that a rule change was unnecessary.

Since then, researchers at the FAA's technical center in New Jersey have studied the possibility of requiring planes to be outfitted with such anti-ice equipment as heaters, vibrators and Teflon-coated paneling. But the agency has concluded that those devices would probably create as many problems as they solve.

In the meantime, frozen blobs have continued to plummet from the heavens, crashing through Lucille Barthke's Arlington, Tex., home in 1982 while she gardened outside; blasting a crater near A.C. Hinson's home in Norman, Okla., that same year; smashing into Dennis Kent's dairy farm in Benton, Me., in 1985, and denting the fuselage of a Continental Airlines jet headed to Pensacola, Fla., last month. In the areas surrounding major airports, from Los Angeles to St. Louis to Boston to New York, a blue-ice incident is reported on the average of about twice a year, FAA officials in those cities say. In the Western-Pacific region—a 23 million-square-mile area covering California, Nevada, Arizona and Hawaii—FAA officials say they are called to investigate droppings about a dozen times a year.

After almost every incident, someone usually decides to salvage a few chunks of the ice and pop them in the freezer, hoping to solve the mystery or offer proof of the ordeal. For obvious reasons, aviation officials don't recommend this.

At any rate, they say, it usually doesn't take too much detective work to figure out that blue ice has struck. The problem is trying to find out which plane should be held accountable.

Few people look at their watches immediately after being walloped, and on some flight paths in Los Angeles, the difference of just 10 to 20 minutes can mean 10 to 20 different flights.

For Charles Stiegler, who had been out at a childbirth class with his wife, Anthea, between 6:30 and 10:30 p.m. May 8, there was no way to know what time the ice had slammed into their Westlake Village home.

There was just the smell, the flooding, the hole and the shreds of aqua-colored toilet paper that the impact had splayed all across his lawn.

Although Stiegler's insurance policy covered most of the $2,500 in damage, he bristled at having to pay a $500 deductible. Being dive-bombed by frozen effluent was bad enough, he thought. Paying for the pelting burned him up.

"It doesn't make sense," he said. "To my insurance company, it was just like a hit-and-run accident. But I think somebody should be held responsible."