

ARE PLANES WE FLY MORE AT RISK?

ATLANTIC SOUTHEAST FLIGHT 529



ASSOCIATED PRESS FILE PHOTO

AUG. 21, 1995 | NUMBER KILLED: 10

WHAT HAPPENED | The Embraer 120 turboprop crash-landed in a Georgia hayfield after a propeller blade snapped in two. Nineteen people on board survived.

INVESTIGATORS FOUND | Workers at a Rock Hill repair facility failed to discover corrosion on the propeller blade largely because of inadequate training and inspection techniques. The NTSB also faulted the FAA for failing to require recurrent ultrasonic inspections on the propellers.

ABOVE | Workers go through the remains of the plane.

VALUJET AIRLINES FLIGHT 592



KRT FILE PHOTO

MAY 11, 1996 | NUMBER KILLED: 110

WHAT HAPPENED | The DC-9 jet crashed into the Everglades 10 minutes after takeoff from Miami after a fire broke out in the cargo hold.

INVESTIGATORS FOUND | Improperly loaded oxygen generators caused the fire. ValuJet and its third-party maintenance firm were both faulted. The NTSB also criticized the FAA for failing to monitor the two companies or to adequately address the chance of fire in cargo holds.

ABOVE | Airboats circle the site of the wreckage.

DELTA AIR LINES FLIGHT 1288



ASSOCIATED PRESS FILE PHOTO

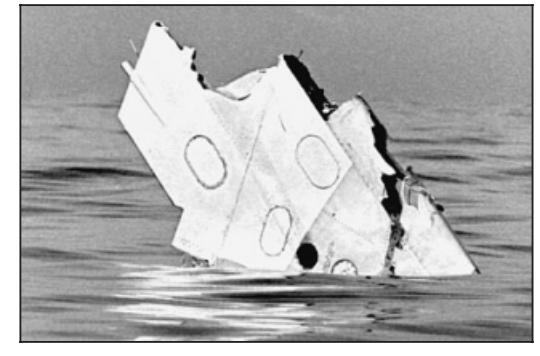
JULY 6, 1996 | NUMBER KILLED: 2

WHAT HAPPENED | The engine of a McDonnell Douglas MD-88 blew apart as the plane accelerated for takeoff from Pensacola, Fla., spraying shards of metal that killed two passengers.

INVESTIGATORS FOUND | A crack in an engine component caused the engine to blow apart. Delta's inspection process failed to detect the crack.

ABOVE | The damaged left engine, shown in a photo shot by a passenger.

TWA FLIGHT 800



KRT FILE PHOTO

JULY 17, 1996 | NUMBER KILLED: 230

WHAT HAPPENED | The Boeing 747 blew up 11 1/2 minutes after leaving Kennedy International Airport for Paris.

INVESTIGATORS FOUND | The center wing fuel tank exploded, most likely because of a short circuit in deteriorated electrical wiring. The NTSB didn't classify this as a maintenance crash. But many experts now say it was maintenance-related, and the Federal Aviation Administration now requires more and better inspections of wiring.

ABOVE | A piece of a wing from the flight floats in the Atlantic Ocean.

A DECADE OF TRAGEDIES | Eight accidents in which maintenance likely played a role, according to the NTSB, investigators and aviation experts.

Oversight seen as lacking

Air Safety from LA

crashes killed 160.

In the Jan. 8 US Airways Express crash in Charlotte, investigators believe that an incorrectly adjusted cable was largely to blame. The NTSB also noted that the plane was slightly overweight.

Air Midwest operated the plane and outsourced the maintenance. The cable work was done by a mechanic working a 14-hour shift and attempting that type of repair for the first time on a Beech 1900D.

Two Colgan Air pilots died when the same type of plane crashed Aug. 26 off Cape Cod, Mass., on its first flight after maintenance. A faulty maintenance manual could have led to improper work on flight control cables in the days before the accident, sources say. Some of the mechanics had never done that procedure on a Beech 1900D, NTSB investigators say.

Mechanics should have discovered any problems with the installation if they'd followed procedural checks, says a spokesman for Raytheon Aircraft, the plane's manufacturer. Colgan Air declined to comment.

Though airline crashes are rare, unscheduled or emergency landings happen almost daily.

In the first six months of 2003, airlines reported problems that threatened safety and led to 180 unscheduled or emergency landings, according to reports airlines file with the Federal Aviation Administration. About 80 percent of the landings had causes often related to maintenance shortcomings - landing gear problems and engine failures.

Regulators increasingly cite airlines for maintenance problems. Since 1990, fines and other FAA maintenance-related enforcement actions against airlines and repair stations increased 57 percent, far exceeding the rate at which the number of flights grew. Maintenance has been the largest single source of enforcement actions in commercial aviation during the past decade.

The airline industry is aggressively cutting costs as it struggles to recover from its worst financial crisis. But airline officials say they have not compromised the quality of maintenance on their planes.

Air travel is "one of the safest modes of transportation," says Terry Kerber, vice president of maintenance and engineering at low-fare carrier ATA. "Safety is at the top of everybody's organizational responsibility."

Overall, crash rates have dropped sharply since the 1960s. During the past decade, the odds of a U.S. commercial flight ending in a fatal crash were roughly one in 3.7 million. In the 1960s, the chances of a crash were about six times higher.

Since 1994 there have been 19 fatal accidents compared with 45



Less than a minute after takeoff, US Airways Express Flight 5481 slammed into a hangar on Jan. 8, killing all 21 people aboard. Investigators believe maintenance contributed to the crash of the plane, which had been worked on two days earlier by contract mechanics.

the previous decade.

"We learn from each event, and certainly we'll continue to make improvements.... But we're part of a pretty safe system," said FAA Flight Standards Director Jim Ballough.

But Ballough acknowledged the agency needs to do more to prevent maintenance errors.

"The last four or five mishaps have had significant issues in the human factors area," he said, speaking about maintenance problems. "We've got to focus in that area. We're going to do that. There has been some progress made, but we need to make more progress."

Maintenance research neglected and underfunded

In the 1960s, '70s and '80s, a series of crashes linked to pilot error and dangerous weather prompted the industry to focus on those problems.

The industry developed cockpit systems to help avoid collisions with other aircraft and to prevent crashes into mountains and other terrain. Modern flight simulators helped train pilots for most emergencies they could encounter. Airports installed more sophisticated weather radar.

The result: Fatal crashes due to pilot error and poor weather dropped sharply. From 1984 to 1993, there were 34 fatal accidents related to pilot error and 14 to bad weather, according to the NTSB. In many accidents, multiple causes are cited. In the next decade, the NTSB linked eight fatal accidents to pilot error, and one to weather.

No comparable effort focused on maintenance, experts say. In the 1980s, faulty maintenance didn't stand out, largely because

crashes related to pilot error and weather were more prevalent. In the past decade, however, fatal accidents related to maintenance far outnumbered weather-related accidents and equaled the number linked to pilot error. Still, only a fraction of federal research money for aviation safety has gone into maintenance.

The FAA usually spends more than \$150 million a year on research, engineering and development. About \$1 million of that typically goes toward research aimed at preventing maintenance mistakes.

Experts say maintenance has been overlooked partly because mechanics play a less visible role than pilots. Most pilots belong to the powerful Air Line Pilots Association, but mechanics are scattered among several unions and aren't as influential.

Purdue University professor Gary Eiff, a certified mechanic who has studied the issue, said he thinks the industry has severely underestimated the prevalence of maintenance problems.

In a 1999 study of accidents and incidents involving regional airlines, Eiff and a colleague found that maintenance problems were a factor in 42 percent of fatal accidents during the previous decade.

"We're too quick to blame people like the pilots when a maintenance problem forces them into a position they're not equipped to handle," Eiff says.

The researchers cited the failure of mechanics to follow procedures and their lack of training and experience.

Most of the more than two dozen regional airline mechanics interviewed by the researchers said they were often expected to

perform maintenance without the proper manuals or documentation. A few reported they were routinely expected to ignore steps or procedures.

In the crash of Flight 5481, NTSB investigators have looked closely at adjustments made to the plane's elevator cables on Jan. 6 in Huntington, W.Va.

With those adjustments, NTSB tests found, pilots would only be able to move the elevator down by about 30 percent to 40 percent of the usual range. That would limit the pilot's ability to control the plane, an NTSB investigator said at a May hearing.

"The data indicate that there was a change in the control column position during maintenance and that the airplane lost about two-thirds of its down elevator capability," said Lorenda Ward, chief investigator for the crash.

On the morning of Jan. 8, the plane was more heavily loaded than during any of the other flights following maintenance. That meant the pilots needed more ability to move the plane's elevator.

The plane took off at a dangerously sharp angle from Charlotte/Douglas International Airport. Investigators believe Capt. Katie Leslie pushed the control yoke as far as it would go, trying to lower the nose, but to no avail.

The plane stalled, rolled to the left and crashed 37 seconds after it took off.

Carol Thompson, whose son, First Officer Jonathan Gibbs, was killed, worries that more lives will be lost.

"The message from the first officer's mother is that something needs to be done because it's going to keep happening," she said.

"By doing that, you are increasing the risk of serious con-

sequences," says Goodrich, who helps run the inspectors' union.

The FAA has about 3,700 inspectors, and is requesting money for about 20 more, an agency spokesperson says.

Ballough said the agency is trying to get smarter about surveillance. It is relying on a 5-year-old inspection program called the Air Transportation Oversight System, which uses inspection records and other data to identify potential problems.

In 2002, a report by the DOT inspector general's office found shortcomings in ATOS, noting many inspectors lacked confidence in it and needed better training. FAA officials say they've addressed those concerns.

"It's going to take an interdependence between us and industry to work together using programs such as this to reduce that accident rate even further," Ballough said.

When safeguards fail, things go wrong in the air

Given the inconsistency of FAA oversight, many experts say, aviation safety depends largely on the airlines' regulatory compliance. Many do a stellar job.

But airlines' and repair stations' own safeguards can fail.

Charles Banks, a retired business developer from Beaumont, Texas, was in the rear bathroom of a Continental Airlines DC-10, headed for a Hawaiian vacation May 21, 1998, when he was knocked to the floor, then thrown to the ceiling and back to the floor.

"I felt like I was a pingpong ball," said Banks, 71.

Banks was knocked out, and awoke to pain and pandemonium. He was sprawled on the floor, his legs in the lavatory, his head out the door. Meal carts were knocked over. One flight attendant was covered in blood, and another was crying in pain, witnesses told the NTSB.

The plane had surged up, then down, 29,000 feet over the Pacific Ocean. One flight attendant told the NTSB "it was like being in the back of a roller coaster."

"I hit the ceiling with my head first and then the force continued until my back was also against the ceiling and I was looking down at the floor," another flight attendant, who suffered a broken leg, told investigators. "A few seconds later, I fell to the floor..."

The plane returned to Los Angeles, where Banks was hospitalized for seven days with two cracked vertebrae. He said he still feels pain more than five years later. Three flight attendants were also seriously injured.

At first, authorities blamed the episode on turbulence. But NTSB investigators later determined a defect in the autopilot had led to the plane's rapid ascent. The captain had reacted by disconnecting the autopilot and pulling the plane's nose down.

The NTSB faulted the airline for failing to "diagnose and correct a historical problem."

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