

## ARE PLANES WE FLY MORE AT RISK?

## Training, oversight scrutinized

## Planes from 1A

cluding that it's harder for airlines to ensure quality work when they farm it out to contractors.

Aviation consultant Bart Crotty, a former FAA inspector who has examined many repair stations, said he expects the outsourcing trend will hurt the caliber of maintenance.

"But will it be to the degree that it affects safety?" Crotty asks. "That's the question."

## Problems found more often at repair shops than airlines

About 4,600 U.S. repair stations do outsourced work. They range from four-person shops that repair propellers to sprawling facilities that employ hundreds of mechanics and are authorized to work on every kind of jet.

Industry leaders say most mechanics do excellent work, regardless of whether they're employed by airlines or contract shops.

"I think we're all damn good at maintenance," said Sarah MacLeod, who helps run the Aeronautical Repair Station Association, a group that represents third-party shops. "...The reality of the industry is if you don't do it well, you get sued."

No formal studies have examined how repair stations' work compares to that done by the airlines.

But The Observer found that when the FAA visits repair stations, it is slightly more likely to find problems.

When FAA officials inspect contract stations, they find problems that result in enforcement or follow-up action 5.4 percent of the time, according to one database with information about FAA inspections since 2000. That's higher than the 3.8 percent rate the FAA found when inspecting airline maintenance shops. In 2002, the difference was slightly larger.

The enforcement actions include cases where shops released planes with problems that could affect flight.

The Observer derived the figures from the FAA's most comprehensive inspection database. The database covers only a portion of inspections conducted at the top 10 airlines, but includes those at all other airlines and repair stations.

For smaller airlines, which can't afford elaborate operations for heavy maintenance, contract repair stations are a logical solution. Often, experts say, contractors can specialize, and can become better at some procedures than the airlines.

Executives at Greensboro-headquartered Timco Aviation Services Inc., a leading repair contractor that serves several major airlines, say their work is as good as that done by the airlines. They say flights are rarely canceled or delayed as a result of mechanical problems following their overhauls.

Timco executives contend they undergo more scrutiny than airlines because, in addition to reviews by the FAA and their own inspectors, their customers send representatives to oversee their work.

"There's many more layers of oversight for a company like ours than a typical air carrier maintenance facility," said Timco President Gil West.

Southwest Airlines outsources about three-quarters of its maintenance, more than most airlines. Jim Sokol, the airline's vice president of maintenance and engineering, said third-party shops do work that is comparable in quality. "I think we've done a damn good job at controlling that," Sokol said.

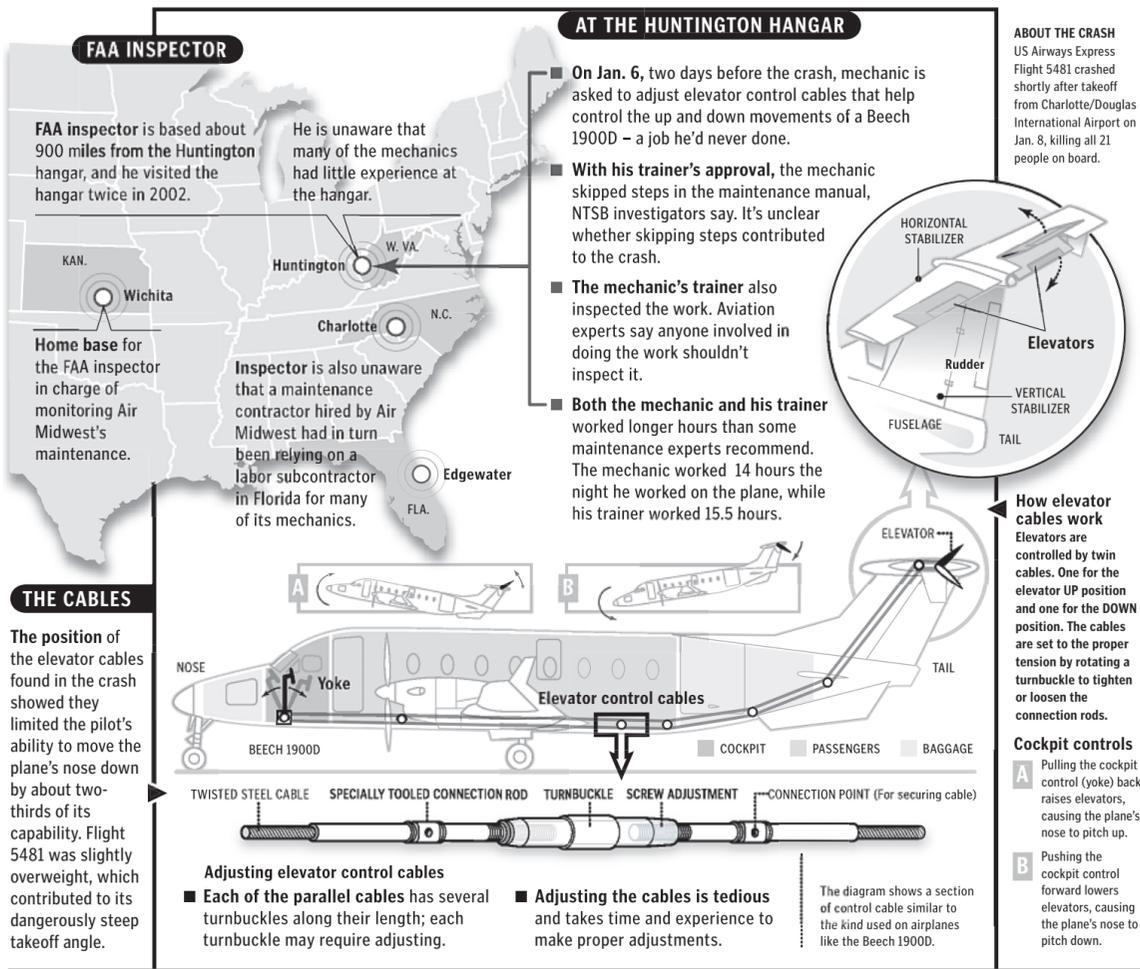
## Trend away from in-house work affects training, pay

Prior to the 1980s, airlines did almost all their own maintenance. That changed with deregulation and the increased availability of leased aircraft, which made starting an airline easier and less expensive. Those startups didn't have money to build elaborate maintenance facilities, so they found third-party providers.

More repair stations opened as entrepreneurs realized how much money could be made. And more major airlines turned to those repair stations when they realized how much could be saved.

## Final Maintenance of a Fatal Flight

The flight data recorder on US Airways Express Flight 5481 — which crashed in Charlotte Jan. 8 — showed unusual elevator movements on all flights following the plane's maintenance on Jan. 6. This graphic summarizes the maintenance and inspections performed on the plane two days before it crashed.



The trend radically changed airline maintenance.

At US Airways' maintenance hangars, which are typical of hangars run by major airlines, top mechanics earn about \$62,000 a year, and virtually all are certified.

According to FAA data, the agency conducts about 200 inspections a year at the Charlotte hangar, and more than 400 annually in Pittsburgh, where the FAA office that oversees US Airways is located.

At about 80 repair stations certified to work on large airliners, however, the FAA does an average of about eight inspections a year, The Observer found. Only about half of the mechanics are certified.

According to a recent survey by Airline Maintenance magazine, line mechanics, who repair problems reported by pilots and do routine maintenance checks, earn an average of \$36,300 a year at repair stations — \$20,000 less than those at major airlines. Third-party contractors tend to hire less experienced mechanics and must cope with higher turn-

over.

For some repair station mechanics, in-house training is less thorough than what airlines offer. Many mechanics at repair stations are contract workers, rather than permanent employees, and "there is economic pressure to minimize training" for those temporary workers, according to a 1999 study by researchers at the State University of New York at Buffalo.

In aircraft maintenance, inexperience and poor training can prove deadly.

On Aug. 21, 1995, an Atlantic Southeast Airlines turboprop was flying from Atlanta to the Mississippi coast, with 29 people aboard. Suddenly, the plane lurched to the left and began losing altitude fast. A propeller blade had snapped in two.

For nine minutes, pilots fought for control. Passengers prayed as a flight attendant coached them to prepare for an emergency landing.

Finally, the plane plowed into a hayfield in Carroll County, Ga. Nine passengers and a pilot ultimately died from injuries suf-

fered in the fiery crash.

Crash investigators faulted Hamilton Standard's Rock Hill repair shop, which inspected the propeller blade about a year earlier. Investigators concluded that workers at the Rock Hill plant failed to detect corrosion that likely caused the blade to snap.

The National Transportation Safety Board found that the inspecting technician didn't have the required training. Many of the station's inspectors were experienced in the automobile industry, not aviation.

"There was tremendous pressure in the Rock Hill, S.C., plant, with the emphasis on moving those blades through the process rather than ensuring that each blade was correctly inspected," said Jim Hall, then NTSB chairman, following the board's investigation.

Atlantic Southeast declined to talk about the crash.

In the years since the accident, the Rock Hill plant has closed, and Hamilton Standard has merged with another company to become Hamilton Sundstrand. The company acknowledged

that some of its procedures then were inadequate, according to Hamilton Sundstrand spokesperson Peg Hashem. She said the company launched an extensive program to "ensure that such a fracture did not happen again."

## After deadly crash, FAA told to increase oversight

Less than a year after the Atlantic Southeast crash, tragedy struck again.

In May 1996, a maintenance contractor at Miami International Airport improperly stowed oxygen generators in the cargo hold of a ValuJet DC-9. Soon after takeoff, the generators caught fire and the plane crashed into the Florida Everglades, killing all 110 aboard.

After the crash, the NTSB advised the FAA to improve its oversight of contract stations. Critics and watchdog groups have made the same recommendation ever since.

In another report issued earlier this year, the U.S. Transportation Department's inspector general's office concluded that the FAA still doesn't adequately

## FAA Maintenance Oversight: Years of Criticism

For more than 15 years, watchdog groups have faulted the Federal Aviation Administration for failing to keep close enough tabs on airline maintenance. Among the reports:

A 1985 report by the Congressional General Accounting Office discovered troubling gaps in the FAA's airline safety inspection program. It found wide variations in the number of FAA maintenance and operations inspections between regions and carriers.

A 1987 GAO study found the FAA's system for inspecting airline safety procedures was inadequate. The report criticized the FAA for failing to pay enough attention to how the "fiercely competitive, deregulated environment" could affect maintenance.

On April 28, 1988, the passenger cabin of an Aloha Airlines 737 tore open in flight, killing a flight attendant and injuring 61 passengers. The National Transportation Safety Board faulted the airline's maintenance program and the FAA's failure to effectively monitor it.

A 1994 report by the U.S. Department of Transportation inspector general's office found widespread use of unapproved parts and outdated manuals at contract repair stations that maintain planes for airlines. The report concluded the FAA should do more in-depth inspections of repair stations, or run the risk of substandard maintenance in those shops.

On May 11, 1996, a ValuJet DC-9 crashed into the Florida Everglades, killing all 110 aboard. Investigators found a maintenance contractor had improperly stowed oxygen canisters, which caught fire in the plane's cargo hold. The NTSB concluded ValuJet had not properly overseen its contract maintenance program, and criticized the FAA for failing to adequately monitor the airline's maintenance.

In 1998, the GAO found shortcomings in the FAA's surveillance of contract repair stations. The FAA typically relied on individual inspectors to monitor repair stations, even though teams of inspectors were far more likely to find systemic problems, the report found.

A 2001 study by the DOT inspector general's office found the FAA isn't doing enough to ensure airlines monitor their own maintenance programs.

Another inspector general report, issued in 2002, found shortcomings in the Air Transportation Oversight System (ATOS), the FAA's new system for monitoring major airlines. Among other things, the report found that many inspectors lacked confidence in the program and needed better training to carry it out.

A 2003 report by the GAO found that the FAA's training curriculum for airline mechanics is obsolete and has not changed significantly in more than 50 years.

In July, an inspector general study found that the FAA has failed to effectively oversee the contract repair stations that now do about half of all maintenance work on the nation's commercial planes. Again, the auditors recommended that the FAA pay more attention to repair stations and ensure its inspectors have the time and resources to do the job. "While these recommendations were made over six years ago, we found that the same weaknesses in repair station oversight prevail today," the report found.



oversee maintenance contractors, and hasn't kept up with the growing outsourcing trend.

The audit found that the FAA had overlooked problems at 18 of 21 repair stations that government inspectors examined. Repair stations were using improper parts and outdated manuals, auditors found. They also discovered some stations didn't fix problems found in past inspections, and had insufficiently documented whether workers were qualified and trained.

Instead of increasing its scrutiny of repair stations, the FAA has inspected them less in recent years, The Observer found. The number of FAA inspections of repair stations dropped more than 20 percent from 2000 to 2002, according to a database analysis.

FAA officials say fewer inspections don't necessarily equate to inadequate surveillance. They say inspectors are doing a better job focusing on areas where risks are highest.

They say they're also working to improve their scrutiny of repair stations. For example, they are trying to improve communication among the FAA offices that monitor those stations, according to Jim Ballough, the director of flight standards.

"We're going to see how we can leverage our folks a little better to do that oversight," Ballough said.

## Repair stations play role in keeping regulations outdated

The regulations the FAA tries to enforce are outdated, too.

Changes aimed at modernizing repair station regulations have been delayed for years, largely because of station operators' concerns. The first revision, effective in January, would require repair stations to revamp the manuals they submit to the FAA.

Another change, scheduled for 2005, would require all repair stations to have FAA-approved training manuals.

But another proposal, which would have required repair stations to have quality assurance programs, was shelved after industry representatives said it wasn't necessary and would add to their costs.

All the major U.S. airlines are required to have quality assurance programs.

## Harder to guarantee quality of work performed off-site

Studies have found it's harder for airlines to ensure good maintenance work when they farm it out.

A recent Northwestern University study found that with third-party maintenance, "the communications channels become much more complex, and hence there is greater scope for error."

The State University of New York study came to similar conclusions, saying that removing the maintenance operations from the airline "must introduce an error potential which is absent from in-house operations."

But the researchers found no evidence that a group of mechanics at a large repair station made more errors than a group at a major airline.

In some ways, repair stations have a more complicated job than airline shops. Many stations serve multiple airlines, each with its own maintenance rules. The SUNY researchers found more than 20 maintenance manuals at one repair station.

Experts argue standards can slip when repair work is done by contractors who are removed from an airline's operations.

In a 1996 memo to co-workers, a former maintenance manager at Timco pointed to potential problems.

"It appears that the lack of discipline in following proper procedures, even knowing to follow proper procedures, is terribly lacking in the Foreman and Project Manager ranks. It's get the job done, I'll shortcut the procedures and by the way I'm not accountable for them..." reads the memo, which is cited in lawsuits against the company. "Somebody needs to hit these people over the head with a 2 by 4."

Timco has been under new management since 2001, and its officials say those criticisms don't apply now.

"What I can say today, at least, is that we have a very strong focus on quality and safety," says West, the company president.