

Pilots may have been overwhelmed in seconds

INDONESIA, FROM PAGE 1
trying to determine if that is what happened.

Boeing in the past week issued a global bulletin advising pilots to follow its operations manual in such cases. But to do so, experts said, would have required Flight 610's captain, Bhavye Suneja, a 31-year-old Indian citizen, and his co-pilot, Harvino, a 41-year-old Indonesian, to have made decisions in seconds at a moment of near-certain panic.

They would have had to recognize that a problem with the readings on the cockpit display was causing the sudden descent. Then, according to the F.A.A., they would have had to take physical control of the plane.

That would not have been a simple matter of pushing a button. Instead, pilots said, Captain Suneja could have braced his feet on the dashboard and yanked the yoke back with all his strength. Or he could have undertaken a four-step process to shut off power to the electric motors in the aircraft's tail that were wrongly causing the plane's nose to pitch downward.

All this would have needed to have happened within seconds — or the aircraft would be at serious risk of entering a death dive.

"To expect someone at a moment of high pressure to do everything exactly right is really tough," said Alvin Lie, an Indonesian aviation expert and the country's ombudsman. "That's why you don't want to ever put a pilot in that situation if there's anything you can do to stop it."

CROWDED SKIES

Even as ever more people take to the air, flying has never been safer. Last year was the safest in the history of commercial air travel. On average, only one out of every 16 million flights results in a deadly accident, according to the Aviation Safety Network. Nearly a decade has passed since a fatal crash by an American airline.

Yet as the evidence accumulates, it appears that the fate of Flight 610 may illustrate how a chain of individual events, particularly in highly automated planes, can lead to fatal consequences.

The crash also points to a growing problem in aviation indirectly caused by the advent of low-cost airlines and an explosive growth in the number of people who can afford to fly. While Boeing and its European rival, Airbus, are producing planes as fast as they can, the number of experienced pilots, aircraft engineers, mechanics and even air safety regulators has lagged.

"The problem is, the less-desirable airlines are the ones with the least resources that are scraping the bottom of the barrel in terms of human resources," said Martin Craigs, the chairman of Aerospace Forum Asia, an industry advocacy group in Hong Kong.

Lion Air's story began nearly 20 years ago, when an Indonesian travel agent and his brother established it as an airline that would offer cheap flights between the islands scattered across the country's densely populated archipelago.

Even as the politically connected company, which owns several airlines, fueled its aggressive expansion with borrowing from banks and government credit agencies, it also racked up at least 15 major safety lapses. Pilots complained that they were overworked and underpaid, and some who challenged the company on contract issues are now in jail.

More troubling, pilots said that the culture at the airline neglected safety. One pilot who refused to fly a pair of planes that he considered unsafe was



Family members grieved over the coffins of Flight 610 victims. In the days following the crash, Lion Air was involved in at least two missteps, according to aviation officials.

eventually sidelined by Lion Air and settled his case in court years later.

A former investigator for Indonesia's National Transportation Safety Committee said that Lion Air repeatedly ignored orders to ground planes for safety issues. Pilots and former safety regulators said that Lion Air flight and maintenance crews regularly filled out two log books, one real and one fake, to hide malfeasance.

Edward Sirait, the general affairs director of Lion Air, said in an interview that the airline considered safety, along with business expansion, its top priorities. He disputed the existence of fake pilot logs.

"They are pilots," he said. "They are professional."

Mr. Sirait also said that he had no information about what may have caused the Flight 610 crash. "I am not an engineer," he said.

Many aviation experts are skeptical about the company. "Lion's corporate culture is against safety," said Mr. Lie, the ombudsman. "If they can fly the plane, they will, rather than ground it and figure out what the problem is."

During the two days before Flight 610 began its final journey, there were repeated indications that pilots were being fed faulty data — perhaps from instruments measuring the speed and a key angle of the plane — that would have compromised their ability to fly safely.

Engineers tried to address the issue in at least three airports, Indonesian investigators said.

After the plane's penultimate flight, for instance, technicians recorded in a maintenance log that they had fixed the pitot tubes, external probes on the airplane that measure relative airspeed. Earlier that day, on the resort island of

Bali, engineers swapped out a sensor that measures the angle at which oncoming wind crosses the plane.

Called the angle of attack sensor, this instrument tells the pilot if the nose of the plane is too high, which could cause the aircraft to stall. In the Max 8, if the data indicates the nose is too high, the aircraft's systems will automatically pull the nose down.

If the sensor data is wrong, the system could cause the plane to dive.

It is not yet certain if the airspeed sensors and angle of attack sensors malfunctioned on the final flight, or if the computers that process the information coming from the sensors malfunctioned.

It is only with further analysis of data on the plane's so-called black boxes, of which only one has been found, that the cause will be determined.

Still, experts say they are surprised that a plane with known problems was cleared for takeoff again and again. Some say they are aghast, wondering why Lion Air was so cavalier.

"I cannot believe the plane was allowed to fly," Ruth Simatupang, a former air safety investigator, said of Flight 610's final takeoff. "It goes against all standard operating procedures."

THE LAST FLIGHT

Before dawn, as the tropical air in Jakarta still hung with moisture, Captain Suneja most likely would have engaged in a ritual familiar to any pilot, walking around the plane that he was to take into the air. He had 6,000 flight hours under his belt, a testament to his diligence during the seven years he had worked for Lion Air.

One of the many mysteries of Flight 610 is why Captain Suneja agreed to fly a plane that maintenance logs should have indicated had two days of airspeed problems — one just a few hours before he was to take off for the small city of Pangkal Pinang, on a tiny, tin-mining island in the Java Sea.

"We want to know why the pilot said yes," said Ony Soerjo Wibowo, an Indonesian air safety investigator looking into the case. "Maybe me, I would not say yes."

Could Captain Suneja have felt pressure from a go-go airline to fly a questionable aircraft? Did he not see the maintenance logs that enumerated the problems? Or did he simply not realize that these issues were so serious? Planes experience anomalies all the time. That is why maintenance crews are always on hand and play such a vital role.

At 6:21, long after the first Muslim prayer had reverberated across Indonesia, Captain Suneja took off from Soekarno-Hatta International Airport. Within a couple of minutes, the flight crew radioed Jakarta air-traffic control and requested permission to return, which was immediately granted.

Captain Suneja did not issue a may-day distress call. Nor did he turn back for the capital. Instead, the plane banked sharply left and embarked on a roller coaster trajectory that would have surely terrified the passengers.

In the days following the crash, Lion Air was involved in at least two other missteps — a plane's wing clipped a pole, and a flight from Malaysia suffered a hydraulic failure upon arrival in Jakarta, according to aviation officials.

THE FINAL SECONDS

When the 11th minute of Flight 610 began, the plane was still in nearly level flight at an altitude of about 5,000 feet. By the end of that minute, it had shattered into a kaleidoscope of pieces in the water, after hurtling earthward nose first at perhaps 400 m.p.h., according to measurements from the Flightradar24

online data service. What caused the aircraft to tip downward so sharply in that final minute is the greatest enigma. Over the past several days, investigators have been looking into whether it was a maintenance failure or a possible shortcoming in the Boeing 737 Max 8 that could affect other fleets operating the jet. Investigators are also exploring the possibility that the pilots were not adequately trained in how the plane differed from earlier models.

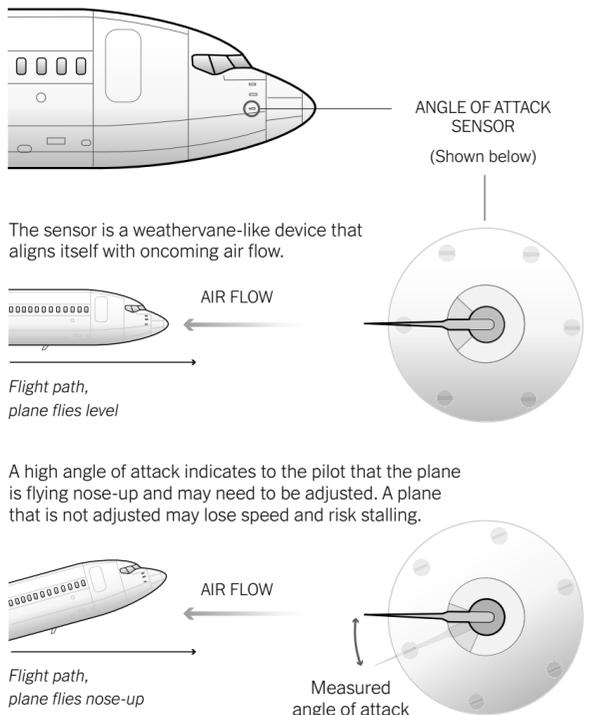
Older versions of the Boeing 737 have a reputation among pilots for ease in ad-

justing the angle of the plane's nose, should a problem arise, said John Cox, the former executive air safety chairman of the Air Line Pilots Association in the United States and now chief executive of Safety Operating Systems, a consulting firm.

But in the new version, Boeing introduced an emergency system that automatically corrects the nose angle to prevent the plane from stalling. In its safety bulletin, Boeing said the system could push the nose down for a full 10 seconds without the pilot's authorization.

A Critical Sensor

The downed airplane may have received false input from an angle of attack sensor, which measures the angle at which oncoming wind crosses the plane. It is crucial in preventing the plane from stalling.



MIKA GRÖNDAHL/THE NEW YORK TIMES



Postgraduate Diploma in Asian Art

Object-based study of the arts of China, Japan & Korea, India, Southeast Asia and the Islamic world including access to the reserve collections in the British Museum and Victoria and Albert Museum

Short courses also available

Further details from:
Dr Heather Elgood
Phone: +44 (0) 20 7898 4445
Email: asianart@soas.ac.uk

SOAS, University of London
Thornhaugh Street
Russell Square
London WC1H 0XG
www.soas.ac.uk/art



