

Safety advances boost plane crash survival odds

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In this Saturday, April 13, 2013, file photo, released by Indonesia's National Rescue Team rescuers arrive at the crash site of a Lion Air plane in Bali, Indonesia. The plane carrying more than 100 passengers and crew overshot a runway on the Indonesian resort island of Bali on Saturday and crashed into the sea, injuring nearly two dozen people, officials said. (AP Photo/National Rescue Team, File)

Passengers in plane crashes today, such as the one in San Francisco involving Asiana Airlines Flight 214, are more likely to survive than in

past disasters.

Saturday's crash was the latest where a big [commercial airliner](#) was destroyed but most passengers escaped with their lives. There were plenty of cuts, bruises and broken bones—and some more severe injuries—but only 2 of the 307 passengers and crew onboard died.

Planes now are structurally sounder. In the cabin, stronger seats are less likely to move and crush passengers. Seat cushions and carpeting are fire retardant and doors are easier to open. Those improvements allow people to exit the plane more quickly.

The nature of crashes has also changed. Improvements in cockpit technology mean that planes rarely crash into mountains or each other—accidents that are much more deadly.

"Crashes are definitely more survivable today than they were a few decades ago," said Kevin Hiatt, president and CEO of the Flight Safety Foundation, an industry-backed nonprofit group aimed at improving air safety. "We've learned from the past incidents about what can be improved."

Investigators are still trying to determine the cause of the Asiana crash. But whatever the reason, it reflects the trend of fewer people dying in plane accidents.

The odds weren't always in passengers' favor. From 1962 to 1981, 54 percent of people in U.S. plane crashes were killed. From 1982 to 2009, that figure improved to 39 percent, according to an Associated Press analysis of National Transportation Safety Board data. Those figures only include crashes with at least one fatality. There have been other serious crashes where everybody survived.

The most famous was a US Airways flight in January 2009 that lost engine power after striking a flock of geese after taking off from New York's LaGuardia Airport. Capt. Chesley B. "Sully" Sullenberger ditched the Airbus A320 in the Hudson River and all 155 people onboard survived. The crash was dubbed the "Miracle on the Hudson."

A British Airways flight in January 2008 crashed short of the runway at London's Heathrow Airport. All 152 passengers and crew onboard the Boeing 777—the same jet type as Saturday's Asiana flight—survived.

This April, a Boeing 737 flown by Indonesian airline Lion Air crashed into water short of a runway in Bali. The plane's fuselage split into two sections but all 108 people on board survived.

"What's really important is for people to understand that airplane crashes, the majority of them are survivable," Deborah Hersman, chairwoman of the National Transportation Safety Board, said Sunday on the CBS News television show, "Face the Nation."

Several advances in aviation technology have made these feats of survival possible. They include:

— Stronger seats. Today's airplane seats—and the bolts holding them into the floor—are designed to withstand forces up to 16 times that of gravity. That prevents rows of seats from pancaking together during a crash, crushing passengers.

— Fire retardant materials. Carpeting and seat cushions are now made of materials that burn slower, spread flames slower and don't give off noxious and dangerous gases.

— Improved exits. Doors on planes are much simpler to open and easily swing out of the way, allowing passengers to quickly exit. And planes

now come with rows of lights on the floor that change from white to red when an exit is reached.

— Better training. Flight attendants at many airlines now train in full-size models of planes that fill with smoke during crash simulations.

— Stronger planes. Aircraft engineers have looked at structural weaknesses from past crashes and reinforced those sections of the plane.

Regulators started mandating such cabin improvements after two deadly aircraft fires in the 1980s.



This Thursday Jan. 17, 2008 file photo, shows the undercarriage from a British Airways Boeing 777 plane flying from China that landed short of the runway at London's Heathrow Airport. An official report said Thursday Sept 4, 2008, that ice in fuel lines probably caused the British Airways jet to lose power and make a jarring emergency landing in London in January. (AP Photo/Tom Hevezi)

First, an Air Canada flight made an emergency landing at Cincinnati's airport in 1983 after a fire broke out in the bathroom. The plane landed safely but half of the 46 passengers and crew died because they couldn't quickly escape the smoke and fire.

Two years later, a British Airtours plane aborted a takeoff in Manchester, England after an engine fire. Passengers evacuated but not fast enough. Of the 137 people onboard, 54 died after inhaling toxic smoke.

Those two accidents together led the U.S. and British governments to impose new fire-safety standards, said Bill Waldock, a professor of safety science at Embry-Riddle Aeronautical University's Prescott, Arizona campus.

Saturday's Asiana crash may have benefited from those changes. The Boeing 777 involved was manufactured in 2005 and contained all of the advances in safety.

"It may have been worse if that fuselage had been designed with practices that were common 20 or 30 years prior," said Todd Curtis, a former safety engineer with Boeing and now a director of the Airsafe.com Foundation.

The emergency response also played a part in limiting the number of fatalities. Airport fire departments frequently hold drills where crews simulate a crash and practice coordinating with area hospitals on how to care for the injured.

"Had this happened in a developing world country with no (advanced) trauma center, there might have been more fatalities," Curtis said.

New technology helps today's pilots avoid the deadliest types of crashes.

Accidents with planes hitting mountains or each other in midair, typically at speeds up to 500 mph (800 kph), are rare in North America and Europe. Crashes during landing happen while planes are flying at lower speeds of 130 mph (210 kph) to 150 mph (240 kph).



In this Wednesday Aug. 3, 2005, file photo, crash investigators examine the wreckage of Air France flight 358 at Pearson Airport in Toronto. All 309 people on the Airbus A340 survived. (AP Photo/The Canadian Press, Frank Gunn)

"You've changed the nature of accidents," said Capt. Alan W. Price, the former chief pilot for the Atlanta base of Delta Air Lines and founder of consulting firm Falcon Leadership.

Today's planes come with ground proximity warning systems, which

alert pilots if they are too low. An alarm sounds and a computer shouts "terrain, pull up."

That technology didn't exist in 1974, when a Trans World Airlines plane heading for Washington Dulles International Airport crashed into 1,754-foot (535-meter) tall Mount Weather in Virginia. All 92 people on board died.

Modern cockpit radar systems alert pilots to other planes nearby. Such a system would have probably prevented the 1960 midair collision of a TWA jet with a United plane over New York, killing all 128 people on the two planes and 6 people on the ground.

Better radar systems on the ground have also helped. They've prevented planes from going down the wrong taxiway or onto active runways. The deadliest aviation disaster in history remains the collision of Pan Am and KLM jets on the runway of Tenerife in Spain's Canary Islands in 1977. In foggy conditions, amid confusion over air traffic controller instructions, the KLM plane took off while the Pan Am jet was taxiing down the same runway. The crash killed 583 people on both planes; 61 survived. Had such radar existed at the time, the KLM pilots would have probably seen the Pan Am jet in its way.

Today, thanks to these advances there are about two deaths worldwide for every 100 million passengers on commercial flights, according to an Associated Press analysis of government accident data.

Just a decade ago, passengers were 10 times as likely to die when flying on an American plane. The risk of death was even greater during the start of the jet age, with 1,696 people dying—133 out of every 100 million passengers—from 1962 to 1971. The figures exclude acts of terrorism.

Those in the airline industry often say that a person is more likely to die driving to the airport than on a flight. There are more than 30,000 motor-vehicle deaths each year, a mortality rate eight times greater than that in planes.

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