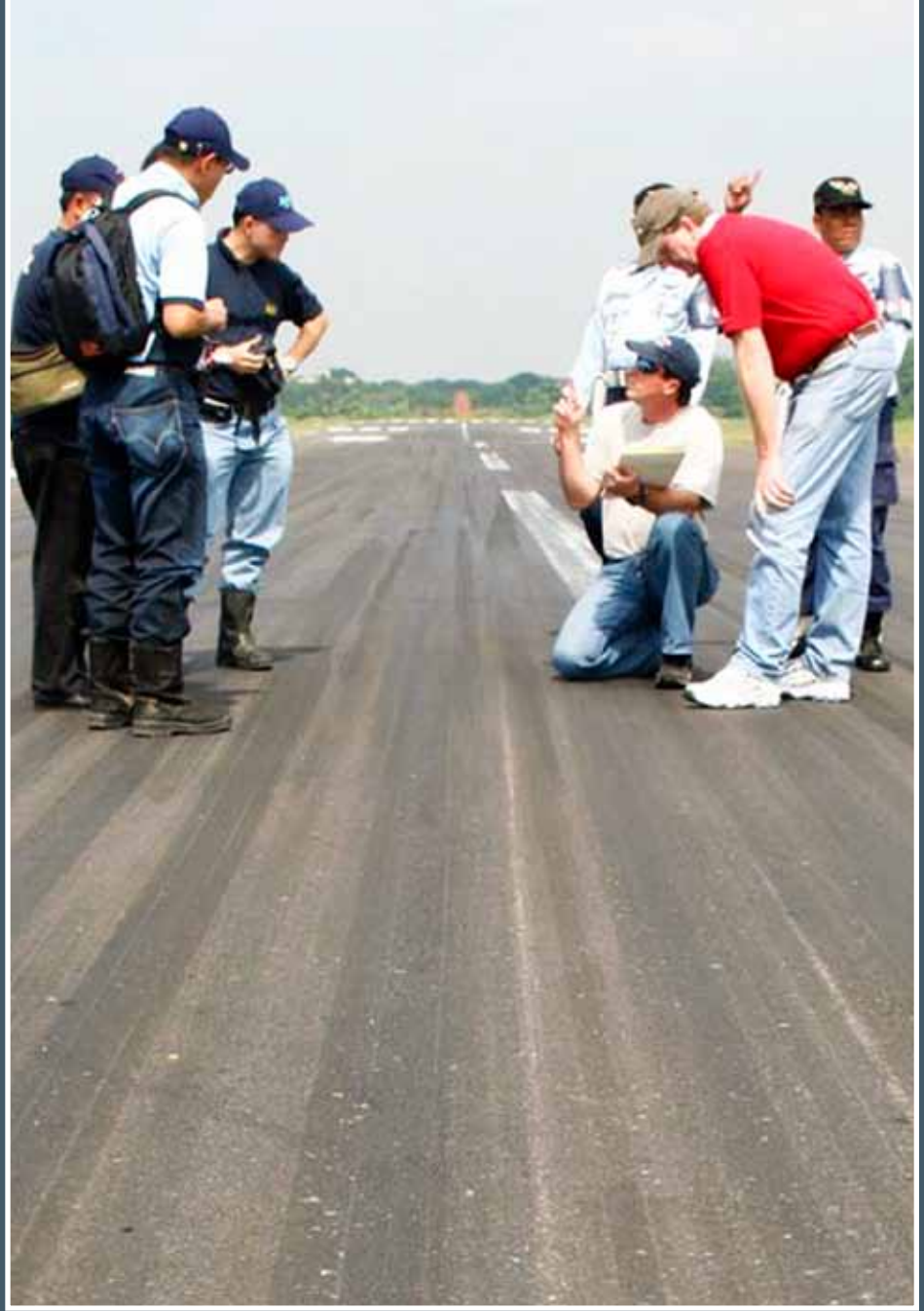

THE GO TEAM

The aim of these Boeing investigators is to make flying even safer than it already is

By Sandy Angers

PHOTO: Boeing air safety investigator Rick Mayfield (kneeling) examines runway marks with investigators from the National Transportation Safety Board and Federal Aviation Administration during a 2007 investigation. NATIONAL TRANSPORTATION SAFETY BOARD

As an air safety investigator, Rick Howes knows he could get a call in the middle of the night that could send him packing for some remote region of the world.

Howes is a part of a specialized team of Boeing investigators who assist government agencies in determining the cause of airplane accidents. These investigators—six of whom are based in Washington state and two in California—must be ready to go anywhere an accident has occurred within hours of the event.

Approximately 6 million people fly safely to their destinations every day, making flying one of the safest modes of transportation. Howes' job—and that of the Boeing investigative team—is to help keep it that way.

Although the aviation industry focuses on preventing airplane accidents in the first place, tremendous effort goes into investigating them. The goal is to learn from any accident.

"That's our charter—to determine the cause so we can prevent it from happening again," Howes said.

International protocol, defined by the International Civil Aviation Organization treaty, establishes that a government with jurisdiction over an accident site leads an investigation. Accredited representatives from the countries of the airplane's manufacturer, designer, operator and registry are invited to join the investigative team. For international accidents involving Boeing airplanes, the accredited representative is the U.S. National Transportation Safety Board. The NTSB leads all domestic investigations.

Boeing's role is to support the NTSB as technical adviser.

Because accidents typically result from a chain of events, investigating and determining probable cause can be complex.

"First impressions are not usually correct. We don't rely on speculation; evidence determines what really occurred," said Tom Dodt, chief engineer of Boeing Air Safety Investigation.

That's why investigative teams follow a disciplined process that includes data gathering and analysis.

During the initial hours after an accident, Boeing mobilizes a "go team" to join the NTSB. These investigators usually lead a small, preselected field team that can include experts on structures,

PHOTOS: (Clockwise, from top left) Boeing investigator Rick Howes helps determine the bank angle of an airplane that hit trees in a Peruvian swamp. NTSB Boeing investigator Simon Lie, on a Taiwanese Coast Guard boat, uses a receiver to locate "pinger" signals from the flight data recorder and cockpit voice recorder of an aircraft in a 2005 accident. TAIWAN AVIATION SAFETY COUNCIL Boeing investigator Lori Anglin (left) examines an airplane that sustained fire damage during a major incident in which no one was injured. NTSB Boeing investigator Bill Steelhammer examines a wingtip of an MD-80 from a 2007 accident in Turkey. PRATT & WHITNEY, NTSB Boeing investigator Richard Andersons matches a damaged interior panel to an oxygen cylinder while examining a decompression incident. KEN HICKS/BOEING, NTSB, AUSTRALIAN TRANSPORT SAFETY BUREAU Boeing investigator Mark Smith documents a 2007 accident site in an Amazon jungle. NTSB

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systems, performance and human factors, as well as a pilot.

At the scene, the investigator in charge gathers NTSB and other members of the investigative team, including Boeing personnel, to establish what's known and set initial priorities for the investigation. Among the first of these is to retrieve the flight data and cockpit voice recorders, known as black boxes. These can quickly provide the investigation with some focus and help corroborate other factual information collected in the field. Still, all parties of the investigation must resist the temptation to draw early conclusions.

"That's challenging because as engineers, we want to resolve things. But part of our training as investigators requires us to let the data speak for itself in the days, weeks or months to come," Howes said.

A "go team" can be in the field for several weeks, depending on the location and condition of the site. Generally, accidents over an ocean can lengthen the field phase, but not always.

Even on land, an accident site can be difficult to find or access. Sometimes, roads have to be built to the site, or teams have to hike through jungles or use helicopters to reach a mountaintop.

Once work in the field concludes, the team returns home for the analysis phase, work that can often take a year or more to complete.

"We have data and information at this point, but we have to go about turning that data into knowledge, which can be used to prevent future accidents," Dodt said.

Data from the black boxes are analyzed. Recovered airplane components are examined and tested as required. At the request of investigative authorities, Boeing frequently provides analytical tools and capabilities as well as access to company test labs and flight simulators.

From 20 to 100 Boeing employees can be involved in supporting this phase, depending on the amount of available data. Based on their knowledge of the airplane, Boeing specialists can determine whether a particular part sustained damage prior to or as a result of the accident.

Once analysis is complete, the investigative authority draws conclusions and publishes a final report, which typically includes safety recommendations that may be directed to a regulator such as the U.S. Federal Aviation Administration, as well as to the airplane operator, air traffic control or manufacturers.

These recommendations may be implemented before the investigation is complete. For example, in the case of the January 2008 crash landing of a 777 at Heathrow Airport, in which all passengers and crew were safely evacuated from the jet, a team led by the UK Air Accident Investigation Branch discovered the reason both engines lost thrust as the airplane approached the airport.

The team learned that on long-range flights during winter, where fuel temperatures can be below freezing for extended periods, ice from water that is naturally present in fuel can accumulate inside the fuel feed system. On rare occasions, ice can release and collect at the engine heat exchanger, restricting fuel flow to the engine.

Boeing quickly worked with regulators and operators to implement temporary flight-crew procedures while the engine manufacturer redesigned the engine heat exchanger. The redesigned component was certified and installation was mandated last year.

"By the time the final report came out earlier this year, there were no additional recommendations in that specific area, because corrective action was already under way," said Mark Smith, a Boeing air safety investigator. ■

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For more information about Boeing's efforts to advance aviation safety, visit www.boeing.com/commercial/safety/index.html