AIR CRASH INVESTIGATION AND BLACKBOX

"Aviation in itself is not inherently dangerous. But to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity or neglect."
— Capt A. G. Lamplugh, British Aviation Insurance Group

Air travel today remains safe, thanks in part to accident investigation. Findings from accident investigators pave the way for important safety improvements in aviation, like the recent changes to pilot duty and rest requirements that address the pilot fatigue problem that was a factor in so many accident reports. These changes are preventing accidents and saving lives.

The accident investigation process is fairly simple on paper but can be complicated by intangible things like politics, legal action, and international differences, as well as physical demands such as rough terrain or post-accident damage from weather. There are many parties and factors involved in aircraft accident investigation, as outlined below.

Who's Involved in an Investigation?

- IIC: Every aircraft accident will have an Investigator-In-Charge or IIC. This is the company or entity in charge of the entire investigation.
- NTSB: In the United States, the National Transportation Safety Board is the authority on aircraft accident investigation, with the exception of some government and military accidents. In addition to their domestic duties, NTSB officials are often called to assist in foreign accidents based on their high level of experience and knowledge. Further, the NTSB can choose to investigate an incident or accident that they would not normally investigate to complete studies to enhance aviation safety further.

- ICAO: The International Civil Aviation Organization doesn't have any authority over a country's investigation board, but it does produce standards and protocols that should be followed for accidents that represent two or more countries.
- FAA: Although some might think that the FAA should be investigating airplane accidents, we're lucky that they don't! They do take part, mostly to determine if any regulations were broken and in general, to be aware of safety issues and legal action that might be necessary.

- Local Police/Fire/Medical Examiners: If an accident occurs at an airport, the airport's emergency plan will go into effect. For obvious reasons, the local fire, police or medical workers may be witnesses to the events just after an accident and are important to the investigation.
- FBI: The FBI gets involved when accidents involve a national security breach or terrorism event.

Accident Priorities:

Since the NTSB cannot possibly investigate each accident that happens in extreme detail, they have to spend their time where it's most valuable. Therefore, aircraft accidents are divided into four categories ranging from 'major investigation' to 'limited investigation'.

A major investigation will likely be conducted in the case that it involves a large airline, important people, or terrorism. An entire team of people and resources will be devoted to a major investigation.

A limited investigation, on the other hand, involves mostly light aircraft accidents for which the NTSB reviews an operator-submitted report. According to Air Safety Investigator Grant Brophy, "limited accidents are typically investigated by phone with various parties, based upon information reported on NTSB 6120.1 form."

On the Scene

If the accident is big enough or important enough, the IIC will launch a "Go-Team," which is a group of people predetermined to react to an accident of magnitude, such as an air carrier accident. The "Go-Team" usually includes the IIC, an NTSB board member, and various specialists, depending on the accident type. If for instance there is preliminary information that an engine failed, the aircraft's engine manufacturer and engineers will participate.

Even before they arrive on the scene the IIC will work to set up an operational base from which all members can be organized and given specific duties.

Local police, fire, and rescue will be coordinated, as will security for the accident site and media initiatives arranged, when needed.

First and foremost, victims and witnesses will be identified and given aid.

The wreckage is then examined, photographed, videotaped and preserved. In some cases, it is sent away to be further examined at a lab.

During the course of the investigation, measures are taken to secure wreckage in the way of hazardous material and other dangers to the investigative crew. Then the investigators will each work on their prospective assignments, depending on individual needs.

A wreckage analysis is done to determine landing impact, velocity, and angle. The status of the propellers, flight instruments, and even the passenger seats can tell investigators a lot about what might have happened.

BLACKBOX

Blackbox are the simple devices which are the useful to find the mystery behind the air crashes. These are the keys to reveal the secret for these flight accidents. They are installed in the flight for the purpose of safety of the air travelers.

The "black box" is made up of two separate pieces of equipment: the flight data recorder (FDR) and a cockpit voice recorder (CVR). They are compulsory on any commercial flight or corporate jet, and are usually kept in the tail of an aircraft, where they are more likely to survive a crash. FDRs record things like airspeed, altitude, vertical acceleration and fuel flow. Early versions used wire string to encode the data; these days they use solid-state memory boards. Solid-state recorders in large aircraft can track more than 700 parameters.

Black boxes are normally referred to by aviation experts as electronic flight data recorders. Their role is to keep detailed track of on-flight information, recording all flight data such as altitude, position and speed as well as all pilot conversations. It is common for many civil airliners to have multiple devices to carry out these tasks so that information can be gathered more easily in the event of a failure. In most instances, they are used to help in the diagnosis of what may have been the likely cause of an accident.