UPDATE: AIRASIA QZ8501 CRASH

Cause Map

Component Failure and Crew Action, Not Weather, Found to Have Caused Crash

Immediately following the crash, severe weather in the area was believed to have been the cause of the loss of control of the plane. However, recovery of the "black box" and a subsequent investigation have found that it was a component failure and the crew's response to the upset condition, that resulted in the crash and that weather was not responsible.

"It's a series of technical failures, but it's the pilot response that leads to the plane crashing."

- Richard Quest, CNN's aviation correspondent

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

CAUSE MAPPING
Problem Solving • Incident Investigation • Root Cause Analysis

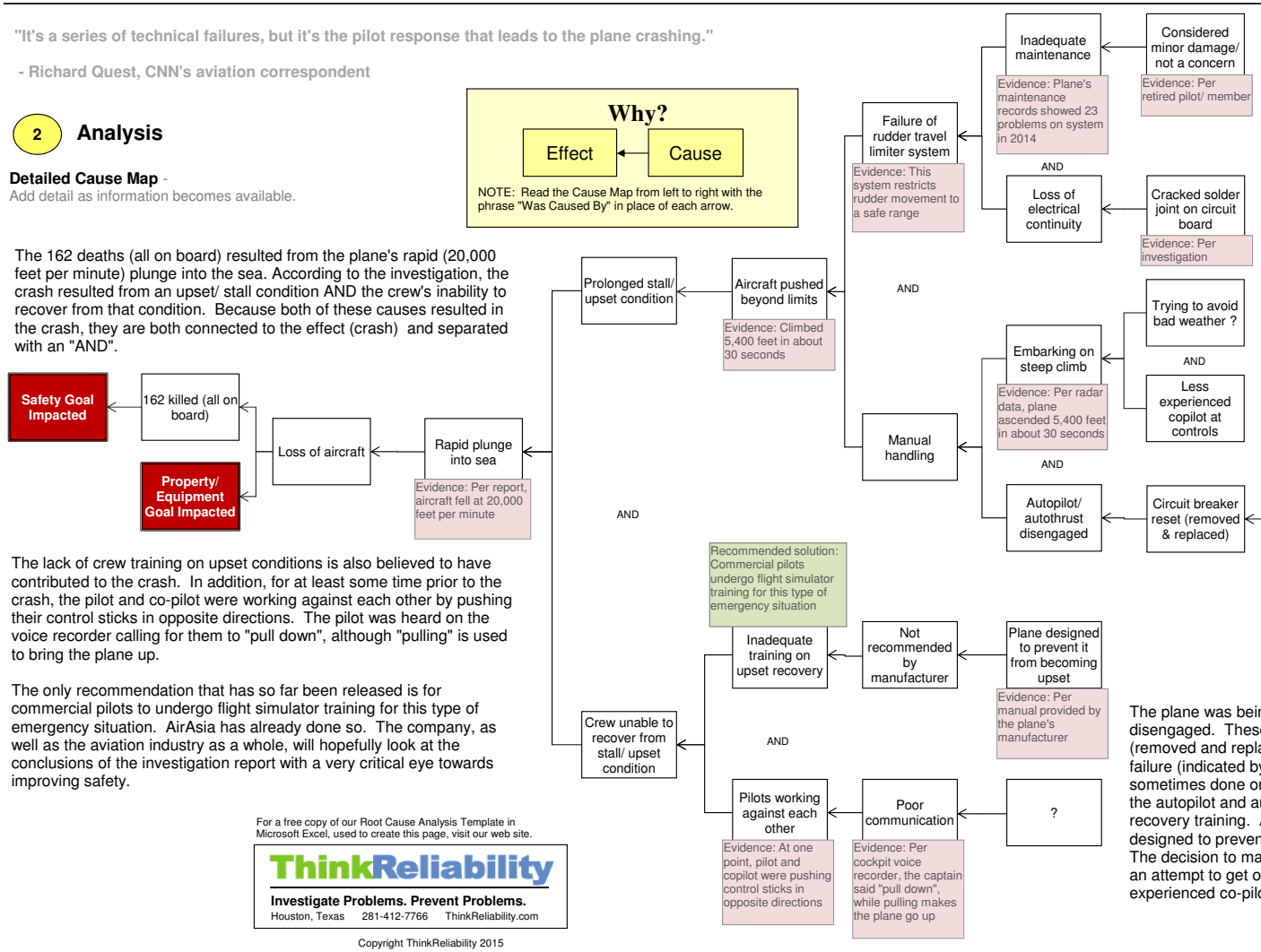
Step 1 **Problem** — What's the Problem?
Step 2 **Analysis** — Why did it happen?
Step 3 **Solutions** — What will be done?

2 Analysis

Detailed Cause Map -
Add detail as information becomes available.

Why?
Effect ← Cause
NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.

The 162 deaths (all on board) resulted from the plane's rapid (20,000 feet per minute) plunge into the sea. According to the investigation, the crash resulted from an upset/ stall condition AND the crew's inability to recover from that condition. Because both of these causes resulted in the crash, they are both connected to the effect (crash) and separated with an "AND".



See same cause

The prolonged stall/ upset condition resulted from the aircraft being pushed beyond its limits. (It climbed 5,400 feet in about 30 seconds.) This occurred because of manual handling and because of the failure of the rudder travel limiter system, which is designed to restrict rudder movement to a safe range. The system failed due to a loss of electrical continuity from a cracked solder joint on a circuit board. Although maintenance records showed 23 complaints with the system in the year prior to the crash, it was not repaired. A former pilot and member of the investigation team stated it was considered "minor damage" and was "not a concern".

The lack of crew training on upset conditions is also believed to have contributed to the crash. In addition, for at least some time prior to the crash, the pilot and co-pilot were working against each other by pushing their control sticks in opposite directions. The pilot was heard on the voice recorder calling for them to "pull down", although "pulling" is used to bring the plane up.

The only recommendation that has so far been released is for commercial pilots to undergo flight simulator training for this type of emergency situation. AirAsia has already done so. The company, as well as the aviation industry as a whole, will hopefully look at the conclusions of the investigation report with a very critical eye towards improving safety.

The plane was being manually controlled because the autopilot and autothrust were disengaged. These systems were disengaged when a circuit breaker was reset (removed and replaced) to attempt to reset the system after a computer system failure (indicated by four alarms that sounded in the cockpit). While this is sometimes done on the ground, it shouldn't be done in the air because it disengages the autopilot and autothrust systems. However, the crew had inadequate upset recovery training. According to the manual from the manufacturer the aircraft is designed to prevent it from becoming upset and therefore training is not necessary. The decision to manually place the plane in a steep climb is believed to have been an attempt to get out of the poor weather. Just prior to the crash, the less experienced co-pilot was at the controls.

For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.

ThinkReliability
Investigate Problems. Prevent Problems.
Houston, Texas 281-412-7766 ThinkReliability.com

Copyright ThinkReliability 2015