



THINKING LIKE AN ACCIDENT INVESTIGATOR

ATTENDING SCSI'S WEEK-LONG HELICOPTER ACCIDENT INVESTIGATION COURSE GAVE THIS PILOT A NEW APPRECIATION FOR INVESTIGATORS' CHALLENGING AND PAINSTAKING WORK.

By Elan Head



When an aircraft accident occurs, a pilot's first impulse is to speculate on what went wrong.

It's certainly my first impulse, although I've written about enough accidents over the years to know that I should restrict my theories to a small group of friends until a preponderance of evidence supports them. Not everyone is so cautious. Speculating about accident causes has become a full-time sport on YouTube and social media, fueled by the increasing availability of eyewitness

video and, more recently, generative artificial intelligence, which can fabricate a plausible-sounding explanation for any crash in a matter of seconds.

Now, however, I'm hesitant to share my theories even with friends. After attending the Southern California Safety Institute's (SCSI's) week-long Helicopter Accident Investigation (HAI) course in Redondo Beach, California, I have a new appreciation for how challenging and meticulous the work of accident investigation is, even in cases that seem to be



SCSI's Matt Robinson at the Helicopter Accident Investigation course in October. **Elan Head Photo**

straightforward. In any accident investigation, there's a lot happening behind the scenes — none of which is evident to armchair experts equipped with a few seconds of cell phone video and ChatGPT.

Indeed, the more one knows about accident investigation, the more careful one tends to be about assigning blame. As the president of SCSI's Air Group, Matt Robinson, tells would-be investigators: "If you have a hypothesis, keep it to yourself, because you might be wrong."

CULTIVATING SKEPTICISM

Robinson is a former U.S. Marine Corps CH-46E helicopter pilot who also served as a lead aircraft accident investigator at the Naval Safety Center, where his remit encompassed everything from helicopters to fighter jets. Still an active investigator, he teaches many of SCSI's courses himself, including HAI. For my course, he was joined by B. Harris Hooper,

an experienced helicopter pilot who spent 25 years at the Federal Aviation Administration, including four years as the head of its Accident Investigation Division.

HAI is one of more than 20 courses in accident investigation and prevention offered by SCSI, which was founded in 1989 by the late aviation safety expert Peter Gardiner. Today, it continues its mission under the leadership of Gardiner's daughter, Christine Schmitz. In addition to a full slate of accident investigation courses — including specialty topics such as gas turbine accident investigation, unmanned aircraft systems, and flight data analysis — SCSI offers multi-course certificates in safety management systems and human factors.

SCSI delivers courses under contract to clients around the world, and holds open enrollment courses each year in various locations in Europe, most recently Vienna. However, the majority of its open enrollment



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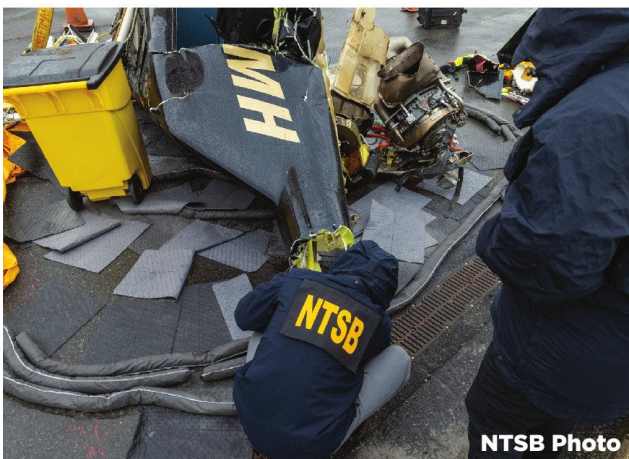
courses — around 30 each year — take place in Redondo Beach. SCSI has set up shop in Redondo Beach Hotel, which has fenced off a corner of its parking lot to serve as a crash lab. It’s a terrific location, convenient to Los Angeles International Airport and a short walk from the beach.

According to Robinson, “there are no typical students . . . we get people who have never touched a helicopter or an airplane, who are brand-new, and we get some very experienced investigators in here who are just coming in to see what the latest and greatest is.” While my classmates skewed heavily toward the experienced side, their backgrounds otherwise varied widely, ranging from government agencies and the military to helicopter manufacturers and operators.

SCSI courses do not have prerequisites, which is why I was able to enroll in HAI with no prior experience in accident investigation beyond poring over a lot of National Transportation Safety Board reports. However, Robinson recommends that anyone new to the field start with SCSI’s Aircraft Accident Investigation (AAI) course, which spans two weeks and covers accident investigation techniques more broadly.

“AAI is an introduction,” Robinson said, explaining that the course is designed to “impart how an investigator needs to think. We’re different: we’re skeptical, we’re unbiased.” Robinson said he teaches his students a variation on the scientific method, similar in approach to the one taught in primary school but slower to arrive at a hypothesis.

“It’s not developing a theory or hypothesis, it’s just asking questions, collecting the data, analyzing it — and then you can go into the hypothesis and validating it,” he said. During my week in Redondo Beach, “ask questions first, hypothesize later” would become a recurring theme.





SCSI instructor B. Hooper Harris (left) formerly headed the FAA's Accident Investigation Division.
Elan Head Photo

HELICOPTERS ARE DIFFERENT

While the basic principles of accident investigation may hold across aircraft types, the HAI course exists because “there’s something different about helicopters,” Harris explained on the first morning of our class. He invoked the sales pitch of pioneering helicopter inventor Igor Sikorsky, who was also one of the helicopter’s best publicists. While ships require deep ports, trains need rails, automobiles need roadways and airplanes runways, a helicopter, he said, can go just about anywhere.

Practically, what that means is that helicopters routinely do things that no other vehicle can do, operate in places that no other vehicle can go, and have unique features that enable those capabilities — all of which can contribute to accidents. For example, Harris said, “our operating environment is a lot more variable. It’s a lot more unpredictable.

And there’s a lot more opportunities for the environment itself to snare us, to trip us up.”

Over four days of classroom instruction, Harris and Robinson covered many of the special characteristics of helicopters in the context of how they crash. While some of their material would be familiar to any helicopter pilot or mechanic (and there were a number of us in class), their emphasis on real-world case studies and practical implications for investigators kept things interesting.

“We try and weave in as much real-world case studies into the content as possible,” Robinson said. “That really connects with our students — they like the war stories. Everyone loves to hear all of the mistakes that I have made in investigations, from passing out inside a nacelle to getting chemical burns on my feet from not protecting myself.”

These first-hand accounts also drove home just how winding and unpredictable accident

Ground resonance was one of the covered topics that might be unfamiliar to investigators without a helicopter background. **ATSB Photo**





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investigations can be, even ones that appear to be cut-and-dried. Robinson recounted one helicopter accident investigation he led during his time in the Marine Corps, which on the face of it seemed to be a straightforward case of controlled flight into terrain (CFIT). During the investigation, however, he discovered a fatigue crack in the wreckage, and subsequent inspections revealed similar cracks throughout the active fleet. That required extensive flight and bench testing to determine whether fatigue damage had played a causal role in the crash (he determined it did not).

“Can you imagine if I would have just said CFIT, and somebody had come across these pictures [of the fatigue crack]?” Robinson said. “If you start suspecting CFIT, you’re going to have a long, long investigation. . . . Why? It may sound easy, [but] you need to rule everything else out.”



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LEARNING TO ASK ‘WHY’

Near the end of the course, we had a chance to put what we had learned into practice with a visit to the crash lab. This corner of the hotel parking lot contains the wreckage of several airplanes and helicopters that met their ends in various tragic ways. Our task was to establish how a particular JetRanger on the lot arrived in its present state.

“Finding wreckage for a lab is difficult for a bunch of reasons,” Robinson told me.

“Number one, it’s got to have a good learning objective. If it’s just a crashed airplane, we can go through some of the evidence and what it looks like, but we need more of a story behind it, and that’s what our exhibits have.”

The lab was run not as a show-and-tell but as a mock investigation, with my classmates encouraged to comb over the wreckage and ask questions to draw out more evidence. Naturally, some of them were tempted to speculate on the cause of the crash after a



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The SCSi crash lab contains the wreckage of two JetRangers. While students were only tasked with investigating one of them, the second JetRanger was available as an exemplar to compare the state of various components. **Elan Head Photo**

cursory look at the wreckage; these early hypotheses were generally wrong. But by working together, they were eventually able to identify a mechanical failure, which led them back into the classroom to pore over maintenance records and interview transcripts to identify contributing factors.

“Probably the hardest thing to impart on new investigators, or any investigator, is to keep asking why, over and over and over again, until you start annoying people,” Robinson said. “If you’re annoying people and asking why, you’re doing a damned good job.”

That relentless pursuit of “why” meant that the handful of us who recognized the JetRanger and already knew the probable cause still had plenty to keep us busy. Beyond the immediate mechanical failure that led to the crash and the organizational factors that contributed to it, there were broader issues of regulation and oversight that made the crash

more likely. While other students focused on the proximate causes, Harris talked us through some of these overarching issues, which received less attention in news reports.

Even with a leg up on my classmates, I found the crash lab daunting. There were so many things to examine, so many details that could be missed, so many ways to be led astray. And that was just in the wreckage itself. When I contemplated all of the other aspects of the investigation — the witnesses to be interviewed, the maintenance records to be scrutinized — I couldn’t believe I had once speculated on the cause of this crash on the basis of a four-second video.

That’s not to say I’ll never do so again in the future; I am, after all, a pilot. But the next time I come up with a hypothesis based on such slender evidence, I’ll know I should keep it to myself. ✦



✦ ELAN HEAD

An award-winning journalist, Elan is also an FAA Gold Seal flight instructor with helicopter and instrument helicopter ratings, and has held commercial helicopter licenses in Canada and Australia as well as the U.S.