Airbus AS 350 Series Floor Mounted Control Quadrant Hazards

The Airbus AS 350 series is a popular helicopter (also known as an “AStar” or a “Squirrel”) that is used throughout Alaska for a variety of missions involving carrying passengers. Some of these missions include commercial operations (aerial photography, glacier treks, heli-mushing, heli-skiing/snowboarding, construction, etc.), public use, and natural resource industry support (oil, gas, mining, forestry, etc.).

Figure 1. An Airbus AS 350 conducting a pinnacle approach in remote mountainous terrain.

The floor mounted control quadrant is a design found only on the Airbus AS 350 series (AS350 B, AS 350 BA, AS 350 B1, and AS 350 B2). Some AS 350 B3 models have the main rotor brake lever and the emergency fuel shutoff lever mounted on the floor with the fuel flow control lever (FFCL) removed and a twist-grip throttle mounted on the collective instead. The control quadrant levers are susceptible to interference from passengers and objects, which can result in inadvertent movement of the controls and cause a loss of engine power. Methods to prevent this interference are described in the passenger briefing supplement provided with this Safety Briefing (located at https://www.aasfonline.org). Operators and pilots should consider printing and laminating the supplement and carrying it with the passenger briefing cards in the helicopter. Have each passenger review the supplement before each flight. This is an optional, free aviation safety educational resource, with unlimited copying and distribution permitted.

Operators of the Airbus AS 350 series, right seat pilot drive configuration, should consider installing a safety guard to help protect the control quadrant from interference. This safety guard is installed via a Federal Aviation Administration (FAA) approved supplemental type certificate (STC) process or field approval process. If the safety guard doesn't provide adequate interference protection from the left side and above, consider installing an acrylic plastic shield on top of the safety guard. For left seat pilot drive configuration, consider installing an acrylic plastic shield on the left side of the control quadrant to prevent interference. Placard the acrylic plastic shields with caution wording to communicate the interference danger to passengers. Contact your local FAA Flight Standards District Office for assistance and any necessary approval to install safety guards and acrylic plastic shields. This best safety practice of using a safety guard along with an acrylic plastic shield is incorporated by several AS 350 operators throughout Alaska.

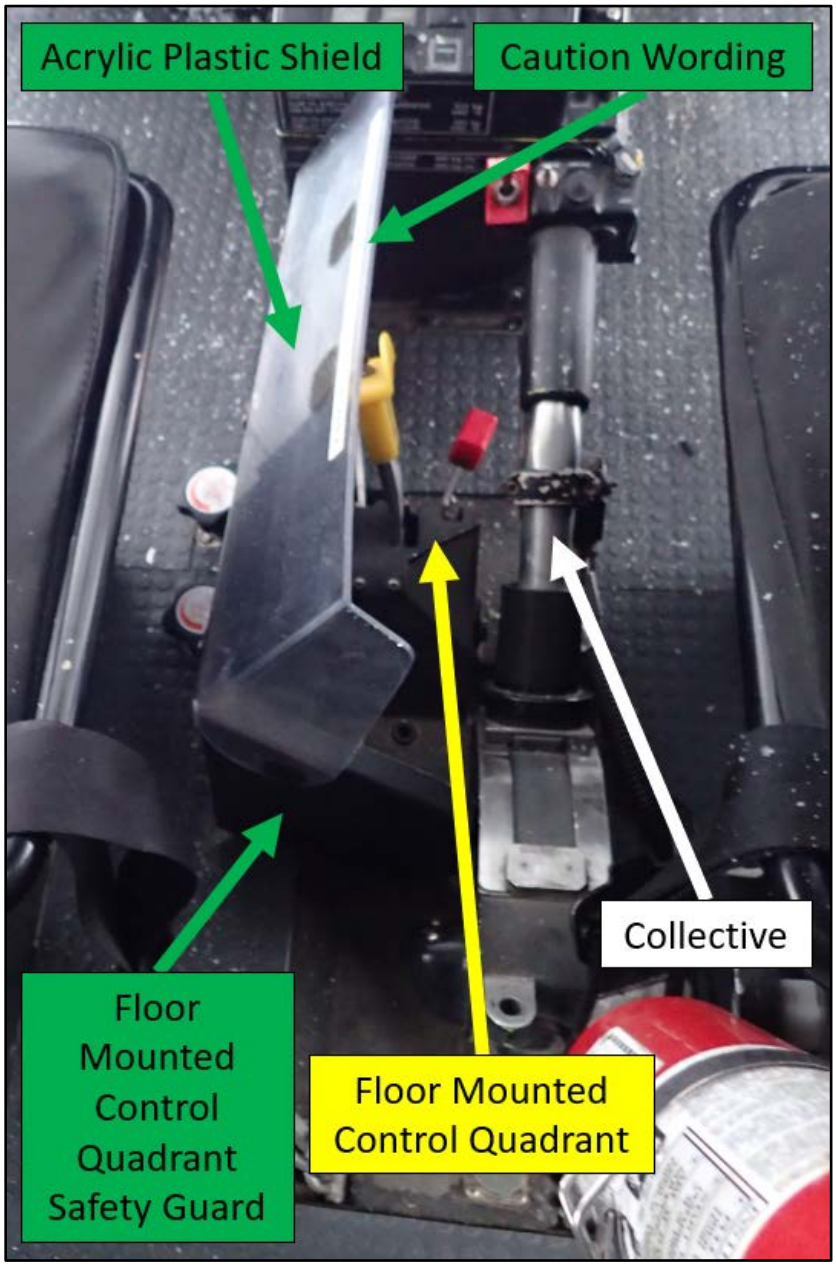

Figure 2. An installed exemplar safety guard (right seat pilot drive configuration), with an attached exemplar acrylic plastic shield and caution wording, viewed from the cabin.

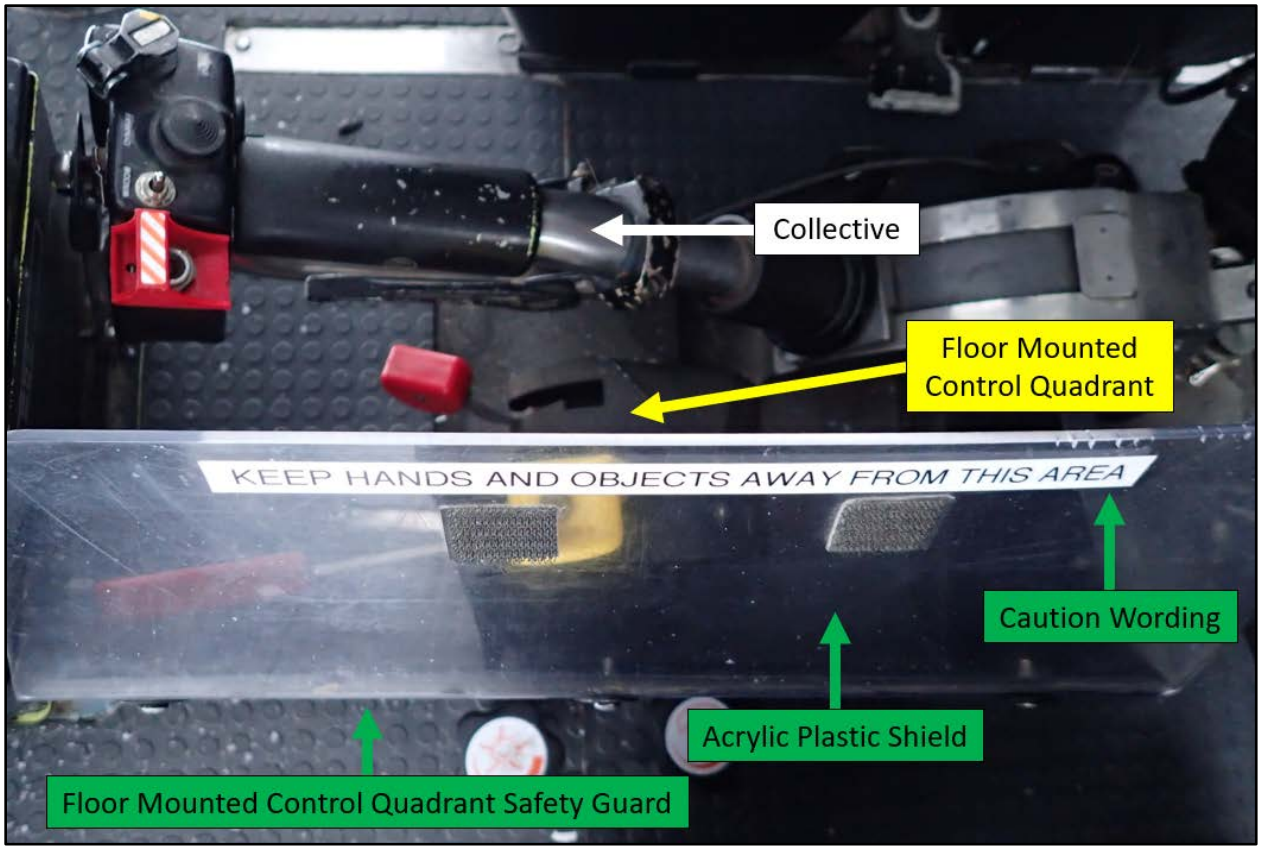

Figure 3. An installed exemplar safety guard (right seat pilot drive configuration), with an attached exemplar acrylic plastic shield and caution wording, viewed from the left side of the cockpit.

Commercial operators and public use organizations should be familiar with this safety issue, and provide education to management, pilots, mechanics, and ground crew personnel to enhance safety awareness. If animals are carried onboard the helicopter, they should be secured from movement near the control quadrant. Specific information should be included in the company's operations manual about passenger briefing requirements, passenger loading and unloading procedures, passenger en route procedures, and object securing procedures that address the prevention of interference with the control quadrant.

Pilots who fly AS 350 series helicopters should ensure passengers are adequately briefed on the potential to inadvertently move the various control quadrant levers and should use extreme caution when loading and unloading passengers and during en route procedures. All objects should be safely secured in the helicopter. All seat belt assemblies for the front passenger seat should always be secured when not in use and not left dangling loose.

Passengers who fly in AS 350 series helicopters should be aware of the potential to inadvertently move the various control quadrant levers. Passengers should understand that all body parts and objects must

always be kept away from this critical safety area, and ensure all objects are properly secured prior to flight. Examples of objects that could interfere with the control quadrant levers include camera straps, backpacks, purses, clothing articles, electronics cords, tools, ski/snowboard equipment, mountaineering equipment, tactical equipment, etc.

If an object is dropped anywhere in and around the control quadrant (such as a cellular phone, pen, tool, camera lens, etc.), the passenger should not reach for the item but should immediately alert the pilot about the dropped item. Objects dropped inside the control quadrant gate plate have the potential of causing jamming with the levers.

If an interference event occurs, and you feel this was due to the inference susceptibility of the control quadrant design, report the event to the FAA via a Service Difficulty Report (https://av-info.faa.gov/sdrx/). FAA Advisory Circular (AC) 20-109A "Service Difficulty Program" states that, "any report can be very constructive in evaluating design or maintenance reliability."

Accident Case References:

1. ERA18MA099 (N350LH, 2018, aerial photography flight) – A 5-person fatal injury Airbus AS 350 B2 accident near New York, New York, where the pilot reported that during an engine failure and autorotative sequence, he realized the emergency fuel shutoff lever was in the off position. He further reported that he noted that a portion of a passenger's tether was underneath the emergency fuel shutoff lever. A rollover occurred during the emergency water landing.

   https://app.ntsb.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20180311X13013&AKey=1&RType=Prelim&IType=MA

2. ANC08FA053 (N213EH, 2008, passenger flight) – A 4-person fatal injury Airbus AS 350 B2 accident near Chickaloon, Alaska, that identified the interference susceptibility of the FFCL.

   https://app.ntsb.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20080421X00524&AKey=1&RType=Final&IType=FA

3. Unknown case number (F-GKDP, 1998, aerial photography flight) – An Airbus AS 350 B2 accident in France, where the passenger's unintentional movement of the FFCL resulted in an engine failure and subsequent hard landing.

   https://www.bea.aero/en

4. HCL 62/96 (OY-HEC, 1996, aerial photography flight) – A 1-person fatal injury Airbus AS 350 B1 accident in Greenland, where the passenger's unintentional movement of the FFCL resulted in an engine failure over water and subsequent ditching.

   http://www.havarikommissionen.dk/index.php?lang=en

5. A94W0037 (C-FHBG, 1994, helicopter air ambulance flight) – An Airbus AS 350 B accident in Canada, where the FFCL was inadvertently moved by either a patient or a backpack, which resulted in an engine failure and subsequent hard landing.

   http://www.bst-tsb.gc.ca/eng/rapports-reports/aviation/1994/a94w0037/a94w0037.pdf

Additional References:

1. National Transportation Safety Board Safety Recommendations A-10-129 (to the FAA), A-10-130 (to the FAA), and A-10-131 (to the European Aviation Safety Agency), referencing ANC08FA053, involving the design and interference susceptibility of the FFCL in the Airbus AS 350 series.

   http://www.ntsb.gov/safety/safety-recs/recletters/A-10-129-130.pdf

   http://www.ntsb.gov/safety/safety-recs/recletters/A-10-131.pdf

2. Transport Canada Service Difficulty Advisory AV-97-07, referencing A94W0037, recommending the installation of a control quadrant safety guard for the Airbus AS 350 series.

   https://www.tc.gc.ca/media/documents/ca-certification/1997-01.pdf

3. Accident Investigation Board Denmark Recommendation REC-11-96, referencing HCL 62/96, recommending the installation of a system to protect the FFCL from interference for the Airbus AS 350 series.

   http://www.havarikommissionen.dk/index.php?lang=en

4. FAA AC 91-32B "Safety In and Around Helicopters" provides guidance on safe operations for passengers during helicopter ground and flight operations.

   http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2091-32B.pdf

5. FAA Helicopter Flying Handbook (FAA-H-8083-21A) discusses safety in and around helicopters for passengers.

   https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/helicopter_flying_handbook/

6. FAA AC 20-109A "Service Difficulty Program" describes the Service Difficulty Program.

   http://www.faa.gov/documentLibrary/media/Advisory_Circular/ac20-109a.pdf

7. Additional AASF aviation safety educational resources.

   https://www.aasfonline.org