

NTSB ISSUES PRELIMINARY REPORT FOR AW139 ACCIDENT

NTSB issues the preliminary report into an accident involving an AgustaWestland AW139, N811TA, that occurred on September 24, 2022 at Houma–Terrebonne Airport (HUM/KHUM), Terrebonne Parish, Louisiana, that led to an Emergency Alert Service

Bulletin (ASB) and Emergency Airworthiness Directive (AD):

On September 24, 2022, about 1811 central daylight time, an Agusta AW139 helicopter, N811TA, was substantially damaged when it was involved in an accident near Houma, Louisiana. The pilot, co-pilot, and 4 passengers were not injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 135 passenger flight.

According to a statement provided by the flight crew, about 7 minutes before arriving at Houma–Terrebonne Airport (HUM), Houma, Louisiana, the flight crew and passengers smelled “burning plastic” throughout the helicopter. The flight crew observed no smoke in the cockpit or cabin, confirmed that there were no abnormal cockpit indications, and that the helicopter exhibited normal flight characteristics. The flight crew decided to turn off the air conditioning in case it was the source of the smell.

The flight crew reported that a few minutes later there was a loud “whoof” sound accompanied by smoke emanating from the aft portion of the overhead circuit breaker panel. Within a few seconds the cockpit was engulfed with a “thick orange/brown smoke” that resulted in “zero visibility” in the cockpit. The flight crew simultaneously encountered a rotor low audio warning with a rapid overspeed of both engines and observed an upward movement of the collective control and a left movement of the cyclic control.

The left-seat-pilot was unable to clear the smoke from the cockpit by opening the small ventilation window on the left-side cockpit door. The left-seat-pilot was also unable to open his cockpit door due the helicopter’s airspeed; however, he was able to remove the left-side cockpit window which cleared the smoke from the cockpit.

After the smoke cleared from the cockpit, the collective control was pushed down and the cyclic control was pushed forward and to the right. The flight crew reported that both the cyclic and collective controls required significant force to keep in position. The power index (PI) was about 145% on both engines with the collective control full down, and the main rotor speed (NR) was slow to recover above 83% but it eventually recovered to 100%.

The helicopter rapidly climbed 3,500 to 4,000 ft because the flight crew was unable to establish a descent using normal flight control inputs. The flight crew attempted to establish a descent by selecting one of the engines to idle using the engine mode switches on the lower console panel, but the NR quickly decreased from 100% to the upper 70s. The engine at idle was returned to a flight condition using the engine mode switch. The flight crew reported that “full body weight” was required to keep the collective control down, but the helicopter did not descend or decrease its airspeed with the collective control down. The flight crew noted that the only way to get the helicopter to descend was to forcibly push the cyclic control forward, but the helicopter descended at 170 to 186 knots indicated airspeed (KIAS).

The left-seat-pilot declared an emergency with the tower controller at HUM and requested fire and emergency medical services to be notified. The flight crew then briefed the passengers about the emergency.

After the helicopter arrived over HUM, the flight crew made a high airspeed descent from 6,000 ft to 1,000 ft where an orbit of the airport was flown to verify flight controllability and to have the tower controller confirm that the landing gear was extended. The tower controller confirmed that the landing gear was extended. As the helicopter orbited the airport, the flight crew were unable to control engine power in manual mode using the beep switches on the collective control. The flight crew then attempted to reduce the helicopter's airspeed by reducing the No. 2 engine to idle using the engine mode switch on the lower console. With the No. 2 engine selected to idle the helicopter decelerated to about 140 KIAS with the No. 1 engine at maximum continuous power. The flight crew then decided that an autorotative landing would be the only way to further reduce the helicopter's airspeed to achieve a safe landing speed.

On the first landing approach, the flight crew aligned the helicopter with the runway 36 centerline at 140 KIAS with the No. 1 and No. 2 engines in flight and idle modes, respectively. The No.1 engine was selected to idle to further reduce airspeed for landing, but the NR rapidly decreased from 100% to about 75% before the flight crew selected the No. 1 engine to flight mode and a go-around was completed.

On the second landing approach, the flight crew began the descent from 400 ft above ground level (agl) while progressively reducing the helicopter's airspeed by alternating the No. 1 engine between flight and idle modes (with the No. 2 engine still selected to idle). Consistent with the first landing approach, NR rapidly decreased with both engines selected to idle; however, during the second approach, when NR decreased to about 70% the No. 1 engine was returned to flight mode until NR increased to 85% when the No. 1 engine was selected back to idle. By alternating the No 1. engine between flight and idle modes, the helicopter descended to about 50 ft agl and decelerated to an airspeed where an autorotation was made with both engines at idle. The helicopter landed on the runway with forward airspeed and skidded off the right side of the runway into a grass area.

After the helicopter came to a stop upright, the right-seat-pilot applied the rotor brake which stopped both rotors and the left-seat-pilot turned off all fuel and electrical switches. After ensuring that the passengers had safely egressed the helicopter, the flight crew noted that both engines were still running. The engines were shut down by moving the overhead engine control levers to the full off position.

The helicopter was recovered by the operator to a hangar where it was examined by National Transportation Safety Board investigators who were assisted by representatives from the Federal Aviation Administration, the helicopter manufacturer, and the operator.

The pilot and copilot collectives are interconnected via the C1 torque tube located beneath the pilot seats, as shown in figure 1. A single control rod, C2, runs vertically up the left side of the helicopter behind the left-seat pilot where it connects through a linkage to the C3 torque tube that runs laterally above and behind the right-seat pilot to the mixing unit.

A visual examination revealed thermal damage and a longitudinal split of the C3 torque tube, as shown in figure 2. The C3 torque tube was installed at both ends, with all fasteners installed and intact. A static test of the collective system without hydraulic pressure was conducted by moving the collective between the minimum and maximum pitch settings and observing the C3 torque tube. There was limited transfer of rotation between the pilot collective controls and the mixing unit because the outboard end of the C3 collective tube twisted while the inboard end by the mixing unit remained stationary; the C3 torque tube deformed torsionally along its length. Typically, the C3 torque tube does not rotate without hydraulic pressure.

Electrical power to the helicopter is provided by two, 30 volt / 300 ampere direct current generators. Wire P190A6-G (p/n 3G9B11A1911) receives electrical power from the No. 1 generator through the T3 terminal on the No. 1 diode module and connects to the No. 5 distribution bar on the No. 1 essential bus in the cockpit overhead. Wire P190A6-G was found chafed through its insulation from contact with the C3 collective torque tube, as shown in figure 3. The chafed area was in-line with a rivet line running circumferentially on the C3 torque tube, as shown in figure 3 and figure 4. In addition to melted resin from the C3 collective torque tube, soot was found laterally along the entire overhead and on the panels that covered the C3 torque tube.

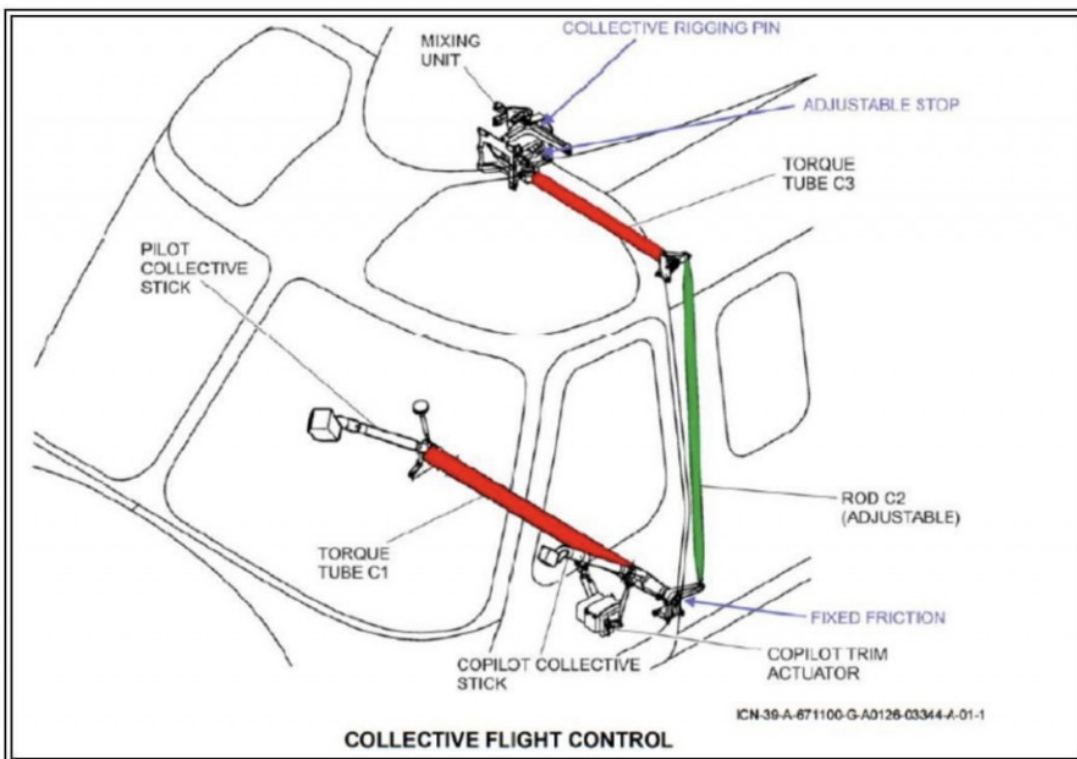


Figure 1: Collective Flight Controls

The wire assemblies routed through the overhead to the overhead circuit breaker panels are intended to pass under support brackets; however, the accident helicopter had retaining clips installed on the upper portion of the left-side support bracket, as shown in figure 2. The chafed wire was secured by one of the retaining clips that was installed on the upper portion of the left-

side support bracket. Additionally, the right-side support bracket also had retaining clips installed on the upper surface, but there was no wire chafing observed.

Wire P190A6-G also was chafed further aft in the main cabin overhead, where it rubbed against the lower outer corner of a cooling fin on the No. 1 diode module (Diode A77; p/n 3G2430V00352). The external sheathing to the wire at this location was damaged, but the internal wiring was not exposed.

After the accident, on October 11, 2022, the helicopter manufacturer issued Emergency Alert Service Bulletin (ASB) No. 139-731 to require inspections of the forward cabin roof ceiling harnesses and their installation to identify potential wire chafing conditions. Specifically, the ASB required a borescope inspection to identify if the cable assemblies were incorrectly routed above their respective support brackets. If a cable assembly was incorrectly routed above a support bracket, then the ASB required additional examination of the cable assembly for evidence of wire chafing and damage to the collective C3 torque tube. Any support bracket with retaining clips incorrectly installed on the upper surface are to be removed from service and replaced with a support bracket manufactured with retaining clips installed on the lower surface to ensure proper routing of the cable assemblies beneath the support bracket. Finally, the ASB required a visual inspection of the cable assembly adjacent to the No. 1 diode module (Diode A77) for chafing and damage, and to ensure there was at least 10 mm of clearance between the cable harness and the diode module.

On October 12, 2022, the European Union Aviation Safety Agency (EASA) issued Emergency Airworthiness Directive (AD) No. 2022-0209-E based on the helicopter manufacturer's Emergency ASB No. 139-731. The Emergency AD required a borescope inspection of the cable installation inside the forward cabin roof ceiling within 10 flight hours, and a visual inspection of the cable assembly adjacent to the No. 1 diode module (Diode A77) for chafing and damage within 25 flight hours.

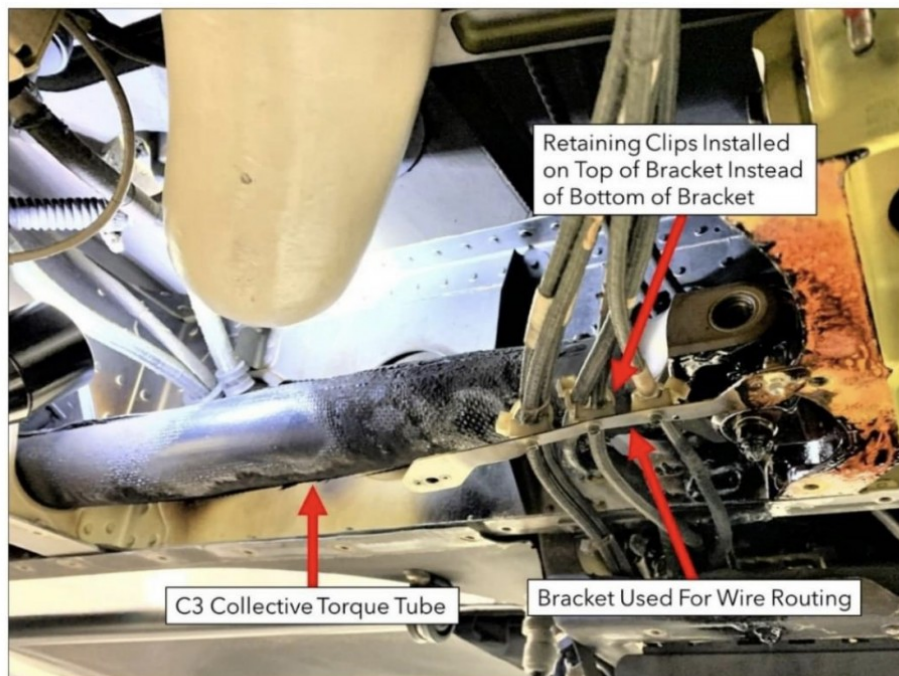


Figure 2: C3 Collective Torque Tube and Bracket Used for Wire Routing

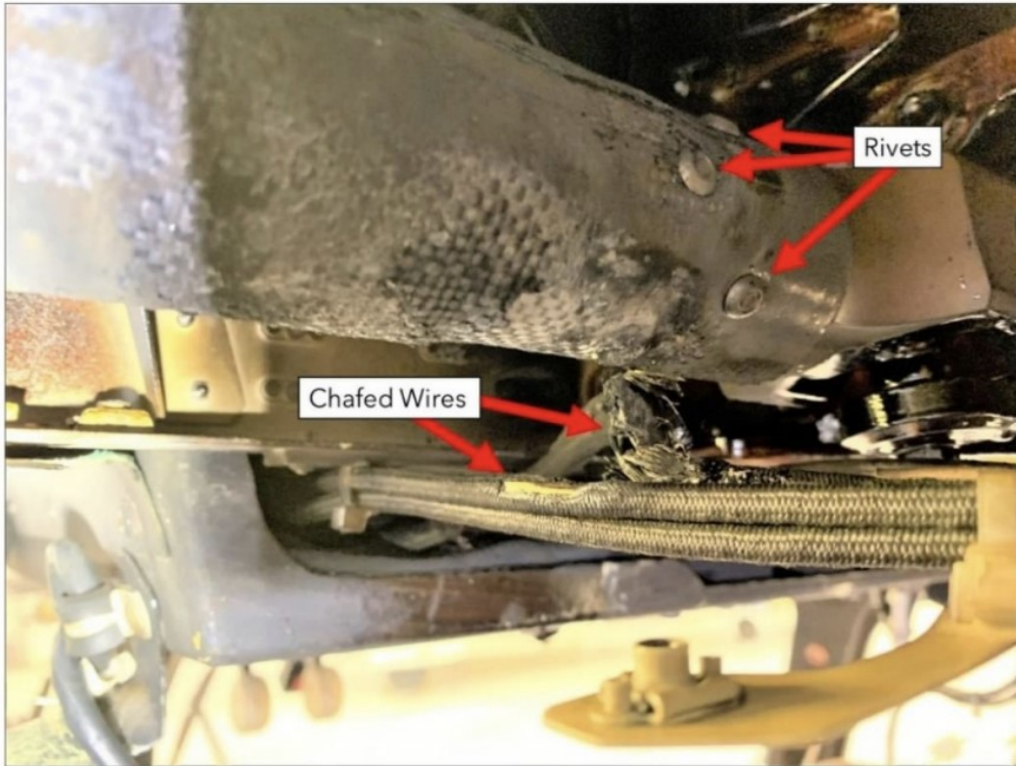


Figure 3: Chafed Wires and Rivets on C3 Collective Torque Tube

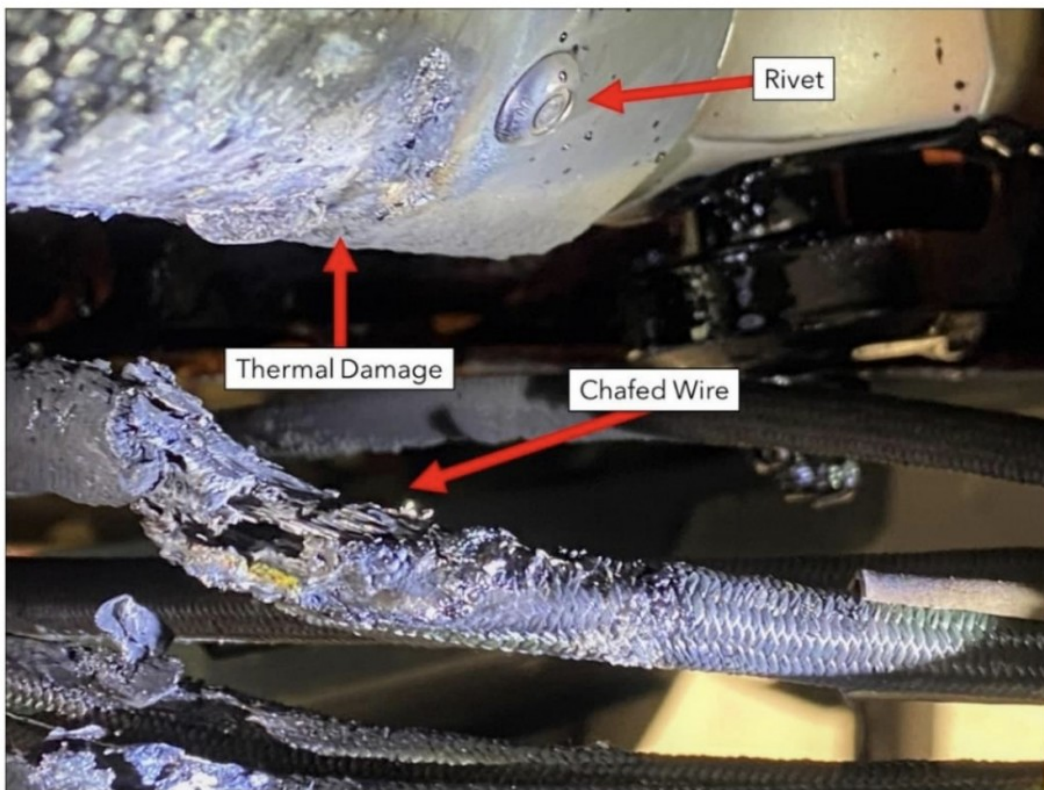


Figure 4: Chafed Wires and Thermal Damage to C3 Collective Torque Tube

