FINAL REPORT

AAIU Report No. 2001-007
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Aircraft Type and Registration:	Eurocopter EC – 120 G-BZIU
No. and Type of Engines:	1 x Turbomeca Arrius 2F
Aircraft Serial Number:	1104
Year of Manufacture:	1999
Date and Time (UTC):	20 September 2000, 11.30 hrs
Location:	Near Waterford
Type of Flight:	Private
Persons on Board:	1 Crew, 1 Pax
Injuries:	Nil
Nature of Damage:	Nil
Commanders Licence:	Private Pilot's Licence (Helicopters)
Commander's Age:	20
Commander's Flying Experience:	Total: 800 hours. On Type: 75 hrs
Information Source:	AAIU Field Investigation

SYNOPSIS

During cruising flight a mobile phone slipped underneath the cockpit floor, jamming the yaw controls. The pilot successfully executed a run-on landing without damage, at Casement Aerodrome.

1. FACTUAL INFORMATION

1.1 History of the flight

The helicopter, which was operating in the private category, departed Cork routeing for Hook Head, Co. Wexford, planning to then continue to Galway. As the helicopter approached the Waterford area, the pilot found that he could not move the yaw

(rudder) pedal right of centre. At this stage he suspected that something was jamming the pedal, and he further suspected it might be his mobile phone. As he had 2½ hours fuel on board, he decided to contact the Air Corps Helicopter Detachment at Waterford Airport to ask for their advice. Following discussion with the Air Corps Detachment, he decided to divert to the Military Airbase at Casement, which gave better wind/runway options and a larger airfield to effect a landing without yaw control.

He duly arrived at Casement and practised several approaches, expending his excess fuel in the process. There was some discussion with helicopter pilots at Casement as to the selection of a concrete runway or a grass area for the final run-on landing. The pilot decided to perform the landing on the concrete runway and the Air Corps Crash Rescue Service laid a blanket of foam. When the unrequired fuel was expended the pilot performed a run-on landing, on the foam blanketed runway. He was able to hold the required heading after touch-down, until the aircraft decelerated to a slow forward speed. At this point the helicopter turned uncontrollably to the left, through about 110º. The helicopter then came to a standstill on the runway but off the foam blanket, without damage.

1.2 Investigation

The final landing was observed by an AAIU Inspector who arrived on-scene as the pilot was exhausting the surplus fuel. On inspection of the helicopter after landing, a mobile phone was found to be wedged between the horn of the yaw control and the perspex bubble window at the front of the helicopter, on the starboard side. See Photo 1 of Appendix A. The phone was firmly wedged, and the maximum degree of movement to the right was a pedal position 10 mm right of centre.

The floor of the EC-120 is flat and covered with carpet in this particular helicopter. The forward edge of the floor ends about 100 mm short of the perspex bubble windscreen of the helicopter. There is also a tapering lateral gap, about 50 mm wide, between the right edge of the floor and the perspex bubble, under the pilot's seat. The bubble extends rearwards, under the floor for about 300 mm. There is no raised edge or other protection, at either the forward edge or the lateral side edge of the floor, to stop loose items slipping over the floor edge into the underfloor area.

During the investigation, one loose item, a pencil, was found on the cabin floor, under the rear seat.

The pilot recollected that he probably left his mobile phone sitting on the rear seat of the helicopter, behind his own seat. When the control became jammed, he could not locate the phone, and he suspected that it had fallen into the underfloor area.

1.3 Other Information

The EC-120 has a slightly nose down attitude in cruise flight. This, allied with the level of vibration found in helicopters, would facilitate the forward movement of any loose objects towards the nose area, and hence into the under-floor area.

There is no caution in the flight manual as to the possibility of loose items finding their way into the underfloor area. There is no guidance in the EC-120 flight manual concerning restricted or jammed tail rotor control. The only related topic is tail rotor control failure which has significantly different characteristics.

2. ANALYSIS

The probable sequence of events is that, in the cruise, the mobile phone slipped off the rear seat, located behind the pilot, and fell onto the carpeted floor. When the phone fell on the floor, the forward inclination of the floor in cruise flight, the normal inflight vibration and the low coefficient of friction between the hard surface of the mobile phone case and the carpet, facilitated the movement forward of the phone. When it reached the lateral edge of the floor, the phone fell into the underfloor area and became wedged between the control horn and perspex bubble. In this location the phone could not be seen by the pilot.

The pilot utilised his available fuel well to explore the handling characteristics of the helicopter with the restricted tail rotor control. In view of the severe yaw to the left experienced at the end of the landing run, his decision to land on a hard surface, as opposed to grass, was justified.

3. CONCLUSIONS

3.1 The incident was caused by a loose article in the cockpit, a mobile phone, sliding along the cockpit floor, and falling off the edge of the floor into the underfloor area and jamming the yaw control horn.

3.2 The standard pre-flight loose articles check of the cockpit was inadequate, as two items of potential hazard, a mobile phone and a pencil, were not secured.

3.3 The design of the floor, in particular the lateral gap between the floor and the bubble, and the absence of a raised edge on the floor, facilitates the entry of loose objects into the underfloor area.

3.4 The pivot bar of the yaw pedals would stop loose items sliding directly forward and falling off the forward edge of the floor, but there is no protection of the lateral gap. If the pilot inadvertently dropped an object, or if it slipped from his right side pockets, while flying, this could also lodge in the underfloor area, again entering through the lateral gap. This layout can be seen in Photos 2 and 3 of Appendix A.

4. SAFETY RECOMMENDATIONS

4.1 The manufacturer of the EC-120, Eurocopter, should consider an amendment to the EC-120 Flight Manual, in order to point out the possibility of loose articles, in the cabin, entering the underfloor area and jamming the controls. **(SR 14 of 2001)**

4.2 The manufacturer of the EC-120, Eurocopter, should consider the feasibility of modifying the EC-120 in the forward floor area, with the objective of eliminating the possibility of loose objects entering the underfloor area and jamming the flight controls. **(SR 15 of 2001)**

5. RESPONSES TO SAFETY RECOMMENDATIONS

The manufacturer of the EC-120, Eurocopter, was given a copy of the draft report on this incident, and replied with the following positive responses:

In response to Safety Recommendation 14 of 2001, *"Eurocopter issued Telex Information T.F.S. No 00000007 on April 10, 2001 in order to remind the operators of the inspection of the inside of the helicopter before flight."*

In response to Safety Recommendation 15 of 2001, *"In order to prevent any foreign object from sliding into the space between the pedal unit and the canopy, Eurocopter will issue as soon as possible a mandatory recommendation. This modification consists in adding covers between the floor and the canopy in order to eliminate such problem."*

Appendix A

PHOTO 1

THIS VIEW SHOWS THE MOBILE PHONE JAMMED BETWEEN THE PERSPEX BUBBLE AND THE CONTROL HORN. AS VIEWED FROM THE LOWER RIGHT SIDE OF THE HELICOPTER

PHOTO 2

THIS VIEW SHOWS THE MOBILE PHONE JAMMED BETWEEN THE PERSPEX BUBBLE AND THE CONTROL HORN. AS VIEWED FROM THE FRONT OF THE HELICOPTER, LOOKING REARWARD

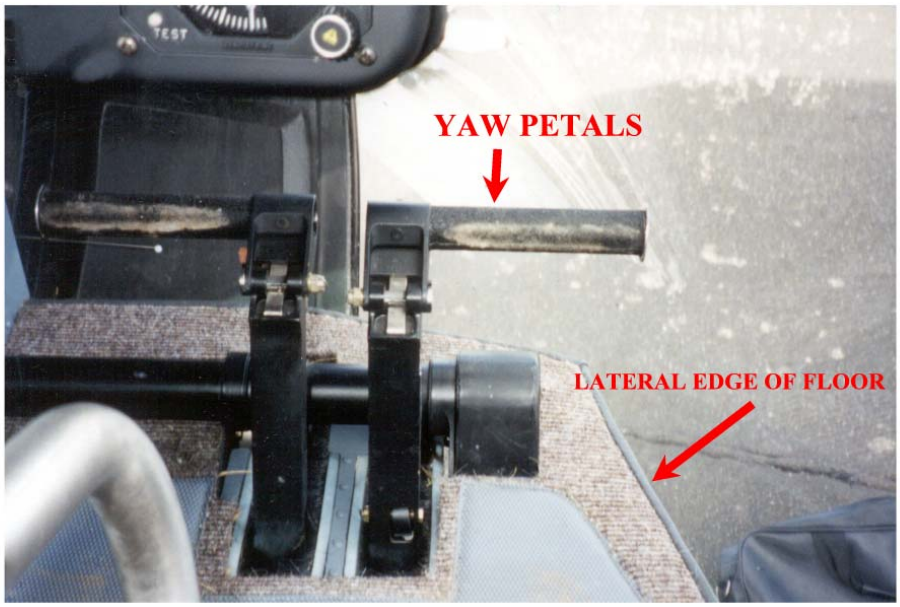

PHOTO 3

THIS SHOWS THE VIEW FROM THE PILOT'S SEAT, LOOKING FORWARD