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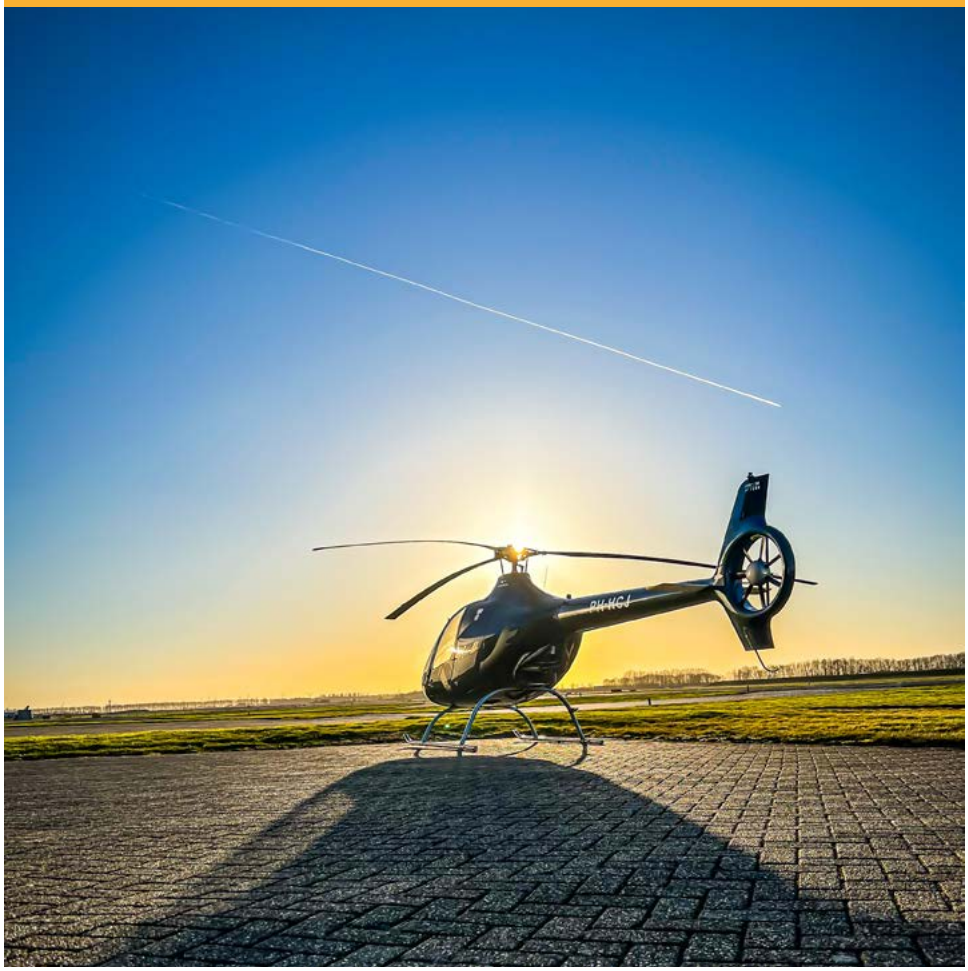
SAFETY BOARD

Loss of control, Hélicoptères Guimbal Cabri G2 helicopter, Lelystad Airport



Loss of control, Hélicoptères Guimbal Cabri G2 helicopter, Lelystad Airport

The Hague, February 2024

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Cover photo: Helicentre

The Dutch Safety Board

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Dutch Safety Board

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N.B: This report is published in the English language, with a separate summary in the Dutch language. If there is a difference in interpretation between the Dutch and English version, the English text will prevail.

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SUMMARY

A student pilot made his third solo flight in a Hélicoptères Guimbal Cabri G2 helicopter from Lelystad Airport. The flight proceeded without any particular issues until his return to the airport. While approaching the circuit at an altitude of approximately 1,000 feet, the pilot became distracted by an incorrect instruction from air traffic control (ATC). The pilot realized that the instruction was not correct and requested a *repetition* of the instruction from the tower controller, who then repeated the incorrect instruction.

Due to the distraction, the pilot allowed the airspeed to drop to zero knots, while the helicopter climbed about 600 feet, without the pilot noticing. The student pilot's helicopter entered a dangerous flight situation, specifically a rapid left rotation around its yaw axis and started an uncontrolled, steep left spiraling descent. Because the student pilot responded appropriately and applied what he had learned in flight school, and partly because of the extra altitude the helicopter had inadvertently gained, he managed to regain control of the helicopter and land at the airport.

An instructor in another helicopter who happened to be flying behind the student pilot, received the same incorrect instruction from ATC. The instructor immediately asked for *confirmation* of the ATC instruction. As a result, the air traffic controller recognized the mistake he had made and corrected it.

ABBREVIATIONS

ATC	Air Traffic Control
BEA	French Civil Aviation Safety Investigation and Analysis Bureau
FATO	Final Approach and Takeoff
hPa	Hectopascal
ICAO	International Civil Aviation Organization
IFT	Instructor Factory Training
LVNL	Air Traffic Control the Netherlands
OGE	Out of Ground Effect
SL	Safety Letter

Identification number:	2022148
Classification:	Serious Incident
Date, time of occurrence:	18 March 2022, 15.50 hours[1]
Location of occurrence:	Lelystad Airport
Operator:	HeliCentre Helicopter Services
Registration:	PH-HCJ
Aircraft type:	Hélicoptères Guimbal Cabri G2
Aircraft category:	Helicopter
Type of flight:	Solo training flight
Phase of operation:	Joining circuit for return to the airport
Damage to aircraft:	None
Flight crew:	One
Passengers:	None
Injuries:	None
Other damage:	None
Light conditions:	Daylight

1 All times in this document are local times unless otherwise stated.

1 INTRODUCTION

1.1 The serious incident

A student pilot made his third solo flight in a Hélicoptères Guimbal Cabri G2 helicopter from Lelystad Airport. The pilot received an incorrect instruction from Air Traffic Control (ATC), became distracted and confused as a result. Partly because of this he lost control of the helicopter. The pilot managed to regain control at low altitude and landed at the airport.

1.2 Investigation questions

The Dutch Safety Board conducted the safety investigation into this serious incident. The investigation focused on answering the following questions:

1. What caused the helicopter to enter an uncontrolled left-turning descending flight?
2. How was the student pilot theoretically and practically trained to fly the helicopter?

1.3 Investigation approach

The French Civil Aviation Safety Investigation and Analysis Bureau, the air safety investigation authority of France, provided information for the investigation.

In addition, the Dutch Safety Board gathered information from the flight school, Air Traffic Control the Netherlands the Aviation Safety Network and the Royal Netherlands Meteorological Institute.

Chapter 2 presents the relevant factual information. In Chapter 3, the analysis is presented. Findings and conclusions are summarised in Chapter 4.

2 FACTUAL INFORMATION

2.1 History of the flight

On 18 March 2022, the student pilot of a Hélicoptères Guimbal Cabri G2 helicopter with registration PH-HCJ, made a solo training flight from Lelystad Airport. It was his third solo flight. The pilot had filed a flight plan at 14.15 hours and started his flight at 15.11 hours.

Prior to the flight, an instructor briefed and instructed the pilot to carry out a number of flying exercises in the Flevopolder training area, located southwest of Lelystad Airport. After performing the planned exercises in the training area for about half an hour, the student pilot returned to Lelystad Airport. He checked in on the Lelystad Tower frequency at 15.38 hours and received instructions to fly northeast along the A6 highway to the X-RAY reporting point (see Figure 1) at an altitude of 1,000 feet. The pilot of PH-HCJ reported overhead X-RAY at 15.48 hours.

According to radar data, PH-HCJ was at an altitude of 1.155 feet, maintaining approximately 80 knots, while approaching reporting point X-RAY (see Figure 1). The air traffic controller instructed the pilot to fly a right hand downwind for Runway 05 at an altitude of 1,000 feet and informed him that other traffic would be flying below him. The pilot expected the instruction to fly a *left hand* downwind for Runway 05 and asked the air traffic controller to "*repeat*" the instructions. The controller repeated the same instructions and the pilot turned left in a north-easterly direction. Afterwards, the pilot stated that, in his opinion, the air traffic controller's instruction was incorrect, because it did not contain the standard, published left hand downwind instruction for Runway 05.

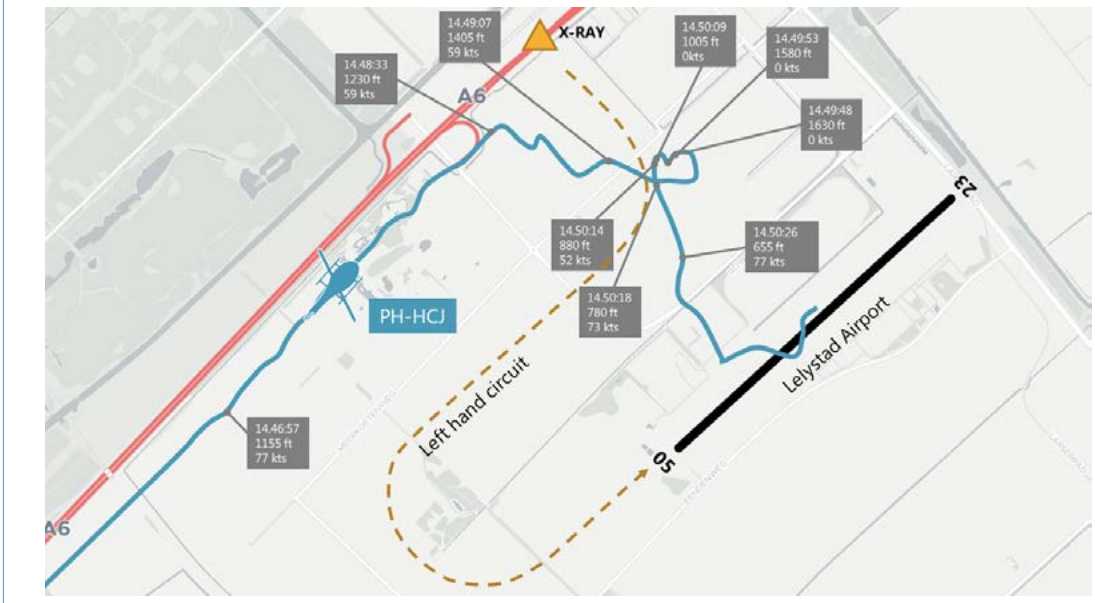

Figure 1: Relevant part of the flight track, indicated airspeed and altitude of PH-HCJ. (Source: Dutch Safety Board)

Shortly after this, the instructor pilot of another helicopter, registered as PH-HCC, coincidentally flying behind PH-HCJ on the same route, contacted the tower at the X-RAY reporting point maintaining 1,000 feet. This helicopter was also instructed to fly a right hand downwind for Runway 05. The instructor pilot immediately realized the incorrect instruction from the air traffic controller and requested "*confirmation*" of the instruction to fly a right hand downwind for Runway 05. The air traffic controller corrected his earlier instruction and changed it to a left hand downwind for Runway 05. The student pilot (of PH-HCJ) heard this instruction and reacted: "*I am confused now*". Thereafter, the controller also gave him the instruction to fly a left hand downwind for Runway 05.

The pilot of PH-HCJ had completed a 90-degree left turn in the meantime. During this turn, he noticed on the flight instruments that his airspeed was now almost zero knots. The minimum permitted airspeed for solo flying students, set by the flight school, was 30 knots. This is not explicitly communicated, since a lot of the training and learning to fly a helicopter is focussed on transitioning to and from a hover close to the ground (practicing take-off and landing). According to radar data, the helicopter had climbed to an altitude of 1,630 feet, when suddenly the helicopter rotated rapidly over left around its yaw axis and an uncontrolled spiralling descent started. The helicopter rapidly lost altitude. The pilot estimates that he had made three to four left rotations.

The instructor pilot in the helicopter PH-HCC that flew behind PH-HCJ saw a dangerous situation developing and gave the student pilot instructions on the tower frequency to regain control of the helicopter. The instructor pilot exclaimed: "Dive, dive, dive".[2] Thereafter, he

2 The instruction: "Dive, dive, dive" was given in the Dutch language.

called the pilot by his first name and said: "Nose down, nose down, nose down!" The pilot however stated that he was so concentrated on trying to recover the helicopter, that he did not hear the calls of the instructor. He moved the cyclic[3] forward to bring the nose of the helicopter down as he had been taught during his training, after which the rotation stopped. The pilot estimated that he regained control of the helicopter at a height of 200 to 300 feet.[4] He then requested and received permission to fly to the helicopter Final Approach and Takeoff (FATO) area at Lelystad Airport, and landed there. The air traffic controller asked if he needed assistance from the emergency services, but the pilot considered this unnecessary. The pilot remained on the ground in the FATO area until an instructor boarded to taxi the helicopter back to the apron of the flight school.

Helicopter control
Pulling cyclic control at a speed of 80 knots will result in a speed decrease and climbing of the helicopter when power is not reduced by pushing the collective[5] lever down. After the speed is reduced to approximately 40 knots, the climbing will stop. When the speed reduces, more power is required to maintain the same altitude. If the speed reduces to 0 knots, the helicopter has reached an *out of ground effect (OGE) hover* situation. This requires a high power setting. A high power setting requires a high anti torque moment around the vertical axis of the helicopter to counteract the torque of the engine power that drives the main rotor. This high anti torque moment has to be produced by the Fenestron tail rotor, which will need a (almost) full right yaw pedal input. The combination of the engine power required to maintain altitude (OGE hover) and the Fenestron tail rotor, may be close to the maximum available power of the helicopter. If in this situation a left turn is started, additional power will be needed to stop the left turn. This power may not be available and could cause the helicopter to rotate around its yaw axis.

2.2 Personnel information

2.2.1 The student pilot

The pilot of PH-HCJ started his training on 5 March 2021 and held a valid radio telephony license. His flight experience at the time of the incident was 26 hours (all on the Cabri G2), including two solo flights. He had no other fixed-wing or helicopter experience, except for five introductory helicopter flights[6], before he started his training at the flight school. He accumulated his flying experience in about one year.

3 The cyclic is a control instrument used to change the pitch of the blades of the main rotor individually. This ultimately causes the helicopter to move forwards, backwards or sideways. The cyclic is usually located in front of the pilot.
4 The Board has been unable to verify this estimation, since the radar data is unreliable, because of the high rate of descent of the helicopter.
5 The collective is a control instrument used to change the pitch of the main rotor blades collectively, causing the helicopter to climb or descend. The collective is usually located on the left side of the pilot's seat. Changing the pitch of the blades also changes power.
6 These introductory flights are not included in his total flight experience.

On the day of the incident, the pilot arrived at Lelystad Airport and had at least one hour to prepare for his flight and refuel the helicopter. He discussed the planned flight with his instructor, who explained to him that the purpose of this third solo flight was to do a number of flying exercises in the training area. The instructor questioned the pilot about possible scenarios to check whether the pilot was familiar with the actions to be taken in unexpected situations. The flight school's safety manager, who was present in the briefing room, stated that he heard the pilot answer his instructor's check questions correctly.

2.2.2 The air traffic controller

The air traffic controller joined Air Traffic Control the Netherlands (LVNL) about three years before the incident. In the autumn of 2020, he started his training at the control tower and at approach control at Amsterdam Airport Schiphol (EHAM). This training ended in September 2021. The air traffic controller then continued his training at the control tower of Lelystad Airport. After working as an assistant on this tower and after practicing in the simulator, he was certified as air traffic controller at Lelystad Airport with effect from 1 March 2022.

On the day of the incident, the air traffic controller was on duty from 14.30 hours to 20.00 hours. Besides the air traffic controller, the tower was occupied by a student assistant controller and instructor.

At the time of the incident, there were eight aircraft in the local traffic area (control zone) of Lelystad Airport. This included departing traffic, incoming traffic and traffic performing (practice) flights in the circuit.[7] The air traffic controller stated that the handling of traffic resulted in a high workload, but that he did not experience it as too high. He managed his workload, by making circuit traffic perform a 'full stop' landing, in order to reduce the number of aircraft in the air.

2.3 Ambient Workplace Recording

As of 27 January 2022, *Ambient Workplace Recording* is mandatory in control towers (see below). From that day, Lelystad Tower is equipped with this recording system. For the investigation of this serious incident, the recorded data was available. It provided information about the working situation in the tower during the occurrence.

7 LVNL monitors the traffic situation at Lelystad Airport using the following thresholds: maximum of 7 aircraft per 10 minutes and maximum radio frequency occupancy of 75% per 10 minutes.

History *Ambient Workplace Recording*

In the Überlingen8 mid-air collision investigation report, published in 2004, the German Federal Bureau of Aircraft Accident Investigation recommended the following:
'To improve the investigation of future accidents and incidents, International Civil Aviation Organization (ICAO) should require Air Traffic Service units - in addition to present regulations - to be equipped with a recording device that records back-ground communication and noises at Air Traffic Controllers workstations similar to a flight deck area microphone system.'
ICAO included a recommended practice in Annex 11 to equip Air Traffic Control (ATC) units with this system to enhance the quality of accident and incident investigations in 2006: 'ATC units should be equipped with devices that record background communication and the aural environment at air traffic controller work stations, capable of retaining the information recorded during at least the last twenty-four hours of operation' (ICAO Annex 11, Amendment 44, 2006).

The Dutch Safety Board recommended LVNL to implement the ICAO recommendation to record background sounds and communications and use this system at Schiphol Tower. The recommendation was included in the final report of the investigation after nine aeroplanes took-off at Schiphol airport from a runway that was not available, on 16 June 2012.9

A regulation of the European Union made background recording mandatory from 27 January 2022 (EU 2020/469). LVNL has implemented the *Ambient Workplace Recording* as of this date.

The controller, the assistant and his instructor, all working in the tower at the time of the incident, are clearly audible on the recording of the ambient workplace recording system. The recording indicates there were no disturbances, only the movement of the metal strip holders on which the flight data were recorded can be heard. The conversations that were held were work-related and only concerned mutual coordination and a single instruction from the instructor to the assistant.

8 Bashkirian Airlines flight 2937, a Tupolev Tu-154M, and DHL flight 611, a Boeing 757-200PF cargo plane, crashed following a mid-air collision near Überlingen, Germany. All 69 on board the Tu-154 and both crew members of the Boeing 757 were killed in the accident.

9 Nine take-offs from an unavailable runway, 16 June 2012, June 2015.

2.4 Injuries to persons/damage to aircraft

The pilot was uninjured and there was no damage to the helicopter.

2.5 Aircraft information

2.5.1 General information

The helicopter, registered PH-HCJ, is a Hélicoptères Guimbal Cabri G2 (See Figure 2) and was built in France in 2021 (serial number 1288). The helicopter has a Type Certificate issued by the European Union Aviation Safety Agency and a maximum take-off weight of 700 kg. The two seater, single-engine helicopter was registered in the Netherlands on 10 September 2021. It had a valid Certificate of Airworthiness, was maintained according to prescribed procedures and had no technical shortcomings. The helicopter is powered by a piston engine (manufacturer: Lycoming), has a clock wise turning main rotor and is equipped with a Fenestron type tail rotor. Since production began in 2008, 300 Cabri G2 helicopters had been produced by July 2022.

Figure 2: Hélicoptères Guimbal Cabri G2. (Source: Dutch Safety Board)

2.5.2 Yaw control occurrences

In the database of the Aviation Safety Network, a total of 74 occurrences worldwide involving a Guimbal Cabri G2 were registered between 19 April 2010 and 10 May 2023. In 22 of these occurrences (loss of) yaw control[10] was mentioned as a causal factor.

Hélicoptères Guimbal estimates that, since the entry into service of the Cabri G2, more than 50% of the Cabri G2 accidents in the world are associated with loss of yaw control. It states that half of these accidents are the result of the pilot's insufficient input on the right yaw pedal, sometimes followed by the pulling of the collective pitch lever, whilst the other half concern losses of rotor speed mainly occurring during maneuvers performed in instruction.

10 The function of the tail rotor is to control the movement of the helicopter around the vertical axis and counteract the torque generated by the main rotor. As the main rotor is turning clockwise, the fuselage has a tendency to turn left (left yaw).The pilot needs to control this yaw. This is known as yaw control.

To address the yaw control issues of the Cabri G2, the manufacturer Hélicoptères Guimbal has published several service letters (SL) in 2012 and 2019 (see table 1 below).

At the time of the incident, the SLs were not incorporated in the helicopter's flight manual nor distributed to the pilots.

Table 1: Hélicoptères Guimbal service letters

Service Letter	Titel	Content
SL 12-001	Yaw control in approach	Handling characteristics which are unique to helicopters with Fenestron-equipped tail rotors. Yaw control in approach, when the helicopter's speed decreases, when transitioning from forward flight (30-60 knots) to hover.
SL 19-002	Controllability in yaw at low rotor speed	To clarify the tail rotor behavior at low revolutions per minute. Controllability in yaw at low rotor speed.

Additionally, Hélicoptères Guimbal introduced Instructor Factory Training (IFT) for instructors who were Cabri G2 rated in 2020. This voluntary training aimed to improve their knowledge of the helicopter, its systems and emergency procedures. Hélicoptères Guimbal promoted the training to operators and training schools and offers it to new Cabri G2 operators. One of the training modules was dedicated to the Fenestron type tail rotor and yaw control, reiterating the explanations and recommendations published in the SLs.

At the beginning of the year 2023, Hélicoptères Guimbal offered to provide this training to the HeliCentre flight school's instructors. The IFT was scheduled to take place in the fall of 2023.

2.5.3 Recent accident investigation report involving a Cabri G2

A recent report from the French Civil Aviation Safety Investigation and Analysis Bureau (BEA)[11], published on 21 April 2023, of an accident with a Cabri G2 at Grenoble Airfield on 18 February 2022, also addresses the yaw sensitivity of the Cabri G2. During the investigation, Hélicoptères Guimbal informed the BEA that, in January 2023, it updated the content of its training for instructors adding a practical exercise with a left yaw rotation and the countering of this by pressing down fully on the right rudder pedal.

According to the report, the design of the Cabri G2 equipped with a Fenestron type tail rotor has specific impacts on the yaw control of this helicopter, which requires pilots to be more reactive in their rudder pedal inputs. Inexperienced pilots and/or pilots used to conventional tail rotors need to be particularly vigilant.

11 BEA, *Accident du Guimbal Cabri G2 immatriculé F-HGRE survenu le 18/02/2022 à Grenoble-Isère (38), April 2023.*

The report also states that according to the statements of experienced pilots and instructors, the Cabri G2 is known for being demanding in terms of flying due to its yaw sensitivity and the quick pedal response that is required. In the report the BEA recommends that: 'Hélicoptères Guimbal Helicopters provide all training organizations with further information or recommendations on how to teach yaw control on the Cabri G2 as part of theoretical and practical training'.

2.6 The flight school

The flight school placed specific emphasis on flying with a Fenestron type tail rotor and the - sometimes larger - pedal inputs required. However, there was no specific mention of this in the Training Manual, and there was no monitoring of the distribution of the SLs within the flight school.

In the fall of 2023, an instructor from Hélicoptères Guimbal was scheduled to provide specific IFT at the flight school.

On the day the incident occurred, immediate action was taken by the Head of Training of the flight school. In an email to the Cabri G2 instructors, he emphasized the importance of addressing the incident directly with the students. Specifically, he requested extra attention to be given to the '*aviate-navigate-communicate*' principle. This principle implies that the highest priority is to keep the aircraft flying and avoiding loss of control or controlled flight into terrain. Next, a pilot should verify his location and navigate toward a suitable destination. Communication with air traffic control or other planes comes thereafter. The Head of Training also mentioned that the incident would be discussed in the upcoming flight instructor's meeting. Additionally, he sent a message (with a delivery confirmation) to all Cabri G2 users of the flight school, urging them to pay attention to the SLs from Hélicoptères Guimbal. These are available to all flight school's Cabri G2 users by logging into an internal server.

The recently published BEA report was shared with all instructors of the flight school. The Head of Training of the flight school stated that in the upcoming Instructor Standardization Meeting it will be discussed how the recommendations from the report can be incorporated.

2.7 Meteorological information

According to the Royal Netherlands Meteorological Institute, it was overcast above an altitude of 4,100 feet around the time of the incident. The flight visibility was more than 10 kilometres and the air pressure at sea level was 1,043 hPa.

Table 2 gives the wind direction, wind speed and temperature at relevant altitudes.

Table 2: winds aloft

Altitude	Wind (direction in degrees, speed in knots)	Temperature (°C)
Ground level	050/09	15
300 feet	040/10	14
500 feet	040/12	12
1000 feet	040/12	11

3 ANALYSIS

3.1 Introduction

The analysis contains factors that were part of the sequence of events, leading to the loss of control of the helicopter. It describes the pilot's actions, the role of air traffic control (ATC), the flying characteristics of the helicopter and the pilot's training. Both weather conditions and technical state of the helicopter were determined to not have played a role in the occurrence.

3.2 Pilot's actions

The flight was uneventful until the return to the airport. In the final phase of the flight, when joining the circuit of Lelystad Airport for Runway 05, the pilot received an incorrect instruction from ATC. Despite the fact that the pilot was relatively inexperienced, it did not escape his attention that the air traffic controller's instructions seemed to be incorrect. Therefore, he asked the controller to repeat the instruction, which the controller did. The pilot was confused and distracted by the instruction received to such an extent, that he did not notice that the speed of the helicopter had reduced to zero knots and the helicopter had climbed to 1,630 feet. At that moment, the pilot made a left turn, which is the direction the helicopter will automatically turn because of the rotor torque, especially in a zero knots situation. The pilot most probably did not give the full right pedal input, necessary to stop the rotation at this zero knots out-of-ground-effect flight phase, as he had never been in this situation. As a result, the helicopter started a rapid left rotation around its yaw axis and entered an uncontrolled, steep left spiraling descent.

The pilot was fully concentrated on recovering the helicopter from its uncontrolled spiraling descent - as he had been taught in flight school - and did not hear the two recovery instructions, which the instructor in the helicopter behind him gave on the tower frequency. The pilot acted according to the principle '*aviate-navigate-communicate*' by concentrating on flying the helicopter and pushed the nose down. He temporarily gave limited or no attention to navigation and communication, resulting in regaining control of the helicopter. The fact that he had climbed during the initial speed reduction, without reducing power, provided him with additional altitude to regain control of the helicopter.

3.3 Air traffic controller's instruction

3.3.1 Circumstances

The air traffic controller at Lelystad Airport perceived the workload to be high, but manageable. The daily report from the airport reflected this perception, indicating that the frequency of tower communications and the number of aircraft handled were nearing the advised guidelines. The controller strategically managed the workload by having aircraft make a full stop.

The ambient workplace recording, combined with radio communication data, reveals that the controller was not distracted or otherwise disturbed in performing his duties. In the period leading up to the time of the incident, there were no issues indicating diminished performance.

3.3.2 Origination and correction of the incorrect instruction

The air traffic controller gave the instruction to fly a right hand downwind to Runway 05, while the intended instruction was to fly a left hand downwind to Runway 05. Instructions for a right hand downwind, when entering via reporting point X-RAY, are common at Lelystad Airport, when Runway 23 is in use.

A large portion of an air traffic controller's behaviour is skill based. The use of phraseology is an example of this.[12] The mix-up between instructing a left or right hand downwind for Runway 05 is categorised as a skill based error, more specifically a 'slip'. This means that the controller intended to carry out the correct action, but a failure occurred when carrying out this required activity.[13] Skill based behaviour is highly practiced, smooth and automatic and is initiated without conscious control after a certain trigger.[14] Skill based errors can occur under increasing workload.[15]

When the initial skill based error by the controller occurred, the student pilot reacted by using the word '*repeat*'. This is not part of official aviation phraseology but has the same connotation as the standard phrase '*say again*', which means "repeat all, or the following part, of your last transmission".[16] This gives the impression that the pilot did not hear or understand the instruction. It likely triggered the same automatic erroneous instruction from the controller to fly a right hand downwind to Runway 05.

The instructor pilot used the phrase '*confirm*' to challenge the controller when confronted with his error. The phrase '*confirm*' means "I request verification of clearance, instruction, action, or information"[17], giving the impression that the instruction itself is questioned. This likely required the controller to switch from automatic skill based behavior to conscious control to verify the instruction, catching the error.

12 G. Borghini et al., 'EEG-Based Cognitive Control Behaviour Assessment: an Ecological study with Professional Air Traffic Controllers', *Sci Rep, 3 April 2017.*
13 D.A. Norman, 'Categorization of action slips', *Psychological Review 88*(1), 1981, p. 1–15.
14 J. Rasmussen, 'Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models', IEEE Transactions on Systems, Man, and Cybernetics, May-June 1983, p. 257-266.
15 M.D. Byrne and S. Bovair, 'A Working Memory Model of a Common Procedural Error', Cognitive Science, 1997, p. 31-61.
16 ICAO, *Doc 9432 AN/925, Manual of Radiotelephony, 2007* and EU Regulation 923/2012 Common Rules of the Air and Operational Provisions Regarding Services and Procedures in Air Navigation.
17 ICAO, *Doc 9432 AN/925, Manual of Radiotelephony, 2007.*

3.3.3 Effect on the pilot

The incorrect ATC instruction did not directly result in the pilot losing control of the helicopter. However, it introduced a situation for the low experienced pilot that forced him to divide his attention. This had an adverse effect on flying and monitoring the airspeed (*aviate*), while his confusion was related to the circuit direction (*navigate*) and communication (*communicate*).

The ATC instruction received did not correspond with the pilot's expectations. Therefore the pilot asked for the instruction to be repeated. Only after the instructor in the helicopter behind him asked for *confirmation* of the downwind direction, the air traffic controller realised his earlier incorrect instruction and subsequently corrected it. Thereafter the student pilot prioritized flying the helicopter (aviate) again.

3.4 Flight characteristics of the helicopter

The design of the Cabri G2, equipped with a Fenestron type tail rotor, has specific impacts on the yaw sensitivity of this helicopter. A Fenestron type tail rotor requires pilots to be more proactive and reactive in their rudder pedal inputs. Inexperienced pilots or pilots used to conventional tail rotors need to be particularly vigilant. The French Civil Aviation Safety Investigation and Analysis Bureau therefore has recommended Hélicoptères Guimbal to 'provide all training organizations with further information or recommendations on how to teach yaw control on the Cabri G2 as part of theoretical and practical training'.

It is noted that Hélicoptères Guimbal offered additional training about yaw control to instructors. Hélicoptères Guimbal also requested attention for the specific particularities of the Fenestron type tail rotor in several service letters (SLs), among other things. While the SLs address yaw control of the Fenestron type tail rotor, the sensitivity of yaw control is not exclusively an issue for operating the Guimbal Cabri G2. Loss of Tail Rotor Effectiveness is a common helicopter flight characteristic that requires the attention of all helicopter pilots.

3.5 Pilot's training

Yaw control, like speed and attitude control, is one of the basic skills a pilot has to learn in order to fly a helicopter. After the first familiarisation flights, basic flying is part of every training flight. It is common knowledge that controlling a helicopter at speeds below 30 to 40 knots is challenging for student pilots, especially in an out of ground effect situation. Even though this was not explicitly communicated by the flight school, the pilot stated that he was aware of this.

The way the student pilot handled the situation, which he never had been in and should not be in during this phase of his training, shows the pilot's training proved to be sufficient to cope with this unforeseen and dangerous situation.

The student pilot emphasised that in his training there was much attention paid to safety aspects and training on possible unforeseen situations. He stated that during his training he always felt that he had sufficient pedal authority to control the helicopter.

Shortly after the incident, the Head of Training of the flight school informed Cabri G2 instructors and users about the existing service letters on yaw control.

4 CONCLUSIONS AND LESSONS

4.1 Conclusions

An incorrect and unexpected instruction from air traffic control caused confusion of the inexperienced pilot which lead to a distraction from flying.

This resulted in a low speed situation at altitude. Combined with a left turn, it led to an uncontrolled left spiraling descent.

The yaw sensitivity of the helicopter in the zero speed situation contributed to the occurrence of the incident. The Fenestron type tail rotor requires pilots to be more reactive in their rudder pedal inputs.

Due to the pilot's good response, resulting from adequate training, he managed to regain control of the helicopter in time. A contributing factor to the timely recovery was the inadvertently gained, additional altitude before the loss of control.

The incident shows that a clear communication "trigger" - in this case '*Confirm*' right instead of '*repeat*' - could make an air traffic controller aware that he gave an incorrect instruction.

4.2 Lessons learned

This investigation highlights the role of human factors in ensuring effective communication across various roles. Whether as a pilot, an air traffic controller or any other professional in aviation, clarity in communication is crucial. When uncertain, asking to repeat the instruction instead of asking for clarification can lead to ineffective communication. Hesitation to request confirmation or explicit clarification can result in accepting incorrect instructions or making assumptions about their meaning.[18]

18 https://skybrary.aero/articles/pilot-controller-communications-oghfa-bn

APPENDIX A

Responses to the draft report

In accordance with the Dutch Safety Board Act, a draft version of this report was submitted to the parties involved for review. The following parties have been requested to check the report for any factual inaccuracies and ambiguities:

- Student pilot
- HeliCentre
- EASA
- Ministry of Infrastructure and Water Management
- Hélicoptères Guimbal
- BEA (State of Manufacture)
- Air Traffic Control the Netherlands (LVNL)

The responses received, as well as the way in which they were processed, are set out in a table that can be found on the Dutch Safety Board's website (https://www.safetyboard.nl).

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