Analyses of Incidents of Helicopter Guimbal Cabri G2 : Analyses of Pilots

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DOI: 10.29322/IJSRP.11.05.2021.p11311
http://dx.doi.org/10.29322/IJSRP.11.05.2021.p11311

Abstract- The Helicopter Guimbal Cabri G2 is a helicopter that is usually used for training and recreational activities. The Cabri G2 is agile and easy to handle. In this paper the author had collected data of incidents and accidents of Cabri G2 and analyses were performed upon these data. The author focused upon the incidents and accidents that were due to the faults of pilots. The results of these analyses were discussed and concluded.

Index Terms- Analyses of Incidents, Accident Investigation, Helicopter

I. Introduction

Helicopters are used for transportation and also for recreational activities. Helicopters are also used for Search and Rescue activities where helicopters could fly to remote locations with ease in contrast to aeroplane. According to Saleh, helicopters were used by the military and civilian outfits due to their agile maneuverability and handling qualities [1]. This is also a key factor in the utilization of helicopters for Aviation Emergency Medical Services.

According to Heli Transair, the Helicopter Guimbal Cabri G2 is equipped with an engine which is reliable and efficient [2]. This makes the Cabri G2 a prominent choice among helicopter enthusiasts. Also the Cabri G2 is able to actuate a flight which could last for 4 hours without any refueling in between.

Several accidents involving helicopters had occurred for the last couple of years and some were due to pilot errors. Rao indicated that numerous flight accidents involving helicopters were the results of misjudgments of pilots that were inexperienced where these inexperienced pilots were student pilots [3].

There were instances where the pilots were not physically fit and thus contributed to the crash. It's imperative for those that operate flying machines be physically sound and able to withstand the rigors of flying. Harridon stated that there are physical exercises that could aid pilots and transform them into beings that are fit [4].

If there were flight accidents it's always the norm for the incidents or accidents be investigated in order to refine the flight process for the purpose of eradicating future incidents or accidents. According to Burban, accident and incident investigations are structured based upon written procedures in order to facilitate non bias investigation [5].

Aircraft incident or accident investigation had evolved over the years and the evolution had saw the procedures of investigation improved in order to gain an accurate picture of the incidents or accidents. According to Milosovski, it's imperative to alleviate the investigation procedures and Milosovski had developed tools akin to an expert system that aided investigation [6]. Milosovski had done thorough analyses upon aircraft powerplant, wreckage, electrical systems, pneumatic systems, and others in order to develop the expert system.

II. Literature Review

Helicopters are used for various purposes such as Search and Rescue, transportation of goods, ferrying of people, and others. Helicopters had also gone through several modifications and evolution that enhanced their purposes and functionalities. Alppay had designed several variations of cockpits of helicopters in order to ease the pilots in handling the helicopters [7]. This ergonomic approach had seen the comfort of handling the helicopter increased and this perhaps aided the pilots.

The equipment, peripherals, and components of the helicopters need to be in pristine and good condition for them to perform the intended tasks. According to Harridon, the good condition ensures the mission of the helicopter would be carried out effectively and efficiently and Harridon gave examples of Search and Rescue missions that were successful due to good conditions of the equipment and the flying vehicles [8].

The Guimbal Cabri G2 is a small helicopter capable of carrying 2 persons and it has a maximum gross weight of 700 kg and this makes it durable for training and recreational flight [9]. The Cabri G2 is also capable of reaching a top speed of 130 knots and and can journey as far as 700 km [9].

Flight accidents or incidents were caused by numerous factors and one of these factors is pilot error. Li stated that 85% of the accidents pertaining to general aviation were probably caused by pilot errors [10]. Li further iterated that the sudden demand during flights somehow had contributed to series of pilot errors [10].

In order to lessen incidents or accidents, it's imperative to train pilots to be proficient. Harridon stated that continuous training would create muscle memory where pilots are able to react instantaneously in a correct manner due to it being second nature [11]. Harridon used examples of Search and Rescue training where crews became proficient due to perpetual training [11].

Accident investigation is important in order to identify the exact cause of the accidents and to provide solutions to eradicate the accidents. Miller pointed out that several procedures were in placed during investigation in order to allocate certain systematic structure during the investigation [12]. Miller also spelled out myriad laws that were utilized in order to hold the parties responsible for the accidents [12].

III. Methodology

The methodology that was employed is shown in Figure 1.

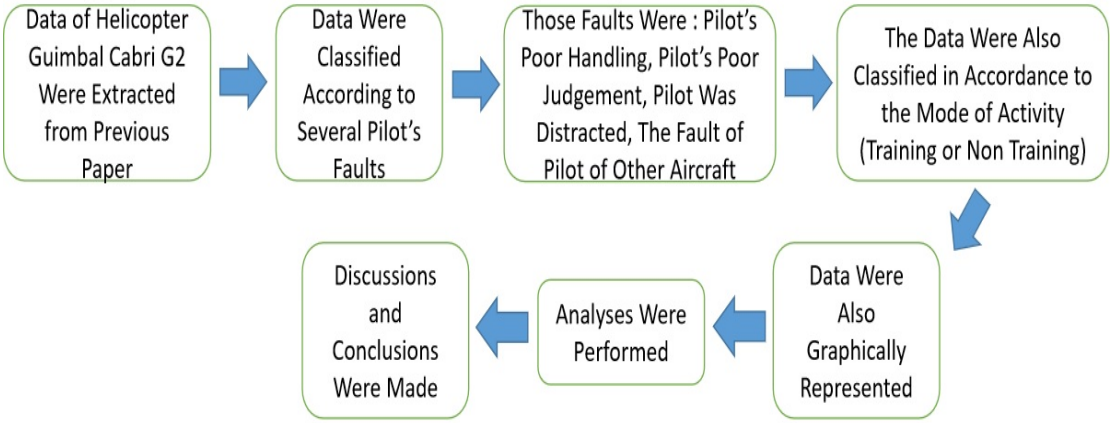

Figure 1. The Methodology Used

The data of the incidents of Helicopter Guimbal Cabri G2 were extracted from the previous paper of the author where in the previous paper Harridon had collected data of incidents and accidents of Cabri G2 that had occurred throughout the world [13]. These data were then reclassified in accordance to the numerous faults of the pilots. The classification was based upon these faults : Pilot's Poor Handling, Pilot's Poor Judgement, Pilot Was Distracted, and The Fault of Pilot of Other Aircraft. The data were also classified based upon the activity of flight, whether it was training or non training. The data were then represented graphically for easy interpretation of the results. Analyses were then performed and discussions and conclusions were actuated.

IV. Results

The results are shown in Tables 1 and 2 and Figures 2 and 3.

Table 1. List of Pilot's Fault

Incident	Human Fault Due to Pilot			
	Pilot's Poor Handling	Pilot's Poor Judgement	Pilot Was Distracted	The Fault of Pilot of Other Aircraft
Incident1	√			
Incident2		√		
Incident3	√			
Incident5	√			
Incident6	√			
Incident7			√	
Incident9		√		
Incident10	√			
Incident11	√			
Incident14	√			
Incident15	√			
Incident16	√			
Incident17		√		

Incident18	√			
Incident19	√	√		
Incident20		√		
Incident21		√		
Incident22	√			
Incident23				√
Incident24	√			
Incident25	√			
Incident26	√			
Incident27	√	√		
Incident29	√	√		
Incident30	√			
Incident31	√	√		
Incident32	√	√		
Incident33	√	√		
Incident34	√	√		
Incident35		√		
Incident36	√	√		
Incident37		√		
Incident39	√			
Incident40	√			

Table 2. Mode of Incident

	Human Fault Due to Pilot	
	Incident Happened During Training Activity	**Incident Happened During Non Training Activity**
Incident1	√	
Incident2	√	
Incident3		√
Incident5	√	
Incident6	√	
Incident7		√
Incident9	√	
Incident10	√	
Incident11		√
Incident14	√	
Incident15	√	
Incident16		√
Incident17		√
Incident18	√	
Incident19	√	
Incident20		√
Incident21	√	
Incident22	√	
Incident23	√	
Incident24	√	
Incident25	√	
Incident26	√	
Incident27	√	
Incident29	√	
Incident30	√	
Incident31	√	
Incident32	√	
Incident33		√
Incident34	√	
Incident35		√

Incident36	√	
Incident37	√	
Incident39	√	
Incident40	√	

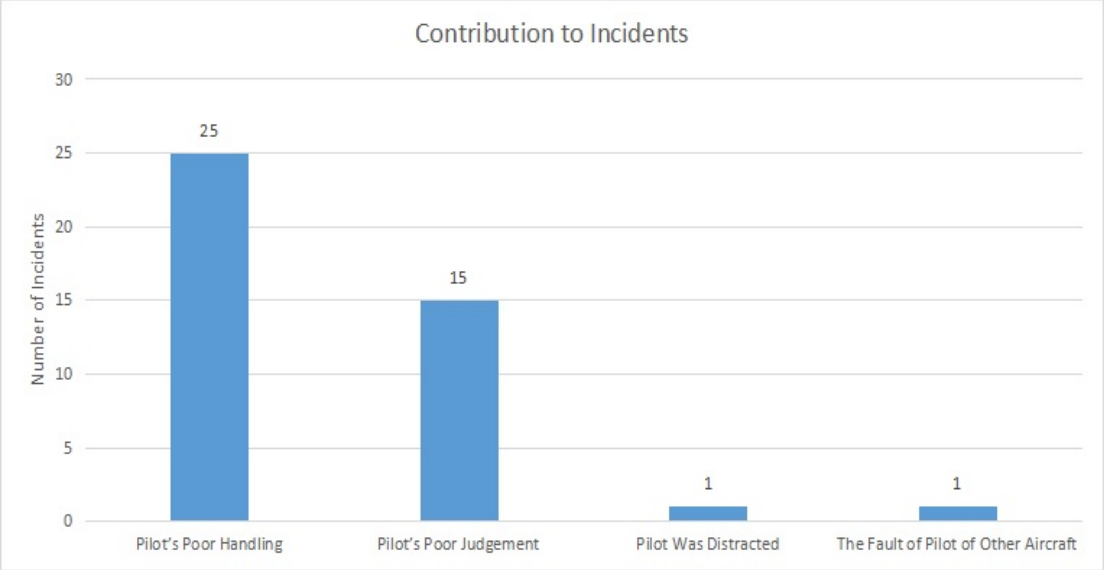

Figure 2. Number of Incidents Based Upon Category of Faults

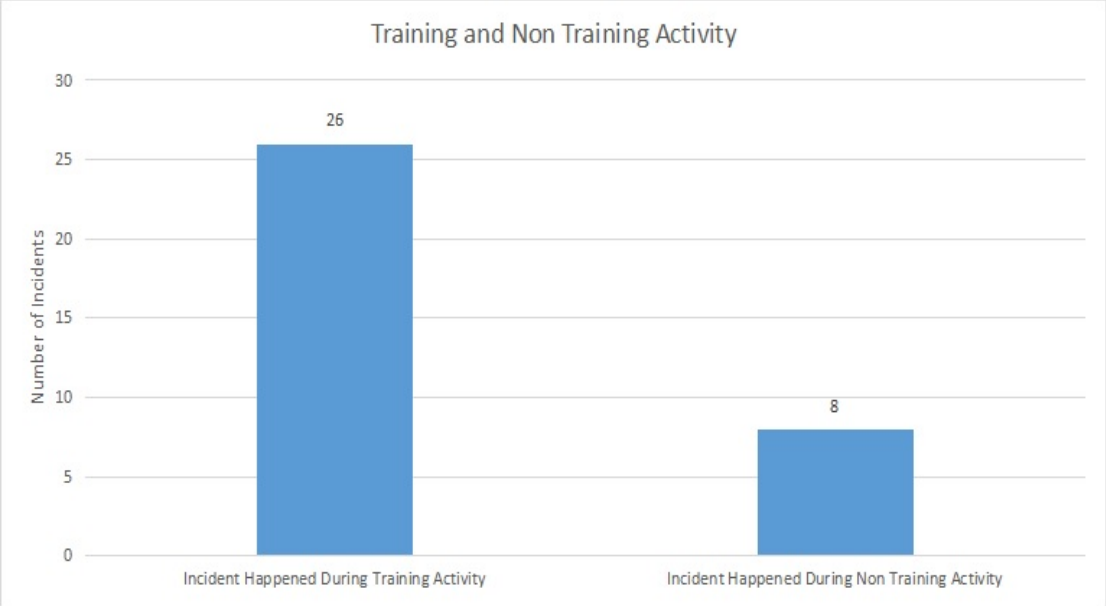

Figure 3. Number of Incidents Based Upon Mode of Incident

V. Discussion

Table 1 showed the categorization of the faults of pilot and the categorization was explained in the methodology section. The faults were based upon incidents that were affirmative attributed by errors of pilots. Incidents that were due to mechanical faults and others were not listed and hence this explained the omission of several numerical labels such as Incident4, Incident8, Incident12, Incident13, and others.

The components of Table 1 were graphically represented in Figure 2. Figure 2 shows the numerical value of the incidents based upon each fault category. The most number of incidents occurred due to pilot's poor handling where the number of incidents was 25. This represented 73.53% of the total number of incidents (note : the total number of incidents is 34 since there were incidents that were caused by more than one fault). Pilot's poor judgement contributed to 15 incidents and this represented 44.12% of the total number of incidents.

Perhaps the contributing factor to the pilot's poor handling was their lack of understanding of the characteristics or behaviour of the helicopter. The pilots need to be able to comprehend the "reaction" of the helicopter if certain physical inputs were imparted upon the helicopter. Different types of helicopter would give different outputs in terms of flight dynamics, movements, and smoothness.

Another plausible contributing factor to the pilot's poor handling is the fact that certain quarter of pilots are physically unfit. Those who are not fit are often inattentive and are unable to react swiftly during certain conditions. Harridon implied that there should be continuous assessment of the physical fitness of pilots in order to prevent mishaps [14]. Harridon also stated that a comprehensive measure should be undertaken to increase the fitness of the pilots [14].

Table 2 showed the mode of the accident or incident, whether the pilot errors occurred during helicopter training or not. The data in Table 2 was transposed into a graphical form which is shown in Figure 3. Based upon Figure 3, the majority of the incidents occurred during training activity. 26 out of 34 incidents happened during flight training. That amounted to 76.47% of the total incidents.

We can perhaps deduced that the majority of the mishaps occurred during training was due to the fact that these pilots were inexperienced in handling the helicopter as they were in the process of "getting to know" the characteristics of the helicopter. This perhaps should be explored further to rigidly confirm the statement. This is also where the roles and functionalities of the flight instructors are scrutinized where the instructors are supposedly monitor the students closely in order to avoid any mistakes by the students.

According to Erickson, the prominent role of an instructor is to provide check and balance to the students during flights and also to intervene when the situation is grave and safety is compromised [15]. Erickson also delineated that flight instructors should assume responsibilities upon the training flights and take charge when the situations are out of hand [15].

We thus could say that perhaps the incidents of Cabri G2 occurred due to the fact that the flight instructors were not in full comprehension of the flight or perhaps the reactions of the instructors towards the maneuvers of the students were delayed. It is suggested this should be explored in details to gain a rigid understanding of the situation.

VI. Conclusions

The data of the incidents of Guimbal Cabri G2 were scrutinized and incidents due to errors of pilots were focused upon. The data of errors of pilots were classified into several categories in accordance to the types of the pilot errors. The data of the errors of pilots were also classified in accordance to the flight mode, whether it was during training or non training. All the data were analyzed and the analyses showed that pilot's poor handling contributed to most of the incidents and most of the incidents occurred during flight training.

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