

HELICOPTER TRAINING STRATEGY: STUDY CASE IN INDONESIA

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Abstract: *External-load operation and instrument rating are important competencies for helicopter pilots to possess. This research was conducted with a descriptive qualitative approach. This article aims to find out the correct strategies for the education and training of helicopter pilots in Indonesia. Data collection techniques are through complete participatory observation, interviews with informants, and distributing questionnaires to civilian helicopter pilots. The results showed that the training programs were constrained by the very large helicopter operational costs for these activities. The results also showed that ownership of these competencies has a positive effect on helicopter pilots, both in carrying out external-load operations and when facing or trapped in instrument meteorological conditions (IMC). Based on the results of this research, helicopter pilot schools should conduct regular surveys of market needs, incorporate external-load operation syllabus and instrument ratings into education and training programs, as well as make improvements to the current training helicopters.*

Keyword: *external-load operation, helicopter pilot, instrument rating*

Abstrak Operasi muatan eksternal dan instrument rating adalah kompetensi penting yang harus dimiliki pilot helikopter. Penelitian ini dilakukan dengan pendekatan kualitatif deskriptif. Artikel ini bertujuan untuk mengetahui strategi pendidikan dan pelatihan pilot helikopter yang tepat di Indonesia. Teknik pengumpulan data melalui observasi partisipatif lengkap, wawancara dengan informan, dan menyebarkan kuesioner kepada pilot helikopter sipil. Hasil penelitian menunjukkan bahwa program pelatihan terkendala oleh biaya operasional helikopter yang sangat besar untuk kegiatan tersebut. Hasil penelitian juga menunjukkan bahwa kepemilikan kompetensi tersebut berpengaruh positif bagi penerbang helikopter, baik dalam menjalankan operasi beban eksternal maupun saat menghadapi atau terjebak dalam kondisi meteorologi

instrumen (IMC). Berdasarkan hasil penelitian ini, sekolah penerbang helikopter harus melakukan survei kebutuhan pasar secara berkala, memasukkan silabus operasi muatan eksternal dan instrument rating ke dalam program pendidikan dan pelatihan, serta melakukan perbaikan pada helikopter pelatihan yang ada.

Kata kunci: Operasi muatan eksternal, *helicopter pilot*, *instrument rating*

Introduction

Helicopters are multifunctional aircraft that can be used for various flight activities and only requires small area to take off and land vertically (Vertical Take-off & Landing / VTOL). Helicopters in operation offer special capabilities as a type of air transportation mode, (Galvagno Jr et al., 2015) including high speed for short and medium distances, ability to reach remote areas and mountainous areas, faster preparation and mobilization than fixed-wing aircraft, and require small landing area for both on land and sea, and capable of carrying out special flight operations involving external-load operations. (Rajendran & Pagel, 2020) However, one of the biggest limitations on rotary wing flight is their inability to fly in degraded visual conditions in the critical phases of approach and landing. (Stanton et al., 2016).

To this day, Rapid technological developments also affect helicopter avionics technology. (Kwon et al., 2019). Currently, a helicopter's ability to navigate and fly almost resembles the capabilities of fixed-wing aircraft. The improved navigation and flying performance of the helicopter bring the helicopter to the capability to carry out IFR flights. Currently, many operators are rejuvenating their helicopter fleet. The helicopters brought in are usually

helicopters with the latest avionics technology. This is a problem because to utilize the avionics technology optimally, helicopter pilots need IR (Instrument Rating) capabilities. However, helicopter pilot schools in Indonesia have not included external-load operation and instrument rating competencies in the helicopter pilot education and training program until recently. In addition, airline operators are reluctant to provide competency training to their pilots if the operator is not engaged in a field that requires such competence due to the high cost of training.

This article aims to find out the correct strategies for the education and training of helicopter pilots in Indonesia.

1.1. Aviation School

A pilot school is an organization or institution that has the authority or authority to be able to train someone to become a pilot who can fly certain types and types of aircraft. An approved school may be able to provide a greater variety of training aids, dedicated facilities, and more flexibility in scheduling (FAA, 2022). In Indonesia, aviation is controlled by the state and its guidance is carried out by the government which includes aspects of regulation, control, and supervision (Presiden Republik Indonesia, 2009). Aviation rules and regulations in Indonesia are described in

detail in the Civil Aviation Safety Regulations. The certification and operating requirements for flying schools are regulated in CASR section 141 Certification and Operating Requirements for Pilot Schools (Kementrian Perhubungan Republik Indonesia, 2017a) and general aircraft operating regulations are regulated in CASR section 91 General Operating and Flight Rules (Kementrian Perhubungan Republik Indonesia, 2017c). It is thus understood that the pilot school can operate after meeting the requirements of CASR sections 91 and 141.

1.2. External-load Operation

External-load Operation is a term used in the aviation world to describe helicopter flight operations to carry personnel or goods outside the helicopter body using additional equipment connected to the helicopter body. This operation is categorized as a dangerous operation because it increases the safety and security risk for the helicopter and its personnel due to the additional burden and obstacles compared to the normal movement of people and goods (Babenko et al., 2022).

In practice, External Load Operations are divided into 4 classes based on their combinations or Rotorcraft-load Combinations (RLC) (FAA, 2017), namely:

- 1) RLC class A. Non-movable, non-detachable, non-extendable External Load under landing gear. An example is the carriage of goods using cargo racks or other equipment approved for installation outside the fuselage.
- 2) RLC class B. External Load which can be removed/dumped, carried on or under the skid, and can be lifted freely

from the ground or water level during flight operations. An example is the transportation of an air conditioner unit to the roof of a tall building.

- 3) RLC class C. External Load that can be removed/disposed of but in practice the load remains in contact with the ground or water surface. An example is the installation of cables between power towers.

- 4) RLC class D. External Load involving the transport of people other than members of the aircraft crew. Operations in this class are required by the FAA to use category A twin-engine helicopters. An example is human rescue missions by the SAR using personnel lifting devices.

External load operations in Indonesia are regulated in CASR section 133. Airline operators carrying out external load operations are required to have an operation certification 133 which is valid for 24 months. Pilots who will carry out external load operations must first receive training to carry out these operations. If within 12 months the pilot does not perform external load operation, then the pilot must undergo external-load recurrent training (Kementrian Perhubungan Republik Indonesia, 2008).

1.3. Instrument Rating

Through several analysis and researches, we could conclude that IMC has damaging effects on flight safety. (Ying-Duo et al., 2022). The operation of aircraft in general in Indonesia is regulated in CASR section 91 of the General Operating and Flight Rules. Fixed wing and rotary wing aircraft, if equipped with adequate equipment, can carry out flights with Visual Flight Rules (VFR) and Instrument Flight Rules

(IFR). VFR is the rule used by the Federal Aviation Authority (FAA) to regulate the flight of aircraft using visual references. VFR operation is determined by altitude and visibility limits that can be seen by the pilot (FAA, 2016). While IFR is the rule made by the FAA to regulate flights that are carried out when visual references can no longer be seen safely (FAA, 2016) In this type of flight, the pilot only relies on the instruments in the aircraft to be able to fly in weather conditions under VFR conditions. Instrument flying (flying by relying on navigational instruments on board) provides pilots with the possibility and ability to fly under VFR conditions. To be able to carry out Instrument Flying, pilots must have an Instrument Rating (IR) certificate (Kementrian Perhubungan Republik Indonesia, 2017b). Moreover, instrument-proficient pilots more safely manage an unexpected encounter with IMC. Thus, helicopter programs should strongly consider maintaining instrument proficiency to enhance safety. (Wuerz & O'Neal, 1997).

Method

The research method is a scientific way to obtain data with certain purposes and uses (Sugiyono, 2021). This study uses a type of research with qualitative/post positivistic /naturalistic methods. In this study, it is deemed necessary to establish social interaction in the research environment so that the truth of information and data in the field can be ascertained. The problems raised from the environment are holistic, complex, and dynamic problems that are

impossible to implement using quantitative methods.

This research was conducted by conducting participatory observations in civil helicopter pilot schools and 4 helicopter flight operators which are engaged in the offshore operation, external-load operation, and charter flight by using the authors themselves as human instruments to explore the social environment.

Data collection techniques used by the author are:

1) Complete Participatory Observation

In conducting this research, the author has been fully involved in the environment where the data source is actively working as a commercial helicopter pilot. The atmosphere and social situation are natural so the writer does not look like they are researching it. By conducting this type of participatory observation, the writers will be able to understand the context better in the overall social situation in the research environment. In addition, through this type of observation, the author can find things that the informant might not deliver in the interview because it could be sensitive or even harm the image of an institution.

2) Semi-Structured Interview

This interview is one type of interview in the in-depth interview category. Practically, it is freer than structured interviews which seem rigid. The author uses this type of interview to be able to talk about problems more openly and casually to build relaxed conditions for conversation. Thus, it is hoped that the informant can provide more and more detailed information

than previously expected by the writers while keeping in mind the core or the main questions in the interview.

3) Triangulation

Technical triangulation means that the writer uses different types of data collection techniques to obtain data from the same source. In this study, the writers used complete participatory observation, semi-structured interviews, references/ documents, and questionnaires simultaneously. This is because the social environment studied contains many informants who come from various backgrounds (age, workplace, background, and others) even though they have the same profession as civilian helicopter pilots. If the writers collect data by triangulation, then the writers collect data which at the same time test the credibility of the data by checking the credibility of the data with various data collection techniques and various data sources (Sugiyono, 2021). In qualitative research, data analysis is carried out before entering the research environment, during the research environment, and after completion in the research environment. Data in qualitative research are findings obtained through an in-depth approach so that they do not appear in the form of numbers. In this study, the writers used the Creswell model data analysis which was slightly modified to suit the purpose of this study. The analysis process is focused on the process in the research field along with data collection.

The steps of data analysis carried out by the writers are as follows:

1) Organizing and preparing data to be analyzed

In this study, the writers collected all the data found and obtained during the process of participatory observation, interviews, and questionnaires.

2) Read and view all data

In the process of this qualitative research, the writers must read all the data collected to find out what data has been obtained, the source of the data, and its meaning which is then followed by data selection/reduction.

Reducing data means summarizing and selecting the main things, focusing on the important things, and looking for themes and patterns (Sugiyono, 2021). Thus, the data are summarized according to the research title, theoretical study, and research objectives raised by the writers.

3) Create categories for all data

After the data is reduced/selected, the next step is data categorization to group the collected data to make it easier to analyze.

4) Connecting between categories

After the authors create data categories, the next step is to find out whether there is a relationship between one category and another.

5) Giving interpretation and meaning to categorical relationships

The results of the construction of relationships between categories need to be interpreted so that other people can understand them.

In qualitative research, the data collected or found can be declared valid if there is no difference between what was reported by the author and what happened actually to the object under study (Sugiyono, 2021). In addition, the process of testing the validity of this

data takes place along with the process of data collection.

In carrying out the validity test, there are 4 types of tests, including:

1) The credibility test consists of:

a) Extended Observation

Extension of observation means the writers return to the field, make observations, and conduct re-interview with data sources that have been encountered or with another informant. With the extension of this observation, it can be seen if the data that has been previously collected from the research field is still the same or has changed. If after checking back into the field and the data is correct, it means that it is credible so that the observation extension period can be ended.

b) Increase Perseverance

Increasing persistence is an activity of re-checking the data that has been collected carefully. By doing so, the researcher can provide an accurate and systematic description of the data about what is observed.

c) Triangulation

Triangulation in the context of credibility testing can be interpreted as checking data from various sources in various ways/techniques and times.

d) Using Reference Materials

Referred to as reference material is the existence of supporting tools/equipment to prove the data that has been found by the researcher. For example, data from interviews need to be supported by recording interviews and others.

e) Member Check

Member Check is the process of checking the data obtained by the author to the data provider. The purpose of Member Check is so that the information obtained and will be used in writing the report by following what is meant by the data source or informant. Member Check also tested the validity of the research externally by testing the level of transferability.

2) Transferability test, this test shows the degree of accuracy or the implementation of research results to similar populations. Therefore, so that other people can understand the results of the research, the writer must be able to make a clear, systematic, and reliable report so that the reader has a clear perception of the results of the research and can decide whether the results of the research can be applied or not.

3) Dependability test. In qualitative research, this test is carried out by conducting an audit of the entire research process, either by the auditor or supervisor who audits the entire research activity.

4) Confirmability test. In qualitative research, it can be referred to as a research objectivity test. Research can be said to be objective if the research results have been agreed upon by many people, in this case, the population in the social situation where the research process takes place.

Result and Discussion

The search activity on the population aims to obtain as much information as possible from the informants to get a complete picture of the world of helicopter operations. Almost all of the informants, both those interviewed and those who filled out the questionnaire, were helicopter pilots of the ages. That is, these helicopter pilots have used various types of helicopters and technology. Starting from full analog and full manual helicopters, and hybrid technology to today's full automation technology. Technological advances in helicopters can assist pilots in operating helicopters but can also be potentially dangerous if not mastered. So, technological advances are like a double-edged sword. Therefore, helicopter pilots have more adaptability and are not only capable of taking off and landing.

The ability of helicopter technology which has increased rapidly in the last 20 years does not seem to be able to be seen in its entirety by the Indonesian government. Helicopter operations in Indonesia have not yet been taken seriously because they have not been studied in terms of complexity and prospective. The number of helicopters in Indonesia is around 190 and helicopter pilots are approximately 300 people, but the utilization rate is very low even though there is still a lot of wealth and natural beauty in Indonesia that can be explored. The government's lack of seriousness in seeing the potential of helicopters can also be seen from the government's indifferent attitude towards the private sector using its own rules in the helicopter pilot recruitment process. The requirements that are freely thrown

into the market as well as the limited of helicopter inspectors to oversee all helicopter operations in a country as large as Indonesia seem to make Indonesia appear to have no strict regulations for helicopter operations.

Indonesia is a very large country. Unfortunately, not all areas have adequate transportation access. This is where helicopters come into play along with pioneering flights. Helicopters are very widely used for remote and limited access locations. Helicopters are presented to assist Indonesia's development in remote areas and limited access as well as for disaster emergency response activities. Many activities and jobs are helped by the presence of helicopters and their unique abilities. Starting from the opening of areas for development, fighting forest and land fires, constructing offshore rigs, medical evacuation, humanitarian activities in natural disasters, and others. All of these activities require additional competencies that take advantage of the helicopter's uniqueness and the latest technological capabilities, namely external-load operation and instrument rating. However, the high cost is the main reason why operators are reluctant to provide training in these competencies to their helicopter pilots

In interviews and distributing questionnaires that the writers conducted on this population, they were also asked about the influence of ownership of external-load operation competence and instrument rating on the informants. All informants stated that these competencies were very influential to them. In addition, to increasing confidence in carrying out helicopter

operations, they are also able to respond to operators' demands for various flight missions. In other words, the operator gets the benefit because the scope of operation becomes wider as the competence of the helicopter pilot increases. Every helicopter pilot in the world wants to have special skills in operating helicopters. Not only capable of takeoff and landing, but also instrument rating, sling load, long line, offshore, search and rescue, medevac, and others, where these competencies are a benchmark for the professionalism of helicopter pilots around the world. In addition, all of the informants agreed that the instrument rating competency is a very important competency because this competency is a requirement to fly to serve oil and gas companies. Around the world today, the market that consistently uses helicopters is the oil and gas and mining industries where they apply a high level of flight safety so that helicopter pilots are required to have these competencies. Having instrument rating competence can also be used if a helicopter pilot encounters or is trapped in an IMC (Instrument Meteorological Condition) condition, the pilot can handle it properly so that safety is maintained. IMC conditions is now linked to a higher proportion of fatalities, emphasizing that helicopter pilots should be made aware of these specific decision-making circumstances in their operations. (de Voogt et al., 2020).

Based on these things, helicopter pilot schools must be able to read the market needs in producing new pilots. They need to avoid producing helicopter pilots which do not match the needs of the market. Understanding, information,

and experience in the field and industry have a big role in helping to prepare pilot resources for the training period. Because this will make it easier for instructors, lecturers, and management to develop an appropriate training formula for the market. Market or industry needs should be a must in creating the helicopter pilot education and training syllabus. Not all helicopter pilots have external-load operation and instrument rating capabilities, that's the pilot's advantage of having these abilities. This study also highlights the relatively slow regeneration of civilian helicopter pilots in Indonesia. This phenomenon can cause a long gap that can affect the transfer of knowledge and capabilities, especially the types of helicopters that are increasingly sophisticated. In addition, the increasing number of training programs will affect the cost of the training. Therefore, management must be able to do good planning by starting to think about the use of helicopters that can accommodate all types of helicopter training programs and the availability of instructors who can carry out all of these training programs. Thus, training costs can be reduced while maintaining the quality of the training.

Conclusion

Based on the results of observations made by the writers in the social environment studied, the results of interviews and questionnaires from informants, as well as studies of document references and regulations, it is found that the strategies that need to be implemented by flying schools include:

- 1) Conducting field studies regularly so that the market needs for helicopter pilot capabilities can be identified.
- 2) Establish and maintain good communication with helicopter flight operators so that flying schools can get continuous feedback from operators regarding their needs for pilot competence.
- 3) Evaluate the current helicopter education and training syllabus and revise it as a form of adaptation to current and future market needs.
- 4) Completing and maintaining the validity of the helicopter instructor's competence to suit all of the training programs offered. Thus, there is no need to use multiple instructors for various helicopter training programs.
- 5) Make changes or improvements to the training helicopter that will be used in undergoing the training program that is owned which can carry out external-load operation and helicopter instrument rating training
- 6) Incorporate external-load operation and instrument rating training syllabus into helicopter pilot education and training programs.

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