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The impact of teaching load on the safety of performing aviation tasks

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Abstract

Flight training is occupied by many hours of theoretical and practical training. Polish universities offer the possibility of conducting the aforementioned training as part of academic training. A young aviation student, implementing himself in this process, takes on the burden of academic training and aviation training. The aviation environment is sensitive to safety issues. These include the occurrence of incidents, events, and aviation accidents. This issue arises directly from the possibility of endangering the health and lives of bystanders as well as aviation personnel and the damage or destruction of aviation equipment. In addition, there are issues related to the immobilization of airports, aviation organizations, excess repairs, or cases settled in court. Despite all the above, it should be mentioned that air transport is described as the safest means of transportation where – although incidents, events, or high-profile crashes are occasionally recorded. It is desirable for personnel to remain as focused as possible during aviation tasks. The multitude of tasks carried out by aviation students, combined with the burden of academic study, can carry a significant impact on maintaining concentration, lowering perception, or at least meticulousness. These topics correlate closely with the human factor. As a research problem, the submitted work was adopted to determine the impact of academic teaching load on the safety of aviation activities performed, in the context of aviation training provided at universities. The research included aviation mechanics and aircraft crews within its scope.

Introduction

The aviation industry is a broad term. More specifically, its scope includes aviation equipment manufacturers, carriers, professional service companies, maintenance organizations, continuing airworthiness management organizations, crew and mechanic training centers, handling companies, air traffic control, and others. Without delving into too much detail, based on the above factors, it is possible to identify a common feature: the human factor. Regardless of the organization or function, for commercial or private aviation, throughout any aviation task a human is present at every stage. Therefore, it is important to be aware that the innumerable activities in which a mistake or omission can potentially occur can be traced back to the human factor. Nevertheless, air transport is referred to as the safest mean of transportation, in which – although incidents, events or high-profile disasters are recorded from time to

time – there is a downward trend in their occurrence (Quddus, 2020).

Acquiring informed, trained personnel is a long process. Its beginning is the undertaking of initial contacts, industry training, and targeted learning at technical or academic centers by young aviation students. Industry training is frequently characterized by its comprehensive or integrated nature. This feature equally applies to the training of ground maintenance personnel, airport operational services, navigators, and aircraft crews. The time required to obtain the first aviation qualification is measured in hundreds of hours of theoretical and practical training. Expanding on this subject, aircraft crew who obtained their first basic tourist pilot's license (PPL) are obliged to perform a minimum of forty-five hours of flight at an accredited aviation training center (ATO). In addition, such personnel is required to successfully pass nine exams that relate to theoretical knowledge in aviation subjects. The next necessary step to obtain a commercial pilot's license (ATPL) is to undergo a minimum of two hundred flight hours (considering airplane pilots) and the passing of fourteen exams in aviation subjects. At this point, it should be noted that the above information refers to acquiring a pilot's license, while one should be aware that to fully utilize the potential resulting from one's documented authorizations, it is necessary to undertake additional training cycles (e.g., night flying, instrument flying, etc.), and ultimately undergo training for a particular type of aircraft (Announcement, 2021; ULC, 2022).

Next, when considering the case of ground maintenance personnel, the required seniority in the maintenance environment is between one and five years (depending on the category of the aircraft mechanic license) (ULC, 2015). An additional requirement is theoretical examinations in twenty-one training modules. It should be noted that this number represents the value of all possible examinations. Their number varies for different license categories. The career path of an aircraft mechanic, conducted at centers with approved training organizations according to PART-147 regulations (Regulation, 2014), obliges practical training close to 1200 hours, depending on the theoretical training factor used.

Accounting for the above information, flight training is occupied by many hours of theoretical and practical training. Due to its duration, there is a tendency for the candidate to start at a young age, which enables a staggered distribution of knowledge and skills. Polish universities offer the possibility of conducting the aforementioned training as part of the academic training. A young aviation student, implementing himself into this process, takes on the burden of academic training and aviation training.

Nowadays, employers recommend that personnel demonstrate a high level of abilities; it is also essential to have a license, training, and education. Bearing in mind the responsibility for passengers and bystanders, and property disposed of by operators, it should be noted that the working environment of personnel from the aviation environment is not lax. The industry in question expects its personnel to simultaneously perform (often several) tasks, have an insensitivity to stressful situations, composure in contentious or dangerous situations, and have knowledge or teamwork skills. The above can be supplemented by the quality of the product expected by the recipient, in the form of an aircraft received after maintenance or a punctual and safe flight.

Advances in technology, given the field in question, lead to operational implementations of other types of aircraft, new solutions, or modifications to existing ones, and the introduction of corrections or removal of revealing design flaws, which are issued in the form of service bulletins or airworthiness directives. This situation directly affects crews, ground technical personnel, and airport operational services. The above factors force personnel to continuously improve their qualifications, retrain, and participate in external training, while also requiring the renewal of already possessed training and authorizations.

Yet another issue one can cite is the changing airspace. Such a state of affairs arises as a result of changes, if only due to the appearance of terrain obstacles, which should include both artificial and natural scenarios. Such changes are reflected in the updates to aeronautical maps and issued dispatches. They can refer to changes in flight paths, aircraft approach paths, or taxiways. The introduction of updates to maps issued in the traditional way, as well as electronic forms, implies the obligation of crews to familiarize themselves with such information and immediately put it into use, directly affecting the performance of flight operations.

Given what has been outlined above, the excessive mental and physical workload associated with learning a job – including participation in aviation training, combined with the intensity associated with taking academic courses – can be a key factor affecting the safety of performing aviation activities in any aviation-related professional group. It is also pertinent to mention that, given the goodwill of young aviation adepts, an additional factor that can affect

conduct during training is premature professional burnout.

In general, the topic of occupational burnout has been extensively covered in previous works (Bilska, 2004; Sęk, 2004; Kamrowska, 2007). The topic of preventing and managing professional burnout is taken up by (Bilska, 2008; Maslach, Leiter & Braksal, 2010). The aspect of stress occurring in this situation, in turn, is the subject of other publications (Terelak, 2001; Litzke, 2007). In a different context, the impact of stress on aviation personnel is analyzed in previous work (Macander, 2016), which focussed on aviation accidents as a source of stress disorders in pilots. The human factor in aviation is widely taken up by publications (Dąbrowska, 2011; Makarowski, 2012) and concerns the process of flight training (Makarowski & Smolicz, 2016). Analysis of the human factor in aviation accidents is also the subject of earlier works (Truszczyński, Tarnowski & Biernacki, 2008; Beaty, 2013; Lasota, 2018).

In (Peruń, Stołtny & Urzędowski, 2021) the aforementioned issue is addressed. The possibility that professional burnout may affect the safety of performing flight operations is commented upon at the same time, and other factors affecting the issues raised are also indicated. The authors point to age, seniority, or stress. A similar issue was raised in (Stołtny & Peruń, 2021), where the authors examined a possible link between overstress and safety. Existing publications in this area mainly concern surveys among pilots and mechanics, after the training process has been completed. Within the scope of this work, the main focus is on the impact on the safety of performing aeronautical tasks of the training process itself, which takes place during the implementation of the educational process at universities. This involves a greater number of teaching duties for the trainees and affects their workload, thus increasing the risk during their various aviation operations.

It is also important to present research (Bavafa & Jónasson, 2021) that shows that fatigue affects employee performance. This information should be considered important for an improved understanding of the training situation faced by young aviation students. Next, the authors (Grady et al., 2022) discussed the effect of high energy levels (the opposite condition for fatigue) on the conscientiousness of task performance. In the industry under discussion, this trait can be seen as crucial due to the importance of possible consequences in case of negligence. It is presented that fatigue (a lower energy level) decreases accuracy, successively higher conscientiousness of the worker increases accuracy and, importantly, the interaction between their energy levels and conscientiousness is also indicated.

The problem of personnel training can also be analyzed in another sense – how training in the profession affects aircraft maintenance times. This topic was addressed in the work (Atici & Şenol, 2022), among others. A model is presented that can be effectively used to plan aircraft maintenance, which evaluates the performance of certified personnel and maintenance training. It is proposed that aircraft maintenance activities are plannable based on a learning effect that achieves a more realistic maintenance plan.

The problem of training during the COVID-19 pandemic was described in a previous paper (Ng, 2022) using the example of Hong Kong in China. Despite the widely addressed topic of safety (Jancelewicz, 2009) and risk management of aviation hazards (Szymaniec, 2018), aviation accidents and disasters still occur, including during personnel training. Hence, it is imperative to conduct research that can improve this situation.

Characteristics of the study

Today, considering the geopolitical situation and the SARS-CoV-2 virus pandemic, it can be seen that the situation in many industries has changed compared to the years before 2019, including the aforementioned aviation industry. In particular, accounting for the preservation of common rules against the spread of the cited virus, remote work has become widespread. This form of work has covered numerous positions and industries. Adjusting to the above circumstances, the survey presented in this work was conducted electronically. The questionnaire submitted to the respondents was anonymous and participation in the research was voluntary.

Questionnaire

The form acts as an in-house study that explores the topic at hand. It consists of closed questions only, constructed in such a way as to examine the correlation between teaching load and the safety of aviation activities as definitively as possible. The survey consisted of seventeen single-choice questions, in which emphasis was placed on addressing only the necessary number of questions. Such a procedure was intended not to lead to a situation in which the respondent would be discouraged from continuing to fill out the form or abandon answering altogether. The form did not include the use of graphics.

Selection of the study pool

To select an adequate pool of respondents, factors that have a key impact on the topics explored were determined, namely active participation in:

- taking academic courses;
- flight training (theoretical and practical) for crews, as well as for ground maintenance personnel.

Individuals who did not meet at least one of the above conditions were excluded; thus, aviation professionals who work in aviation industries were not invited to the survey. Instead, aviation students of both first- and second-degree courses in aviation, whose academic groups participated in the industry training process, were asked. Respondents to the survey represent two groups: aircraft crews attending training at an Approved Training Organization center, and ground maintenance mechanics attending basic training on behalf of a technical staff training organization certified according to the PART-147 regulations. The level of training among students did not affect participation in the study. The authors did not introduce an upper age limit, while the lower age limit was determined with respect to the start of the academic study. Both women, men, and non-binary participants entered the study. The percentage distribution of the study groups is presented below.

Summary of collected results

The pool of survey participants was 76; it should be noted that the vast majority of the respondents are directly involved in the subject of the presented article. Due to the number of respondents, the presented survey results should be considered preliminary. It is planned to continue them in future years using a broader scope. The results obtained, as well as the conclusions drawn from them, are presented in this section. It was assumed that each paragraph is a presentation of the results concerning one question. The percentages of the obtained answers were rounded to a whole number, the sum of which was not always 100% in each case.

The construction of question 1, and the possible distribution of responses, are shown in Figure 1. Among the surveyed pool, 80% were male and 17% declared a female gender. Among the participants, 1% were non-binary people and 2% of the respondents did not select any answer, which may suggest that these people identify their gender differently than the survey predicted.

Figure 2 refers to the next question. It raised the question of the age of the respondents. The results

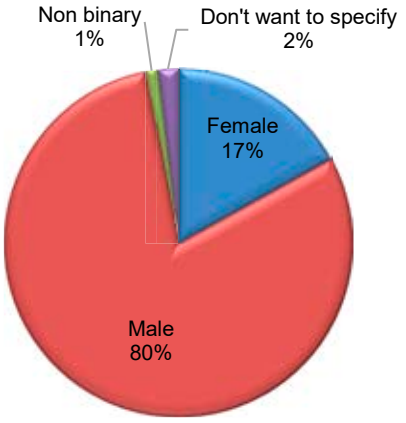

Figure 1. What is your gender?

collected show that a large proportion of those involved was aged 23–26 (47%). The second largest age group is those between 18–22 years old (43%). The following age groups, in terms of numbers, are ranked next: over 30 years old (5%) and 27–30 years old (3%). The group of respondents who did not respond accounted for 2% of the pool and those under 18 are 0%.

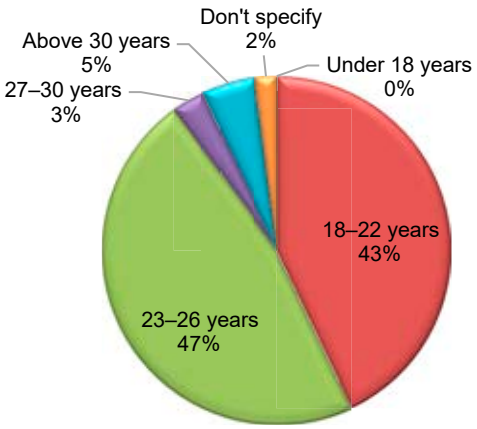

Figure 2. What is your age range?

The overwhelming majority of those interested proclaimed that they were a student of an aviation faculty (99%), whereas 1% of the pool did not indicate an answer. The ratio of the distribution of responses to the third question may indicate that, in the case of the last-mentioned answer, the research team is potentially dealing with a statistical error. Another large group (among the 99%) of declared aviation students is aviation mechanics students. It is a group containing 88% of the studied pool. This was followed by air navigation/pilotage (9%) and other (2%). The results discussed above are summarized in Figures 3 and 4.

Among 99% of the aviation students, 93% of them indicated that they were involved in aviation

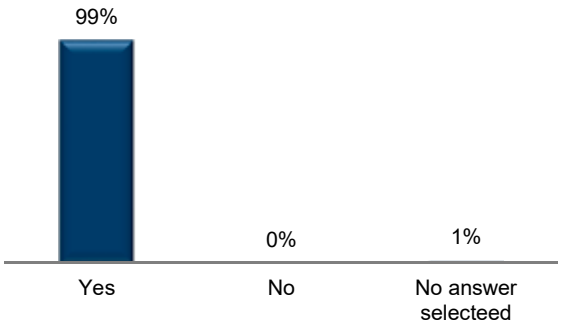

Figure 3. Are you a student with an aviation education?

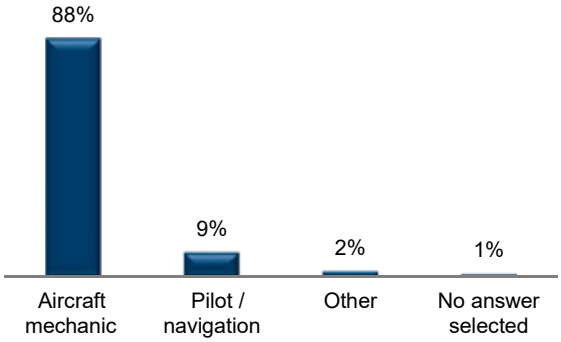

Figure 4. What is your field of aviation education?

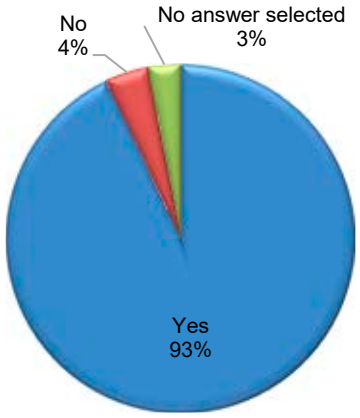

Figure 5. Are you involved in aviation training?

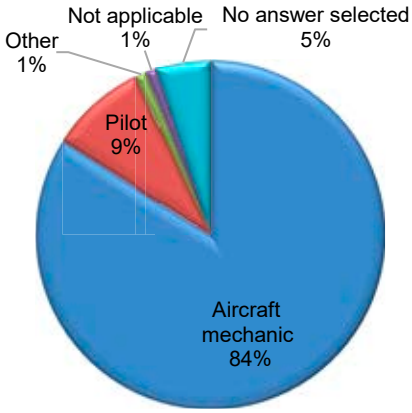

Figure 6. What is your aviation training direction?

training. 4% of the respondents said they did not participate in such training (Figure 5). Subsequently, 84% of the group said they favored engaging in industry training related to aviation mechanics (Figure 6). In comparison, 9% of the respondents chose the answer that indicates active participation in flight crew training. Only 1% indicated a different orientation, while 1% indicated that the question did not concern them. 5% of the pool did not choose an answer from the available options.

Figure 7 presents a summary of responses to the question relating to the period of work of the respondents in aviation. The most numerous group entails people whose involvement in the aviation industry is 3 to 4 years. The results show that this group is 43% of the respondents. The second most numerous group relates to over four years (32%). It is followed by 1 to 2 years (17%) and less than a year (4%).

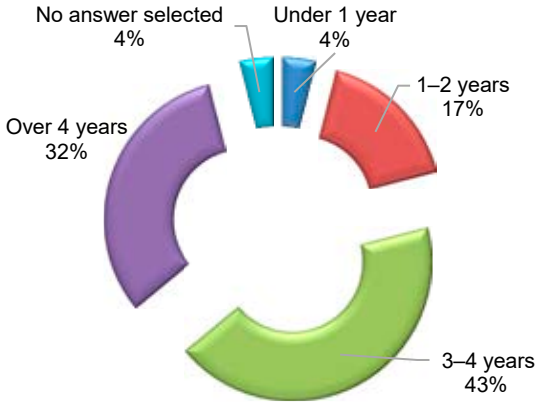

Figure 7. How long have you been involved in aviation?

Figure 8 shows the situation related to their feelings towards the undertaken training. Considering the overwhelming number of positive responses (86%), it can be stated that, using a colloquialism, "students like what they do". In addition, 8% of respondents believed it is difficult to say whether they like their aviation training course, while 4% refrained from expressing their opinion on this question.

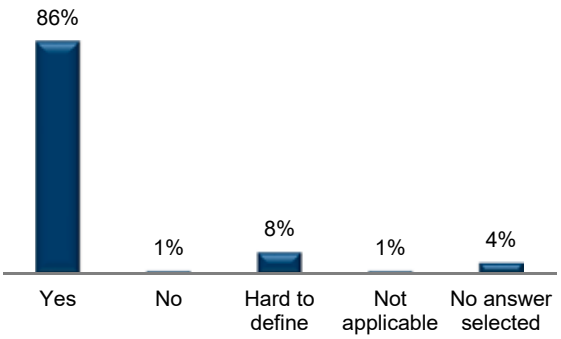

Figure 8. Do you like your aviation training course?

Figure 9 shows the distribution of the results for the question: "How large do you think the teaching load is relating to your studies?" Next, question 10 is: "How large, in your opinion, is the burden related to the conducted aviation training?". This is a crucial question, considering the distribution of responses to questions 5, 6, and 8. Even though the vast majority of respondents:

- participates in academic education concerning aviation courses;
- takes part in industry training;
- likes his targeted course.

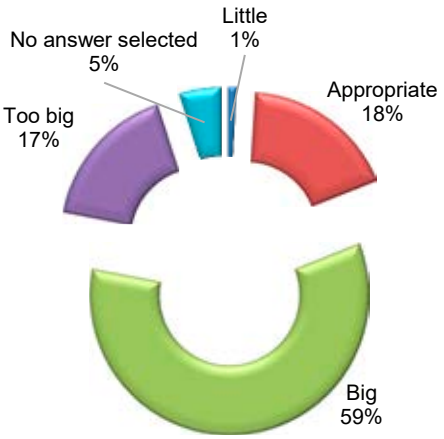

Figure 9. How large do you think the teaching load is relating to your studies?

The collected results related to questions 9 and 10 may indicate a high level of didactic load, taking into account the entire commitment. The respondents indicate a "large" teaching load, which originates from the academic study (59% of the respondents), and the "heavy" burden related to the flight course (42%, Figure 10). Subsequently, 17% of respondents believed that the academic burden, as well as that of training (32%), is "too great". Only 18% of the respondents (Figure 9) and 30% of them (Figure 10) replied that the burden from their sciences is appropriate.

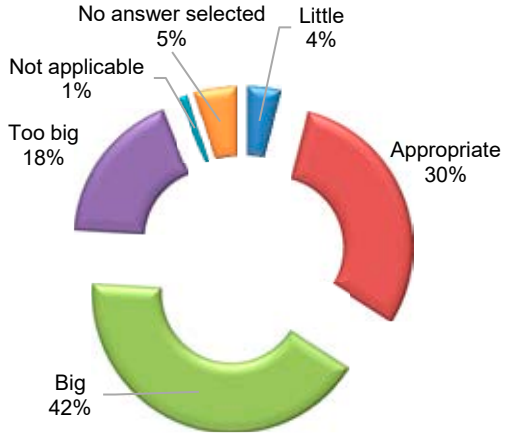

Figure 10. How large, in your opinion, is the burden related to the conducted aviation training?

The situation presented in Figure 11 is similar. Here, 41% of the respondents believed that they often find themselves in a situation where they participate in training while tired. In addition, 37% of them are sometimes tired, while 8% of respondents think that they are constantly tired in class. It should be emphasized here that the trainees perform aviation activities, and the state of fatigue significantly affects the safety of the human factor. Despite the results obtained in question 11, 79% of students declared that they did not witness an incident during their flight training in which other people were involved in the training (Figure 12). On the other hand, 14% of them witnessed such an incident.

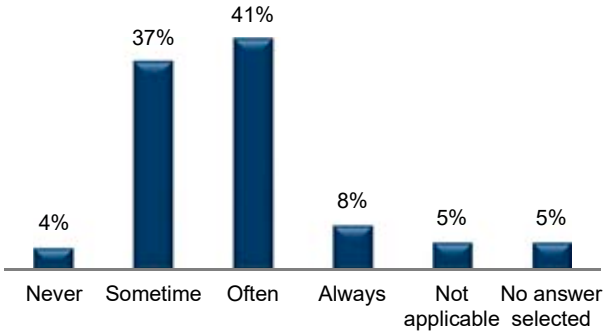

Figure 11. How often do you attend aviation training while being tired?

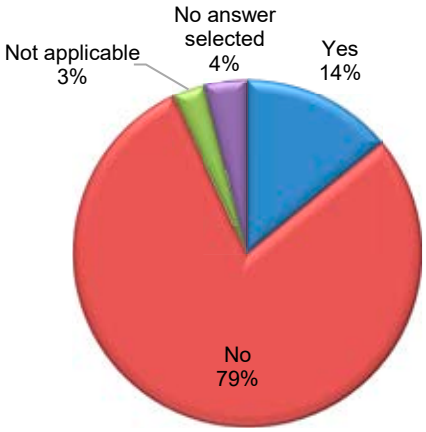

Figure 12. Have you witnessed an incident during flight training attended by other people?

Despite the frequent fatigue of the apprentices (Figure 11), only 14% of the respondents observed incidents caused by other trainees (Figure 12), while only 1% of the respondents declared that their actions led to the incident (Figure 13). Despite the entire situation described here, as many as 17% of

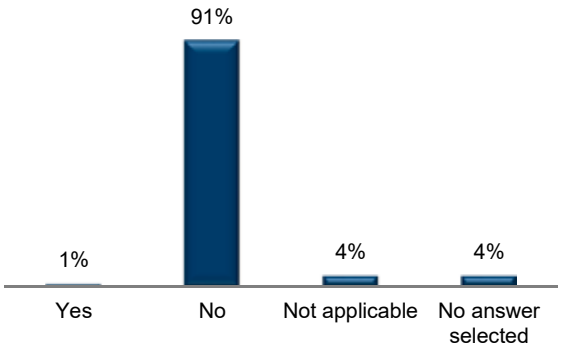

Figure 13. Have your actions led to an incident during flight training?

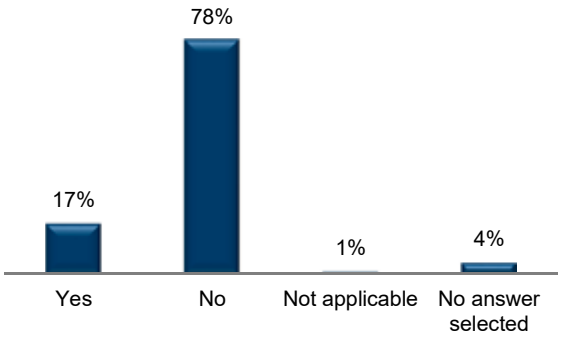

Figure 14. Have you witnessed a dangerous situation during flight training in which other people involved in the aviation training participated?

the respondents answered positively to the question regarding the observation of the occurrence of dangerous situations (Figure 14). There seems to be a certain dissonance between declarations about introducing dangerous situations and witnessing them.

The dissonance referred to above is somewhat confirmed after analyzing the results, when comparing the above figures with the results presented in Figure 15. Only 1% of the responses indicated an awareness that a trainee's action led to a dangerous situation during the performance of aviation activities.

Another important issue is illustrated in Figure 16. This question correlates with the topics discussed in Graphs 9, 10, and 11. 70% of responses to question 16, according to respondents, indicated a relationship between the total training burden and the safety of aviation activities. This is consistent with the results presented in the discussion of the above figure.

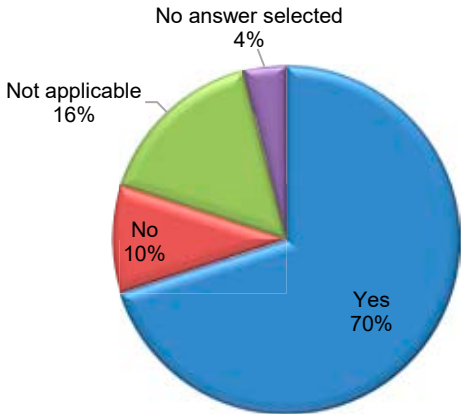

Figure 16. Do you think there is a correlation between academic burden, training, and behavior safety during the activities related to aviation training?

Figure 17 presents the distribution of responses to the final question included in the survey. This question concerned the impact of training intensity on the safety of aviation activities. The answers, as was the case earlier, are consistent with the collected results relating to the following questions: 9, 10, 11, 16. According to the respondents, 78% of the answers are affirmative.

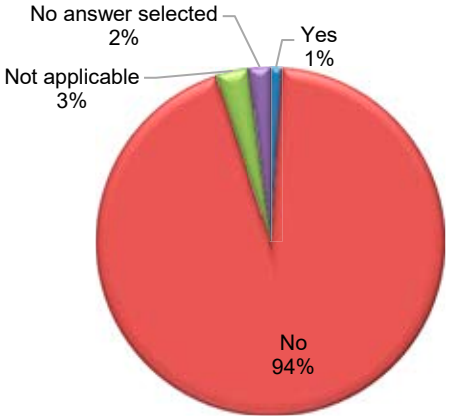

Figure 15. Have your actions led to a dangerous situation during aviation training?

Figure 17. Do you think the training intensity may impact safety during the performance of aviation activities?

Discussion

The survey results presented in the previous section first show a general picture of the people interviewed. The vast majority of responses during the survey were given by men. The age of the respondents in the range 18–26 years was indicated by as many as 90% of people, while older people were only 8% of the respondents. However, based on these surveys, it cannot be concluded that there is no interest in aviation training among older people, as the place of surveying and the correlation with the age of those pursuing their higher education has a direct impact on the results here.

All the respondents are students of aviation specialties, as the survey was directed to them. However, since the human factor is a significant problem in other industries, it is possible to conduct similar surveys in other industries that require intensive training, which can be performed in parallel with the standard educational path. It can also be noted that the survey was mainly taken by students of one of the two aviation specialties, in which training is conducted at the Silesian University of Technology, specifically, the aviation mechanics specialty. Since training in the specialty does not necessarily occur with simultaneous training outside the university, a few percent of respondents declared that they do not participate in such training.

Further survey results, indicating the period of involvement in aviation-related activities, are also interesting. The period correlating with the time of the beginning of studies (and later) is indicated by 21% of people (involvement up to 2 years) and 64% (up to 4 years). More experience is shown by 32% of the respondents, whose involvement is estimated at more than 4 years. From the point-of-view of the research conducted, the most relevant seems to be the answers on the degree of teaching load associated with the studies themselves and, separately, with flight training. In the first case, the answers "high" and "too high" are indicated by about 75% of people, while "adequate" and "low" are indicated by 19% and 34%, respectively. Unfortunately, according to the authors, this also results in people participating in training in a fatigued state too often. The survey participants revealed a correlation between the burden of studying and concurrent training, as well as the intensity of the training and staying safe during the activities provided for in the training. For this reason, it seems reasonable to take measures to improve the safety and efficiency of the training provided. A similar problem, with a completely different reference, is presented in the publication (Tuasikal et al., 2021).

Conclusions

Averaging the presented research results, which should undoubtedly be treated as preliminary due to the number of respondents, shows a picture of a man between the ages of 18 and 26, as previously indicated. The average result also suggests that this person is a mechanics and aeronautical operation student, who has engaged in industry-specific aviation training in aviation mechanics. The average respondent has been associated with the aviation industry for 3 or more years.

The academic workload, and the burden related to the conducted aviation training, are defined as high. The respondents indicated that they take part in aviation training while being tired. This may indicate that this condition is caused by the study load as well as the training intensity, or a combination of both. The respondents answered that there were air incidents involving people participating in the training. The indicated percentage can be considered significant, given the instructor's supervision over the apprentices.

Among the results, there are some discrepancies between the thematically related questions. This situation may result from several factors, among which we can distinguish the following: low involvement in research, lack of willingness to answer in line with the actual situations, poor sense of the importance of safety in the aviation industry, willingness to conceal facts, lack of understanding of the questions, and disregard for both the research surveys and the actions taking place during the training. Most respondents believed there is a correlation between the study, training, and safety burden. Training intensity was indicated as the main factor of the obtained results.

References

1. Announcement (2021) Announcement of the Minister of Infrastructure of August 13, 2021 on the announcement of the consolidated text of the Regulation of the Minister of Transport, Construction and Maritime Economy on the licensing of aviation personnel (in Polish: Obwieszczenie Ministra Infrastruktury z dnia 13 sierpnia 2021 r. w sprawie ogłoszenia jednolitego tekstu rozporządzenia Ministra Transportu, Budownictwa i Gospodarki Morskiej w sprawie licencjonowania personelu lotniczego), Warszawa, 17.09.2021.
2. Atici, U. & Şenol, M.B. (2022) Determining aircraft maintenance times in civil aviation under the learning effect. *Aircraft Engineering and Aerospace Technology* 94(8), pp. 1366–1378.

3. Bavafa, H. & Jónasson, J.O. (2021) *The Distributional Impact of Fatigue on Performance*. Available at SSRN: https//ssrn.com/abstract=3943699, doi: 10.2139/ssrn.3943699.
4. Beaty, D. (2013) *Pilot – naga prawda: czynnik ludzki w katastrofach lotniczych*. Warszawa: Wydawnictwo W.A.B.
5. Bilska, E. (2004) Like a Phoenix from the ashes, or professional burnout syndrome (in Polish). *Niebieska Linia* 4.
6. Bilska, E. (2008) Prevention of professional burnout (in Polish). *Niebieska Linia* 5.
7. Dąbrowska, J. (2011) The human factor in aviation (in Polish), *Prace Instytutu Lotnictwa* 12 (221), pp. 66–70.
8. Grady, J.N., Cox, P.H., Nag, S. & Mitroff, S.R. (2022) Conscientiousness protects visual search performance from the impact of fatigue. *Cognitive Research: Principles and Implications* 7(1), 56.
9. Jancelewicz, B. (2009) *Safety and reliability in aviation: Air Show 2009* (in Polish). Toruń: Wydawnictwo Adam Marszałek.
10. Kamrowska, A. (2007) Job burn-out (in Polish). *Polski Merkuriusz Lekarski* XXIII, 136, pp. 317–319.
11. Lasota, M. (2018) Human factor in selected models of the origin of aviation accidents (in Polish). *Obronność – Zeszyty Naukowe Wydziału Zarządzania i Dowozenia Akademii Sztuki Wojennej* 3 (27).
12. Litzke, S.M. (2007) *Stress, lobbying and professional burnout* (in Polish). Gdańskie Wydawnictwo Psychologiczne.
13. Macander, M. (2016) *Aviation accidents as a source of occurrence of post-traumatic stress disorder in state aviation pilots* (in Polish). Warszawa: Vizja Press & IT.
14. Makarowski, R. & Smolicz, T. (2016) *The human factor in the process of flight training* (in Polish). Dęblin: Wydawnictwo Wyższej Szkoły Oficerskiej Sił Powietrznych.
15. Makarowski, R. (2012) The human factor in aviation (in Polish), *Przegląd Psychologiczny* 3, pp. 305–322.
16. Maslach, C., Leiter, M. & Braksal, K. (2010) *Overcome job burnout: six strategies to improve your relationship with work* (in Polish). Wolters Kulwer Polska.
17. Ng, D.T.K. (2022) Online aviation learning experience during the COVID-19 pandemic in Hong Kong and Mainland China. *British Journal of Educational Technology* 53 (3), pp. 443–474.
18. Peruń, G., Stołtny, B. & Urzędowski, M. (2021) *Identification of the predisposition to the occurrence of the phenomenon of occupational burnout among Aviation personnel and the impact on the safety of air operations*. Transport Problems Conference Proceedings.
19. Quddus, M. (2020) Aviation safety. In: Budd, L. & Ison, S. (eds). *Air Transport Management. An International Perspective*. Second Edition. London.
20. Regulation (2014) Commission Regulation (EU) No. 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organizations and personnel involved in these tasks. *Official Journal of the European Union* L 362/1.
21. Sęk, H. (2004) *Professional burnout: causes and prevention* (in Polish). PWN.
22. Stołtny, B. & Peruń, G. (2021) *An attempt to determine the impact of the teaching load on the psychophysical condition and safety of air operations among young aviation adepts*. 17th Scientific and Technical Conference Transport Systems Theory and Practice, Book of Abstracts.
23. Szymaniec, K.M. (2018) *Systemic risk management of hazards in transport aviation* (in Polish). Poznań: Politechnika Poznańska.
24. Terelak, J. (2001) *The psychology of stress* (in Polish). Oficyna Wydawnicza Branta.
25. Truszczyński, O., Tarnowski, A. & Biernacki, M. (2008) The human factor in aviation accidents (in Polish). *Kwartalnik Bellona* 3, pp. 104–109.
26. Tuasikal, A.R.S., Hartoto, S., Prakoso, B.B., Kartiko, D.C. & Hariyanto, A. (2021) The analysis on teaching skills and learning effectiveness of internship students. *Cakrawala Pendidikan* 40, 3, pp. 650–658.
27. ULC (2015) Licensing of aircraft and helicopter maintenance personnel – inspector's manual. (in Polish: Licencjonowanie personelu obsługi technicznej samolotów i śmigłowców – podręcznik inspektora). Urząd Lotnictwa Cywilnego, Departament Personelu Lotniczego. Wydanie II, Warszawa.
28. ULC (2022) Aircraft Type Training. Procedure for approval of aircraft type training in an aviation organization that does not hold a Part-147 Certificate. 2nd Edition. (in Polish: Szkolenie na typ statku powietrznego. Procedura zatwierdzania szkolenia na typ statku powietrznego w organizacji lotniczej nie posiadającej Certyfikatu Part-147. Wydanie II). Urząd Lotnictwa Cywilnego.

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