



An Evaluation of Best Practices in On-the-Job Training for Aircraft Maintenance at Indiana Aerospace University

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Abstract

This study evaluates the best practices of on-the-job training (OJT) in aircraft maintenance, with a focus on the training experiences of students at Indiana Aerospace University (IAU). Recognizing the critical role of Aircraft Maintenance Technicians (AMTs) in ensuring aviation safety, the research aims to assess current OJT practices, identify existing challenges, and propose actionable improvements. Employing quantitative research design, the study surveyed 50 fourth-year AMT students who had completed their OJT, selected through stratified random sampling. Data was gathered using structured questionnaires covering training quality, safety protocols, and human factors. Results revealed that while IAU's OJT program is generally well-implemented, notable gaps persist. These include insufficient specialized training tailored to individual learning needs, limited support for workload management, inadequate attention to trainee well-being, and inconsistencies in enforcing safety measures such as personal protective equipment (PPE) use. Based on these findings, the study recommends the adoption of personalized training strategies, increased instructor support, enhanced focus on trainee welfare, and stricter implementation of safety protocols. These improvements aim to further align IAU's OJT practices with the demands of the aviation industry.

Keywords: *on-the-job training, aircraft maintenance, safety protocols, human factors, aviation education*

Introduction

Aircraft maintenance is a critical component of aviation safety, ensuring that aircraft remain airworthy, reliable, and fully operational. This responsibility involves comprehensive systems of inspection, maintenance, and overhaul procedures. Errors in maintenance can lead to serious consequences, including operational failures and accidents, which underscores the pivotal role of Aircraft Maintenance Technicians (AMTs) in maintaining the safety and efficiency of flight operations (Federal Aviation Administration [FAA], 2020).

To ensure competence, AMTs undergo rigorous training that combines classroom instruction with in-depth on-the-job training (OJT), enabling them to apply theoretical knowledge to real-world scenarios. OJT is essential for bridging the gap between academic learning and hands-on maintenance skills. In the United States and Europe, these training programs are guided by the Federal Aviation Administration (FAA) and the European Union Aviation Safety Agency (EASA), which impose standardized curricula and performance expectations. Likewise, in Asia—including the Philippines—national aviation authorities, such as the Civil Aviation Authority of the Philippines (CAAP), mandate strict compliance with established OJT standards to ensure uniformity and quality in technician training (CAAP, 2021).

As aviation technology continues to evolve, continuous learning and the adaptation of modern maintenance procedures are imperative. Effective OJT ensures that AMTs stay current with industry developments, thereby reducing maintenance-related errors and promoting aviation safety (International Labour Organization [ILO], 2020). Properly trained AMTs significantly minimize risks by enhancing technical precision and procedural compliance.

The aviation sector plays an increasingly vital role in the modern global economy, with air traffic recovering to pre-pandemic levels. According to Boeing's Pilot and Technician Outlook (2023–2042), the demand for skilled maintenance technicians is expected to rise sharply in response to the growing aviation workforce needs. To meet this demand, effective training programs and sufficient staffing are essential. As a result, CAAP continues to mandate high-quality OJT programs to equip future AMTs with the required skills and competencies.

Internship experiences, such as OJT, provide essential hands-on learning that allows students to apply and refine their technical skills while gaining valuable professional experience. As Thompson et al. (2021) suggest, well-structured internships help bridge the gap between theory and practice, enhancing career readiness. Theories such as Competency-Based Training (CBT) and Experiential Learning Theory further support this approach. CBT emphasizes mastery of specific skills through structured training and assessments (ILO, 2020), while experiential Learning Theory highlights the importance of learning through direct experience (Kolb & Kolb, 2001).

Despite the importance of OJT, studies have identified persistent challenges. For instance, many AMTs rely on informal training methods such as the “buddy system,” where trainees shadow experienced technicians without a structured curriculum (Mohd Shariff & Saad, 2010). Additionally, feedback from institutions such as UniKL MIAT indicates that students often perform unrelated tasks and receive insufficient guidance during OJT. Issues like unclear training objectives, poor communication skills, and a lack of student initiative are frequently reported (Muda, 2011; Hassan, 2012).

Given these concerns, this study seeks to evaluate the best practices in on-the-job training for aircraft maintenance at Indiana Aerospace University (IAU). Specifically, it aims to identify which OJT methods are most effective in developing the technical competence and safety awareness of AMT students. Utilizing a quantitative research approach, the study will employ structured surveys to gather data on current practices, performance outcomes, and perceived challenges. The findings will support the development of an evidence-based action plan to improve training effectiveness, ensure regulatory compliance, and enhance the readiness of AMTs for the demands of the aviation industry.

The researchers, being AMT students themselves, underscore the importance of combining methodological rigor, practical application, and industry expertise in evaluating OJT practices. A thorough understanding of maintenance standards, training systems, and performance evaluation will guide the research in producing practical, data-driven recommendations. Ultimately, this will contribute to a continuous cycle of improvement that aligns training programs with evolving industry standards and stakeholder feedback.

Research Question/ Objectives

This study aims to assess the best practices of on-the-job training for aircraft maintenance students at Indiana Aerospace University for A.Y. 2023-2024 and to propose an action plan. Specifically, this study sought the following:

1. Determine the profile of respondents in terms of gender, age, and year level
2. Assess the best practices for on-the-job training in aircraft maintenance at Indiana Aerospace University in terms of training, safety protocols, and human factors.

Methodology

This study employed a qualitative methodology to gather data. Various qualitative tools were used, including in-depth interviews, focused observations, recordings, and detailed notes, as described by Girardin (2023). This approach aimed to provide insights and an understanding of the participants' lived experiences by analyzing social dynamics and human behavior. Below is a summary of the research design, setting, participant selection, data collection procedures, data analysis methods, trustworthiness measures, researcher reflexivity, and instruments used.

Research Design

This study employed a descriptive quantitative research design to evaluate the best practices of on-the-job training (OJT) in aircraft maintenance at Indiana Aerospace University (IAU). By focusing on key areas such as training techniques, safety protocols, and human factors, the research aimed to systematically measure the effectiveness of various OJT components. Data were gathered through structured surveys and interviews with 50 fourth-year Aircraft Maintenance Technology (AMT) students who had completed their OJT. The use of quantitative methods enabled the researchers to identify statistically significant patterns and relationships between training practices and outcomes, such as skill proficiency, safety compliance, and trainee preparedness. The survey included rating scales to evaluate specific practices, including simulation tools and mentorship programs, and helped conclude their impact on reducing errors and improving performance.

Participants/Respondents

The study was conducted at Indiana Aerospace University, located at IAU Town Center, Kagudoy Road, Lapu-Lapu City, Cebu. Established in 1992 as the Indiana School of Aeronautics, IAU has grown from modest beginnings to become a respected institution known for fostering excellence in the field of aeronautics. With a strong focus on student development, IAU continues to attract dedicated faculty and support the intellectual, moral, and emotional growth of its students. The research respondents consisted of stratified randomly selected fourth-year AMT students, chosen to ensure a balanced representation of training experiences. These participants provided essential insights into the strengths and challenges of current OJT practices, particularly in areas concerning safety and human factors..

Instruments

Data collection involved structured questionnaires and interviews focused on the three primary aspects of OJT: training efficacy, safety protocol implementation, and human factor considerations. Observations were also conducted within training facilities to validate survey responses and examine real-time adherence to safety measures, including the use of personal protective equipment (PPE)..

Ethical Considerations

Ethical considerations were strictly observed; participants were informed of the study's purpose, ensured of confidentiality, and asked for informed consent. The survey tool was designed to gather both demographic information and perceptions of OJT practices, rated on a five-point Likert scale ranging from "not implemented" to "very well implemented." Statistical analysis of the data provided valuable insights into which training components were most effective and highlighted gaps that need addressing, thereby offering a foundation for enhancing OJT programs and aligning them with industry standards.

Results

The best practices of on-the-job training in aircraft maintenance are presented and tabulated in terms of training, safety protocols, and human factors.

Levels of Best Practices of on-the-job training for AMT

Table 1 presents the best practices of on-the-job training given to aircraft maintenance in terms of training.

The training aspect was very well implemented; the internship was highly effective, showing positive results. Respondents emphasized that instructors were heavily involved in the training process, that the internship was customized to each trainee's skill level and learning pace, and that efficient communication with coworkers was observed. Although efforts were made to reduce stress and fatigue in the training environment and to address issues encountered throughout the internship.

Table 1. Training

<i>Indicators</i>	<i>Weighted Mean</i>	<i>Description</i>
1. OJT is specialized to meet the specific skill level and learning pace of each trainee.	4.68	Very Well Implemented
2. There is effective communication with other coworkers.	4.5	Very Well Implemented
3. Instructors were involved in the students' training.	4.34	Very Well Implemented
4. The training environment is discussed to minimize stress and fatigue for students.	4.14	Well Implemented
5. Challenges faced during OJT are addressed by the organization/ institution.	4.14	Well Implemented
Average Weighted Mean	4.36	Very Well Implemented

Legend: 4.21–5.00 – Very Well Implemented; 3.41–4.20 – Well Implemented; 2.61–3.40 – Implemented; 1.81–2.60 – Fairly Implemented; 1.00–1.80 – Not Implemented

Table 2 presents the best practices of on-the-job training given to aircraft maintenance in terms of safety protocols. The safety protocol aspect was very well implemented. Positive feedback was given regarding the internship's safety protocol. The regular application of safety procedures, appropriate safety training for students, emergency-simulation exercises in the real world, availability and appropriate use of personal protective equipment (PPE), and regular reminders from teachers regarding precautionary measures are important aspects.

Table 2. Safety Protocols

<i>Indicators</i>	<i>Weighted Mean</i>	<i>Description</i>
1. The instructors remind trainees of the safety protocols.	4.64	Very Well Implemented
2. Trainees were taught the proper safety protocols during OJT.	4.52	Very Well Implemented
3. Safety protocols were often implemented.	4.44	Very Well Implemented
4. Personal protective equipment (PPE) were provided and used when necessary.	4.24	Very Well Implemented
5. Includes practical exercises that stimulate emergency situations and proper responses.	4.22	Very Well Implemented
Average Weighted Mean	4.41	Very Well Implemented

Legend: 4.21–5.00 – Very Well Implemented; 3.41–4.20 – Well Implemented; 2.61–3.40 – Implemented; 1.81–2.60 – Fairly Implemented; 1.00–1.80 – Not Implemented

Table 3 presents the best practices of on-the-job training given to aircraft maintenance in terms of human factors. The human factor aspect was very well implemented. Respondents emphasized that the internship's human factor component yields tangible results.

Table 3. Human Factors

<i>Indicators</i>	<i>Weighted Mean</i>	<i>Description</i>
1. Lack of communication affects teamwork.	4.48	Very Well Implemented
2. Trainees felt comfortable asking questions during OJT.	4.48	Very Well Implemented
3. Stress influences the quality of work.	4.44	Very Well Implemented
4. Support students in developing different strategies and workload management.	4.34	Very Well Implemented
5. Lack of sleep affects the line of work.	4.22	Very Well Implemented
Average Weighted Mean	4.39	Very Well Implemented

Legend: 4.21–5.00 – Very Well Implemented; 3.41–4.20 – Well Implemented; 2.61–3.40 – Implemented; 1.81–2.60 – Fairly Implemented; 1.00–1.80 – Not Implemented

They observed that while stress affects how well they carry out their jobs, sleep deprivation has a detrimental effect on both. It was also shown that ineffective communication hampered teamwork. Positively, the organization helps students create plans and efficiently

handle their workloads. Moreover, during the internship, trainees felt encouraged to express concerns.

Conclusion

The study concludes that the on-the-job training (OJT) program in aircraft maintenance at Indiana Aerospace University is generally very well implemented, particularly in the areas of technical training, adherence to safety protocols, and emphasis on human factors. The integration of practical experience with structured lesson plans, certified supervision, continuous feedback, and clear documentation contributes significantly to trainee readiness. Moreover, the program's flexible approach allows accommodation for different learning styles and paces, ensuring that students are well-prepared for the demands of the aircraft maintenance industry. However, despite its strengths, several areas for improvement have been identified, which, if addressed, could further enhance the program's overall effectiveness and impact.

To strengthen the OJT experience, the institution should consider individualizing training approaches to address varying skill levels and learning speeds among trainees. Strategies such as mentorship pairing, regular skill assessments, modular learning, and the integration of e-learning platforms can enhance trainee engagement and skill mastery. Additionally, support for workload management must be improved. Schools can offer workshops on stress management, time management, and study strategies, while also incorporating these competencies into the curriculum. The use of digital tools and peer support systems, along with consistent feedback channels, will also help students develop better coping mechanisms during their training.

Finally, the well-being of trainees must be prioritized. Instructors should receive training in emotional intelligence, mental health awareness, and empathetic communication to better support students. A safe and supportive environment can be cultivated through access to counseling services, wellness programs, and anonymous feedback systems. Organizational attention should also be directed toward resolving OJT challenges, including gaps in communication and mentorship, as well as the inconsistent use of Personal Protective Equipment (PPE). Regular safety training, enforcement of PPE policies, and continuous supervision will not only ensure regulatory compliance but also protect the health and safety of trainees in real-world maintenance environments. Addressing these concerns will foster a more supportive, effective, and industry-aligned training experience for AMT students.

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