



**Categoría: STEM (Science, Technology, Engineering and Mathematics)**

**ORIGINAL**

## Issues and Challenges Encountered By Air Traffic Controllers in the Philippines

### Problemas y desafíos de los controladores aéreos en Filipinas

Zenia Uy Paciones<sup>1</sup> , Jonathan E. Lobaton<sup>2,3</sup> 

<sup>1</sup>Air Traffic Management Officer V, Civil Aviation Authority of the Philippines. Manila, Philippines.

<sup>2</sup>Professorial Lecturer, University of St. La Salle, Philippines.

<sup>3</sup>Assistant Professor, Carlos Hilado Memorial State University. Philippines.

**Cite as:** Uy Paciones Z, Lobaton JE. Issues and Challenges Encountered By Air Traffic Controllers in the Philippines. Salud, Ciencia y Tecnología - Serie de Conferencias. 2024; 3:.1131. <https://doi.org/10.56294/sctconf2024.1131>

**Submitted:** 07-02-2024

**Revised:** 09-05-2024

**Accepted:** 28-05-2024

**Published:** 29-05-2024

**Editor:** Dr. William Castillo-González 

#### ABSTRACT

The study examines workplace issues faced by air traffic controllers in Manila Air Traffic Control Facilities, involving 146 out of 232 controllers. Results show that organizational and personal variables significantly influence controllers' management of these issues. Human factors include stress due to air traffic volume and extended working hours, while work environment issues include workload imbalance, increased air traffic volume, and uncomfortable sleeping/resting quarters. Technical factors include congested air space and route structures. Controllers' coping strategies include distancing, self-controlling, social support, responsibility acceptance, escape avoidance, and problem-solving. The findings have influenced a proposed career development plan to address these challenges.

**Keywords:** Air Traffic Controllers; Air Controller Management; Coping Strategies; Civil Aviation Authority.

#### RESUMEN

El estudio examina los problemas laborales a los que se enfrentan los controladores aéreos de las instalaciones de control del tráfico aéreo de Manila, en el que participaron 146 de los 232 controladores. Los resultados muestran que las variables organizativas y personales influyen significativamente en la gestión de estos problemas por parte de los controladores. Los factores humanos incluyen el estrés debido al volumen de tráfico aéreo y a las largas jornadas de trabajo, mientras que los problemas relacionados con el entorno de trabajo incluyen el desequilibrio de la carga de trabajo, el aumento del volumen de tráfico aéreo y la incomodidad de los lugares para dormir y descansar. Los factores técnicos incluyen la congestión del espacio aéreo y las estructuras de las rutas. Las estrategias de afrontamiento de los controladores incluyen el distanciamiento, el autocontrol, el apoyo social, la aceptación de responsabilidades, la evasión y la resolución de problemas. Los resultados han influido en una propuesta de plan de desarrollo profesional para afrontar estos retos.

**Palabras clave:** Controladores Aéreos; Gestión de Controladores Aéreos; Estrategias de Afrontamiento; Autoridad de Aviación Civil.

#### INTRODUCTION

The aviation industry is grappling with increasing workplace issues that impact financial security, personal identity, and community involvement, necessitating a comprehensive solution (Harnois & Gabriel, 2000). Dewe

(2000) suggests that stress theories suggest that employees frequently employ coping strategies to alleviate discomfort in a threatening situation. The challenge of promoting diversity in the workplace necessitates innovative management strategies to recognize, value, and accept the diverse perspectives of employees (Green et al., 2015).

Because safety is a primary concern in the aviation industry (Brown, 2019), it affects everybody who uses air transport as a means of transportation. This is why stakeholders in the aviation industry work continuously to improve the sector's safety performance (AGCS, 2014). The ICAO, established in 1944, collaborates with 193 member states and industry groups to develop international safety standards and policies for the civil aviation sector. The study by Marume (2016) and Charest (2012) emphasizes the CAAP's role in regulating air transportation laws and ensuring safety, focusing on public management and cooperative efforts.

Public management is a discipline that involves managing processes and relationships within the public and organizations, preparing concepts, principles, and laws for effective organization and service, and satisfying public interest (Popa, 2012).

However, the increasing number of escalating flights annually increases pressure on Air Traffic Controllers (ATCs), increasing the risk of human error, and significantly impacting ATCs performance. (Baker, 2019).

The Philippines' air travel demand has surged, with Ninoy Aquino International Airport (NAIA) currently handling over 31 million passengers annually (Leoncio, 2017). NAIA has been congested since 2009 because both domestic and international flights have increased by leaps and bounds (Tulfo, 2019). The increasing air travel demand has led to a pressing need to reduce congestion, and delays, and improve safety measures in the aviation system among stakeholders (National Academy of Sciences, 2019).

CAAP has upgraded its Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) systems to improve air traffic flow, airspace management, safety, reliability, and efficiency (Felongco, 2018). CAAP ensures safe, efficient, and economic operations of public air utility facilities by providing technical personnel with the necessary skills and knowledge to handle air traffic (ATS Manual, 2012).

Despite advancements in ATC training and technology, incidents in Philippine airspace are still recorded through Safety Management Systems, as mandated by PCAR Part 13. (PCAR, 2014). From 2017 to 2019, 1,845 incidents were reported, highlighting the challenges faced by Air Traffic Controllers (ATCs) in ensuring safety in air traffic. These incidents emphasize the need for resilience, creativity, and hard work, and the Philippines must improve safety and performance by understanding ATC guidelines (AMT Handbook, 2018).

Researchers conducted a study to address the challenges faced by ATC, focusing on managing conflicts within organizations. Participants were asked about their stress management strategies, to provide insights and information to alleviate the problems faced by these professionals.

## Literature review

### *On the Complexity of ATC*

Nolan (2011) highlights the complexity of air traffic management, highlighting the need for improvements due to the anticipated global increase in air travel. Research and development efforts are underway to develop safe solutions, including controller tools, pilot tools, aircraft avionics, infrastructure improvements, and new procedures. Despite technical and financial challenges, promising technologies and procedures are expected to support modernization.

### *On Problems and Issues in the Workplace*

Kapur (2018) workplace issues, including environmental conditions, time management, conflict resolution, lack of knowledge, stress, diversity, communication, and sexual harassment, negatively impact employees' health and well-being. Addressing these issues requires communication and implementation measures.

### *On Human Factor*

Aviation organizations prioritize safety by focusing on human factors like characteristics, education, skills, motivation, training, and compensation, but few uses management tools to measure and manage these factors (Vogt et al., 2010). Understanding human factors influencing air traffic controllers' performance is crucial for maintaining flight safety and mitigating threats to performance.

Sour (2011), FAA AMT Handbook (2018), and AGCAS (2018) recommend the aviation industry prioritize safety by reducing human error and addressing factors like fatigue, complacency, and stress. ATCs need skills beyond a bachelor's degree, including motivation, conscientiousness, and decision-making abilities.

In the Philippines, ATC aspirants must pass the Comprehensive Air Traffic Service course, interview, and medical examination, with a baccalaureate degree, natural-born citizenship, singleness, and good moral character. Infinithink.org (2015) emphasizes the importance of incoming ATCs being motivated, decisive, committed, self-confident, and physically fit to effectively carry out their duties.

ATCs work 24/7 to ensure air travel safety, with a demanding and stressful job. They receive training at

the Federal Aviation Administration Academy, with a starting pay of \$37 070 and an annual increase. ATCs are considered the best-paying jobs in the 2013 Wall Street Journal article. They also have annual leave, sick leave, and life and health insurance benefits.

In 2015, Daphne J. Magturo reported that Philippine ATCs are the “lowest paid” in the region, earning an average monthly salary of \$1 100, compared to other countries like Hong Kong, Singapore, Macau, Taiwan, Malaysia, and South Korea, leading to a high attrition rate.

The FAA implemented a workforce plan in 2017 to address rising attrition rates of air traffic controllers and ensure flexibility in matching controllers with increasing traffic volume, requiring two to three years in advance staffing (FAA ATC Workforce Plan, 2017).

The Civil Aviation Authority of the Philippines (CAAP) is set to implement a new salary adjustment for ATCs and other technical personnel, starting in January 2009. The adjustment aims to address the high attrition rate among ATCs, who have been lured by higher pay abroad (Santos, 2008).

ATCs use radar, visual references, and rules to control aircraft movements, but may make mistakes due to external factors. The increasing air traffic volume and demand for controllers in the Civil Aviation Administration of China lead to increased work stress, influenced by factors like personality, family circumstances, and marital status (Zhou Qin, 2009).

Erik Erikson’s psychosocial development theory in Cherry (2019), emphasizes the importance of social interaction and relationships in personal growth. Conflicts in each stage can lead to psychological strength, and understanding the well-being of ATCs is crucial for their behaviour, judgment, thinking, and decision-making, especially in handling air traffic issues.

#### *On Work Environment and Technical Factor*

Work environment, physical characteristics, and policies influence the efficiency of Accident Prevention Centres in preventing incidents or accidents, while technical factors like equipment and tools also play a crucial role.

Weir’s 2016 study underscores the necessity for improved aviation issues like safety and financial viability, emphasizing the importance of efficient airspace management and policy formulation.

Checcio’s (2011) study highlights the US’s lack of comprehensive aviation policy, causing airport congestion and reduced convenience. Experts recommend addressing national interest, economic development, connectivity, energy sustainability, and aviation safety.

Based on the study of Roosens (2009) and Chew (2006), Congestion in transportation occurs when infrastructure demand exceeds capacity, causing delays in travel time. The challenge is to decrease congestion while maintaining safety levels as traffic increases.

The capacity problem in the US and the EU probably will become worse after the implementation of the recent Open Skies agreement (Turner, 2007). Economists are exploring airport capacity enhancement strategies, including pricing, slot allocation, and operational solutions like reduced vertical separation, single sky project, and satellite navigation.

Araujo’s 2014 study reveals that while automation of ATC could reduce aviation’s climate change impacts, progress has been slow due to lock-in issues and political and organizational challenges. Overcoming these obstacles requires testing and operating new ATC software without compromising safety.

The booming Unmanned Aerial System (UAS) industry needs to be considered as UAS also utilizes the airspace. Smith (2014), a Serco employee, explains that UAV pilots often struggle with visual identification due to computer screens, limiting their ability to navigate airspace.

The Indian Aviation Industry is experiencing rapid growth, with passenger numbers expected to double by 2025. However, challenges include a shortage of skilled personnel, safety concerns, and inadequate infrastructure.

In an article in Sunstar.com written by Virgil Lopez on June 10, 2010, flights at Ninoy Aquino International Airport (NAIA) were diverted due to equipment breakdowns of the Omnidirectional Radio Range and Instrument Landing System. The equipment is crucial for pilot guidance during low visibility and bad weather. Manila International Airport Authority General Manager Melvin Matibag urged improvements in navigation, airport facilities, and legal issues. The diversion resulted in revenue losses.

In an article in Rappler.com written by Judith Balea on April 10, 2014, The Philippines has regained its aviation rating upgrade, receiving a category 1 rating from the US FAA and lifting a ban from the EU.

The International Air Transport Association (IATA) chief, Alexander de Juniac, has urged the Philippine government to provide adequate infrastructure to handle the growing air traffic at NAIA, highlighting the economic benefits of higher capacity and modern airport infrastructure (Camus, 2017).

The Philippines has failed to establish an independent National Transportation and Safety Board (NTSB) as required by the International Civil Aviation Organization (ICAO), increasing the risk of downgrading aviation standards. The US Department of Homeland Security advised airlines to inform passengers about the lack of

security measures at NAIA (Mercurio, 2019)

### *Synthesis*

The literature review highlights the various aspects that contribute to problems and issues within organizations, including organizational structure, workplace conditions, rules, policies, work timings, and goals. ATC, who handle air traffic and are well-trained, face significant challenges due to their responsibility and the increasing volume of air traffic. Understanding these issues and challenges in terms of human factors, work environment, and technical factors is crucial for maintaining high levels of aviation safety. The review provides a framework for researchers to pursue this endeavour, despite the scarcity of material on this topic.

### **Study's framework**

#### *Theoretical Framework*

Dawis (2000) and Brown (2007) examine workplace behaviour, self-knowledge, motivation, cognitions, emotions, and goals, focusing on aviation safety and managing issues. It uses Social Cognitive Career Theory, Job-Environment Correspondence, Herzberg's two-factor theory, and Job-Environment Correspondence to understand how individual performance, satisfaction, and job fit impact aviation safety (Bernardin, 2010).

#### *Conceptual Framework*

Abah, (2017); Juneja (2019); Van Vliet (2011); and Shah (2017) The study examines administrative management, focusing on Air Traffic Controllers' duties, age, education, job position, and training, emphasizing the importance of human, work environments, and technical factors for safety and efficiency.

### **Objectives of the study**

This study aims to address issues and challenges faced by ATCs, focusing on managing conflicts and disputes within organizations. Participants will be asked about their stress management strategies within their employment. The study aims to provide insights and beneficial information to alleviate problems and issues faced by these professionals.

## **METHOD**

### *Research Design*

This study utilized a mixed method, combining quantitative and qualitative elements to describe a phenomenon's measurable state and an individual's subjective response to it (Houser, 2008). This study employs a qualitative descriptive research design focusing on the challenges faced by air traffic controllers in adherence to air traffic rules, using in-depth interviews with up to 10 individuals (Creswell, 2007).

Dukes (1984, as cited in Creswell, 2007) recommends the use of 3 to 10 participants. Creswell adds, "The important point is to describe the meaning of a small number of individuals who have experienced the phenomenon." Creswell cites Polkinghorne (1989, as cited by Corbin & Strauss, 2008) to justify the length of time used with in-depth interviews (usually 1 ½ to two hours).

The study utilized interviews with air traffic controllers to gain a comprehensive understanding of their issues and challenges. A descriptive survey was employed to provide a detailed and quantified description of the population, aiming to provide a general picture of the population and describe existing conditions (Sapsford, 1999, as cited in Ardales, 2008).

### *Respondents and Sampling Plan*

The study surveyed 146 Manila air traffic controllers, including 23 from the Air Traffic Service, to enhance their information on air rules. The researchers used simple random sampling for quantitative selection and purposive sampling for qualitative recruitment, selecting controllers with facility ratings and experience (Munhall, 2007).

### *The Instrument*

The study utilized a questionnaire and structured interview guide to gather data on ATCs' challenges and issues, focusing on their profile. Part I dealt with the participants' profiles. Part II involved 30 questions evaluating human factors, work environment, and technical factors, with participants rating each indicator based on their interpretations. Part III discussed the suggested resolution plans for ATCs, while Part IV analysed the opinions of participants on the impact of these issues on the work performance of ATCs. The results showed varying levels of agreement and disagreement. Two-part instruments were developed to gather participant responses on ATCs' challenges in adherence to rules, including age, service years, facility assignments, and human factors. The instrument's validity rating is 4,93 and Cronbach's Alpha reliability is 0,90.

### Data Gathering Procedure

The researcher conducted a study with permission from the Air Traffic Service, involving in-depth interviews with 30 non-actual respondents. The study used various methods, including face-to-face, telephone, text messages, and email, to gather information about a phenomenon. Open-ended questions and a protocol were used, with confidentiality guaranteed. A smartphone was used for participant responses and documentation.

### Data Analysis

The study examined the challenges faced by air traffic controllers in adherence to air traffic rules, focusing on factors such as human factors, work environment, and technical factors, using the Mann-Whitney U Test. The qualitative part of the study utilized the following procedures developed by Creswell (2007). The researcher employs four stages to gather information about a phenomenon: reflective, epistemological, thematic, and eidetic. Reflective insight identifies themes, while epistemological involves understanding the main ideas. Thematic insights group statements, while eidetic insight constructs an overall description.

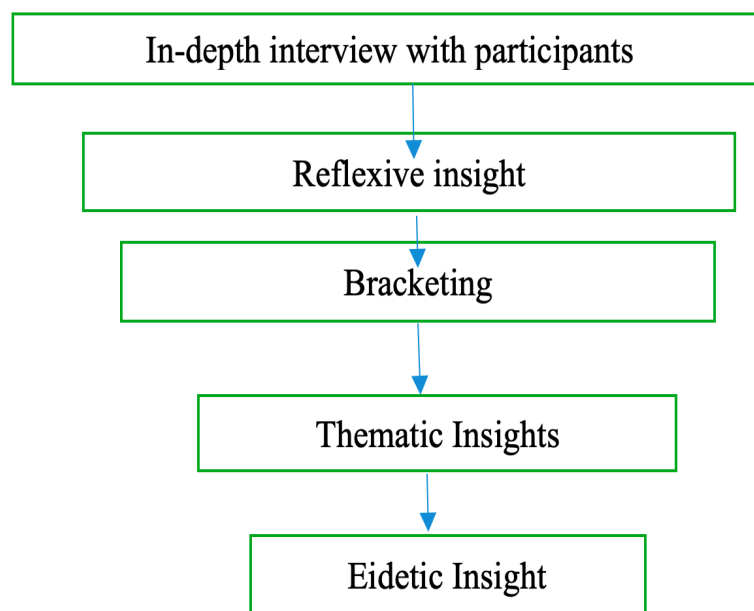


Figure 1. Schematic Diagram of Thematic Analysis for the Qualitative Data of the Study

In the group of Erlandson, Harris, Skipper, & Allen (1993); Lincoln & Guba, (1995); Merriam (1999); Erlandson et al., (1993) in Creswell (2007), qualitative data validity is ensured through member checking, trust building, and rich descriptions, while reliability is achieved through high-quality transcriptions of participants' responses, revealing nuances and nonverbal cues.

### Ethical Considerations

In the observation of ethical principles, the Code of Ethics has guided the conduct of this study. The researcher prioritized the welfare of participants, obtaining their consent for voluntary participation. Formal communication was sent via email, anonymity was protected, and number coding was used to identify them. The researcher assured them that all disclosed information would be used for research purposes. The researcher kept data on a personal computer with a password, and a backup CD, and shredded hard copies six months after the final paper's completion, with the files deleted (Creswell, 2013).

## RESULTS AND DISCUSSIONS

### On Participants' Profile

Over half of the participants (53,4 %) are aged 29 and above, indicating they are mature employees. As individuals age, they gain experience, which can improve their decisions and judgments. Chung et al.'s (2015) study on older employees and cognition found that older employees have better cognitive abilities. The study reveals that 53 % of employees are female, while 43 % are male, with little difference between genders. Both genders value work aspects but rank them differently (Peterson, 2004). The majority (71,9 %) have less than nine years of service, with job satisfaction significantly correlated with length of service. Future changes in the company could lead to more supervisors and controllers retiring, causing issues in staffing and filling vacant positions. In this cohort, a majority of the participants (72,6 %) are designated as officers.



The majority of participants (89 %) attended 1-4 trainings, highlighting the importance of training in expanding employees' knowledge base.

**Table 1. Profile of the Participants (n=146)**

Variable	Category	Frequency	Percentage
Age	Older (≥ 29 years old)	78	53,4 %
	Younger (< 29 years old)	68	46,6 %
Sex	Male	69	47,3 %
	Female	77	52,7 %
Length of Service	Between 20-29 years	17	11,6 %
	Between 10-19 years	24	16,4 %
	Between < 1 - 9 years	105	71,9 %
Job Designation	Supervisor	9	6,2 %
	Officer	106	72,6 %
	Assistant	31	21,2 %
Number of Trainings Attended	Between 5 - 8 trainings	16	11,0 %
	Between 1 - 4 trainings	130	89,0 %

*Issues Encountered by ATCs in Compliance with Air Traffic Rules Regarding Human Factor*

Dole (2016) and (Cooper et al., (2001) air traffic volume and extended working hours cause stress and strain on controllers, leading to fatigue-related accidents and job-related stress due to overwhelming workload demands. ATCs face human factors like pilot non-adherence, absenteeism, work-life balance issues, and personal problems, which can negatively impact work quality and safety margins, as highlighted by Welsh (2018).

**Table 2. Issues Encountered by ATCs in Compliance with Air Traffic Rules Regarding Human Factor**

Rank	Item	Mean	Interpretation
1	Stress due to numerous air traffic volumes affects the quality of work of Air Traffic Controllers in providing safety to the flying public.	3,30	Very Often
2	Extended working hours result in mental and physical fatigue.	3,29	Very Often
3	Non-adherence of pilots to air traffic controller's instructions compromises air safety.	3,26	Very Often
4	Habitual absenteeism of colleagues creates an imbalance in the shift complement.	3,22	Often
5	Uncooperative colleagues make working conditions difficult.	3,05	Often
6	Working away from family results in loneliness and a lack of motivation.	2,98	Often
7	Wrong judgment in traffic situations causes incidents or accidents.	2,94	Often
8	Variations in control techniques and perspective cause friction between Air Traffic Controllers.	2,79	Often
9	Usage of cell phones and gadgets during duty hours causes distraction or loss of concentration.	2,70	Often
10	Personal problems affect the quality of work of an Air Traffic Controller.	2,57	Often

*Issues Encountered by ATCs in Compliance with Air Traffic Rules Regarding Work Environment*

Work environment hazards refer to situations that could potentially harm a person's health or welfare, as defined by Croskerry et al. (2008). ATCs face a significant staff shortage with a mean score of 3,37, causing increased workload, traffic volume, and uncomfortable sleeping conditions (Gambino, 2019). This issue affects their well-being, productivity, and overall organizational performance, affecting their work quality (Kamarulzaman et al.,2011).

**Table 3.** Issues Encountered by ATCs in Compliance with Air Traffic Rules Regarding Work Environment

Rank	Item	Mean	Interpretation
1	Shortage in manpower due to attrition affects the work condition of Air Traffic Controllers resulting in extended work shift schedules.	3,37	Very Often
2	The imbalance between workload and compensation leads to the demoralization of Air Traffic Controllers.	3,16	Often
3	An increase in air traffic volume results in over capacity of Air Traffic Controllers to handle traffic.	3,10	Often
4	Uncomfortable sleeping/resting quarters result in fewer Air Traffic Controllers	2,60	Often
5	Delays in information dissemination like memorandums, Notice to Airmen (NOTAM), and new regulations relative to air navigation compromise safety.	2,45	A few times
6	Filthy workplaces and disorganized seating arrangements affect Air Traffic Controllers' mind state.	2,26	A few times
7	Inconsistent room temperature causes uneasiness to Air Traffic Controllers.	2,16	A few times
8	Difficulty in adjusting to the new Communications Navigation Surveillance /Air Traffic Management (CNS/ATM) System work setup results in confusion and miscommunication.	2,14	A few times
9	Organizational cultures like favoritism and unequal distribution of tasks lead to tension between Air Traffic Controllers.	2,10	A few times
10	Proximity of workstations causes distraction among Air Traffic Controllers.	1,81	A few times

*Issues Encountered by ATCs in Compliance with Air Traffic Regarding Technical Factor*

A study by Vaaben and Larsen (2015) highlights that congested air space and route structures are the most significant technical issues faced by airlines, leading to the fastest-growing source of flight delays, as they manage hundreds of aircraft, thousands of flights daily, and millions of passengers annually.

Low-quality equipment in Air Traffic Control systems limits aircraft tracking, and makes enhancement, troubleshooting, and maintenance difficult, according to Ahmad and Saxena (2018). Artaya et al.'s (2011) study highlights the impact of work facilities on employee performance, safety, and the nation's air travel system.

**Table 4.** Issues Encountered by ATCs in Compliance with Air Traffic Regarding Technical Factor

Rank	Item	Mean	Interpretation
1	Congested airspace and route structures increase the probability of air traffic conflicts.	3,13	Often
2	Low quality of equipment like headsets adds to Air Traffic Controllers' burden in providing safety.	3,05	Often
3	Radio and radar equipment outage compromises safety.	3,05	Often
4	Single runaway configuration lowers Air Traffic Controllers' acceptance rate in handling air traffic.	2,97	Often
5	Prolonged runway works and maintenance cause delays in handling air traffic resulting in congestion.	2,95	Often
6	Frequency congestion results in confusion and miscommunication.	2,90	Often
7	Non-compliance with the safety standards of aircraft operating within the Philippine Flight Information Region poses a risk to other aircraft.	2,81	Often
8	Outdated facilities and equipment limit Air Traffic Controllers' capacity to provide safety.	2,54	Often
9	Limitations on radio and radar coverage result in incidents or accidents.	2,53	Often
10	Complex interrelated functions of the new system cause work slowdown.	2,25	A few times

*Significant Difference in the Issues Encountered by ATCs in Compliance (Human Factor) with Air Traffic Rules when Grouped Regarding Selected Variables (age, sex, length of service, job designation, and number of trainings attended)*

The study used nonparametric tests to examine the differences in issues faced by ATCs. Results showed no significant difference in issues encountered by air traffic controllers based on age or sex. The p-value was 0,291, above the standard p-value of 0,05, indicating no significant difference in human factor issues. The findings suggest that ATCs' experiences do not significantly vary by age or sex. The study found no significant difference in issues faced by ATCs based on their length of service, contradicting the idea that experienced employees can handle job issues better than new ones, as indicated by a p-value of 724; in issues faced by ATCs based on their job designation, with a p-value of 0,184, indicating that the issues they face do not significantly differ by their job; and in issues faced by ATCs based on sex, with a p-value of 0,985, indicating that training attendance does not significantly influence these issues, respectively.

**Table 5.** Significant Differences in the Issues Encountered by ATCs in Compliance (Human Factor) with Air Traffic Rules when Grouped Regarding Selected Variables

Variable	Category	Mean	Test	p-value	Decision
Age	Older ( $\geq$ 29 years old)	3,08	Mann-Whitney U Test	0,291	Accept Ho
	Younger (< 29 years old)	2,93			
Sex	Male	3,01	Mann-Whitney U Test	0,604	Accept Ho
	Female	3,02			
Length of Service	Between 20-29 years	3,02	Kruskal-Wallis H Test	0,724	Accept Ho
	Between 10-19 years	3,07			
	Between < 1 - 9 years	3,00			
Job Designation	Supervisor	2,82	Kruskal-Wallis H Test	0,184	Accept Ho
	Officer	3,08			
	Assistant	2,85			
Number of Trainings	Between 5 - 8 trainings	3,03	Mann-Whitney U Test	0,985	Accept Ho
	Between 1 - 4 trainings	3,01			

*Significant Differences in the Issues Encountered by ATCs in Compliance (Work Environment) with Air Traffic Rules when Grouped Regarding Selected Variables (age, sex, length of service, job designation, and number of trainings attended)*

Significant differences in work environment issues among ATCs were found based on age and job designation, with p-values greater than 0,05, as per Mann-Whitney U and Kruskal-Wallis tests. Kapur's 2018 study reveals full-time adults experience increased stress due to work activities, regardless of job designation, and that issues in the work environment aren't influenced by sex, service length, or training attendance with p-values above 0,05 alpha.

**Table 6.** Significant Differences in the Issues Encountered by ATCs in Compliance (Work Environment) with Air Traffic Rules when Grouped Regarding Selected Variables

Variable	Category	Mean	Test	p-value	Decision
Age	Older ( $\geq$ 29 years old)	3,08	Mann-Whitney	0,000*	Reject Ho
	Younger (< 29 years old)	2,93	U Test		
Sex	Male	3,01	Mann-Whitney	0,486	Accept Ho
	Female	3,02	U Test		
Length of Service	Between 20-29 years	3,02	Kruskal-Wallis H Test	0,192	Accept Ho
	Between 10-19 years	3,07			
	< 1 - 9 years	3,00			
Job Designation	Supervisor	2,82	Kruskal-Wallis H Test	0,002*	Reject Ho
	Officer	3,08			
	Assistant	2,85			



Number of Trainings	Between 5 - 8 trainings	3,03	Mann-Whitney	0,132	Accept Ho
	Between 1 - 4 trainings	3,01	U Test		
*Significant <0,05					

*Significant Differences in the Issues Encountered by ATCs in Compliance (Technical Factor) with Air Traffic Rules when Grouped Regarding Selected Variables (age, sex, length of service, job designation, and number of pieces of training attended)*

Table 6 shows significant differences in technical factors faced by ATCs based on age and job designation, with p-values below the standard alpha level. Smith's 2014 study reveals that seniors are slower adopters of technology, often disconnected from digital tools and services, with significant differences in technical factors based on job designation.

**Table 7.** Significant Differences in the Issues Encountered by ATCs in Compliance (Technical Factor) with Air Traffic Rules when Grouped Regarding Selected Variables

Variable	Category	Mean	Test	p-value	Decision
Age	Older ( $\geq$ 29 years old)	3,08	Mann-Whitney U Test	0,000*	Reject Ho
	Younger (< 29 years old)	2,93			
Sex	Male	3,01	Mann-Whitney U Test	0,702	Accept Ho
	Female	3,02			
Length of Service	Between 20-29 years	3,02	Kruskal-Wallis H Test	0,080	Accept Ho
	Between 10-19 years	3,07			
	< 1 - 9 years	3,00			
Job Designation	Supervisor	2,82	Kruskal-Wallis H Test	0,001*	Reject Ho
	Officer	3,08			
	Assistant	2,85			
Number of Training	Between 5 - 8 trainings	3,03	Mann-Whitney U Test	0,116	Accept Ho
	Between 1 - 4 trainings	3,01			
*Significant <0,05					

*How did the ATCs address issues and challenges encounter in compliance with the air traffic rules?*

A workplace study highlights the importance of distancing oneself from situations to reduce stress. Self-controlling involves regulating one's feelings and actions, focusing on balance and focus. Seeking social support enhances self-esteem and mitigates stress. Accepting responsibility is crucial for efficient coping. Escape-avoidance involves avoiding stressors rather than dealing with them. Planful problem-solving is a common strategy used to develop and implement stress management plans. These themes help individuals cope with work-related issues and maintain a healthy work-life balance. To wit:

*"The importance of maintaining a respectful, professional, and positive attitude in the workplace, avoiding negativity, and promoting anger management. It encourages reporting abnormal events to the ATMC division and seeking assistance from experienced workmates. The text emphasizes the need to adapt to daily workplace issues and focus on the work itself, stating that incompetence is not an excuse and relearning from training is crucial. It also expresses frustration due to uncontrollable issues like equipment failure and manpower shortage, but focuses on efficiency and letting authorities handle tasks. The text suggests allocating more funds for air traffic control equipment procurement to improve the quality of life for traffic controllers and enhance their capabilities. It also calls for a more just working environment and just compensation for employees working in multi-sectoral approaches. The author suggests open discussions, compliance with standards, and focusing on the strengths and benefits of the new system."*

## CONCLUSIONS

The study reveals that ATCs face various challenges in their work environment, including stress due to air traffic volume and extended working hours, non-adherence of pilots, habitual absenteeism, uncooperative colleagues, working away from family, wrong judgment of traffic situations, variations in control techniques and perspectives, usage of cellphones and gadgets, and personal problems. These issues affect the quality of their work if not addressed properly.

In terms of work environment, the highest reported issues are imbalance between workload and compensation, increase in traffic air volume, and uncomfortable sleeping/resting quarters. Low quality of equipment is also a significant issue. Technical aspects encountered by the participants include congested airspace and route structures.

When grouped according to age, sex, length of service, job designation, and number of trainings, no significant difference was found in human factors. However, there were significant differences in work environment and technical factors when grouped according to age and job designation.

The Interpretative Phenomenological Analysis process revealed the lived experiences and how participants handled these challenges at the workplace. Themes surfaced from the interview include distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, and planful problem solving.

The study concludes that organizational and personal variables play a vital role in participants' management of issues and challenges. Participants with high self-esteem engage in productive behavior, while those with low self-esteem may less likely to use effective coping strategies.

## RECOMMENDATIONS

A health wellness program can help employees' physical and emotional well-being by fostering a support group for those with physical and emotional issues. This can help enhance the adoption of constructive coping strategies and provide opportunities for personal growth and development. A culture of excellence should be designed to challenge employees to be productive and effective.

Perceived organizational support should be valued, emphasizing policies promoting employee well-being, accomplishments, and positive contributions to the organization. This is crucial during difficult times and ensures aid is available when needed.

Future researchers should expand the study to provide a more comprehensive understanding of job-related issues and challenges. Career guidance should be provided to students, particularly in the aviation industry, to help them understand the nature of their jobs and the demands of the industry. Institutions should also provide support during the transitional stage from school to work, intensifying industry and school linkages.

In terms of human resource strategies, training students on positive behavior in coping with job-related problems is essential.

## BIBLIOGRAPHIC REFERENCES

1. Ahmad, J. & Saxena, R. (2015). Managing severe airspace flow programs: The airline side of the problem. AGIFORS Airline Operations Study Group Meeting, Brisbane.
2. Ana Publishing Inc. (2017). NAIA alternative pushed with the volume of Philippines air traffic increasing rapidly. The Market Monitor. <https://marketmonitor.com.ph/naia-alternative-pushed-volume-philippines-air-traffic>
3. Artaya, K. & Altus, S. (2011). Quantitative problem-solving methods in the airline industry. Springer.
4. Baker, J., & Baker, J. (2019, February 25). Acknowledging the human factor in air traffic control. Airport Technology. <https://www.airport-technology.com/features/human-factor-air-traffic-control>
5. Baker, J., & Baker, J. (2018, July 11). The role of automation in air traffic control. Airport Technology. <https://www.airport-technology.com/features/automation-air-traffic-control>
6. Bernardin, J. H. (2010). Human resource management: An experimental approach. New York: McGraw-Hill Companies.
7. Brown, D. (2007). Career information, career counseling, and career development. (9th Ed.). Boston, Massachusetts: Allyn & Bacon.
8. Catalano, R., Rook, K., & Dooley, D. (2015). Labor markets and help-seeking: A test of the employment security hypothesis. Journal of Health and Social Behavior.
9. Charest, N. (2012). Public management. McGill-Queen's University Press.
10. Chung et al. (2015). A study on the relationships between age, work, experience, cognition, and workability in older employees working in heavy industry. Texas, USA.
11. Cooper, C.L. & Marshall, J. (2001). Healthy mind, healthy organization: A proactive approach to occupational stress. London: The British Library.
12. Croskerry, P. et al. (2008). Patient safety in emergency medicine. Lippincott Williams & Wilkins.

13. Dawis, R.V. (2020). Person-environment correspondence theory. In D. Brown & Associates. (Eds.), *Career choice and development*. (4th ed.). (pp. 427-464). San Francisco: Jossey-Bass.
14. Definition of Coordination. (n.d.). <https://www.managementstudyguide.com/coordination.htm>
15. Dlamini, B. I. (2017). Impact of compensation and benefits on job satisfaction. *Res. J. Business Manage, South Africa*.
16. Dewe, P.J. (2000). Identifying strategies nurses to cope with work stress. *Journal of Advanced Nursing*.
17. Green, K., Lopez, M., Wysocki, A., Kepner, K., Farnsworth, D., & Clark, J. L. (2015). Diversity in the workplace: Benefits, challenges, and the requirement. *Managerial Tools*. University of Florida. Retrieved from <https://edis.ifas.ufl.edu/pdffiles/HR/HR02200.pdf>
18. Felongo G. (N.D.). Philippines: Better services seen with improved air traffic equipment. <https://gulfnews.com/world/asia/philippines/philippines-better-services-seen-with>
19. Flin, R. et al. (2008). *Safety at the sharp end: A guide to non-technical skills*. Farnham: Ashgate.
20. Gambino, K.M. (2019). *Motivation for entry, occupational commitment, and intent to remain: Multivariate data analysis*. (6th Ed.). Upper Saddle River, NJ: Prentice Hall.
21. Harnois, G., & Gabriel, P., (2000). *Mental health and work: Impact, issues and good practices*. Geneva. Retrieved from [http://www.Who.Int/mental\\_health/media/en/712.pdf](http://www.Who.Int/mental_health/media/en/712.pdf)
22. Hassanain, M.A. (2020). *Review and assessment of factors affecting the workplace relocation process*. Bingley, United Kingdom.
23. Houser, J. (2018). *Nursing research: Reading, using, and creating evidence*. Denver, Colorado: Jones & Bartlett Learning.
24. Kapur, R. (2018). *Problems and issues at the workplace*. New Delhi.
25. Kamarulzaman, N., Saleh, A., Hashim, S., & Abdul-Ghani, A. (2011). *An overview of the influence of physical office environments on employees*. University TeknologiMARA Perak.
26. Marume, S.B.M. (2016). *The necessity of work, method, and procedure in public administration*. North Carolina.
27. McClure, J. (2019). *Tracking progress over time*. Retrieved from [https://research.acer.edu.au/monitoring\\_learning/5](https://research.acer.edu.au/monitoring_learning/5)
28. MindTools | Home. (n.d.). <https://www.mindtools.com/asjiu77/henri-fayols-principles-of-management>
29. Ojogwu, A.E. (2017b). *Administrative And Management Theories, Principles And Practice*. ResearchGate. [https://www.researchgate.net/publication/317830043\\_administrative\\_and\\_management\\_theories\\_principles\\_and\\_practice](https://www.researchgate.net/publication/317830043_administrative_and_management_theories_principles_and_practice)
30. Oshagbemi, T. (2000). Is the length of service related to the level of job satisfaction? *International Journal of Social Economics*, 27(3), 213-226.
31. Peaucelle, J., & Guthrie, C. (2015). *Henri Fayol, the Manager*. ResearchGate. <https://doi.org/10.4324/9781315654546>
32. Peterson, M. P. (2004). *What men and women value at work: Implications for workplace health*. New York: McGraw-Hill Companies.
33. Rosca, P., Ponizovsky, A., & Finkelsten, I. (2013). *Interpersonal distances, coping strategies*. PubMed

Google Scholar.

34. Safety Issues Facing Aviation. (2022, October 1). Work - Chron.com. <https://work.chron.com/safety-issues-facing-aviation-23895.html>
35. Shah, K.A. (n.d.). 5 Functions of Management by Henri Fayol. [www.linkedin.com](https://www.linkedin.com/pulse/5-functions-management-henri-fayol-kalpesh-shah). <https://www.linkedin.com/pulse/5-functions-management-henri-fayol-kalpesh-shah>
36. Shethna, J. (2021). How to Apply Management Theories At Workplace. EDUCBA. <https://www.educba.com/how-to-apply-management-theories-at-workplace/>
37. Smith, S.J. (2018). Factors predicting the use of technology: Findings from the Center for Research and Education on Aging and Technology. Thousand Oaks, CA: Sage.
38. Vaaben, B., & Larsen, J. (2015). Mitigation of airspace congestion impact on airline networks. Technical University of Denmark, Denmark.
39. Watson, D., Clark, L. (2000). Negative affectivity: The disposition to experience aversive emotional states. Princeton, NJ.
40. Welsh, J. (2018). Organizational behavior. New York: West Publishing

#### **FINANCING**

The authors did not receive financing for the development of this research.

#### **CONFLICT OF INTEREST**

The author declare that there is no conflict of interest.

#### **AUTHORSHIP CONTRIBUTION**

*Conceptualization:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Data curation:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Formal analysis:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Research:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Methodology:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Project management:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Resources:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Software:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Supervision:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Validation:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Display:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Drafting- original draft:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Writing-proofreading and editing:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Drafting - original draft:* Zenia Uy Paciones, Jonathan E. Lobaton.

*Writing - proofreading and editing:* Zenia Uy Paciones, Jonathan E. Lobaton.