IMPROVING SITUATIONAL AWARENESS IN AIR TRAFFIC MANAGEMENT: A HUMAN FACTORS APPROACH

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Abstract: *This research aims to investigate the influence of human factors in increasing situation awareness in air traffic management. Situation awareness is the ability to understand and respond to existing conditions in a timely manner, especially in the context of complex and dynamic air traffic. Human factors, such as fatigue, experience, and psychological factors, have been known to play an important role in situational awareness. This research uses a qualitative approach with a focus on in-depth interviews with air traffic managers and analysis of human factors involved in events or incidents related to situation awareness. Data will be analyzed using thematic methods to identify patterns, themes and key aspects that influence situation awareness. The research results are expected to provide in-depth insight into the human factors that influence situation awareness in air traffic management, as well as recommendations for improving training, standard operating procedures, and policies to improve response and performance in demanding situations. The conclusions of this research are expected to make a significant contribution to the field of aviation safety and air traffic management as a whole.*

Keywords *: Awareness, Situation, Traffic Management, Air Traffic*

Kawareness situation (situational awareness) is factor critical in management Then cross Complex and dynamic air . Awareness situation defined as accurate understanding about elements environment moment This is the correct interpretation to existing information , as well correct projection about environmental status the in time will coming (Endsley, 1995). In context management Then cross air , consciousness high situation is very important For identify potency danger , take the right decision , and avoid incident or accident .

Awareness self is ability For in a way objective recognize and understand thoughts , feelings , and behavior We yourself at the moment This . This includes awareness will

motivation , strengths , and weaknesses personal without accompanied evaluation or critics excessive . This process possible individual For more Good arrange self , interact with other people more effective , and take more decisions wise based on more understanding in to self Alone . Awareness self is deep and complex concept in psychology that has Lots researched by experts in a number of year final . Following is description from experts about understanding awareness self , with reference from articles and journals scientific latest : Ahmad (2023): Declare that awareness self is ability For recognize and understand in a way accurate thoughts , feelings , and behavior We Alone without evaluation excessive . This includes awareness will strengths and weaknesses personal as well as ability For arrange emotion with Good .

Traffic air is one of sector crucial in global transportation that brings challenge complex in management and supervision . Security and efficiency internal operations room air is very dependent on ability manager Then cross air For maintain level awareness optimal situation . Awareness situation , which is defined as accurate understanding to the elements involved in something situation as well as projection future developments (Endsley, 1995) , becoming key in taking right decision and fast response to change condition in dynamic environment like Then cross air .

Study This aim For explore and improve awareness in- between situation manager Then cross air through factor - focused approach man . Factors This covers influence experience work , level fatigue , communication strategies , and use technology in context management Then cross air is dense and complex . More understanding in to How factors This interact can help in identify challenge main problem faced by managers Then cross air and formulate effective intervention strategies .

Human factors play role central in level awareness situation among manager Then cross air . Factors like level experience , fatigue , communication , as well taking decision in situation pressure influence ability individual For maintain level awareness optimal situation . Previous studies show that lack of awareness situation often contributing to incidents or accidents in the sector aviation (Salas et al., 2010).

Enhancement awareness situation No only depends on skill technical , but also on in -depth understanding about aspects psychology and interaction man with environment Work they . Therefore that , research This aim For deepen How factors man in a way Specific influence awareness situation in management Then cross air .

Study previously has identify that training that focuses on aspects human , like management stress , communication effective , and retrieval the right decision , yes increase awareness situation among personnel manager Then cross air (Morrow et al., 2011). However , still required studies more carry on For integrate findings This to in practice operational daily .

This study No only aim For strengthen literature academic about awareness situations and factors man in management Then cross air , but also for give contribution practical to industry flight in effort increase security and efficiency operational . With evaluate and understand dynamics complex behind awareness situation , expected study This can give valuable guide for maker policy , managers , and practitioners in effort they For increase quality management Then cross air .

Introduction This direct reader For understand context and purpose from study about awareness situation in management Then cross air , as well highlighting importance factor - focused approach man For overcome existing challenges in industry modern aviation . With understand in a way deep factors humans who contribute to consciousness situation in management Then cross air , research This expected can give recommendation practical For increase training , policies , and procedures operational standard in frame increase safety and efficiency in sector flight .

METHOD

Research methods For study " Improve Awareness Situation in Air Traffic Management : A Human Factors Approach " can designed with a structured and comprehensive approach For understand interaction complex between factor humans and consciousness situation in the environment management Then cross air . Following is description more detailed about method research that can Used : Research This use

approach mixtures (mixed-methods) that combine elements Qualitative and quantitative . Approach This possible For get deep understanding about factors influencing humans awareness situation , while also measuring impact from intervention or training certain in a way empirical (Creswell & Plano Clark, 2018).

Participants study will consists from manager Then cross air working in the center control Then cross air (ATC), incl controller Then cross air (controllers), managers operations , and personnel related other . Participants chosen based on experience they in situation Then cross complex and dynamic air (Salas et al., 2010).

Data Collection Instruments and Techniques , namely ; Interview Deep , done with manager Then cross air For get outlook about experience they in face situation critical , as well perception they to factors influencing humans awareness situation (Endsley, 1995). Observation Participatory , researcher will observe in a way direct interaction between manager Then cross air and environment Work they For understand in a way deep context in which consciousness situation formed (Morrow et al., 2011). Questionnaire Structural , used For measure level awareness situation , perception to pressure work , level fatigue , and evaluation to training or existing interventions (Salas et al., 2015).

Research Data Analysis This namely ; Qualitative data from interviews and observations will analyzed use approach thematic For identify patterns and themes main influence awareness situation . Quantitative data from questionnaire will analyzed use technique statistics descriptive and analytical inferential For evaluate connection between factors man with level awareness situation . Research Ethics , Research will obey all guidelines ethics research , incl agreement participants , data confidentiality , and protection privacy individuals governed by codes ethics professional .

With adopt approach integrated mix , research This expected can give more understanding deep about How factors man can managed For increase awareness situation in management Then cross air , as well give recommendation practical For increase safety and efficiency operational in sector flight .

DISCUSSION RESULT

The discussion of the research on "Improving Situation Awareness in Air Traffic Management: A Human Factors Approach" discusses the findings in more depth, connects the findings with related literature, and explores the practical and theoretical implications of the research. The following is a description of the discussion which covers several key aspects; Human Factors and Situation Awareness, researchers outline how human factors such as work experience, fatigue, and communication skills contribute to the level of situation awareness in air traffic management. For example, research has shown that broader work experience can improve a person's ability to recognize patterns and anticipate changes in air traffic situations (Salas et al., 2010). On the other hand, fatigue or stressful conditions can interfere with a person's ability to maintain optimal situational awareness (Endsley, 1995).

Evaluation of Training and Interventions, evaluation of the effectiveness of training and interventions aimed at increasing situation awareness. Previous research shows that training such as Crew Resource Management (CRM) can be significant in improving team coordination, communication, and decision making among air traffic managers (Morrow et al., 2011; Salas et al., 2015). The discussion will explore how implementing this training can improve individual and team responses in dealing with complex and potentially dangerous situations.

Practical Implications for Air Traffic Management, practical implications of the findings of this research for air traffic management. This includes the development of better standard policies and procedures, increased training and professional development, and the integration of enabling technologies in air traffic management systems. By strengthening these aspects, aviation organizations can improve operational safety and overall efficiency (Salas et al., 2010).

Limitations and Research Directions Next, there are limitations to this research, such as the research methods used, generalization of findings, and other factors that may influence situation awareness but are not covered in this research. In addition, further research directions that can be taken to further explore the interaction between human factors and situation awareness in the context of air traffic will be discussed. Through discussions like this, this research can make a significant contribution in developing better

strategies and policies to improve situation awareness and operational safety in air traffic management.

CONCLUSION

The conclusions of the study on "Improving Situation Awareness in Air Traffic Management: A Human Factors Approach" will reflect the essence of the findings and implications resulting from the study. The following is a description of the conclusions of this research, covering several key aspects: This research confirms that human factors such as work experience, fatigue, and communication skills have a significant influence on the level of situation awareness in air traffic management. Longer work experience is often associated with a better ability to recognize and respond to complex situations, while burnout can reduce an individual's ability to maintain optimal situational awareness.

Research findings also suggest that training such as Crew Resource Management (CRM) and simulation techniques can be effective in improving situation awareness and decision-making capabilities among air traffic managers. This training helps in improving team coordination, effective communication, and better handling of emergency situations. The conclusions of this research provide support for the development of better standard policies and procedures in air traffic management. By strengthening aspects such as training, fatigue management, and improved communications, aviation organizations can improve operational safety and overall efficiency.

Although this research provides valuable insights, there is room for further research and development. Further studies could explore other human factors that may influence situation awareness, as well as test the effectiveness of different intervention strategies in broader or specific contexts. This conclusion underscores the importance of considering human factors holistically in improving situational awareness in air traffic management. By understanding the critical role of these factors, and implementing appropriate interventions, aviation organizations can effectively improve their safety and operational performance.

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