University of South Australia

Aviation

Research Project: abstract and introduction examples

Abstract: example

In air traffic management (ATM) knowledge of the impact of human factors on performance is critical to address safety incidents. Previous research has largely focused on the effects of single factors on performance which has resulted in a comprehensive understanding of single factor effects. In current control environments however, the residual threats for incidents often result from the interaction of multiple human factors and the resulting cumulative impact on performance. This research uses a literature review, an analysis of over 400 European aviation incident reports and finally a survey of ATM professionals to assess the need for a multifactorial model of performance. Literature findings suggest that Human Factors approaches are fundamentally single-factor in nature, which is out of step with real ATM working contexts. An incident report analysis, supported by a survey of air traffic experts, suggests that multiple factor incident causation exists. An incident report analysis, supported by a survey of air traffic experts, suggests that multiple factor incident causation exists.

Background

Problem/gap

Methods/purpose

Findings

(Adapted from Edwards et al., 2012, p. 159)

Introduction: example

1. Introduction

Air traffic control (ATC) is a safety critical environment (Chang & Yeh, 2010). Air Traffic Controllers (ATCOs) are at the sharp end of this safety critical system. To ensure flight safety, ATCOs are required to maintain a consistently high standard of performance. *The potential consequences* of poor performance are severe, with high costs and potential loss of life (Cox et al., 2007). In such a safety critical environment, human performance and error are primary concerns. Although Kirwan (2011) notes that ATC is a highly reliable operation, of incidents that do occur, human error has been attributed as a primary or secondary cause in 75-90% of cases (Mackieh & Cilingir, 1998), human factors have been repeatedly evidenced to affect human performance (Chang & Yeh, 2010) and are "major determiners of human error" (Park & Jung 1996, p. 330). *Knowledge of* the impact of human factors on human performance and error *is therefore critical* in addressing safety incidents in air

Background information to set context.

Language used to highlight the current 'problem' and the need to investigate it.

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Language used to highlight current understanding of the topic and the gap.

1. Introduction *(example continued from previous page)*

Most previous human performance and error research has focused on the effects of single factors on performance (Svennson, 1997). This focused research has resulted in a comprehensive understanding of the impact of single factors on performance. As such, single factor issues such as fatigue, vigilance, and situation awareness problems have now largely been designed out or sufficiently mitigated by design, operational and Human Factors & Safety expertise. *In current* control environments, although accidents are rare, when they do occur they are often multi-causal in nature, or are seen as having no direct causes but many contributors, as highlighted by so-called 'Swiss Cheese' and Resilience Engineering models (Reason, 1990). *Therefore*, the residual threats for incidents often result from the interaction of multiple human factors and the resulting cumulative impact on performance.

Brief review of the literature.

A potential solution is the development of a multifactorial model of human performance. This conceptualization would permit the modelling of the interactions between relevant human factors. Human performance limits may also be acknowledged and integrated in the model as 'performance boundaries'. Currently, this proposal is limited by its anecdotal nature and the lack of specification of factors and thus accurate performance boundaries. However, considering the previous calls in the literature for research into multiple factor interrelations [e.g., 15] the authors believed it would be worthwhile to investigate the need for a human performance model to represent multifactor interactions and multi-factor impacts on performance, in the safety critical domain of air traffic control.

Narrowing of the focus.

The writer states the need or importance of undertaking this study.

1.1. Current investigation

The current investigation aims to:

1. assess the need for a multifactorial model of performance
2. identify and refine key factors which impact ATCO performance for later integration into an envelope model.

The aims of the research (these can be written in question form).

The aims of this investigation were addressed using three separate methodologies. A literature review was conducted to summarize the sporadic research to date on factor interaction effects on performance. An incident report analysis subsequently aimed to investigate the multifactorial nature of incidents in the field. Finally, a survey for ATM professionals (controllers and incident investigators) was utilized to refine and prioritize factors that should be considered for further investigation and potentially integrated into a multifactorial model of ATCO human performance.

A brief description of the methods and outline for the research paper.

(Adapted from Edwards et al., 2012, pp. 159-160)

References

Edwards, T., Sharples, S., Wilson, J.R., & Kirwan, B. (2012). Factor interaction influences on human performance in air traffic control: The need for a multifactorial model. *Work, 41*(1), 159-166.