NOTES TRAINING IN ATM – A NEW APPROACH USING COMPUTER-BASED SIMULATION METHODS: RESEARCH METHODS

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Abstract

The purpose of this paper is to introduce preliminary research for the training development in order to conduct a new concept for simulation-based non-technical skills training for Air Traffic Controllers (ATCO) in Switzerland. The analyses comprise the use of critical incidents questionnaires, interviews with ATCOs, a Job Analysis Survey (F-JAS), and the analysis of human factor causes in serious incident AIRPROX reports (SAIB) using a category system. A selection of different results are presented and discussed in the present paper.

1 Introduction

Numerous studies in high-risk work settings indicate that about 80% of all accident causes in aviation can be attributed to human factors [1] [2] [3]. Human factors thus represent non-technical skills, especially cognitive and social skills, which complement workers technical skills [3]. As human errors cannot be eliminated in today`s workforce, research point out that an effective training concept is able to help people achieve appropriate non-technical skills to cope with the risks and demands of their work.

As literature shows, there is no standard set of non-technical skills that should be included as a part of human factors training. Numerous concepts and methods are used to train non-technical skills [4]. Because of this fact and the high safety relevant background of human factors in the daily work of ATCOs, it is of special importance for training development to analyse (a) all human factor caused incidents and accidents, (b) shed light on the interplay of non-technical skills (c) gather a clear picture of ATCO`s workplace, working tasks as well as their expectations of a non-technical skills training.

2 Methods

To optimize the acceptance of the new training, to get more information about human factors in Air Traffic Management (ATM) and at least to ensure high levels of training transfer to the workplace we conducted the following analyses:

- Critical incidents reported by air traffic controllers (N = 13)
    - needs assessment
    - benefit of new training design
- Interviews with air traffic controllers (N = 14)
    - personal human factor strategies
- F-JAS – *Job Analysis Survey* [5] (N = 62)
    - subjective importance of human factors in air traffic control
- Analysis of human factor causes in serious incident airprox reports (SAIB) (N = 69), period: last ten years

3 Results

Results showed that the benefits of a simulation-based form of a non-technical skills training were rated among a mean of 5.33 (*SD* = 1.37) on a scale from 1 (not at all useful) to 7 (very useful). And feedback of previous non-technical

skills training revealed the following most named statement: *Transfer is often difficult and the effect does not last very long.* The F-JAS questionnaire further measured the subjective importance of human factors in ATM. The results showed that stress resistance with a mean of 6.55 was rated as the most important non-technical skill on a scale form 1 (not important) to 7 (highly important) followed by decision making with a mean of 6.44, situation awareness with 6.37, communication 5.97 and leadership 4.02. The results of the analyses of serious incident airprox reports (SAIB) over a period of the last ten years showed the important role of situation awareness and intercorrelations among involved human factors: Situation awareness and decision making r = .27*, decision making and stress/workload r = .23*, decision making and teamwork r = .26*, stress/workload and leadership r = .23* as well as communication and teamwork r = .43*.

4 Discussion

Results from preliminary training development research clearly highlight the importance of human factors in ATM - non-technical skills thud are highly safety relevant. Furthermore intercorrelations among human factors indicate that the training of one non-technical skill needs to be incorporated in the training of another human factor (e.g., training of situation awareness in high traffic episodes (stress/workload training)). A promising way for a new training design would be a simulation-based training in a real-life setting realized by radar scenarios.

5 References

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