Task analysis, subjective workload and experienced frequencies of incidents in an airport control tower

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Abstract

This study aims at a better understanding of the behaviour of air traffic controllers in control towers. In the tower of a major Swedish airport a task analysis has been conducted by means of observations in addition to subjective workload assessments. Based on earlier research it was hypothesized that air traffic controllers with two years or less of experience would experience higher subjective workload, than air traffic controllers with more than two years of experience. Furthermore, it was hypothesized that when traffic intensity increases, more subjective workload would be experienced. Both hypothesises were confirmed, and interesting correlations between observed variables were found. To gain insight in the rate of recurrence of unwanted incidents, a questionnaire about experienced frequencies of problems with weather with reduced visibility, the clearing of snow, system failures and the distribution of flight progress strips was administered. Major problems indicated in the responses were system failures, the distribution of flight progress strips and the clearing of snow. Suggestions for improvement and future research are presented.

Introduction

"KLM one-one-one-three, cleared for take-off, runway one-niner right". Air traffic controllers in control centres all over the world are doing the same work, they guide aircraft from destination to destination. Furthermore, they try to make efficient use of airspace. They also provide additional information to pilots, helping them to avoid bad weather conditions and give assistance in their navigational activities. In an airport control tower, air traffic controllers have a slightly different job. They assist aircraft from the ground to the air and the other way around. From the moment they leave the gate till the time they reach the boundaries of the airport airspace, they fall under the responsibility of the control tower. At the control tower of this study a team of up to nine controllers take care of all the departures and arrivals as well as ground traffic at the airport. On a busy day this can amount to around 1000 aircraft movements in 24 hours.

After September 11th 2001 there was a considerable drop in air traffic, but in spring 2004 it was almost back at the same level as before 9/11. Due to expected future