

# Task analysis, subjective mental workload and incidents in airport tower air traffic control during adverse weather conditions

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## Abstract

This study is part of a project aimed at a better understanding of the behaviour of airport tower air traffic controllers during adverse weather conditions. Observations of controllers' work and assessment of their subjective mental workload have been performed during adverse weather conditions. In addition a questionnaire about experienced frequencies of weather and systems related problems was administered. Results show that the handling of the flight progress strips (FPS) adds substantially to the experienced mental workload. Less experienced controllers show higher workload ratings. System failures (mainly ground radar) seem to be recurrent.

## Introduction

Airport tower air traffic controllers alternate between observing traffic, on ground and in the air, through the tower windows, and following the traffic on radar and computer screens. The change is mainly guided by weather and visibility. During adverse weather with limited visibility the air traffic controller can only see parts or even nothing of the runway and taxiway/apron system. In those conditions the controller has to rely on his support systems (radar, computers). In the spring of 2004 a study was carried out in the control tower of a major Swedish airport, collecting observational data and assessing mental load. During the data collection period weather conditions were excellent and controllers rarely used the support systems (Weikert & van Ham, 2004). A follow-up study started in January 2005 and this time data are only collected during adverse weather conditions.

## Method

Controllers were observed during their spells in position (see table 1). After each observation period they rated their subjective mental workload with NASA-TLX. Each controller also had to answer a questionnaire on experienced problems/incidents during the last two months.

In D. de Waard, K.A. Brookhuis, and A. Toffetti (Eds.) (2006), *Developments in Human Factors in Transportation, Design, and Evaluation* (pp. 153 - 156). Maastricht, the Netherlands: Shaker Publishing.