



Research and guidelines for implementing Fatigue Risk Management Systems for the French regional airlines

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ABSTRACT

This paper describes research that aims to provide the overall scientific basis for implementation of a Fatigue Risk Management System (FRMS) for French regional airlines. The current research has evaluated the use of different tools and indicators that would be relevant candidates for integration into the FRMS. For the Fatigue Risk Management component, results show that biomathematical models of fatigue are useful tools to help an airline to prevent fatigue related to roster design and for the management of aircrew planning. The Fatigue Safety assurance includes two monitoring processes that have been evaluated during this research: systematic monitoring and focused monitoring. Systematic monitoring consists of the analysis of existing safety indicators such as Air Safety Reports (ASR) and Flight Data Monitoring (FDM). Results show a significant relationship between the hours of work and the frequency of ASR. Results for the FDM analysis show that some events are significantly related to the fatigue risk associated with the hours of works. Focused monitoring includes a website survey and specific in-flight observations and data collection. Sleep and fatigue measurements have been collected from 115 aircrews over 12-day periods (including rest periods). Before morning duties, results show a significant sleep reduction of up to 40% of the aircrews' usual sleep needs leading to a clear increase of fatigue during flights. From these results, specific guidelines are developed to help the airlines to implement the FRMS and for the airworthiness to oversight the implementation of the FRMS process.

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1. Introduction

Fatigue in aviation is widely acknowledged as a major risk for safety and has been on the most wanted list of the National Transportation Safety Board (NTSB) since 1990. In order to manage this specific risk, several approaches have been proposed, from the education and training of the crews related to the management of fatigue risk to the integration of scientific knowledge in Flight and Duty Time Limitations (FTL). New rules have recently been proposed by the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA). Furthermore, the International Civil Aviation Organization (ICAO) will shortly release

Standard and Recommended Practices (SARP) and guidelines to support the aviation industry in developing Fatigue Risk Management System (FRMS).

In the context of the new harmonised regulation on FTL (EU-OPS-sub-part Q), France has issued a specific regulation relating to crew rest requirements. More specifically, the directive applies to two specific cases, split duties and reduced rests. In the split duty provision, if a flight duty includes a break period between 03:00 h and 09:59 h, the flight duty period can be increased by half the break time, less 15 min. The reduced rest provision allows rest periods to be reduced to a minimum of 7 h and 30 min if the rest is taken in a hotel located less than 15 min from the airport. The flight duty period prior to the reduced rest period must not include more than five sectors and the next flight duty must be limited to three sectors. A maximum of two reduced rests can be scheduled between two normal rest periods. The directive stipulates that companies wishing to benefit from these specific provisions must set up a Fatigue Risk Management System (FRMS). This system, part of the operator's Safety Management System (SMS) (Graeber, 2008) as defined

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