

Human factors involved in container terminal ship-to-shore crane operator tasks: operator fatigue and performance analysis at Cagliari Port

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Abstract

This paper is concerned with active safety and human factor aspects in maritime transport, in the specific case container terminals. In container handling safety optimization the human operator continues to play a central role and there are numerous sources of job stress that can lead to the serious risk of accidents.

This paper aims to define, for the first time, a tool that is able to understand the cause of human error in port operations most exposed to fatigue-related risk. The first experimental performance curves have been constructed for crane operators in container terminals.

A function has been constructed for crane operator performance under actual working conditions comparing subjective/perceived fatigue curves, developed using data drawn from a survey conducted among port workers at Cagliari Port, with performance curves for a number of crane operators at the container terminal, developed on the basis of productivity data. Furthermore it has been possible to highlight the deviation between the productivity trend recorded by a container terminal operator and the actual performance curve disregarding idle time.

Introduction

Fatigue, and impaired performance in general, is regarded as a significant factor in the majority of accidents occurring in transport systems (Fadda, 1984). In air transport, the FAA (Federal Aviation Administration) states that 21% of reports submitted to the Aviation Safety Reporting System (ASRS) deal with fatigue related issues. As for road transport, the National Highway Traffic Safety Administration (NHTSA) estimates that in the U.S.A roughly 100,000 accidents are caused by drivers falling asleep at the wheel, resulting each year in 1,500 fatalities and 71,000 injuries. In the maritime sector an analysis carried out in 1996 by the US Coast Guard (USCG) showed that out of 279 accidents, fatigue accounted for 16% of no-injury accidents and 33% of accidents involving injuries. In railway transport, an analysis for the ten-year, period January 1990 - February 1999 carried out by the