Human Error in Helicopter Accidents: Understanding the manifestation of human error across helicopter missions

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Abstract

Human error is responsible for the majority of accidents in complex environments including helicopter operations. To reduce the overall accident rate throughout the helicopter industry, we must first understand how helicopter missions differ from one another and what errors lead to accidents.

The research documented in this dissertation involved a series of three studies. The first study sought to identify how helicopter mission types differ through pilot interviews. Using information gleaned from pilot interviews hierarchical task analysis (HTA) models were developed and compared to one another. The study revealed that some tasks related to mission planning, taxiing, departing an airport, and flying en route to a location are shared by missions while more detailed tasks, such as hoisting operations, are specific to particular mission types.

The second study applied three human error frameworks to a set of 60 helicopter accident reports and evaluated each on comprehensiveness, reliability, analyst confidence, and application time. The Human Factors Analysis Classification System (HFACS) was identified as the human error framework that was best suited for future helicopter accident report analysis studies.

The third study combined the finding of the first two studies by applying HFACS to a set of 691 United States helicopter accidents. Pilot and flight characteristics were evaluated along with the types of human error identified. Mission type, phase of flight, time of day, meteorological conditions, and the number of crewmembers had significant effects on error classifications. Pilot age, total flight hours, total flight hours on the make and model of the accident aircraft and qualifications also had significant effects on error classifications.

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