Impact of Weather on Serious Injury Rates of Flight Crews

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Abstract

Weather is an important factor in aviation accident investigations. It is commonly assumed that flying in bad weather is more dangerous to passengers and pilots. How accurate is this assumption? The present study aims to evaluate the relationship between weather and the frequency of serious injuries to flight crews in aviation accidents. The study evaluated serious injuries to flight crews as a more sensitive measure for low to medium severity accidents.

An ex-post facto analysis was performed with 2,488 accidents from the NTSB database from 1983-1999 in the United States. The study comprised FAA part 121 and part 135 air carrier accidents. The data were run as a between groups independent samples *t* test focusing on the differences in means of the two groups. Results indicate that on average, the means differed .057 less in the Visual Meteorological condition (VMC) than in the instrument meteorological condition (IMC) and this difference was statistically significant. The *t* ratio for VMC compared to IMC groups was $t(655) = -3.32$, $p < .0005$ which was beyond the *t* critical region of $t(655) = -1.95$. Thus, accidents occurring in IMC flight have a higher frequency of serious injuries to the flight crew.

However, based on the descriptive statistical analysis, four times more accidents occur in VMC conditions than in IMC conditions. Thus, while accidents in IMC are more severe, accidents are more common during VMC flight. Pilot training should address the higher accident rate in VMC flight despite its decreased salience of weather-related risk.

Keywords: aviation accident investigation, weather decision making, visual meteorological flight, instrument meteorological flight, human factors, pilot training