20130614 - Relationship between pilot duty hours and accidents - 2002

[Data] [<Normal page] [**KENDALL Todd & Jose D PEREZGONZALEZ [eds] (2013).** *Relationship between pilot duty hours and accidents.* Knowledge (ISSN 2324-1624), 2013, pages 99-100.]

Duty hours and aviation safety

In 2002, Goode[1] carried out research to assess the potential effect of duty hours on human-factors-related accidents in commercial aviation. The study identified several time brackets of continuous duty time, then calculated the number of hours contemporary pilots work within those brackets (as a proxy for historical work hours) against historical accidents that occurred when pilots were on duty within similar brackets.

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Table of Contents

The results showed a relationship between hours on duty and amount of accidents. Illustration 1 standardizes results as percentages, and shows that workloads of 10 hours or more made up just 10% of total duty time yet 21% of human-factors-related accidents also occurred within those brackets. In terms of relative risk, there was a 73% chance of accidents occurring when pilots had been on duty for 10 or more hours. When attending to the most extreme bracket, just 1% of total duty time is done beyond 12 hours, yet 5.5% of accidents also occurred when pilots had been on duty in such time bracket, implying a 56% chance of accidents when on duty in that time bracket.

Illustration 1: percentages for hours of duty, accidents and risk

Duty hours	% hours	% accident	% risk	cumulative
1-3	34.6	27.3	7.9	7.9
4-6	32.6	27.3	8.4	16.3
7-9	23.0	25.5	11.1	27.4
10-12	8.8	14.5	16.5	43.9
13+	1.0	5.5	56.2	100

Study's scope

Although, the measures of accidents and duty hours are not from the same sample or time period, the study is a clever one in attempting to overcome the low occurrence of contemporary accidents and the difficulty in collating historical workload data in order to assess the potential relationship between aviation accidents and pilots' duty hours. Still, such sample mismatch may compromise the subsequent results, and these should be taken with caution. Furthermore, results are relative to American airlines, thus they should be considered local until replicated in other nations.

Methods

Research approach

Exploratory study describing the potential relationship between pilots' duty hours and aviation accidents.

Sample

The sample comprised two subsamples: the accident subsample consisted of reports from 55 serious incidents or accidents that occurred between 1978 and 1999, considered to be human-factors-related and which also had recorded pilots' activities for at least 72-hours prior to the accident. The workload subsample consisted of the contemporary monthly duty hours (scheduled or actual) of captains for 10 carriers in 1999.

Variables

Contemporary duty-hours per month as a measure of workload (and as a proxy for historical duty-hours per month); historical rate of human-factors-related serious incidents and accidents as a measure of accidents; ratio between accidents and workload as a measure of risk.

Data analysis

Descriptive statistics: frequencies, percentages and ratios.

References

1. **GOODE Jeffrey H (2002).** *Are pilots at risk of accidents due to fatigue?* Journal of Safety Research (ISSN 0022-4375), 2003, volume 34, issue 3, pages 309-313.

Want to know more?

AviationKnowledge - Sleep management for commercial aviation
A small standard operating procedure about sleep management for commercial pilots.
PubMed - Original article's abstract
Access to the original article can be obtained via ScienceDirect.
WikiofScience - Pseudoscience in Goode's (2002) work
This WikiofScience page delves with some pseudoscientific evidence in the original article.

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