



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

JOURNAL OF THE TRANSPORTATION RESEARCH FORUM

Volume XXVIII Number 1

1987



TRANSPORTATION RESEARCH FORUM
In conjunction with



**CANADIAN TRANSPORTATION
RESEARCH FORUM**

A Preliminary Analysis of the Impact of the PATCO Strike on Airline Safety

by William A. Cunningham* and Grant M. Davis**

ABSTRACT

Contentious debate has evolved recently over the issue of airline safety. A recent survey conducted by the DALLAS NEWS indicated that, in the opinion of airline pilots, safety has deteriorated.

One of the principal reasons stated in the Dallas survey, and offered by others who perceive a decline in safety, is the air traffic controllers' strike of 1981. Another related factor contributing to decreasing safety is the increasing number of flights offered since deregulation, especially in the commuter airline segment.

This brief study investigates the issue of safety from two perspectives. The first is the effect, if any, of the controllers' strike and concurrent relation in personnel. The second is concerned with the data on safety by type of service (for instance, general; computer; air taxi; and trunk). To analyze the data ANOVA is performed on data before and after the strike to attempt to discern any effects on accidents and fatalities that can be attributed to the strike. The analysis, moreover, delineates any categorical variations or changes in safety due to increasing frequency of service.

While there is a plethora of literature relating to the issue of safety, this study provides some preliminary statistical insight into this highly controversial issue.

I. INTRODUCTION

On October 22, 1981, the Federal Labor Relations Authority removed the Professional Air Traffic Controllers Organization's (PATCO) right to represent the controllers.¹ This action was taken in direct response to the August 3 illegal strike called by PATCO President, Robert E. Poli (BUSINESS WEEK, August, 1981).

Of the approximately 15,000 PATCO members, employed in 1981, more than 12,000 ignored the return-to-work order issued by the Reagan Administration (WALL STREET JOURNAL, August, 1981). In November of 1981, there remained only 10,000 functioning controllers (supervisors, military controllers, nonstrikers, and new trainees) compared with a prestrike number of 16,000 (BUSINESS WEEK, November, 1981).

Irrespective of this dramatic change in the controller employment situation, in 1982 the FAA began plans to substantially alter their safety regulations in order to provide airlines additional operational flexibility in complying with these regulations. Designated by the FAA as "regulation by objective", the new regulations would offer broad rules as to how airlines should operate replacing the "how to" rules

then in existence (FLIGHT, 1982). The actual method or technique of complying with the new rules would be up to the individual airlines who in turn would be required to submit to the FAA a detailed statement of how compliance with the new regulations would be achieved. Putative benefits would be the fostering of the development of new safety methods and a simultaneous reduction in the volume of regulations (JOURNAL OF COMMERCE, 1983). This new approach was not universally accepted by aviation interests as leading to improvements in safety.

While there are almost infinite number of aviation safety issues; these are but two, albeit major, changes that occurred that produced substantial debate regarding the airline safety issue. The first impact, that of the PATCO strike, generated the most controversy. Numerous aviation practitioners in the industry (pilots, new and old controllers, bureaucrats, among others) and outside experts as well who question whether or not the level of airline safety is adequate. The quintessential question regarding the effect of deregulation on safety has, and continues to be explored and is contentious.

Although a myriad of opinions exists concerning the level of safety and the impact of low rates and a declining number of controllers, there is a notable absence of empirical verification of the effect, if any, there has been on airline safety. The balance of this paper attempts to provide rudimentary evidence regarding safety experience in aviation and the diminished number of air controllers.

To empirically ascertain whether or not the PATCO strike and subsequent reduction in the number of air traffic controllers has contributed to a decline in airline safety, the data on safety will be examined dichotomously and compared over the pre-strike period of 1975-1980. The second time period will be the 1981-1984 post-strike years. Although the strike did not occur until the latter part of 1981, there had been several incidents of work slow-downs are growing dissension prior to the strike; ergo, 1981 should be included in the post-strike time period. This rather straight-forward methodology concentrates on aviation safety with a full compliment of controllers, and an environment with a reduced number.

II. COLLECTED DATA

The data examined in the analysis was collected from the FAA statistical handbook for the years 1975-1980, a publication containing data compiled from the National Transportation Safety Board (accidents, and miles flown for air carriers), and the FAA itself for data on general aviation. The FAA Safety

Board basically categorizes air carrier accidents into one of four groups. These groupings depend on which Federal Air Regulation were in use when the accident flights occurred. The groupings are (1) large airlines in scheduled service under Part 121 of the regulations; (2) commuter carriers in scheduled service under Part 135; (3) "on-demand" air taxis in unscheduled operations under Part 135; and (4) general aviation, a category for all other civil flying. These data do not include flights made by military aircraft.

As previously indicated, the analysis is essentially dichotomous. First, the data is examined to ascertain if the level of safety has changed over the two select time periods. Data on total accidents, fatal accidents, and total fatalities is employed. Secondly, an examination of these data is conducted for each of the four groupings. This approach permits isolating any changes occurring within categories, as well as identifying the direction of those changes. Even though the aggregate data alone would not necessarily indicate any change, significant differences do exist when examining by grouping. In addition to the above data classes (total accidents, fatal accidents, and total fatalities), analysis is conducted relative to accidents on a per 1,000,000 hours flown to correct for differences between groups in usage or exposure.

The ANOVA statistical technique is employed in this analysis of aviation safety data. Specifically, the data is examined with a view to discerning if significant differences in the mean value of the various measures exist in the pre-and-post strike periods. In

this regard, the ANOVA results within the four groups is of particular interest. Due to the proliferation of small regional airlines and computer carriers caused in part by deregulation and in part by the adoption of hub-and-spoke systems utilized by the major carriers. A general but pervasive contention has evolved recently that many of these airlines are under inordinate pressures associated with increased competition, and one which cuts have been made, at the expense of safety, has been maintenance. Another area relating to safety has been the utilization of less experienced pilots by the smaller commuter and regional airlines. Examining accident data on this breakdown by categories will assist in testing these hypotheses. Table 1 illustrates the results of the ANOVA's for the aggregate data. TA is total accidents, FA represents fatal accidents, FT is fatalities, and TAPHR is total accidents per 100,000 hours flown. Tables 2 through 5 depicts the same results for each category employed: large airlines; commuter; "on-demand" air taxis; and general aviation, respectively. Premean and postmean are the means of the data for the two time periods.

An examination of Table 1 reveals that the hypotheses regarding the means of the two different time periods are different would be rejected at the .90 confidence level (.10 level of significance) regardless of which variable is considered. This result suggests that commercial aviation is no less or no more safe after the PATCO strike than before. However, analysis contained in Tables 2-5 reveals this observation is not carried across all groupings of air carriers.

TABLE 1
Anova Results For Total Aggregated Data

| | Premeans | Postmeans | F | Significance Level |
|-------|----------|-----------|-------|--------------------|
| TA | 10499.65 | 7624.82 | .306 | .584 |
| FA | 1352.43 | 1380.94 | .002 | .968 |
| FT | 2408.17 | 2117.82 | .092 | .7653 |
| TAPHR | .53 | .09 | 1.456 | .235 |

TABLE 2
Anova Results For Large Scheduled Airlines

| | Premeans | Postmeans | F | Significance Level |
|-------|----------|-----------|-------|--------------------|
| TA | 22.33 | 18.25 | 1.345 | .280 |
| FA | 2.67 | 3.00 | 0.100 | .760 |
| FT | 41.50 | 14.00 | 3.269 | .108 |
| TAPHR | .05 | .04 | .076 | .790 |

TABLE 3
Anova Results For Commuter Airlines

| | Premean | Postmean | F | Significance Level |
|-------|---------|----------|--------|--------------------|
| TA | 463.33 | 154.50 | 15.314 | .004 |
| FA | 1116.67 | 352.25 | 11.309 | .010 |
| FT | 3966.67 | 1214.00 | 7.705 | .024 |
| TAPHR | 1.00 | .04 | 18.172 | .003 |

Table 2 indicates no significant difference between the pre and post periods (at the .10 level of significance), yet, safety is measured, with the exception of fatalities. The variable FT only marginally misses the .10 level.

In Table 3 the results for commuter airlines indicated a marked difference. In all variables and measures of safety there is significant difference in the means of the two periods, exceeding the .95 level of confidence in all cases. Examination of the means suggests that in all measures employed the post-strike period is safer than before the strike.

Table 4 shows the results for "on-demand", non-scheduled air taxis. In only one case, total accidents, is there a significant difference in safety, the post period being safer than the pre.

Table 5 provides somewhat mixed results for general aviation. Both TA and FT are significant at the .10 level, with the mean of total accidents declining, and that of fatalities declining. Interestingly, in four of the five cases, commuter airlines being the exception, the mean number of fatal accidents is greater in the period after the strike than before; none of the differences being statistically significant, with the exception of commuter airlines, at any acceptable level.

An examination of the relationship between safety measures and departures should prove enlightening regarding controller impact. An argument could be proffered that departure and landings are the most dangerous segment of flight times, safety wide, for aircraft, and hence are crucial times when the role of the air traffic controller comes into play. Unfortunately, data was not available for all groups for any safety measures related to departures, but, data was available for the commuter airline on total accidents per departure. This figure would also implicitly include landings, since each departure would require a subsequent landing. These data are presented in Table 6. These results again indicate that the commuter airline sector is safer post than pre period. The results are significant at the .006 level and the mean values have fallen.

III. CONCLUSIONS

The results of the brief analysis suggests several conclusions. First, our analysis of the FAA data indicates that the PATCO strike and actions taken by the Reagan Administration following the walkout

had no significantly adverse effect on airline safety. Those individuals who contend that the general level of safety has deteriorated, and deteriorating, would appear to be erroneous in light of the data analyzed. One factor that conceivable may have contributed to this situation, or at least contributed to offsetting any potential adverse effects, is technological change in air safety. Newer types of radar have been installed, as well as new electronic aids to assist the air traffic controllers in their work. No attempt has been made to quantify this effect.

The second conclusion, and one that runs contrary to what has appeared in the media of late, is that the commuter air segment of the airline industry is safer in the post-strike period than before.² In fact, it is the only category that showed a significant improvement in *all* measures of safety. This is in spite of the increasing number of firms and aircraft now in existence, and is perhaps the most surprising result of the study.

One conclusion that can be reached as a result of this brief examination of aviation data is simply that analysis should be conducted before conclusions are reached. Safety, in particular, is an area in which opinions by professed "experts" are of minuscule use in determining the true state of events. In such an emotional area where the potential risks are great, the need for adequate research prior to conclusions and sweeping generalizations is acute.

In short, available data tends to suggest that reduction in air controllers levied no material impact on accident occurrences in aviation. Air commuter operations, moreover, are statistically more "safe" than generally perceived. But, before any meaningful conclusions can be reached, more exposure, metrological, and "incident" data needs to be gathered and analyzed. In terms of the impact of the PATCO strike, however, the analysis suggests no impact; yet the number of accidents such as "near misses" and safety citations will be more meaningful in analyzing the overall aviation safety environment. In short, the discomfiting results of this manuscript remain preliminary in nature.

ENDNOTES

* Department of Marketing, Memphis State University, Memphis, TN.

** Center for Transportation Research, University of Arkansas, Fayetteville, AR.

¹ "Who Controls the Air," *Newsweek*, August 17, 1981, pp. 18-24, and "Turbulence in the Tower," *Time*, August 17, 1981, pp. 14-24.

² J. Richard Jones and Sheila I. Cocke, "A Performance Evaluation of Commuter Airlines" The Passenger's View," *Proceedings*, TRF, Vol. 22, #1 (Oxford, IN), Richard B. Cross Company, pp. 248-249.

**** Tables 4-6 were not included.**