

ISASI Rudolf Kapustin Memorial Scholarship Application Essay

Investigations – Do They Really Make a Difference?

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Introduction

Aircraft accident investigations are critical processes which provide findings, recommendations, and statistics that can enhance safety in an industry which thrives on the rewards of assuming ever greater risk. Although investigations have been extremely valuable in reducing the accident rate over the past century, much of the vigour of the old days has been lost. The recent investigations of the past few decades have not been able to instigate the changes required to significantly improve aviation safety; the declining occurrence rate has plateaued.

Investigations are no longer making a significant difference.

So what needs to change? Air accident investigators work hard, really hard, and in multiple instances they place their societal duties ahead of their families. This effort and dedication deserves showcasing and public exhibition; not for fame or glory, but in order to stimulate greater action towards improving aviation safety. Episodes of “Air Crash Investigation” [1] or “Mayday” [1] are simply not enough. There is an urgent requirement for accident investigators and their overarching safety boards to develop methods which better invoke government and industry action. This “need to act” can be instigated through five key transformations in the investigation process: Enhanced Communication of Existing Statistics, Standardization of Statistics across Borders, Emphasizing the Need to Implement Recommendations, Quantifying the Costs of an Accident, and Marketing Prevention.

1) Enhanced Communication of Existing Statistics

Statistics are important; in many circumstances they are relied upon as the only objective evidence to enforce an argument for change. Unfortunately, the current method of communicating accident statistics is ineffective in producing change: the statistics do not invoke the urgent requirement to immediately address an issue; instead, the statistics do the opposite and encourage passivism. For example, a common method used to present accident statistics is a graph, similar to Figure 1, accompanied by a statement such as: “over the past decade there has been a significant downward trend in accident rates”. This does not portray an issue; this actually sounds good. Why would any action be required? The problem seems to be solving itself.

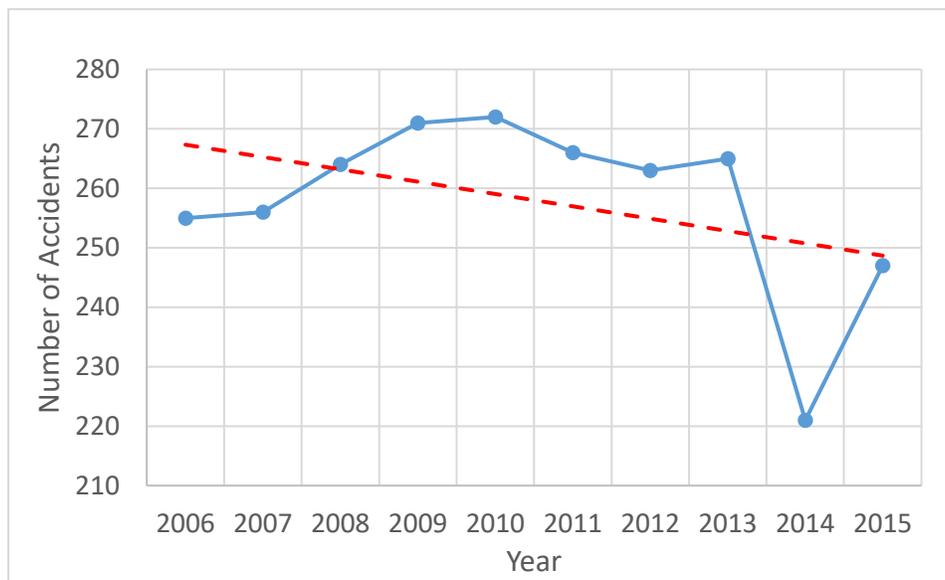


Figure 1: Accident Rate 2006 to 2015

Instead, investigators should communicate statistics in a manner which highlights an issue. The previous data could equally be presented using a more holistic perspective; such as the graph in Figure 2 accompanied by the statement: “while history has indicated a significant reduction in accident rates, the progress within the past two decades has plateaued despite vast improvements in the knowledge and technology available to defend against such events”. This viewpoint

highlights an actual problem and even identifies the presence of a solution. When presented in a more compelling context, statistics provide much stronger evidence for taking the actions required to improve aviation safety.

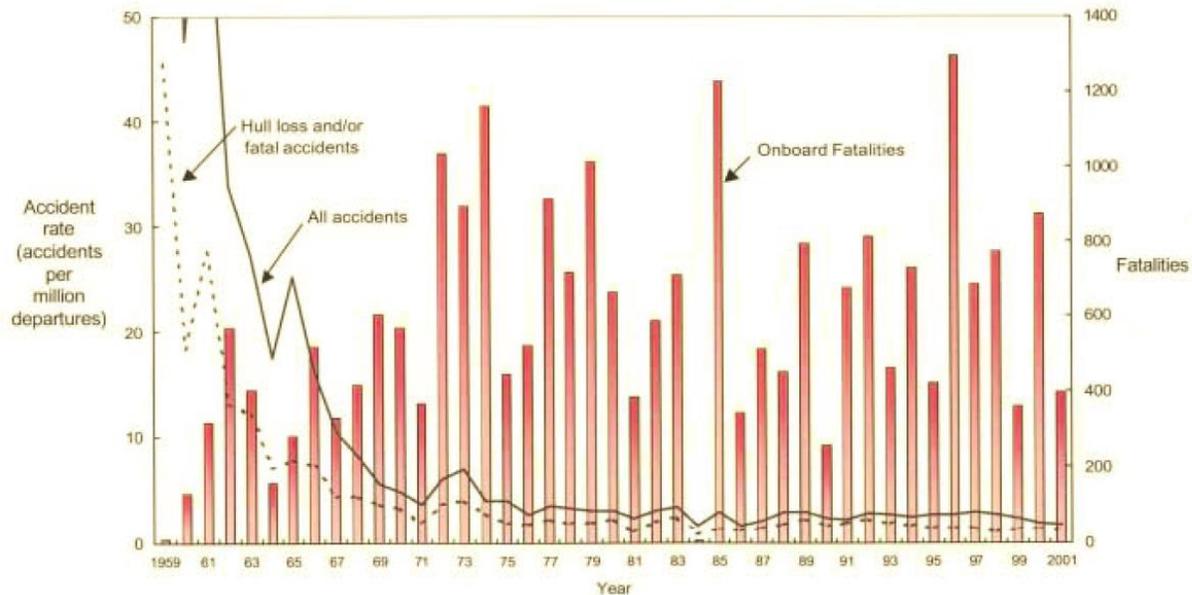


Figure 2: Accident Rate 1959 to 2001 [2]

2) Standardization of Statistics across Borders

When analyzing and addressing safety, a common question is: how does our performance compare with others? [3] If one nation has a low occurrence rate, it is likely that other nations (and their industry organizations) will be interested in examining this high performance so they can emulate best practices and reduce their own occurrence rate. This cannot take place if each nation is unable to effectively compare occurrence statistics (admitted as an issue by the Transportation Safety Board of Canada [3]). To facilitate the process of comparative growth, investigators should strive to establish an international standard for documenting and reporting aviation occurrence statistics. This would not impose restrictions on the statistics which nations can collect and report, rather, it would simply establish a requirement to report a set of statistics

which can be commonly understood across all borders. As an additional benefit, developing an international standard would expand the population of data available for statistical examination; presenting opportunities to improve accuracy and explore new analytical territory.

3) Emphasizing the Need to Implement Recommendations

A key outcome of any accident investigation is the recommendations addressed to various parties. Nonetheless, these recommendations are virtually useless if not acted upon. To encourage action, investigators must take all steps possible to emphasize the importance for effective and efficient recommendation implementation. To address this, one common method is to develop a “Watchlist” [4] or “Most Wanted List” [5] and then lobby both industry and the government accordingly. However, “watching” or “wanting” does not create a sense of urgency to act. Instead, urgency to act can be stimulated through the development of a public alarm mechanism. This “alarm” would sound based on the varying implementation status of recommendations. Examples of such mechanisms include the “Doomsday Clock” [6] and the Defence Readiness Condition of the United States Army (a.k.a. “DEFCON”) [7]. These easy-to-understand and media-hyped mechanisms are effective in alerting the public about important information; such as the probability of an impending aviation occurrence. The outcome of such heightened public awareness is an increased pressure on industry and government to take action (eventually downgrading or resetting the alarm). As an experienced and objective third-party, investigators and their associated safety boards are in an excellent and informed state to regulate and implement such alarm mechanisms.

4) Quantifying the Costs of an Accident

One of the main reasons that available technological and knowledge based solutions are not implemented by industry, or mandated by government, is due to an inadequate understanding

of the financial costs associated with an accident. It is quite possible that multiple solutions would be implemented if there was greater awareness of these costs. To assist in this effort, investigators and their safety boards should take steps to document and publicize objective information regarding the costs associated with an accident. Such data can include: the costs to the state (including emergency medical services, search and rescue, public relations, official visits to the crash site, accident investigation, and cleanup), as well as the costs to the operator (including capital loss, increased operating expenses, occurrence expenses, and lost revenue). Estimates of these costs can be obtained through examining historical data, requesting accounting information from accident operators, and by using reasonable approximations. Once analyzed, the financial data can be categorized according to aircraft type and presented alongside accident statistics. If government and industry understand that there is a multi-million dollar bill associated with accidents, it will be much more difficult to argue that safety based changes are “too costly” to implement. The cost of an accident is always more than the cost of its prevention.

5) Marketing Prevention

One of the saddest findings of an accident is the inadequate presence of countermeasures which are currently available with modern knowledge and technology. This should not continue to be the case. To arouse action, a new statistic should be developed that clearly classifies whether or not an occurrence was reasonably preventable. This should be identified as an objective conclusion, within each accident report, accompanied by a suitable evidence-based explanation. This is not an occasion to assign blame, but rather a blunt and forceful opportunity to instigate action and achieve the “sole objective of [an] investigation” [8]: **prevention**.

Conclusion

The docile nature of implementing the changes recommend from recent accident investigations has been rumbled. Five key transformations are suggested to give the investigation process back its strength (i.e. the ability to inspire significant improvements in aviation safety):

- 1) **Enhanced Communication of Existing Statistics** advocates to the public that there are problems with aviation safety which compel immediate action.
- 2) **Standardization of Statistics across Borders** facilitates the comparison of safety records and the emulation of best practices; while also allowing for increased statistical accuracy and the potential innovation of new analytics.
- 3) **Emphasizing the Need to Implement Recommendations**, accomplished through “alarming” the public of an impending aviation occurrence, pressures industry and government to effectively and urgently address safety issues.
- 4) **Quantifying the Costs of an Accident** enables an improved understanding of the cost savings associated with proactive occurrence prevention.
- 5) **Marketing Prevention** (i.e. objectively reporting evidenced based conclusions regarding the preventability of accidents) re-installs the vigour required to instigate action and reintroduce a significant decline in the accident rate.

So...Investigations – Do they really make a difference? Well, it is up to investigators to decide.

References

- [1] "Mayday," Cineflix Media, [Online]. Available:
<http://www.cineflixproductions.com/shows/28-Mayday>. [Accessed 13 04 2017].
- [2] F. Scholz, "Statistics in Aviation - Celebrating 100 Years of Flight," [Online]. Available:
www.stat.washington.edu/fritz/Reports/Daytonnew0.pdf. [Accessed 12 04 2017].
- [3] *Government of Canada: Hous of Commons Standing Committee on Transport, Infrastructure and Communities - Meetings on Aviation Safety*, Ottawa, Ontario , 2017.
- [4] "Watchlist 2016," Transportation Safety Board of Canada , 31 10 2016. [Online]. Available:
<http://www.bst-tsb.gc.ca/eng/surveillance-watchlist/>. [Accessed 13 04 2017].
- [5] "2017-2018 Most Wanted List," National Transportation Safety Board , [Online]. Available:
<https://www.ntsb.gov/safety/mwl/Pages/default.aspx>. [Accessed 13 04 2017].
- [6] "Doomsday Clock Timeline," Bulletin of the Atomic Scientists , 2017. [Online]. Available:
<http://thebulletin.org/timeline>. [Accessed 13 04 2017].
- [7] "DEFCON," Wikipedia , 13 04 2017. [Online]. Available:
<https://en.wikipedia.org/wiki/DEFCON>. [Accessed 13 04 2017].
- [8] "Annex 13 To the Convention on International Civil Aviation: Aircraft Accident and Incident Investigation," International Civil Aviation Organization , [Online]. Available:
www.emsa.europa.eu/retro/Docs/marine_casualties/annex_13.pdf. [Accessed 13 04 2017].