

192 Jason M. Demagalski, Don Harris and James E. Gautrey

- Federal Aviation Administration (1985). *Injury Criteria for Human Exposure to Impact (AC 21-22)*. Washington DC: US Department of Transportation.
- Hart, S.G. and Staveland, L.E. (1988). Development of a Multi-dimensional Workload Rating Scale: Results of Empirical and Theoretical Research. In, P.A. Hancock and N. Meshkati (Eds) *Human Mental Workload*. Amsterdam: Elsevier.
- Maine, T., Schaefer, P., Burken, J. and Burcham, F. (1994). Design Challenges Encountered in a Propulsion-Controlled Aircraft Flight Test Program. In, 30th *AIAA/ASME/SAE/ASEE Joint Propulsion Conference (AIAA paper 94-3359)*. Indianapolis, IA, June 27-29.
- McRuer, D.T., Hoffman, L.G., Jex, H.R., Moore, G.P., Phatak, A.V., Weir, D.H. and Wolkovitch, J. (1968). *New Approaches to Human-Pilot/Vehicle Dynamic Analysis (AFFDL-TR-67-150)*. Dayton, OH: Wright Patterson AFB.
- National Transportation Safety Board (1990). *Aircraft Accident Report: United Airlines Flight 232, McDonnell Douglas DC-10-10, Sioux Gateway Airport, Sioux City, Iowa, July 19, 1989. Report PB90-910406, NTSB/AAR 90/06 (November)*. Washington DC: Author
- Wickens, C.D. (1992). *Engineering Psychology and Human Performance (2nd Edition)*. New York: HarperCollins.

Acknowledgements

The contribution made by Roger Bailey, the Chief Test Pilot in the College of Aeronautics, Cranfield University, in the design and development of the emergency flight control display system, is gratefully acknowledged.

Human Factors and Aerospace Safety 2(2), 193-195
© 2002, Ashgate Publishing

CRITICAL INCIDENTS

Human error after all

Sidney Dekker
IKP, Linköping Institute of Technology, Sweden

September 11 has changed everything. Or so the general belief goes. The brutal use of commercial airliners for the purpose of terrorist attacks has opened a window onto a reality that previously belonged solely to fiction books by Tom Clancey. As the events of September 11 recede into the past, their implications are pushing us forward, into a new interpretation of world order, where threats to aerospace safety, and tactics to forestall them, have shifted dramatically. While the nature of the threat facing us today may have been brought into clearer focus by September 11, its source eludes us and we do not know which pathway to success it will attempt to pursue next time. This affects our investments, as aerospace community, in protection against failure. The chief threat to safety was once 'human error', and though an elusive source of failure, we learned—if haphazardly and stumblingly—how to invest in countermeasures and buffers against it. But, as far as I know, 'human error' has not ever been cited as responsible for four complete hull losses and thousands of lives in one day. Terrorism now has. It is likely that because of this, aerospace human factors research agendas may change in emphasis and direction, as aviation safety funding sources demand greater attention to the more pedestrian world of passenger and baggage checking.

Human error after all

But human error never goes away. And by this I do not mean the phenomenon of performance deviations as they exist out there in operational worlds (for surely those won't go away). No, by this I mean our judgment, as a community, as a society, of what lies behind failure, of what causes failure. As people started digging through the rubble of the September 11 events, removing stone by stone, slab by slab, body by body, they undoubtedly kept asking 'why?' The answers that

Correspondence: Dr Sidney Dekker, Centre for Human Factors in Aviation, IKP, Linköping Institute of Technology, SE - 581 83, Linköping, Sweden or sidde@ikp.liu.se

kept returning in the immediate weeks after the disaster were deeply muddled and diffused, pointing to that new world order, where repercussions from irregularities and injustices thousands of miles away and hundreds of years into history would suddenly drive a stake into the financial heart of Western society; where possible blowback from intelligence interventions in Central Asia more than a decade and a half old would prove to have grown out of control.

But such diffuse explanations of failure, that extend and multiply cause *ad infinitum*; that fade into the dust of distant lands and ill-understood history, are complex. Not only are they complex, they are deeply troubling, for they force responsibility on Western society itself, as it were European nations who carved up the carcass of the Ottoman Empire less than a century ago, into the countries that now produce their oil and their terrorist threat.

Faced by a rising body count in Lower Manhattan, on the Virginia bank of the Potomac and in that field in Pennsylvania, the complex and foggy explanations for 'why?' may themselves begin to crumble, victims of a loss of patience and a desire for immediately visible countermeasures. This is where explanatory tension appears. From the diffused account, that spreads out from the rubble to organizational factors, cultural conditions and the poverty and frustration of whole groups of young men and women in a newly interconnected world, we move back to a very localized account, and account that is more comfortable, more understandable; where the source of failure can be pinned down in a very limited space-time volume, and, better still, in one single human action or inaction (see Galison, 2000).

On October 4th, less than a month after the attacks, that single human inaction had been found in the rubble. The flaw was located within the Head of Security at Boston Logan Airport, from where two of the suspects hijacked their respective Boeing 767's. It was determined that the attacks occurred on his watch, and so it became time for him to leave his job. The governor of Massachusetts, probably under pressure to help construct a cause where none could otherwise be found, fired him. The events of September 11 had once again been the result of human error—if only the Head of Security had done his job well, this would never have happened. The Head of Security was ejected from the aviation system, never to cause trouble again. The bad apple had been found and banished from the basket, the system was once again safe and now we could all fly again—safely. Or so the Chief Executive pleaded with the no-longer-flying-public on a sunny day between idly parked airplanes at Chicago O'Hare.

This, in some sense, is the sick perpetuation of human error research. Even if we, as researchers, have no inclination whatsoever to label 'human error' as causal, other people will readily do so for us. 'Human error' becomes the product of political pressure.

Yet the media did not seem to buy it. Usually a protagonist for simple and limited accounts of failure; a subscriber to the usefulness and explanatory exhaustiveness of the label 'human error', the media did not buy the localized explanation this time. It was, after all, pretty obvious: the Head of Security at

Boston Logan, like all U.S. airports, had precious little say over the checking of bags and passengers. His job mandate focused on security of the airport's real estate—runways, buildings, perimeter fences. The checking of bags and passengers was the job of the airlines, who delegated it to a limited number of outside security companies. The personnel turnover in these companies reached 200% per year at Boston Logan alone, where a sizable percentage of security workers (all on low hourly wage) were not even born in the US, some only having been there a year or less. Logan, by the way, was not the only airport from which later hijacked aircraft took off, so what about the other Heads of Security? And then of course, there was the ultimate irony: it was not at Boston Logan where the two suspects slipped through security first, but at Portland, Maine. Aviation Week and Space Technology (September 24, 2001, p. 22) showed a picture, a video still, of the two men striding through security at Portland—confidently, if relieved. The date was September 11, the time was 05:45 am. Their destination was Boston Logan. So the localized explanation did not hold water—as it never does.

But the tension between localized and diffused accounts will continue (Galison, 2000). Other 'Eureka parts' (as the chief investigator of TWA 800 called it) or, for that matter, 'Eureka people' will be identified as *the* seed of destruction, and presented as our greatest hope for directing countermeasures against repetition. As Snook (2000) and Galison (2000) and other researchers appear to agree, this search for *the* nucleus of failure, for *the* source from which all evil emanates, is not necessarily without purpose. The purpose, however, is not to explain failure, because that will never work. The purpose is instead to keep a nightmare at bay. The events of September 11, like all crashes, open a crack of a window onto a world we would rather not know about. A world in which there *is* no single cause, in which all causes are themselves effects of other causes, in infinite perpetuity; a world in which failure is not the result of egregious misbehaviour or complacency, but where it instead follows from normal people doing normal work in normal organizations; a world in which the failures that confront us are the necessary by-product of the way we organize our work and distribute our resources; a world that may be a much less orderly and much more dangerous place than we would ever want to know. With the pursuit and identification of a eureka part, or eureka person, we lean against that window onto that world, we lean against it with all our might and against pressures to acknowledge what goes on at the other side. To keep that nightmare at bay, we struggle to slam it shut.

References

- Galison, P. (2000). An accident of history. In P. Galison, and A. Roland (Eds.) *Atmospheric flight in the twentieth century*. Dordrecht, NL: Kluwer Academic Publishers. pp. 3-44.
- Snook, S. (2000). *Friendly fire: The accidental shootdown of US Black Hawks over Northern Iraq*. Princeton, NJ: Princeton University Press.