

Management of behavioural risk in the first line of defence

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A preliminary remark

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: June 7, 1979

UNITED AIR LINES, INC.
MCDONNELL-DOUGLAS DC-8-61, N8082U
PORTLAND, OREGON
DECEMBER 28, 1978

SYNOPSIS

About 1815 Pacific standard time on December 28, 1978, United Airlines, Inc., Flight 173 crashed into a wooded, populated area of suburban Portland, Oregon, during an approach to the Portland International Airport. The aircraft had delayed southeast of the airport at a low altitude for about 1 hour while the flightcrew coped with a landing gear malfunction and prepared the passengers for a possible emergency landing. The plane crashed about 6 nmi southeast of the airport. The aircraft was destroyed; there was no fire. Of the 181 passengers and 8 crewmembers aboard, 8 passengers, the flight engineer, and a flight attendant were killed and 21 passengers and 2 crewmembers were injured seriously.

✖ The National Transportation Safety Board determined that the probable cause of the accident was the failure of the captain to monitor properly the aircraft's fuel state and to properly respond to the low fuel state and the crewmember's advisories regarding fuel state. This resulted in fuel exhaustion to all engines. His inattention resulted from preoccupation with a landing gear malfunction and preparations for a possible landing emergency.



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A preliminary remark: "Flight 173" versus "Flight 1549"



United Airlines Flight 173 crew was making an approach to the Portland International Airport on the evening of Dec 28, 1978 (with a fuel reserve for 45+20 minutes) when they experienced a landing gear light abnormality. The captain decided to enter a holding pattern and focused on existing protocols for such a problem for an hour, ignoring repeated hints from the first officer and the flight engineer about their dwindling fuel supply. Only when the engines began flaming out did he realize their dire situation. They crash landed in a wooded suburb of Portland, Oregon, over six miles short of the runway. Of the 189 people aboard, two crewmembers and eight passengers died



Shortly after Flight 1549 took off from LaGuardia Airport, a flock of geese flew in both engines, causing immediate engine failure only two thousand feet over ground. All emergency checklists and technical trainings to confront engine failure were premised on the assumption that such failure would transpire a cruising altitude above twenty thousand feet – an incapacitating event so low was unprecedented. Without an existing procedure and without time to "command" the crew, everybody from the captain to the crew staff reacted "heuristically" but according to the ideas of Crew Resource Management, turned the plan, prepared the passengers and splashed into the Hudson River. Everyone survived.

Sources: <http://goflightmedicine.com/united-airlines-173/>; <http://edition.cnn.com/2016/08/11/us/hudson-landing-archive-crew-reaction/>

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Behavioral Risk Management in other Industries: Lessons to be learned by financial services

- N.F. Pidgeon elaborated about "Safety culture and risk management in organizations" in 1991 (with a special regard to the aftermath of the Chernobyl disaster)
- R.L. Helmreich and H.C. Foushee discussed "Why crew resource management? Empirical and theoretical bases of human factors in aviation" in 1993
- R.M. Yandrick wrote about "Behavioral Risk Management: How to Avoid Preventable Losses from Mental Health Problems in the Workplace" in 1996 (healthcare).
- Alan Rozanski discussed "The Epidemiology, Pathophysiology, and Management of Psychosocial Risk Factors in Cardiac Practice" in 2005.
- B.S. Williams analysed "Heuristics and Biases in Military Decision Making" in 2010.
- Atsuyuki Suzuki analysed "Managing the Fukushima Challenge" after the Fukushima Daiichi accident of 2011 in 2014

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Conduct Risk versus Behavioral Risk in Financial Services

The FSB agreed in early 2015 ... to reduce **misconduct risk**...

- whether the reforms to incentives, for instance to risk governance and **compensation** structures, are having sufficient effect on reducing misconduct and whether additional measures are needed to strengthen disincentives to misconduct;
- the progress of ongoing reforms to benchmarks, and whether steps are needed to improve **global standards of conduct in the fixed income**, currency and commodities (FICC) markets; ...

"Code of **Conduct**" of the ACI (2016):

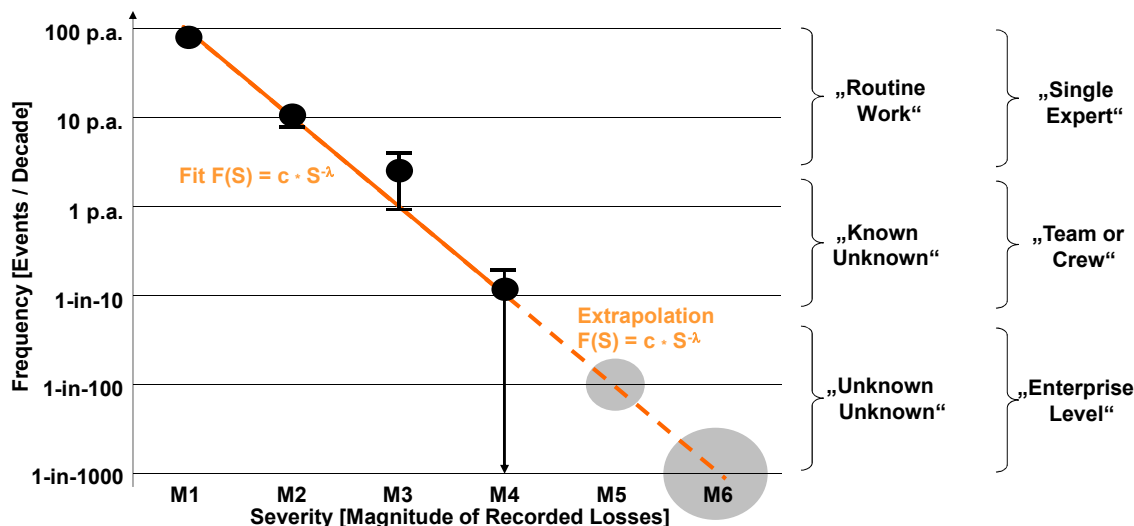
- "... universal code of conduct, with comprehensive guidelines and best practices which span the whole of Fixed Income, Currency and Commodity markets best practice, is used by more institutions in more countries, than any other in the world. It covers a broad range of conduct issues, from the detailed processes of the back office right through to the up-to-date functions of the electronic platforms utilised by the front office. It is cited as the best of the conduct codes in providing education, process, and a **moral compass for guidance**, to which all professionals can adhere."

(see also: Guy Debelle "The Global Code of Conduct for the Foreign Exchange Market", 30.1.2017)

Behavioral Risk – due to:

- unconscious component in human behavior and human decision making
- either of one person or of groups
- including
 - preoccupation (see Flight 173)
 - selection of information
 - illusory correlation
 - overconfidence
 - anchoring
 - groupthink/herding
 - et cetera.

Statistics (of Operational Risk) versus Human Experience und Communication



Source: Udo Milkau "Adequate Communication about Operational Risk in the Business Line", The Journal of Operational Risk, Vol. 8.1, Spring 2013

How Are Decisions Made?

Time frame	Short-term business with high volume	Long-term and/or insufficient statistics	Longer than human experience
Operational risk	frequent events	rare events	unexperienced
Decision making during routine work and increasingly as exception to nearly automated processes (e.g. "autopilots")	... under conditions of bounded rationality and/or time pressure	... in totally unexpected situations of complex interactions and/or dynamics
Mental methods	logic / statistics	heuristics (rules of thumb)	adoption to surprises
Tools (examples)	protocols / procedures	fast-and-frugal choices	experiments
Key requirements	training	learning from failure	end-to-end information
Objective	constant vigilance	agility and flexibility	leadership
Behavioral risk	believe in design, bias and mental underload	delegation and misconception of "risk"	simplification, bias and mental overload

Bias versus Heuristics

Tversky and Kahneman:
"Judgment Under Uncertainty" (1984)
focus on the

- **negative effect** of biases on decision making due to ignoring available information,
- but admit that heuristics can be helpful as shortcuts in such situations where prior experiences are available

Gigerenzer and Gaissmaier:
"Heuristic Decision Making" (2011)
focus on the

- **positive use** of heuristics in situations with incomplete information and/or under time pressure.
- This perspective is aimed on Simon's problem of decisions under bounded rationality (Simon, 1955 and 1987).

A Practitioner's Perspective

- **Training and education of the workforce** with open communication about behavioral risk in daily business (see e.g.: Crew Resource Management (CRM) in commercial aviation)
- **Avoiding “muda”, “mura”, and “muri”** (Ohno, 1988, Shingo, 1989) by proper design of the workplace and working conditions
- **Establish leadership** for situations with exceptions, problems, disruptions et cetera and accepted those events as reality to prepare for agility and flexibility **to make decisions under uncertainty** by heuristics
- **Building a “team of teams”** (McChrystal, 2015) with established processes to distribute information about situation, changes (e.g. software updates!), problems in the last shift et cetera and, respectively, with rapid escalation

Conclusion: Conduct Risk versus Management of Behavioral Risk

