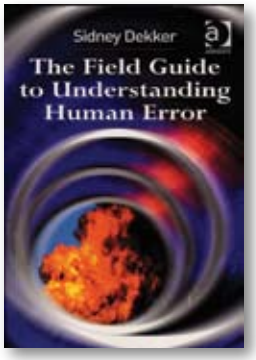
When Errors 'Make Sense'

A new book argues that human errors seemed correct at the time they were made and provide insight into deeper, systemic problems.



BOOKS

The Field Guide to Understanding Human Error

Dekker, Sidney. Aldershot, England: Ashgate, 2006. 252 pp. Figures, tables, references, index.

Sidney Dekker makes the case for a paradigm that is increasingly accepted by human factors specialists and accident investigators, although perhaps less by aviation management, the news media and the public. Rather than perceiving human error as a cause of accidents, which Dekker calls "the Old View," the "New View" sees it as a symptom of underlying trouble in the system — the organization, the rules and the procedures.

Traditionally, when a human error led to an incident or accident, the tendency was to look for carelessness, procedural violation or lack of motivation. But, says Dekker, people in safety-critical positions, such as pilots, know only too well the possible consequences of complacency or failure to follow procedures. They typically do not make errors because they are daydreaming or have a bad attitude. What is found in retrospect to have been an error seemed reasonable at the time it was made.

"It *has* to make sense, otherwise they would not be doing it," the author says. "So if you want to understand human error, your job is to understand *why* it made sense to them. Because if it made sense to them, it may well make sense to other practitioners too, which means that the problem may show up again and again."

How can an error seem to be the right move to a skilled, rational pilot? Dekker says that the pilot works within a system, and no system exists purely to be safe. Its goal is to make a profit or achieve other ends. Dekker says, "Besides safety there are multiple other objectives: pressures to produce; to not cost an organization extra money; to be on time; to get results; to keep customers happy. People's sensitivity to these objectives, and their ability to juggle them in parallel with demands for safety, is one reason why they were chosen for their jobs, and why they are allowed to keep them."

So pilots are expected to put safety first, but also to make trade-offs in practice. Moreover, says Dekker, the trade-offs are among unevenly calculable factors: "Goals other than safety are easy to measure (How much fuel or time will we save? Will we get to our destination?). However, how much people borrow from safety to achieve these goals is very difficult to measure. … The trade-offs need to be made under much uncertainty and often under time pressure."

Accidents do not result from human shortcomings in otherwise well-functioning processes, Dekker says; on the contrary, they result from people doing their best to create safety amid a patchwork of technologies, regulations,

procedures and goals that does not automatically ensure it.

According to the New View, "If you want to learn anything of value about the systems we operate, you must look on human errors as a window on a problem that every practitioner in the system might have; a marker in the system's everyday behavior, and an opportunity to learn more about organizational, operational and technological features that create error potential."

The position Dekker argues for implies that some standard fixes for human error are unproductive, or even counterproductive. For example, he says:

- "Adding or enforcing existing procedures does not guarantee compliance. A typical reaction to failure is procedural overspecification — patching observed holes in an operation with increasingly detailed or tightly targeted rules that respond specifically to just the latest incident. But procedural overspecification is likely to widen the gap between procedures and practice, rather than narrow it."

- "We often think that adding just a little bit more technology will help remove human error. After all, if there is technology to do the work, or to monitor the human being doing the work, then we have nicely controlled the potential for error. But more technology does not remove the potential for human error. It merely relocates or changes it."

- "If you hunt down individual people for system problems, you will quickly drive real practice underground. You will find it even more difficult to know how work really takes place. Do you want to wait for an accident to reveal the true picture?"

The Field Guide to Understanding Human Error leads the reader through many other corollaries of his view that errors tend to point to flaws in the system rather than flaws in individuals.

REPORTS

European Action Plan for Air Ground Communications Safety

European Organisation for the Safety of Air Navigation (Eurocontrol). Edition 1.0, May 2006. 67 pp. Tables, references, appendixes. Available via the Internet at <www.eurocontrol.int/safety/gallery/content/public/library/AGC_action_plan.pdf> or from Eurocontrol.*

This action plan, developed by the combined efforts of several organizations including Flight Safety Foundation, is designed to help reduce the number of incidents in which miscommunication between air traffic control and aircraft pilots is a factor. It is particularly aimed at lowering the number of level busts — deviations from the assigned altitude — and runway incursions.

The plan results from studies and surveys to identify common problems, and is presented in the form of recommendations, best practices and resources for civil aviation authorities, controllers, pilots, aircraft operators and others. Briefing notes are categorized under general, call sign confusion, loss of communications, blocked transmission and radio discipline. Other resources, such as Eurocontrol, U.K. Civil Aviation Authority and International Civil Aviation Organization publications, are listed.

CASCADE Stream 1 Real-Time Simulation

Trzmiel, Aymeric; Rognin, Laurence. Eurocontrol. EEC 404. February 2006. 131 pp. Figures, tables, annexes, references. Available via the Internet at <www.eurocontrol.int/eec/public/standard_page/2006_report_404.html > or from Eurocontrol.*

The CASCADE (Cooperative ATS [Air Traffic Services] Through Surveillance and Communication Applications Deployed in ECAC [European Civil Aviation Conference]) program aims to reduce air traffic management delays, increase safety and increase efficiency. An experiment conducted in May and June 2005 involved three CASCADE Stream 1 services to controllers: auto-transfer — that is, automatic transfer of aircraft control to the next sector, pilot preferences downlink (PPD) and aircraft-derived data for ground tools (ADD).

The experiment assessed the controllers' familiarization with the services, the acceptance

of the services and the effect of the services on controller workload, situational awareness, safety and capacity.

Researchers found that fewer than 10 percent of controllers in the experiment used the auto-transfer function, while "the PPD and ADD services were well appreciated and considered as useable by most of the controllers," the report said.

In general, the CASCADE Stream 1 services neither increased nor decreased the controllers' workload. The services' effect on situational awareness was positive but limited. Controllers perceived PPD and ADD services as a potential safety benefit, but the auto-transfer service was considered a source of risk if the transfer occurred at an inappropriate moment. The benefits of data link for reducing communication frequency usage were still observed during the operation of CASCADE 1 services.

Controllers suggested improvements both to the simulation environment and to the CASCADE Stream 1 services interface. They recommended, for instance, clarifying the distinction between the visual representation of aircraft with and without data link capability.

WEB SITES

International Cabin Safety Research Technical Group Aircraft Accident Database, <www.rgwcherry.co.uk/html/accidentdatabase.html>

The database is sponsored by Transport Canada, the U.K. Civil Aviation Authority and U.S. Federal Aviation Administration (FAA) and maintained by R.W. Cherry & Associates, United Kingdom.

The Web page says, "The database currently contains information on 3,376 accidents, and of these, textual information is available on 1,036. The database was initially intended to carry out analytical work aimed at improving occupant survivability. More recently the scope has been expanded, and it now includes information on non-survivable accidents."

Data are obtained primarily from accident investigation authorities on transport category

passenger aircraft (with 19 or more passenger seats) and cargo aircraft certificated under U.S. Federal Aviation Regulations Part 25 requirements or equivalent non-U.S standards. Individual accident records contain typical accident data information (e.g., aircraft type, operator and occupant statistics).

Records may contain more specific information (e.g., fire-, water- or impact-related, fuselage ruptured, fuel tank ruptured, evacuation). Records can be made to appear in different screen views and can be exported into other formats, such as spreadsheets.

The database must be downloaded to the user's computer. Downloaded files contain textual and numeric data, a glossary, diagrams and photographs. Periodic updates are available.

Instructions for downloading the software, stored files and optional picture files are on the Web site. No technical support for the database is available.

The sponsors say, "The database is freely available for use as a resource for improving aviation safety." They suggest that "any conclusions derived from the database [be] independently verified. In particular, analyses based on the database selection criteria can lead to misleading conclusions and should be independently confirmed."

The database is an outgrowth of the Cabin Safety Research Technical Group, whose activities are described at the FAA's Web site,

<www.fire.tc.faa.gov/cabwg.stm>. This Web site provides an alternate link to the accident database.

Transport Canada Aviation Safety Publications and Videos, <www.tc.gc.ca/civilaviation/systemsafety/pubs/menu.htm>

Transport Canada (TC) develops and administers policies, regulations and services for the Canadian transportation system. Transport Canada, Civil Aviation (the civil aviation authority) conveys a significant amount of aviation knowledge through numerous publications, regulations and technical information appearing on the TC Web site.

Available to pilots, flight crew, maintenance technicians, instructors, passengers and others in the aviation community are posters, brochures, educational packages, videos and reports. The specific Web site discussed here presents a categorized list of these materials.

By selecting entries within categories, users are linked to product descriptions, availability and accessibility. Some materials are free and may be viewed on line or downloaded to the user's computer. Some materials require purchase. Several examples are as follows:

- The category *Aviation Safety Videos* opens to a collection of videos for purchase with titles such as "Plane Talk on Ice" and "The Human Factors in Aviation Maintenance."

- The *Posters* category lists titles (e.g., "Everything Moves at an Airport. Be Aware! Runway Incursions Are Real!") that are available for instant downloading.
- A multi-media kit, "Crew Resource Management," appears under the category *Educational Packages* and comprises a video, CD with slides, participant's workbook and facilitator's notes.

Product descriptions may not include dates of production or publication, but some items are flagged as being new or updated. The information is intended to provide continuing value.

REGULATORY MATERIALS

Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

U.S. Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5345-42E. May 8, 2006. 38 pp. Figures. Available from FAA via the Internet at <www.airweb.faa.gov>.

Programs for Training of Aircraft Rescue and Firefighting Personnel

U.S. Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5210-17A. April 28, 2006. 14 pp. Appendix. Available from FAA via the Internet at <www.airweb.faa.gov>.

SAE Documents to Support Aircraft Lightning Protection Certification

U.S. Federal Aviation Administration (FAA) Advisory Circular (AC) 20-155. April 28, 2006. 2 pp. Available from FAA via the Internet at <www.airweb.faa.gov>.

Airspace Flow Program

U.S. Federal Aviation Administration (FAA) Advisory Circular (AC) 90-102. May 1, 2006. 6 pp. Available from FAA via the Internet at <www.airweb.faa.gov>. ●

Source

* Eurocontrol
96, Rue de la Fusée
B–1130 Brussels
Belgium

— Rick Darby and Patricia Setze