

The simple genius of checklists

Boeing's experience using checklists is helping many other professions

By Tom Brabant

A heart surgery gets under way in a busy Boston hospital. A midwife in a remote African village delivers a baby at a primitive medical clinic. A Boeing 747 takes off from Chicago's O'Hare airport.

All these tasks—each requiring sound judgment and precise execution—reflect the expertise of a Boeing Commercial Airplanes team and its innovative work with checklists.

The Flight Technical & Safety group, part of Boeing Training & Flight Services, has long worked with checklists, a concise list of

tasks pilots use to ensure critical functions are performed, even in emergency situations. But now, the recognition that checklists can increase success whenever critical tasks are being performed has some of the world's most vital professions looking to Boeing as a leader in their checklist compilation, structure and use.

"People in other industries find that in one meeting with Boeing they can benefit from our decades of experience," said Dan Boorman, electronic checklist procedure manager and a Technical Fellow. "There is a trend that recognizes checklists as a tool. A light bulb definitely has come on."

Along with his primary responsibilities, Boorman is the contact for organizations outside of aviation that want to benefit from checklists. He has worked with the FBI, the American Society of Radiation Oncologists, Northwestern Memorial Hospital in Chicago and the Washington State Hospital Association.

One of the most important beneficiaries of Boeing's checklist knowledge is the World Health Organization. Using ideas learned in part from Boorman and the Flight Technical & Safety team, a study of eight hospitals around the world showed that major complications for surgical patients decreased 36 percent after the introduction of checklists. Deaths fell by 47 percent. The World Health Organization now is creating and distributing checklists worldwide.

"What impresses me most is that these people are really questioning how things are done in their profession," Boorman said. "They are not defensive. They are willing to say that they are not getting it right."

The rationale for checklists is not an issue of aptitude, but the realization that complex activities can overwhelm. Professionals who

have skill, knowledge and experience are making mistakes, despite their expertise. A different strategy for overcoming failure is required.

But why are checklists so effective, and what differentiates a common "to do" list from a document that can save lives?

"A good checklist is precise and lists only critical steps in a concise way," said Erich Mahr, assistant chief pilot, Flight Technical and Safety. "They must be easy to use even in difficult and stressful situations."

Many programs at Boeing use checklists. Commercial Airplanes' 737 Engineering, for example, uses checklists to prevent errors within Lean manufacturing systems. Space and Intelligence Systems uses checklists throughout satellite development and production to help with compliance to established processes. Checklists used by these groups have proved they can be a substantial safeguard against errors.

As technologies continue to advance, whether within Boeing or in other industries, checklists can be a simple solution to help navigate complexity.

"I don't think the future will hold significant change to the concept of checklists," Mahr said. "Technology may change the methodology, but the principal remains the same. It is by far the best tool to contain errors." ■

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PHOTO: Boeing instructor pilot Gregg Pointon consults the electronic checklist in the 787 Dreamliner flight deck. ED TURNER/BOEING

Checklist factory

An unexpected call to Boeing's Dan Boorman two years ago from surgeon and author Atul Gawande started a working relationship that is helping medical patients around the world.

Gawande had been trying unsuccessfully to implement checklists in the operating room. Frustrated, he asked his research staff to find an expert in aviation. His team

found Boorman's published papers on checklist technologies and passed the information along.

By coincidence, Boorman, looking for reading material at an airport prior to a flight, purchased Gawande's book on medical ethics.

"One day my cell phone rang and it was Atul Gawande," Boorman recalled. "He introduced himself and I said, 'I know who you are, I just read your book.'"

Boorman later hosted Gawande at Boeing where he taught him about effective pilot checklists from aboard a 777 flight simulator.

The information that Gawande gleaned from his Boeing visit helped him create a valuable checklist for the operating room and was later published in his best-selling book *The Checklist Manifesto: How to Get Things Right*. The author pays tribute to Boeing's Flight Technical and Safety group by titling a chapter of his book "The Checklist Factory."

"It is a privilege to work with highly talented people from other fields critical to humanity," Boorman said. "It takes little time and energy, but it pays tremendous returns for all of us."

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