

FAA Human Factors Guide Hits The Spot

Human factors in maintenance training could become mandatory within five years. In the meantime FAA has issued a guide book on the subject, which is being greeted with some enthusiasm by the industry, writes **Chuck Weirauch**.



Image credit: Czech Airlines

The number of US airlines voluntarily incorporating human factors-based maintenance training programs is on the rise. This is due mainly to training managers being able to convince their top management that the additional expense is justified by estimations of fewer maintenance-related incidents after the program is in place.

However, a stronger motivation is on the horizon, with the revision of Federal Aviation Administration (FAA) Part 121 rules now underway. Once completed these rules will include requirements for the implementation of airline human factors (HF) maintenance programs that are similar to those stipulated by the European Aviation Safety Agency (EASA).

Ideally a voluntary approach would work in every case but, given the harsh economic climate, it has become even harder for airlines hit by financial troubles to justify the added cost of adding new elements to their existing training programs. Overall the Air Transport Association (ATA) predicts that, with stability in fuel prices, the industry should post up to \$2bn in net losses in 2006, followed by an industry-wide profit in 2007. According to some airline industry representatives, the FAA should push forward to establish the new HF rules, since a voluntary HF program is harder to justify economically.

Implement

To help training managers in the meantime to implement voluntary programs, FAA has and will continue to develop "a new wave in the FAA advisory role," according to Dr. Bill Johnson, the agency's chief scientific and technical advisor for human factors in aircraft maintenance systems. The first effort in this new direction is the 'Operator's Manual for Human Factors in Aviation Maintenance', an online guidebook that was completed and made available in October 2005. Since then, there have been a number of updates to the publication. The document can be accessed at <http://www.hf.faa.gov/opsmanual>.

"We at the FAA are doing our best to create and disseminate more human factors guidance materials," Johnson said. "We want to be sure that our guidance materials follow the '4 Cs' of communication rules taught in many HF classes - written communication must be correct, clear, complete, and concise. We believe that the Operator's Manual for Human Factors in Aviation Maintenance meets these criteria."

The new publication has six chapters, with five focusing on a topic considered vital to the success of a maintenance HF program. Chapter topics are: Event Investigation; Documentation;

Human Factors Training; Shift/Task Turnover; Fatigue Management; and Sustaining and Justifying an HF Program.

The manual was authored by a 10-member committee, whose members have expertise in maintenance HF. They represent not only the federal government but also airlines, aircraft manufacturers, academia and unions. They include: John Hiles, FAA Flight Standard Service – Aircraft Maintenance division; Roger Hughes, JetBlue Airways; Ernie Kiss, Aircraft Mechanics Fraternal Association, Northwest Airlines; Barbara Kanki, NASA-Ames; Terry Kleister, FedEx Express; Manoj Patankar, Saint Louis University; William Rankin, the Boeing Company; Dave Supplee, International Association of Machinists and Aerospace Workers, US Airways; Dennis Watson, Transport Workers Union, American Airlines; and Dr Bill Johnson.

Rather than a large and tedious document, the manual is designed to be a simplified guide. Each chapter explains why its topic is important to the maintenance HF program, then describes how to implement that element into the program. Next, the chapter outlines how to determine if that process is working and then provides authoritative references to the chapter topic.

"The authoring committee members all agreed that it is more difficult to write a short document than a long one," Johnson said. "The five key HF areas were identified from extensive deliberation by the committee over several months."

Johnson cited how all five key chapter areas of the manual fit together to provide for a successful HF maintenance program.

"If companies investigate and address errors" (chapter 1); "if company employees raise their diligence with respect to quality and use of procedures and documentation (chapter 2); if companies deliver HF training matched to their main performance challenges (chapter 3); if the industry continues to improve procedures and communication at shift changes (chapter 4); and if companies and workers address fatigue as a serious fitness for duty issue (chapter 5); then the industry would help ensure continuing safety in maintenance," Johnson said.

Reaction

Industry reaction to the new HF manual has been positive, Johnson said. However, the number of 'hits' on the agency's Web site links to the online document have been fewer than expected. But Johnson expects this number to increase when word gets around. Since the publication is available in Spanish and Mandarin as well as English, he expects interest from around the world as well as in the US.

Some feedback has indeed come from other parts of the globe, as well as the US. In a letter to FAA, Holger Beck, managing director for Lufthansa LAN (Latin America Network) Technical Training S.A., praised the manual's committee for keeping its language simple and its length manageable.

"This is, especially for the non-native English speaker, of the utmost importance," Beck wrote in his letter.

"I am convinced that the international aviation maintenance industry will use the document. After discussions with Dr. Bill Johnson, we decided that the manual would have best impact in Latin America if it was translated into Spanish. We have completed that translation and will offer the book, at no charge, to all of our training customers, including those in Spain. In addition, we invited Dr. Johnson to speak and present the book at our biannual safety and training-related maintenance conference late March. We plan to integrate the document into our HF training program. In summary, I believe that the manual takes the traditional 'government documents' to a new and improved level of clarity and usefulness. We - the industry - appreciate that."

The Operator's Manual for Human Factors in Aviation Maintenance also has applications for operators of FAA certified aircraft repair stations, both in the US and elsewhere under FAA Part 145, as well as those in the US that operate under EASA regulations. There are over 1,000 repair stations in the US that already must comply with EASA HF regulations, so already 20% in the country must have HF programs in place, Johnson said. In Part 145 there are specified maintenance guidelines, including how inspection must be overseen, for example.

Insight

Rayner Hutchinson III, corporate vice president of quality and safety for AAR Corp, provided some insights as to the usefulness of the Manual to Part 145 operators. His company is using it not only to supplement training, but also to help guide HF programs in the firm's FAA certified repair stations around the world.

"As an operator of independent MROs, we are delighted that the Operator's Manual was written addressing all maintenance organizations, including those performing contract maintenance under CFR 14, Part 145," Hutchinson said. "We believe that the manual is very helpful to guide our compliance with the new Part 145 training and HF recommendations."

Hutchinson also praised the document because it serves as a reference on how to develop a HF program rather than just on the science of HF, as most references seem to do.



"We are using the Operator's Manual because it is clearly written and easy to understand," Hutchinson said. "This book is an excellent example of compiling thousands of pages of information into a short listing of critical actions in five very important safety-related areas, including event reporting, use of documentation, training, shift turnover and fatigue. I believe that these are the ideal areas of concentration to ensure continuing safety, and also to ensure effective and efficient production."

Ray Peterson, FAA aviation safety action program manager at the agency's flight standards district office in Milwaukee, Wisconsin is another keen advocate. He has been distributing dozens of copies of the document to airline inspection and safety personnel. He is impressed by the document's simple, straightforward approach to what managers and maintainers need to know about HF maintenance issues and how to establish and maintain a HFM program. One company he has provided the document to is Midwest Airlines, which is in the process of developing its own HF program.

"The manual covers the real 'meat and potatoes' of aviation maintenance, and it was designed so that airlines can use it as a guide to develop HF maintenance programs that fit their individual needs," Peterson said. "That's why I am trying to provide it as a guide for everyone that I can."

Message

United Airlines is one company that has already made use of the manual in its HF programs. According to Bob Scoble, general manager for aircraft inspection and regulatory compliance,

Above

The Operator's Manual for Human Factors in Aviation Maintenance. An online guidebook that was completed and made available in October 2005.

Image credit: FAA

United has had several HF and HFM initiatives in place for at least a decade. However, what he refers to as "kind of a systems approach" taken in the publication has allowed the company to get the HF message out to top levels of management.

"Prior to this time HFM had been lined up under our training department as training material to deliver," Scoble said. "The very last chapter in the manual talks to sustaining and justifying the HFM program, as well as what kind of leadership focus to give it. As it takes on a systems approach, what we were able to do was bring awareness up to senior division leadership throughout the company."

According to Scoble the mechanism for this top-level awareness is the company's HF sub-committee to its executive safety review board. This board is chaired by the airline's vice president of maintenance. General managers on the sub-committee will take point positions on HF for their divisions, serving as single sources of information who have access to senior staff about HF issues, Scoble explained.

"With the systems approach what you can do is start looking at all the systems in your maintenance organization as they can affect HF," Scoble said. "What we did here because of the manual is do a gap analysis, or audit, of our existing systems that the document identifies as HF-related. Now we are doing a 'deeper dive'

into their effectiveness, as well as making sure that they are in place."

Part 121 timeline

FAA's goal seems to be to have voluntary airline HFM programs in place so that once Part 121 rules apply in this area, they can be implemented with as little pain to the industry as possible. Johnson could not say for sure when the new rules would be issued, but his best guess is that the process still needs as much as five years for completion. Fortunately for airlines a significant part of this time is so that the industry will have an adequate period to provide input to FAA concerning the impending regulations, he said.

"One of the lessons learned is that Part 145 rules were put into effect with no guidelines," Johnson said. "That will not happen with Part 121, since industry feedback is being solicited in the formation of these rules, and guidelines are being provided beforehand. Industry clearly has the ability to influence how these Part 121 rules will be worded."

In addition to the Operator's Manual, FAA will revise and provide online the Human Factors Guide for Maintenance and Inspection, which was last updated in 1998.

The revision process is underway, and CAT will provide links to this document once it becomes available. According to Johnson, like the new publication, the updated document will be streamlined, simplified and published in English, Spanish and Mandarin. More information on the FAA's Human Factors in Maintenance and Inspection organization can be accessed at <http://hfskyway.faa.gov>. 