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APPENDIX: 3

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BULLETIN TITLE: Guidance for Evaluation and Acceptance of Maintenance Human Factors Training Programs

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NOTE: THIS BULLETIN REQUIRES SPECIFIC PTRS INPUT. See page 7.

1. PURPOSE. This bulletin provides national policy and guidance for evaluation and acceptance of an operator, air agency/applicant's maintenance human factors training program. This bulletin applies to principal maintenance inspectors (PMI) and principal avionics inspectors (PAI) with certificate management responsibilities for Title 14 of the Code of Federal Regulations (14 CFR), parts 121, 135, and 145 certificate holders.

2. BACKGROUND. The National Transportation Safety Board (NTSB) has issued several safety recommendations involving human error in aviation maintenance. Federal Aviation Administration (FAA) inspections have revealed additional findings and systemic deficiencies. Current U.S. regulations do not require the approval of a human factors training program, however, efforts are underway to make human factors training required. Additionally, a maintenance human factors training program is required for those maintenance organizations seeking European Aviation Safety Agency (EASA) 145 certification.

3. AREAS OF CONCERN WITH MAINTENANCE HUMAN FACTORS. A panel of FAA and industry experts has identified six key areas of immediate concern.

- A. Event Investigation.
- B. Documentation.
- C. Human Factors Training.
- D. Shift/Task Turnover.
- E. Fatigue Management.
- F. Sustaining and Justifying a Human Factors Program.

4. DISCUSSION. The FAA has developed a manual, Operator's Manual for Human Factors in Aviation Maintenance, in response to industry requests for a simple and manageable list of actions to implement a maintenance human factors program. The manual offers the following format for each chapter:

- Why the chapter topics are important
- How to implement the chapter topic
- How to verify that the chapter topic area change is working
- Key references for the chapter topic

A. Like any good operator's manual, this document tells you what to do without excessive description of why you should do it. The Operator's Manual recognizes that aviation safety inspectors accept the importance of human factors. The manual is easily located and retrieved on the Web at www.hf.faa.gov/opsmanual/. It is currently downloadable in English, Spanish, and Chinese.

B. Although this bulletin is based solely on evaluating and accepting a maintenance human factors training program, the Operator's Manual and its selected six topics are critical because they are based on operational data and practical experience from the United States and other countries. These straightforward suggestions provide the key components for implementing a successful maintenance human factors program that will benefit the entire aviation industry. Chapter 3 of this manual addresses the specifics of a human factors training program.

C. Human factors training programs encompass not only flightcrew, but also all aspects of aviation where the human element is involved, such as maintenance. Formerly called maintenance resource management (MRM), this type of training is now more commonly referred to in the industry as human factors in aviation maintenance training.

D. Advisory Circular (AC) 120-72, Maintenance Resource Management Training, provides further background information on MRM. The AC also provides an excellent MRM/human factors training sample curriculum.

E. Human factors training is not specifically required in any of the current CFRs for maintenance. This HBAW addresses inconsistencies between AC 145-10, Repair Station Training Program, and FAA Order 8300.10, Airworthiness Inspector's Handbook versus the current part 145, § 145.163. A recent revision to 14 CFR Part 145, § 145.163 requires that certificated repair stations must have an employee training program approved by the FAA that consists of initial and recurrent training. AC 145-10 states that a submitted training program must include human factors elements as does Order 8300.10. Until such time that human factors training becomes a part of the CFRs, human factors training is highly suggested as a part of an approved maintenance training program, but not required. Currently, maintenance training programs for CFR part 121, § 121.375, and part 135, § 135.433 are merely accepted, not approved by the FAA.

5. HUMAN FACTORS TRAINING. Research and experience have shown that human factors training can address many of the issues that contribute to maintenance events. Training in this area can also reduce the costs associated with human performance issues.

A. Why Human Factors Training is Important.

(1) Human factors training is instrumental in fostering a positive safety culture.

(2) Human factors training for the workforce, including the leadership is a critical and cost-effective first step in identifying methods to recognize, understand, and manage human performance issues.

(3) Effective human factors training not only improves work performance but also promotes workforce physical and psychological health.

(4) Initial and recurrent training on new regulations, procedures, and equipment are opportunities to reinforce awareness of the human factors issues that affect job performance.

(5) The International Civil Aviation Organization (ICAO) and other national aviation authorities mandate or recommend maintenance human factors training, recognizing its impact on safety and quality.

B. How to Evaluate a Human Factors Training Program.

(1) The FAA has identified the following key topics that should be included in a training program.

NOTE: These are only suggested topics and the operator should select the topics that best suit the needs of its particular organization. These topics are also aligned with the current EASA requirements.

- (a) General introduction to human factors.
- (b) Safety culture/organizational factors.
- (c) Human error principles, event investigation, and case studies.
- (d) Human performance and limitations.
- (e) Environment.
- (f) Procedures, information, tools, and task sign-off practices.
- (g) Planning of tasks, equipment, and spares.
- (h) Communication.
- (i) Teamwork.
- (j) Professionalism and integrity.
- (k) Shift and task turnover.
- (l) Undocumented maintenance.
- (m) Fatigue management/fitness for duty.

(2) AC 120-72 helps an operator to conduct analyses to determine training requirements matched to their organization.

This process is as important as the actual training topics selected. The event investigation, covered in Chapter 1 of the Operator's Manual, also helps an organization to select appropriate content.

C. Steps to Accept a Human Factors Training Program.

(1) Attend an entire training session.

(2) Determine that training requirements and company priorities have been met and that they map reasonably to key topics listed in paragraph 5B of this document. There is not necessarily a one-to-one mapping to paragraph 5B.

(3) Ensure that the human factors training is a cooperative development between the workforce and management, and both have buy-in of the program.

(4) Ensure training is provided to appropriate work groups. Training benefits maintainers, other key maintenance departments, and all levels of management.

(5) Ensure content and delivery techniques match the targeted audience.

(6) It is recommended that the effects of training be measured. If the training is measured, verify that feedback is provided to the instructors and management.

(7) Key references in the Operators Manual for Human Factors in Aviation Maintenance provide additional information helpful for evaluation.

(8) Ensure that there is a documented training needs analysis that offers a clear mapping between organizational requirements and the training program. (Ref. AC 120-72)

(9) These same steps are applicable to acceptance or approval of an EASA Human Factors Training Program.

D. How to Know if the Training is Working.

(1) Management/workforce acceptance and approval of the program.

(2) Training evaluations and workplace discussions from trainees show positive trends.

(3) Event investigations indicate a reduction in the number of human-factor-related contributing factors.

(4) An initial increase in reported events due to improved awareness.

(5) Work performance improves in targeted areas.

(6) Employees demonstrate positive behavior changes towards safety awareness and company procedures.

(7) Requests from employees for more/recurrent training.

6. SUMMARY.

A. Implementing a training program can be straightforward when approached in an organized manner. An ideal training program design will identify need with a formal or informal task analysis. That process will define the knowledge, skill, and attitude that the worker must have to complete a job safely and efficiently. With the learner requirements identified, the organization must select content and delivery methods. These methods may involve books, media, and an instructor. Once training duration is determined and the class is delivered, it should be evaluated by the instructors, the students, and by supervisors on the job. The program should be dynamic and change as company requirements change.

B. While it is not part of this document, the inspector should remind operators that human factors training is only one component in a high-value human factors program. Such a program can be a key component to a safety management system and an evolving safety culture.

C. Human factors training should represent a shift in thinking about how one does his or her job. It should encourage individuals to feel personally responsible for safety and provide the tools for them to safely administer their knowledge. Aviation safety inspectors should note that after training, these attendees should be able to use those tools, believe that they can use those tools, and be shown that human factors approaches can make a difference in the maintenance work environment. That is the goal of providing human factors training in aviation maintenance.

7. RECORDING. Since no specific human factor codes existed prior to this HBAW, AFS-300 has provided new activity codes. The new first numbers will signify either maintenance (43) or avionics (63). Regional office and field personnel will

document all evaluations, acceptance, and related activities using these new PTRS activity codes.

A. Parts 121 and 135

(1) 4306/6306 - TECH/ADM/OPER/HU FACT TNG INIT

(2) 4307/6307 - TECH/ADM/OPER/HU FACT TNG REV

B. Part 145

(1) 4372/6372 - TECH/ADM/OPER/HU FACT TNG INIT

(2) 4373/6373 - TECH/ADM/OPER/HU FACT TNG REV

8. INQUIRIES. This bulletin was developed by the Air Carrier Maintenance Branch, AFS-330. Any questions or comments should be directed to Jay Hiles, AFS-330, at (202)267-8625.

9. LOCATION. This guidance will be incorporated into a new chapter of FAA Order 8300.10, Airworthiness Inspector's Handbook, in a future change.

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