

EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) program on Human Factors in Aviation Maintenance includes support of a series of meetings addressing specific topics of interest in air carrier maintenance. The purpose of this two-day meeting, held in January 1992, was to consider maintenance support for the air carrier industry a decade from now, to identify problems likely to exist at that time, and to begin planning toward solutions for these problems.

The meeting was attended by representatives of all segments within the air carrier industry, including airline operators, manufacturers, maintenance managers, union representatives, regulators, and scientists and engineers working on new technologies of possible applicability. Presentations reviewed problems facing the air carrier maintenance industry at this time and trends likely to affect these problems in coming years. Other presentations reviewed information management technologies which are just becoming available and which might be employed to advantage as the industry works toward solutions in the coming decade. Specifically, the goal of the meeting, as supported by these presentations, was to ensure that over the next ten years the industry could achieve:

- Continuing improvement in the quality and effectiveness of air carrier maintenance.
- Productive and efficient utilization of maintenance personnel.
- Incorporation of new technologies beneficial to the air carrier maintenance industry.
- Adherence to rigorous cost control procedures.

Based on presentations given and ensuing discussions, the following recommendations are presented:

The Maintenance Workforce

Recommendation

1. Demands to be placed on U.S. air carriers in the year 2000 can only be met with a fully staffed and well-qualified workforce. Questions have arisen concerning the adequacy of a supply of maintenance candidates at the end of the decade. If problems are foreseen for that time, planning for solutions must begin now. An in-depth study should be made of factors likely to affect the maintenance workforce in the year 2000. Study coverage should include evaluations of (1) manpower projections indicating a shortfall in the 25 - 34 year old group, (2) likely availability of women and minorities in the workforce and (3) the impact of release into the workforce of maintenance personnel from airlines ceasing operations.

Personnel Capabilities

Recommendations

1. Aviation maintenance technicians increasingly need to work with computer-based systems to obtain necessary work instructions and supporting data. The next generation of aircraft will be capable of providing much of this information through on-board systems which present both diagnostic data and maintenance materials through computer displays. The industry goal of reducing human error to the lowest achievable level requires that this man-computer exchange of information be accurate and expeditious. A considerable number of studies have been made, many reported in *Human Factors*, the journal of the Human Factors Society, which seek to determine the parameters of an optimized computer display for various classes of information. These studies should be reviewed systematically for their application to work requirements projected for aviation maintenance technicians with the advent of aircraft such as the Boeing 777. To the extent that information to define an optimum computer interface is not available, appropriate research should be conducted. When this computer interface can be defined, consideration should be given to establishment of an industry standard for air carrier maintenance operations.

2. The Federal Aviation Administration is planning to conduct a job task analysis of the aviation maintenance technician (AMT) position. The goal is to define the manner in which job activities are accomplished, the knowledge and skills required, the manipulative capabilities necessary, and the training required after certification. While the principal output of the job task analysis will be a clear exposition of the current AMT position, one part should review projected task demands and, on this basis, offer a picture of the AMT position in the future.

Cost Factors

Recommendation

1. Airlines are continually examining ways to reduce costs. No additional recommendation to do so is warranted. However, cost control efforts must continue, with a measure of these efforts directed toward maintenance. Since the aging aircraft issue came into prominence, primary attention within the FAA and the maintenance establishment has been on quality of maintenance. This attention now should be expanded to include "cost control in maintenance," giving it a priority immediately beneath quality. This attention, possibly through a joint FAA/industry team, should address:

- Ways to reduce the airline in-house training effort as new and more complex maintenance equipment is used.
- Procedures for assessing the efficiency as well as the effectiveness of maintenance work teams.
- Ways to facilitate the incorporation of new technologies, such as non-destructive inspection (NDI), through the industry as a means of making maintenance better and at the same time less personnel-intensive.