



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

Office of the Administrator

800 Independence Ave., S.W.  
Washington, D.C. 20591

**AUG 19 2011**

The Honorable John D. Rockefeller, IV  
Chairman, Committee on Commerce, Science  
and Transportation  
United States Senate  
Washington, DC 20510

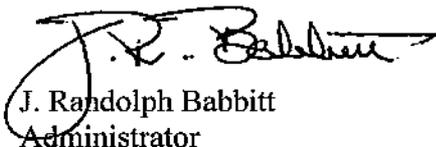
Dear Mr. Chairman:

As required by Section 207 of Public Law (PL) 111-216, The Airline Safety and Federal Aviation Administration Extension Act of 2010, I am pleased to provide you with the Flight Crewmember Pairing and Crew Resource Management Techniques report.

The report provides the results of the study as required in the legislation. This report is not intended to communicate the FAA's response to the results of the study.

We have sent identical letters to Chairman Mica, Senator Hutchison, and Congressman Rahall.

Sincerely,

A handwritten signature in black ink, appearing to read "J.R. Babbitt".

J. Randolph Babbitt  
Administrator

Enclosure



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The Honorable Kay Bailey Hutchison  
Committee on Commerce, Science  
and Transportation  
United States Senate  
Washington, DC 20510

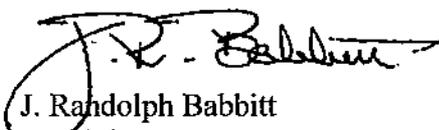
Dear Senator Hutchison:

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Sincerely,



J. Randolph Babbitt  
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The Honorable John L. Mica  
Chairman, Committee on Transportation  
and Infrastructure  
House of Representatives  
Washington, DC 20515

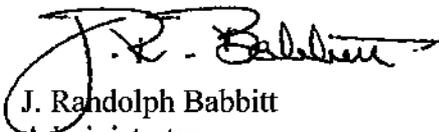
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Sincerely,

A handwritten signature in black ink that reads "J. R. Babbitt" with a stylized flourish at the end.

J. Randolph Babbitt  
Administrator

Enclosure



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Washington, D.C. 20591

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**AUG 19 2011**

The Honorable Nick J. Rahall, II  
Committee on Transportation and Infrastructure  
House of Representatives  
Washington, DC 20515

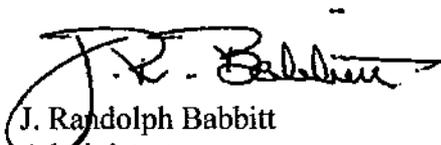
Dear Congressman Rahall:

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We have sent identical letters to Chairmen Rockefeller and Mica and Senator Hutchison.

Sincerely,



J. Randolph Babbitt  
Administrator

Enclosure



REPORT ON FLIGHT CREWMEMBER  
PAIRING AND CREW RESOURCE  
MANAGEMENT TECHNIQUES  
P.L. 111-216, SECTION 207

2011

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**Acknowledgements**

The Federal Aviation Administration (FAA) wishes to acknowledge the work of JEDCO Enterprises, Inc. and McDonald Ops Evaluations LLC for their work on this study. Additionally, the FAA acknowledges the work of the air carriers that participated in this research.

## **1.0 Executive Summary**

This report responds to Section 207 of Public Law (PL) 111-216, the Airline Safety and Federal Aviation Administration Extension Act of 2010. Section 207 required the FAA to conduct a study on aviation industry best practices with regard to flight crewmember pairing, crew resource management techniques and pilot commuting. The FAA was then to submit to the Committee on Transportation and Infrastructure of the House of Representatives and to the Committee on Commerce, Science and Transportation of the Senate a report on the results of this study.

On September 21, 2010, the FAA contracted, through Science Applications International Corporation (SAIC), with JEDCO Enterprises, Inc. and McDonald Ops Evaluations, LLC to conduct a study on best practices in crewmember pairing and crew resource management (CRM) techniques. Since PL 111-216 also required the FAA enter into an agreement with the National Academy of Sciences (NAS) to conduct a study on pilot commuting, the FAA did not include pilot commuting in this contract. The FAA did engage with the NAS for the pilot commuting study. The NAS presented its interim final report with recommendations to the FAA on June 30, 2011.

The contractors studied the crew pairing and CRM practices of 10 air carriers operating under Title 14 of the Code of Federal Regulations (14 CFR) part 121. In conducting its study, the contractors met with both personnel from the FAA certification management office (CMO) responsible for oversight of the air carriers, as well as personnel from the air carriers to determine current best practices. The contractor provided the FAA with its findings on March 31, 2011.

The intent of this report is to relay the findings of the contractors; this report is not intended to communicate the FAA's response to the findings. The FAA has preliminarily reviewed the report and believes we are already promoting many of the recommended best practices, such as use of voluntary programs including the aviation safety action program, the advanced qualification program and the line observation safety audit. We are also engaged in rulemaking projects that will address several of the best practices, including the Supplemental Notice of Proposed Rulemaking (SNPRM) on "Qualification, Service and Use of Crewmembers and Aircraft Dispatchers," which proposes to incorporate CRM into scenario-based training programs and the Notice of Proposed Rulemaking (NPRM) on Flight Crewmember Mentoring, Leadership and Professional Development.

The FAA will still need to carefully evaluate these best practices in light of our current activities, other Agency priorities and the overall safety agenda of the FAA.

## **2.0 Methodology**

For this study, the contractors reviewed both how the air carriers complied with the existing regulations regarding crew pairing (§ 121.438) and CRM (14 CFR §§ 121.404, 121.427, 121.917, and 121.919), as well as what “best practices” the air carrier identified regarding crew pairing and CRM. The “best practices” were perceived as being voluntary in nature, as they are not specifically mandated by the FAA. The contractors reviewed the processes and procedures at 10 air carriers operating under 14 CFR part 121: 5 large domestic/international air carriers, 2 domestic/international (cargo only) air carriers and 3 domestic regional air carriers.

The contractors used a two-fold methodology to conduct the study. First, it interviewed applicable FAA personnel responsible for the oversight of the part 121 air carriers surveyed. Those individuals may have included the Certificate Management Office (CMO) Office Manager, Principal Operations Inspector (POI), Aviation Safety Inspector (Cabin Safety), Aviation Safety Inspector (Dispatch) and the Operations Research Analyst (ORA).

Secondly, the contractors interviewed the responsible individuals employed by the air carrier. Those individuals may have included the Director of Training, the Director of Operations, the Director of Crew Scheduling, the Manager of Crew Resource Management (CRM) & Human Factors, and the Director of Regulatory Compliance. The air carriers provided the contractors with tours of the training facilities, crew scheduling departments and system operations centers (SOC). In addition, the contractors attended pilot recurrent training classes at two air carriers.

The contractors organized the study using the taxonomy of the Air Transportation Oversight System (ATOS). The contractors identified the procedures, controls, process measurement, and management authority and responsibility associated with crew pairing and CRM processes to analyze an air carrier’s performance. The study identified best practices as they related to these quality assurance items.

### **3.0 Introduction**

Current regulations already include requirements to provide CRM training (14 CFR §§ 121.404, 121.427, 121.917, and 121.919) and requirements for crew pairing (§ 121.438). In addition to these requirements, air carriers have adopted best practices surrounding crew pairing and CRM. The contractor found a great deal of similarity in the crew pairing and CRM programs at the air carriers it studied and provided the FAA with a summary of how widespread these best practices have already spread through the industry.

The recommended best practices follow.

## **4.0 Best Practices**

### **4.1 Best practices for crew pairing**

#### Summary of best practices:

- Provide documented procedures and training for crew schedulers.
- Provide special emphasis for unusual situations, such as “special airports.”
- Evaluate performance through data collection.
- Have a designated management individual with authority and responsibility to change the process.

Current regulations require the PIC to make all takeoffs and landings in certain situations if the Second-In-Command (SIC) has fewer than 100 hours of flight time in operations under part 121 in the type airplane being flown. Additionally, current regulations prohibit operations under part 121 unless either the PIC or the SIC has at least 75 hours of line operations flight time in the type of airplane being flown. The study identified best practices that support compliance with the current regulations.

#### Documented crew scheduling procedures and training for crew schedulers

The air carriers surveyed identified documented procedures for scheduling as a best practice. Some of the suggested procedures included developing manuals for scheduling procedures and using a computerized scheduling system. A computerized scheduling system has the advantage of providing controls on crew pairing, such as alerts or flags. Having multiple individuals review system alerts or flags, reduces error in the use of the system. A computerized system also permits easier auditing. Additionally, the air carriers identified a formal training program for schedulers as another best practice. The training should include initial, recurrent and on-the-job training, as well as a proficiency check and a familiarization flight from the flight deck jumpseat. This program should be documented in a schedulers’ training manual.

#### Special emphasis areas

Air carriers also identified best practices for the handling of special emphasis situations. Special emphasis situations could include a PIC’s first trip into a complex route or airport or a “special area or airport” as defined in existing 14 CFR section 121.445. Although the specific best practices varied from air carrier to air carrier, examples include scheduling a line check airman to accompany a PIC on his or her first trip into a complex area or scheduling a duty period so that a crew is not operating into a special airport at the end of a long duty day.

#### Evaluation and management oversight

Another best practice identified in the study was the use of data collection to evaluate the effectiveness of the crew pairing process, including audits by the air carrier’s quality assurance department. Again, the use of a computerized crew scheduling software can assist in this process. Air carriers also identified the use of a voluntary employee reporting system, including the Aviation Safety Action Program (ASAP) and the use of a

Line Observation Safety Audit (LOSA) program as best practices to evaluate the effectiveness of the crew pairing process. Finally, air carriers identified as a best practice having a management person with the responsibility and authority to revise the crew pairing process in response to identified need, such as a noted deficiency.

## **4.2 Best practices for CRM techniques**

### Summary of best practices

- Improve quality of CRM training.
- Develop “nomenclature” for CRM throughout the company.
- Evaluate performance through data collection.
- Have a designated management individual with authority and responsibility to change the process.

Current regulations (14 CFR §§ 121.404, 121.427, 121.917, and 121.919) prohibit an air carrier from using a flight crewmember, flight attendant or dispatcher unless the person has completed CRM or dispatch resource management initial and recurrent training. Additionally, current regulations require qualification and continuing qualification curricula to be approved under an Advanced Qualification Program (AQP) to integrate the training and evaluation of CRM into ground and flight training. Completion of the AQP curricula is dependent on the applicant showing competence in CRM knowledge and skills in scenarios. The identified best practices support these requirements.

### Improve quality of CRM training

The air carriers identified numerous best practices associated with the development and delivery of CRM training. One identified best practice is to use real life events in classroom training on CRM. Similarly, another best practice is for a training department to consult with the aircraft fleet managers to jointly select a theme for the next recurrent CRM training class. Several other best practices relate to incorporating CRM into training/checking modules of the training program. This includes either adopting AQP or emphasizing CRM in Line-Oriented Flight Training simulator sessions. Another identified best practice is for air carriers to provide leadership training to new PICs. Finally, at least one air carrier suggested selecting check airmen as CRM instructors.

### Develop common CRM language

Air carriers identified as a best practice the development of a shared “nomenclature” for CRM and Threat and Error Management (TEM) throughout a company. All pilots, flight attendants, dispatchers, schedulers, maintenance and management personnel should be taught and/or trained that a particular word or phrase means the same thing to each of them. For example, the term “altercation” when referencing a passenger disturbance should have a specific meaning with respect to the level of intensity and actions to be taken by all parties. This “nomenclature” should be included in the air carriers’ flight operations and flight attendant manuals.

### Evaluation and management oversight

Another best practice identified in the study was the use of data collection to evaluate the effectiveness of an air carrier’s CRM program. Specific examples include audits by the air carrier’s quality assurance department, use of a voluntary employee reporting system, including the ASAP, and the use of a LOSA program. Additionally, air carriers identified as a best practice the use of data to improve the quality of a CRM program.

Specific examples include presenting data acquired by a flight operations quality assurance program in CRM/TEM class room training and providing additional CRM training to line pilots identified as having CRM issues. Finally, air carriers identified as a best practice having a management person with the responsibility and authority to revise an air carrier's CRM program in response to identified need, such as an identified deficiency.

## **5.0 Conclusion**

The FAA has preliminarily reviewed the report and believes we are already promoting many of the recommended best practices, such as use of voluntary programs including the ASAP, the AQP and the LOSA. We are also engaged in rulemaking projects that will address several of best practices, including the SNPRM on “Qualification, Service and Use of Crewmembers and Aircraft Dispatchers,” which proposes to incorporate CRM into scenario-based training programs and the NPRM on Flight Crewmember Mentoring, Leadership and Professional Development. The SNPRM on crewmember training was published on May 20, 2011. We anticipate the NPRM on mentoring, leadership and professional development will be published by summer 2011.

The FAA will consider these recommendations in any rulemaking or advisory circulars issued in the future.

**Appendix 1: Excerpt from Public Law (PL) 111-216**

**SECTION 207. FLIGHT CREWMEMBER PAIRING AND CREW RESOURCE MANAGEMENT TECHNIQUES.**

*(a) STUDY.—The Administrator of the Federal Aviation Administration shall conduct a study on aviation industry best practices with regard to flight crewmember pairing, crew resource management techniques, and pilot commuting.*

*(b) REPORT.—Not later than one year after the date of enactment of this Act, the Administrator shall submit to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the results of the study.*