Loadmaster Certification Working Group Recommendation Report

REVISION	REVISION DATE
Final	**May 17, 2018**

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EXECUTIVE SUMMARY

The Loadmaster Certification Working Group (LCWG) was formed under the authority of a tasking accepted by the Federal Aviation Administration's (FAA) Aviation Rulemaking Advisory Committee (ARAC) on March 23, 2016, and published in the May 12, 2016, Federal Register.[1] The ARAC tasking was based on the National Transportation Safety Board (NTSB) Safety Recommendation A–15–014. That recommendation was issued to the FAA as a result of the Board's findings in its investigation of a fatal accident that occurred on April 29, 2013, at Bagram Air Base, Afghanistan. The accident involved a U.S. registered aircraft operated by an air carrier conducting all-cargo operations. The 747–400 Boeing Converted Freighter (BCF)[2] crashed after takeoff at Bagram Air Base, Afghanistan, while carrying five mine-resistant ambush-protected (MRAP) vehicles, which were not properly loaded or restrained in accordance with the aircraft's weight and balance manual (WBM). Shortly after takeoff, at least one of the vehicles shifted aft, damaging the aircraft's hydraulic systems and other components, rendering the aircraft uncontrollable.

The NTSB recommended, in part, the FAA "create a certification for personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes."[3] The ARAC tasked the LCWG to—

1. Provide advice and recommendations to the ARAC on whether safety would be enhanced if persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of special cargo load plans, be certificated. If the Working Group recommends certification of these persons, it should also provide recommendations regarding which specific operations should require the use of these certificated persons. Additionally, it should also recommend appropriate knowledge, experience, and skill requirements for the issuance of the certificates and appropriate privileges and limitations.
2. Determine the effect of its recommendations on impacted parties.

[1] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.
[2] "A 747-400 SF (Special Freighter), or optionally known as a 747-400 BCF (Boeing Converted Freighter), is a 747-400 Series passenger airplane that has been modified in accordance with FAA-approved Boeing Service Bulletin 747-00-2004 to operate in a freighter configuration. These aircraft remain as 747-400 Series aircraft for documentation purposes on the Type Certificate Data Sheet (TCDS) and with regard to the applicability of airworthiness directives." European Aviation Safety Agency. *Type-Certificate Data Sheet No. IM.A.196 Boeing 747*. 30 October 2017. Page 27.
[3] National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR-15/01, PB2015-104951, Notation 8710. Adopted 14 July 2015.

3. Develop a report containing recommendations based upon its analysis and findings. The report should document both majority and dissenting positions on its recommendations and findings and the rationale for each position. Any disagreements should be documented, including the rationale for each position and the reasons for the disagreement.[4]

The FAA and ARAC reviewed requests for participation in the LCWG and selected twelve members to provide a balanced representation of those involved with the planning, loading, and handling of special cargo in operations conducted under part 121 of Title 14, Code of Federal Regulations (14 CFR). The LCWG held its first meeting in August 2016.

To address the tasking, the LCWG had to first determine the scope of the term "special cargo," which is not defined in the regulations. Although a definition is published in Advisory Circular (AC) 120–85A, Air Cargo Operations,[5] the LCWG quickly determined the term was subject to different interpretations. During this process of determining the scope of the definition, the working group became more aware of varying operational practices within the industry. Moreover, it noted although the job functions necessary for the handling and loading of special cargo are uniform, air carriers use personnel with various job titles to carry out the necessary tasks. The LCWG identified similarities between the functions necessary for handling and loading special cargo and, accordingly, focused its efforts on determining which specific job functions should address the proper carriage of special cargo, rather than limiting its recommendations to holders of specific job titles. The working group determined specific job functions that should be addressed include—

- The initial recognition or awareness of certain cargo as special cargo requiring special handling procedures.
- Planning the load, which entails conducting an analysis of the load and determining the proper procedures to secure the load. This is identified as the special cargo analysis function (SCAF) in AC 120–85A.
- Validating that the special cargo load plan was properly implemented.

The LCWG noted there are many variations among air carriers regarding which personnel perform these job functions. These differences make it difficult to identify or use one job title, such as "loadmaster," to encompass all of those persons who perform special cargo handling, planning, and loading functions. The term "loadmaster" is not used or defined in the regulations and is a term more commonly used in U.S. military aircraft operations. This further complicated the scope of the tasking, as the term has not been applied consistently when describing an individual's level of knowledge, proficiency, or training.

[4] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.
[5] On August 16, 2017, special cargo was incorporated into Operations Specification (OpSpec) A002 and is defined as "cargo that requires special handling and securing/restraining procedures within the limitations specified in the airplane flight manual (AFM)/weight and balance manual (WBM) approved by the type certificate/supplemental type certificate. Special cargo may be enclosed in an approved bulk compartment if the WBM has limitations supporting procedures for securing and restraining the special cargo."

The LCWG notes that before it was tasked, many voluntary safety enhancements (SE) and initiatives were put into place to address deficiencies in the handling and loading of special cargo (see section 2.4.1). Although those activities were not under the purview of this working group, they do serve as significant safety risk mitigations. The FAA Cargo Focus Team's (CFT) outreach efforts also played a key role in raising the awareness of the need to identify special cargo and the importance of not exceeding the operating limitation contained in the aircraft's WBM. The majority of these initiatives were the result of Government and industry working collaboratively to address identified safety risks.

The LCWG considered several alternatives for its recommendation to ARAC. Section 3 of this report details the various alternatives that were evaluated. The LCWG assessed each alternative according to its effectiveness in enhancing safety, operational impact, portability, FAA impact, industry impact, and overall financial impact. Ultimately, the working group reached general consensus on its recommendation that air carriers be required to adopt a program called the FAA-Approved Special Cargo Program.

In accordance with the LCWG's recommendation, the FAA would require an air carrier intending to transport special cargo to submit a comprehensive Special Cargo Program to the FAA for approval. This program would include training elements, policies, and procedures to ensure compliance with applicable aircraft flight manuals and design approval holder (DAH) WBMs. The FAA would review and approve the Special Cargo Program using both the air carrier's principal operations inspector (POI) and principal maintenance inspector (PMI), with approval being provided by one or the other, thus providing the agency with broader oversight and knowledge of the carrier's special cargo operations. Given the differences in operations and the various personnel who are responsible for the handling and loading of special cargo, the LCWG believes this method would provide the necessary flexibility in determining the appropriate scope of the approval of an air carrier's program. Additionally, because many air carriers commonly use contractors as well as employees located outside the United States, an approved program would be more easily adaptable to these operations.

A similar and well-understood process exists today in the area of transporting hazardous materials (HAZMAT) by air. The proposed recommendation could be implemented in a manner similar to that used to implement an air carrier's HAZMAT training program under part 121 subpart Z. Under that subpart, air carriers are required to establish and maintain a program that meets the requirements of that subpart and ensures personnel performing job functions relating to the transport of HAZMAT by air are trained to comply with the requirements of the Hazardous Materials Regulations (Title 49, Code of Federal Regulations (49 CFR) parts 171–180). The program must be approved by the FAA before implementation. The FAA-Approved Special Cargo Program would be a continuous improvement process providing air carriers with the ability to rapidly adapt their programs as operations change (for example, adding an aircraft to the air carrier's fleet).

The LCWG notes one dissenting opinion in its recommendation: that the consensus recommendation does not fully address the NTSB Safety Recommendation. The dissenting position is that a more formal certification process, similar to that used to certificate repairmen under 14 CFR part 65, should be required for persons performing special cargo duties for air carriers conducing operations under 14 CFR part 121.

The LCWG believes, as outlined in section 4.2 of the report, its recommendation for adoption of the FAA-Approved Special Cargo Program will enhance safety for the persons engaged in the loading and supervision of the loading of special cargo. It will improve the preparation and accuracy of special cargo load plans and provide both air carriers and the FAA with the flexibility to address a wide range of operations while enabling more effective FAA oversight. The LCWG also believes its recommendation best incorporates the elements of the safety management system (SMS) philosophy by providing air carriers with a more effective means to use ongoing training data to continually improve their programs.

1. BACKGROUND

On April 29, 2013, a Boeing 747–400 Boeing Converted Freighter (BCF), operated by an air carrier conducting all-cargo operations, crashed shortly after takeoff from Bagram Air Base, Afghanistan. The airplane was destroyed from impact forces and post-crash fire. The flight was a supplemental operation conducted under part 121 of Title 14, Code of Federal Regulations (14 CFR) and was being conducted under a multimodal contract with the U.S. Transportation Command. The intended destination for the flight was Dubai World Central—Al Maktoum International Airport, Dubai, United Arab Emirates.

The airplane's cargo included five mine-resistant ambush-protected (MRAP) vehicles secured onto pallets with shoring. Two vehicles were 12-ton MRAP all-terrain vehicles (M–ATV) and three were 18-ton Cougars. These vehicles are considered special cargo because they could not have been placed in unit load devices (ULD) and restrained in the airplane using the locking capabilities of the airplane's main deck cargo handling system. Instead, the vehicles were secured to centerline-loaded floating pallets and restrained to the airplane's main deck using tie-down straps. Both of these methods for restraining cargo were and still are used in the industry; however, the limitations prescribed in the aircraft weight and balance manual (WBM) must be followed when using either the onboard aircraft cargo restraint system or tie down restraint of the cargo.

In this specific event, during takeoff the airplane immediately climbed steeply then descended in a manner consistent with an aerodynamic stall. The National Transportation Safety Board (NTSB) investigation found strong evidence that at least one of the rear MRAP vehicles moved aft into the tail section of the airplane, damaging hydraulic systems and horizontal stabilizer components, making it impossible for the flightcrew to maintain pitch control of the airplane. The NTSB determined the probable cause of this accident was the air carrier's inadequate procedures for restraining special cargo loads were not aligned with type certificate (TC) or supplemental type certificate (STC) holder provided data. This action resulted in the loadmaster's improper restraint of the cargo, which moved aft and damaged hydraulic systems 1 and 2, as well as horizontal stabilizer drive mechanism components, rendering the airplane uncontrollable.

As a result of this accident, the NTSB issued Safety Recommendation A–15–14, which recommended, in part, for the Federal Aviation Administration (FAA) to ''create a certification for personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes.''[6] Although air carriers have internal training programs for personnel responsible for loading and restraining special cargo, currently there is no regulatory requirement that persons responsible for the loading and restraining of special cargo be certificated by the FAA. Therefore, existing industry practices do not reflect uniform standards or regulatory requirements to ensure adherence to operational limitations. In turn, FAA oversight is not specifically directed to operations involving special cargo loads or an air carrier's training program for special cargo loads. FAA oversight of these activities is

[6] National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR-15/01, PB2015-104951, Notation 8710. Adopted 14 July 2015.

conducted as part of its normal and routine oversight of an air carrier's operations. Through its development of Operations Specification (OpSpec) A002 and other related activities, however, the FAA has been increasing its emphasis on the oversight of operations involving the carriage of special cargo.

Persons performing certain special cargo functions for an air carrier may perform additional functions for a flight, such as developing the aircraft load manifest or approved schedule,[7] performing weight and balance (W&B) functions, and verifying loading functions in accordance with part 121 and Advisory Circular (AC) 120–27E, Aircraft Weight and Balance Control. Proper performance of these specialized functions is critical to ensuring the flight characteristics of an aircraft are not adversely affected and that its structural limitations are not exceeded. Depending on the air carrier, these functions may or may not be accomplished by the person planning the special cargo load, which entails conducting an analysis of the load and determining the proper procedures to secure the special cargo load. These functions are identified as the special cargo analysis function (SCAF)[8] in AC 120–85A, but the specific activities performed under this function may vary depending on the specific operation, the particular special cargo load, and the air carrier's procedures governing personnel responsibilities.

The FAA determined the Aviation Rulemaking Advisory Committee (ARAC) would be the most appropriate forum to assist in developing a response to NTSB Safety Recommendation A–15–014.

The Loadmaster Certification Working Group (LCWG) was formed under the authority of a tasking accepted by the ARAC on March 23, 2016 and issued by the FAA on May 12, 2016.[9] The FAA and ARAC reviewed requests for participation in the LCWG and selected twelve members to provide a balanced representation of those involved with the planning, loading, and handling of special cargo in operations conducted under part 121. The LCWG held its first meeting in August 2016. It serves to advise and recommend to the ARAC in accordance with the tasking. The ARAC will review and vote on whether to accept this recommendation report. If accepted, the ARAC will be responsible for submitting the recommendation report to the FAA.

[7] The approved schedule or loading schedule.
[8] Federal Aviation Administration. (25 June 2015). *Cargo Air Operations* (Advisory Circular 120-85A).
[9] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.

1.1 THE TASK[10]

The Loadmaster Certification Working Group is tasked to:

1. Provide advice and recommendations to the ARAC on whether safety would be enhanced if persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of special cargo load plans, be certificated. If the Working Group recommends certification of these persons, it should also provide recommendations regarding which specific operations should require the use of these certificated persons. Additionally, it should also recommend appropriate knowledge, experience, and skill requirements for the issuance of the certificates and appropriate privileges and limitations.
2. Determine the effect of its recommendations on impacted parties.
3. Develop a report containing recommendations based upon its analysis and findings. The report should document both majority and dissenting positions on its recommendations and findings and the rationale for each position. Any disagreements should be documented, including the rationale for each position and the reasons for the disagreement.

In developing this report, the Working Group shall familiarize itself with:

1. NTSB Aircraft Accident Report NTSB/AAR–15/01 PB2015–104951, with particular attention provided to Safety Recommendation A–15–14.
2. AC 120–85A, *Cargo Air Operations*.
3. Minutes of the June 30, 2015, B747 Special Cargo Load Meeting.

The recommendation report should be submitted to the FAA for review and acceptance no later than 24 months from the publication date of this notice in the Federal Register.[11]

1.2 WORKING GROUP ACTIVITY

The Loadmaster Certification Working Group must comply with the procedures adopted by the ARAC and:

1. Conduct a review and analysis of the assigned tasks and any other related materials or documents.
2. Draft and submit a work plan for completion of the task, including the rationale supporting such a plan, for consideration by the ARAC.
3. Provide a status report at each ARAC meeting.
4. Draft and submit the recommendation report based on the review and analysis of the assigned tasks.
5. Present the recommendation report at the ARAC meeting.

[10] Ibid.
[11] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.

1.3 PARTICIPANTS IN THE WORKING GROUP

The LCWG was comprised of the following individuals:

NAME	ORGANIZATION
LCWG Members (Voting Members)	
Mark Phaneuf	Air Line Pilots Association, International (ALPA)
J. Martin McKinney	United Parcel Service (UPS) Airlines
Stephen Banks	National Cargo Group, Inc. d/b/a National Airlines
Steve Brewer	Kalitta Air
Richard Brose	FedEx
Lawrence Fine	Atlas Air
Erik Kaupa	Professional Loadmaster Association (PLA)
Peter Mejia	Northern Air Cargo
Darrin M. Noe	The Boeing Company
Jeff Olver	Alaska Airlines, Inc.
George Paul	National Air Carrier Association (NACA)
Yvette Rose	Cargo Airline Association (CAA)
FAA and Other Advisory & Support Staff (Non-voting)	
Stephen W. Grota FAA Representative	FAA Aircraft Maintenance Division (AFS–300) Cargo Focus Team (CFT)
Julia Greenway	FAA Office of Rulemaking (ARM)
Jose Castedo	FAA Office of Aviation Policy and Plans (APO)
Paul Greer	FAA Office of the Chief Counsel (AGC)
Sandra L. Lamparello	PAI Consulting, Inc.

2. WORKING GROUP ACTIVITIES

This section of the report details the activities of the LCWG.

2.1. REVIEW THE ASSIGNED TASKS AND ANY OTHER RELATED MATERIALS OR DOCUMENTS

The LCWG reviewed the assigned tasking from the tasking statement[12] and, once it reached a general understanding of the assigned tasking, the LCWG members reviewed the following materials specified in the task assignment and discussed them at a group meeting:

1. NTSB Aircraft Accident Report NTSB/AAR–15/01 PB2015–104951, with particular attention provided to Safety Recommendation A–15–14;
2. AC 120–85A, *Cargo Air Operations*; and
3. Minutes of the June 30, 2015, B747 Special Cargo Load Meeting.

In addition to the materials identified in the assigned tasking, the LCWG spent a significant amount of time and resources reviewing, discussing, and developing a common understanding of issues involving—

1. Past accidents from 1993 to 2016 that may have involved the carriage of special cargo by aircraft conducting operations under part 121;
2. The term "special cargo," as stated in OpSpec A002; and
3. The impacts of other documents and changes that have taken place within the air cargo industry, especially those relating to special cargo. This was done to ensure any potential recommendation was being assessed using the current environment rather than the environment that was the initial basis for NTSB Safety Recommendation A–15–14 (see section 2.4.1 for a list of documents reviewed).

2.2. DRAFT AND SUBMIT A WORK PLAN FOR COMPLETION OF THE TASK, INCLUDING THE RATIONALE SUPPORTING SUCH A PLAN, FOR CONSIDERATION BY THE ARAC

The LCWG developed a work plan, which ARAC accepted at its September 15, 2016, meeting. A copy of this work plan is included as Appendix B. The work plan outlines the goals and objectives, tasking, and ground rules for the LCWG and provides a schedule for the completion of work.

2.3. PROVIDE A STATUS REPORT AT EACH ARAC MEETING

The LCWG Chair or Co-chair presented a status report at each of the following ARAC meetings:

- July 19, 2016: Initial status report and formal ARAC working group acceptance
- September 15, 2016: Status report and work plan acceptance
- December 15, 2016: Status report

[12] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.

- March 16, 2017: Status report
- June 8, 2017: Status report
- September 14, 2017: Status report
- December 14, 2017: Status report and notification that because of ARAC scheduling, the LCWG would not be able to present its final recommendations report until June 2018
- March 15, 2018: Status report

2.4. Draft and Submit the Recommendation Report Based on the Review and Analysis of the Assigned Tasks

This section of the report provides the discussion and background on how the LCWG interpreted and divided the assigned tasks. The working group reviewed each element of the tasking to determine whether safety would be enhanced if personnel were certificated, who should be considered a loadmaster, and what the definition of "special cargo" would be for the purposes of this tasking. The LCWG also discussed industry changes and other issues required to establish the scope of the associated tasking. These elements are discussed in the following sections.

2.4.1. Risk Mitigation Activities Implemented Since the Accident

Since the April 29, 2013, accident and the subsequent NTSB report and recommendations, there has been an increased awareness of and focus on the procedures and methods used to transport all types of air cargo. The LCWG believes this increased awareness by both Government and industry is directly enhancing safety. The following demonstrate the increased level of activity that has occurred to address the safe carriage of cargo by air carriers since the 2013 accident:

- OpSpec A002 definitions (including "special cargo")
- Revision to AC 120–85A—Air Cargo Operations
- Airworthiness Directive (AD) 2015–14–09—offset intermodal containers
- STC approvals relating to special cargo retention
- Boeing supplemental procedures—FAA-approved enhanced special cargo-loading procedures
- Notice 8900.262 Review operator Weight and Balance Control Programs (WBCP)
- Notice 8900.317 Accepting/Revising WBMs to ensure compliance with the airplane flight manuals (AFM)π
- Notice 8900.339 Correct discrepancies between AFMs and flightdeck handbooks
- Notice 8900.417 Surveillance of computerized WBCP
- Information for Operators (InFO) 15010 approved WBM supplements for certain Boeing aircraft
- InFO 13012 FAA-approved Boeing 747 Sample Weight and Balance Manual (WBM)

- Safety Alert for Operators (SAFO) 13005 heavy vehicle special cargo loads safety impact
- SAFO 13008 Tie down procedures for restraint of special cargo
- SAFO 16007 and Revision A to Technical Standard Order (TSO) C172 to eliminate the "D6" hook
- SAFO 17003 Non-compliance with a manufacturer's FAA approved aircraft WBM
- SAFO 17004 Cargo retention methods using pallet straps
- Continued Airworthiness Notification to the International Community (CANIC), which included SAFOs 13005 and 13008, InFO 13012, and Notice 8900.262
- FAA cargo blended course—air cargo operations practical application workshop
- The FAA CFT evaluation of air carrier WBCPs
- FAA inspector guidance—
  - Delineation of duties
  - Accepting/Revising WBCP
  - AC 120–85A briefing course
  - Order 8900.1 reform with respect to cargo
- Safety Assurance System (SAS) cargo-related element development
- The FAA CFT educational outreach program to both industry and agency personnel
- FAA participation in industry groups and participation in dialog with the International Air Transport Association (IATA) for alignment and consistency with regulatory requirements
- Air Cargo Safety Symposium, August 17, 2017
- The FAA CFT has successfully evaluated and worked toward concurrence of all part 121 supplemental cargo air-carriers' WBCPs
- Awareness that special cargo requires special handling and procedures which cannot exceed the operating limitations provided by the design approval holder (DAH), which is often contained in the aircraft WBM

With the development of these materials and actions, taken by both Government and industry, the overall level of awareness of special cargo has been raised, resulting in special cargo being transported in a safer and more compliant manner. When assessing potential recommendations, the LCWG considered the impact these actions have had on the current state of air cargo operations with regard to the level of safety in air cargo operations.

2.4.2. Rationale for Limiting Scope of the Recommendation to 14 CFR Part 121 Operations

The ARAC decided to focus this LCWG's recommendation on part 121 operations involved in the transport of special cargo, rather than include other types of operations. This aspect was clarified during a conversation between the LCWG Chair and the ARAC Chair. The rationale

for limiting to part 121 operations was to ensure the focus of the LCWG would be on making a determination on the safety and impact of the recommendation within a reasonable timeframe. Much of the rationale and many of the assumptions in this report can easily be applied to operations conducted under other parts of the regulations, including 14 CFR parts 91, 135, 125, and 129. Additionally, the accident flight which led to NTSB recommendation A–15–014 was conducted under 14 CFR part 121 as a multimodal transport.

2.4.3. Definition of Special Cargo

At the time of the April 2013 accident, no definition of "special cargo" existed. The first definition for "special cargo" was provided in the June 2015 version of AC 120–85. From this starting point, the FAA further refined the definition using industry input during the development of OpSpec A002, Definitions and Abbreviations. The FAA is in the process of modifying the existing "special cargo" definition in AC 120–85 to match the definition published in OpSpec A002. The definition of "special cargo" within the glossary of this report references the definition from OpSpec A002; it is this definition the LCWG used in the preparation of this report and its associated recommendation.

2.4.4. Consideration of Fatigue and Creation of Duty-Hour Limitations

In A–15–014, the NTSB recommended the certification requirement for personnel responsible for the loading, restraint, and documentation of special cargo loads include duty-hour limitations and rest requirements consistent with other safety-sensitive, certificated positions. The ARAC did not task the LCWG with making recommendations regarding duty-hour limitations or rest requirements; however, the Civil Aerospace Medical Institute (CAMI) has performed a field evaluation of loadmaster fatigue and issued a report[13] addressing this issue.

2.5. Task Elements

The LCWG worked to divide the tasking into its elements. The first element, taken directly from the tasking, is as follows:

Would safety be enhanced if persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of load plans, be certified?

The working group generally agreed with the premise that some form of "certification" provides an individual with a sense of accountability and personal responsibility, which accordingly enhances safety. In other words, a certificated individual would have a professional interest in correctly completing those tasks for which that person was certificated. The individual would be motivated to properly complete those tasks in part by the potential for FAA enforcement action. The LCWG believes the process required to certificate an individual would be much more structured and transparent than what is currently done in the industry. The FAA's direct role with the certificated individual also would add another layer of safety and accountability.

[13] Federal Aviation Administration. *Evaluation of Fatigue and Responsibilities of Cargo Supervisors and Flight Mechanic Cargo Supervisors*. August 2016. Available at http://www.faa.gov/data_research/research/med_humanfacs/oamtechreports/2010s/media/201606.pdf. Last accessed 11 May 2018.

Currently, because there is no certificated position for the loading of special cargo specified in the regulations, there are no specific individual standards or training requirements to ensure adherence to aircraft operational limitations. Additionally, while these personnel or their job duties may be covered under the FAA's review of a certificate-holder's operations more generally, there is no direct, focused oversight on these tasks. The implementation of a certification process would increase consistency and interdependency between the certificated individual and FAA oversight. It would also allow air carriers and the FAA an opportunity to identify areas of non-compliance and increase the level of standardization within the air cargo industry.

The twelve-member LCWG reached a full consensus position that safety would be enhanced if persons involved in the loading and the supervision of the loading of special cargo were required to be certificated for some duties and activities. Although not explicitly stated in the tasking, the LCWG worked under the assumption the FAA would issue and oversee any certificate resulting from its recommendation. Methods of providing certification or authorization from sources other than the FAA could be accomplished while providing an equivalent level of safety enhancement. The LCWG agreed to include all methods or approaches for addressing the ARAC tasking, regardless of whether an FAA-issued certificate was granted. Although safety would be enhanced by certificating those involved in the loading and supervision of the loading of special cargo, it would not be the most cost-beneficial solution to implement.

2.5.1. ADDITIONAL CONSIDERATIONS/ASSUMPTIONS

Although the LCWG reached a full consensus position, there were additional considerations/assumptions the LCWG discussed regarding certification, which were—

- Although it is believed the person performing a task would have a professional interest in completing the task correctly as FAA enforcement action would be a consequence, there was no data available to validate this assumption.
- The same principles and benefits for certificating other safety-sensitive positions or functions, such as pilots, may not apply when certificating personnel for special cargo, and therefore certification may not provide a similar level of safety enhancement.
- The use of contractors or outsourcing the handling and loading of special cargo is a common industry practice. The complexity of certificating individuals who are not employees of a company or who are employed outside the United States was not fully addressed; however, concerns were raised about the process and oversight of individuals, especially those personnel located outside the United States.

2.6. DETERMINE WHICH PERSONS OR POSITIONS SHOULD BE CONSIDERED

One of the LCWG's initial tasks was to determine which personnel responsible for performing specific functions of the special cargo load process should be considered in its recommendation. Through these discussions, it became apparent air carriers use many different practices to determine who may perform specific functions associated with the special cargo loading process. Some of these challenges are a result of the new term "special cargo," coupled with no formal regulatory definition for duties assigned to persons commonly referred to as "loadmaster." Rather than focus on a title, which may have a different meaning from one operation to the next, or one air carrier to the next, the working group decided to define the functions for which the individual required to be certificated would be responsible. The two functions identified by the LCWG were—

- **SCAF**—load analysis and planning for special cargo loads in accordance with AC 120–85A.

  A person performing this function outlines the plan to be implemented on the airplane for the carriage of special cargo loads. If the plan is not correct, then it cannot be implemented correctly; therefore, the person(s) responsible for planning special cargo loads may need to be certificated.

- **Special Cargo Loading Supervisor Function (SCLSF)**—validates the special cargo loading plan was implemented correctly on the airplane before dispatch.

  A person performing this function validates the special cargo load plan was implemented as provided. Other individuals may perform the work of loading and executing the special cargo load plan, but the person performing the SCLSF would be responsible for ensuring the work performed was done in accordance with the plan.

A reasonable expectation of the LCWG's work would be for the group to identify the loadmaster as a person or position to be considered for certification. In fact, the title assigned to this ARAC working group in the Federal Register notice contains the term "loadmaster." However, a closer look at the assigned tasking indicates there was a presumption the role of the loadmaster within the industry varies greatly depending on the specific air cargo operation being supported. Moreover, the task refers to "persons engaged in the loading and supervision of the loading of special cargo" rather than listing a specific title.[14] This is a result of having no formal, FAA-regulated definition of a loadmaster that addresses specific functions, privileges, limitations, and requirements. Without a controlled definition, the use of the term "loadmaster" has been applied to individuals who hold different responsibilities in different companies.

[14] "Aviation Rulemaking Advisory Committee—New Task; Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC)," 81 Federal Register 92 (12 May 2016), pp. 29609–29611.

The LCWG determined these two functions provided sufficient coverage for purposes of defining the persons or positions engaged in the load planning and supervision of the loading of special cargo to be used within this report and considered in its final recommendation.

2.6.1. CONSENSUS POSITION

The LCWG continued the discussion regarding both the SCAF and SCLSF and whether these positions should be considered as person(s) or function(s) to be covered by the LCWG's final recommendation. The LCWG reached a full consensus when discussing whether both of these positions should be considered by the LCWG's final recommendation; however, when discussing whether the SCLSF should be considered as a person or function to be covered by its final recommendation, the LCWG reached general consensus that this position should not be considered and decided training for the SCLSF position would be just as effective as certification for this function.

2.6.2. DISSENTING POSITION

Two members voted that both the SCAF and the SCLSF should be included as a function to be considered in the final recommendation. They believed there must be certification for the person responsible for ensuring the actual loading is performed in accordance with the plan provided in the SCAF. The dissenters felt this provides a higher level of accountability than training alone and individuals in the field may need the skills to adjust or modify material provided by the SCAF. They believe only someone with an equivalent level of certification should be allowed to change the SCAF loading plan, which is provided by a certificated person.

2.7. PRESENT THE RECOMMENDATION REPORT AT THE ARAC MEETING

At the request of ARAC, the Chair will present this recommendation report at the June 21, 2018, quarterly ARAC meeting.

2.8. SUMMARY OF WORKING GROUP ACTIVITIES

In summary, the LCWG has determined safety would be enhanced for part 121 air cargo operations involved in the transport of special cargo and the final recommendation will cover persons performing the SCAF. In developing the recommendation, the LCWG considered all methods for addressing the ARAC tasking regardless of whether there is an actual FAA-issued certificate. Combined with the additional measures put into place since the Bagram accident, the LCWG's recommendation is enhanced by the additional focus and attention to the safe transport of special cargo by air.

3. SAFETY ENHANCEMENT OPTIONS CONSIDERED

Using the definitions and boundaries established and discussed in section 2, the LCWG created a framework for evaluating various methods for enhancing safety. These included existing methods used in other areas of aviation and were not limited to those that provided an FAA-issued certificate. Once the LCWG had generated several methods to be considered, the methods were then assessed to determine their—

- Effectiveness at enhancing safety,
- Operational impact,
- Portability,
- FAA impact,
- Impact to industry, and
- Overall financial impact.

Further definition of these evaluation criteria is provided in section 3.2.

3.1. OPTIONS EVALUATED

This section provides an overview of the different methods considered by the LCWG for addressing the task of enhancing safety by certificating persons engaged in the loading and supervision of the loading of special cargo. The LCWG looked at various other methods currently being used by the FAA and the aviation industry for providing certification or authorization of personnel for various duties. These other methods became the options that were adapted and used for providing a similar type coverage for the SCAF. These options include some methods where certificates are issued by the FAA and some methods where an FAA certificate is not issued.

The LCWG evaluated each option's effectiveness in enhancing safety. Each of the options listed here are based on an existing method or model. A detailed description of each option is provided in subsequent paragraphs. The final LCWG recommendation, along with the consensus and dissenting position and overall rationale, may be found in section 4.

The LCWG evaluated the following options for enhancing the safety of the handling and loading of special cargo:

- Require air carriers to have the FAA-Approved Special Cargo Program. This option would not result in an individual being issued an airman certificate by the FAA, but rather would require the air carrier to develop a special cargo training program to ensure adherence to the DAH limitations for the aircraft being used by the air carrier. This program would be approved by the FAA. Individuals would receive an authorization issued by the air carrier after meeting proficiency requirements. This option is based on the approach used to implement an air carrier's hazardous materials (HAZMAT) training program found in part 121 subpart Z. Under that subpart, air carriers are required to establish and maintain a program that meets the requirements of that subpart and ensures personnel performing job functions relating to the transport of HAZMAT by air are trained to comply with the requirements of the Hazardous Materials Regulations (Title 49, Code of Federal Regulations (49 CFR) parts 171–180).
- Amend the regulations for the certification of repairman in subpart E of 14 CFR part 65. This option would add provisions applicable to personnel performing the SCAF to the current provisions applicable to repairman certificates.
- Create a certification process to specifically address the SCAF. This option would amend part 65 by creating a new subpart G to establish a new certificate for persons performing the SCAF.
- Issue a certificate of demonstrated proficiency to a person performing the SCAF. This option was based on the method used to issue certificates of demonstrated proficiency to flight attendants. The certificate would not be an airman certificate. Application and processing would be accomplished by the air carrier in accordance with the applicant meeting a demonstrated level of proficiency using a training program approved by the FAA Administrator.
- Issue a fully portable SCAF certificate. This approach would create a portable certificate, similar to a mechanic certificate, for persons performing the SCAF. The certificate would be based on subpart D of part 65.
- Create a hybrid option. This option would create a new SCAF certificate under new part 65 subpart G and require the air carrier to have the FAA-Approved Special Cargo Program.
- Require a designated FAA representative to perform the SCAF. This option would require the SCAF to be performed by designees and would be administered under 14 CFR part 183 in a manner similar to that used for existing designees.
- Certificate persons performing the SCAF using models based on the certification of airmen other than flightcrew members. This option would certificate persons performing the SCAF based on provisions used for the certification of airmen, such as air traffic controllers, aircraft dispatchers, and parachute riggers.

3.1.1. FAA-Approved Special Cargo Program

This approach would be modeled after the existing, well-understood, approved HAZMAT training program required by 14 CFR part 121 subpart Z to ensure compliance with the HAZMAT regulations contained in 49 CFR parts 171–180. This approach would require development of an FAA-approved training program to ensure compliance with an air carrier's fleet DAH limitations administered by the air carrier.

Benefits:

- **Multiple FAA Reviews and FAA Approval:** The FAA-Approved Special Cargo Program would necessitate FAA oversight to ensure proper procedures are followed, training is developed and implemented according to an air carrier's operation, and policy is carried out in a consistent manner. Both the air carrier's principal operations inspector (POI) and principal maintenance inspector (PMI) would review the program because their roles for special cargo overlap. This is intended to be an intense review and the FAA inspectors may discuss their findings with each other before they ask questions of the air carrier. Requiring multiple FAA inspector reviews of the program increases the intensity of the oversight. The LCWG notes it is common for POIs and PMIs to move to other positions within the FAA and, when this happens—sometimes several times per year—the FAA assigns new inspectors to the air carrier. The thorough review of the FAA-Approved Special Cargo Program would occur every time the air carrier makes a revision to its program. This would increase oversight and knowledge of the air carrier's new procedures.
- **Performance-based:** The requirements for the FAA-Approved Special Cargo Program could be crafted as a performance-based rule. Using the air carrier's safety management system (SMS) to collect data and evaluate the effectiveness of training programs, identifying issues in the field through voluntary reporting, and using that data to continually improve the program would enhance safety. The FAA's review and approval process also would compel the FAA to evaluate continuous improvements. This methodology also aligns with and supports NTSB Recommendation A–15–18, which recommends the FAA "implement temporary risk-reduction methods any time that required surveillance items 14 *Code of Federal Regulations* Part 121 and 135 operators are deferred, and establish appropriate limitations on surveillance deferrals."[15]

[15] National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR-15/01, PB2015-104951, Notation 8710. Adopted 14 July 2015.

- **Easily adaptable to Differences in Air Carrier Operations:** If worded correctly, as in the HAZMAT regulations, the new "Special Cargo Regulations" would allow for the use of contractors, foreign workers, and employees of multiple air carriers to perform the SCAF with differences training. This would be less of a burden on the FAA and air carriers when it is common for contractors, foreign workers, and employees of multiple air carriers to work for other air carriers. Differences training could be accomplished at the other air carriers, as all air carriers have trained their personnel under an approved program. This lowers the need for duplicate training for multiple air carriers, which would save thousands of dollars and countless training hours. Air carriers can track employees, contractors, and vendor personnel more effectively than the FAA.
- **Ease of Training Protocols:** This program could also follow the HAZMAT recognition model by including special-cargo recognition training for all those who handle, distribute, load, plan, and accept special cargo. This option also offers an air carrier flexibility, as it permits training personnel at different levels based on duties performed.
- **Compatibility with Existing AC:** In Safety Recommendation A15–013, the NTSB recommended the FAA revise the guidance material in AC 120–85, "Air Cargo Operations," chapter 201(a)(4), to specify an air carrier should seek FAA-approved data for any planned method for restraining a special cargo load for which approved procedures do not already exist. The NTSB further recommended the FAA remove the language in the AC that states procedures other than those based on FAA-approved data can be used. This proposal would respond to that recommendation by mandating an approved training program is the best way to accomplish this necessary "training."
- **Accordance with Relevant NTSB Recommendation:** NTSB Safety Recommendation A–15–015 recommended the FAA "[a]dd a special emphasis item to Federal Aviation Administration (FAA) Order 1800.56O, 'National Flight Standards Work Program Guidelines,' for inspectors of 14 *Code of Federal Regulations* Part 121 cargo operators to review their manuals to ensure that the procedures, documents, and support in the areas of cargo loading, cargo restraint, and methods for securing cargo on transport-category airplanes are based on relevant FAA-approved data, with particular emphasis on restraint procedures for special cargo that is unable to be loaded via unit loading devices or bulk compartments."[16] The FAA-Approved Special Cargo Program would ensure an FAA-reviewed and approved training program to ensure adherence to the aircraft DAH limitations and would also satisfy this recommendation.
- **FAA CFT Involvement:** The FAA would oversee this program with existing staff and processes and use the FAA CFT as a focal point for approval of the FAA-Approved Special Cargo Program. The POIs, PMIs, and the FAA CFT already would have reviewed the air carrier's manuals and programs and could easily review and approve the program.

[16] National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR-15/01, PB2015-104951, Notation 8710. Adopted 14 July 2015.

Concerns:

- **Various Training Levels:** Depending on the air carrier's operations, different levels of training may be needed (for example, small package carriers compared to charter or aircraft, crew, maintenance, and insurance (ACMI) carriers). This would have to be documented in the appendix/table in any regulation. This could require further tasking to make sure all areas of responsibility are covered.
- **FAA Training:** This would have to be included in the additional training and guidance the FAA is currently developing for POIs and PMIs.

3.1.2. REPAIRMAN SUBPART E

The LCWG originally considered modifying subpart E of 14 CFR part 65.101 and part 65.103 to add language for certification of persons performing the SCAF under this subpart, which covers repairman certificates. When the LCWG attempted to modify this section to add the new SCAF language it became too complicated and not as useful as first envisioned. The LCWG members assigned to this task quickly decided it would be more appropriate to add a new subpart G for special cargo certification and performed no further work to develop this option.

Ease of Regulatory Change: The LCWG discussed amending § 65.1 by adding paragraph (f), **Special cargo analyst**, to that section which lists those certificates, such as repairman and parachute riggers, covered by part 65. This also required amending §§ 65.11 and 65.15, which discuss application, issuance, and duration of certificates. New subpart G would follow the order of current part 65 by adding §§ 65.141, 65.143, and 65.145. The logic and the titles of the sections mirrored current subpart E, but the content was focused only on the SCAF. The first section, § 65.141, **Certificate required**, would list those tasks for which a certificate would be required. The next section, § 65.143, **Eligibility requirements: General**, would list the specific prerequisites needed before one can apply for a special cargo certificate. The last section, § 65.145 **Special Cargo Analysis Function Certificate: Privileges and limitations**, would list the privileges of the certificate and restrictions that may impact the use and terms of suspending, surrendering, or revoking the certificate.

In fact, even though the framework for the certification of repairmen under subpart E provided a good starting point to develop certification requirements for personnel involved in special cargo operations, the group determined modification of those requirements would result in excessive confusion and accordingly has not recommended this option.

3.1.3. REPAIRMAN SUBPART G

This option would create a new subpart, modeled after the preceding subparts in part 65. It would require the FAA to establish a regulatory process to certificate personnel performing the SCAF responsibilities.

Benefits:

- **Familiar process:** This option uses current regulation and guidance structure. This is a much simpler process for the FAA to certificate and perform oversight than other types of certificates.

Concerns:

- **FAA Oversight of Foreign Workers and Contractors:** The LCWG was concerned that a requirement for a certificate would hinder the ability for 14 CFR part 121 air carriers to use foreign contractor repairman who would need to be certificated by the FAA. The working group also was concerned about how the FAA would control these certificates through the air carriers. The LCWG was further concerned about the process that would be used to revoke a repairman certificate applicable to a specific part 121 air carrier for an individual who is supporting multiple air carriers and how to communicate to the other air carriers this individual has lost their privileges, which could be difficult to implement and enforce.
- **FAA Training:** This would have to be included in the additional training and guidance the FAA is currently developing for POIs and PMIs.
- **Training Program Burdens:** Because of the wide variations in how some air carriers use different positions in support of special cargo loads, this method of certification would still require air carriers to provide specific training once the certificate is issued and before performing certificated duties. The FAA may not approve each training program, which would lead to less oversight. In addition, there would be duplication of training among air carriers. Given that many air carriers use contractors, this duplication would raise costs and they would all be required to fully train each position without being able to take advantage of offering only a differences training course.

3.1.4. FLIGHT ATTENDANT

The LCWG considered modeling the SCAF certificate on the requirements currently used to certificate flight attendants. Airmen certificates—such as those issued to pilots, mechanics, repairmen, and dispatchers—are issued under the authority of Title 49, United States Code (49 U.S.C.) § 44703. Flight attendant certificates of demonstrated proficiency, however, are issued under the specific authority contained in 49 U.S.C. § 44728. That statute requires persons serving as a flight attendant aboard an aircraft that has 20 or more seats and is being used to provide air transportation to hold a certificate of demonstrated proficiency. This certificate is not an airman certificate and is issued after the director of operations of an air carrier has determined the person has completed the applicable requirements of a training program approved by the FAA Administrator.

The certificate lists the airplane group for which the certificate is issued. If the LCWG decided to recommend issuance of a certificate to perform certain functions associated with the handling of special cargo, those certificates would be issued under the authority of 49 U.S.C. § 44703, as 49 U.S.C. § 44728 provides specific authority only for the issuance of flight attendant certificates. The FAA could issue a certificate incorporating some of the procedures used in the issuance of flight attendant certificates; however, it would be an airman certificate issued under the authority of 49 U.S.C. § 44703.

Because the issuance of certificates demonstrated proficiency for flight attendants is governed by legislative mandate, the LCWG did not further pursue this method of certification.

3.1.5. AIRFRAME AND POWERPLANT MECHANIC

This option would look specifically at the regulatory requirements for airframe and powerplant (A&P) mechanics and certificate persons performing the SCAF using an approach similar to 14 CFR § 65.71–65.95.

Benefits:

- **Robust Training Requirements:** The primary benefit of this option would be the robust FAA-administered training used for certification of personnel performing the role of the SCAF.

Concerns:

- **Implementation/Administration of Certificate Issuance:** There are no schools, testing facilities, or authorized inspectors for this type of certification. These would all have to be put in place to allow certification. To do so would be very time consuming and costly—as it would require the FAA to introduce into the rules not only requirements for certification of the person performing the SCAF, but also for developing testing procedures—and delegate designees to administer tests and exams. The FAA also would have to address the issuance and monitoring of the licensing by FAA personnel. Test facilities would have to be identified and materials created and validated to ensure they appropriately cover a wide array of aircraft types and accompanying procedures.
- **Rating, Skills, and Knowledge Differences:** 14 CFR part 65 does not provide for a rating for a person performing the SCAF. This would have to be either written in as a separate certification or added as an alternate provision of an already-existing certification. A review of the regulation shows this is not practical because a person performing the SCAF has a skill and knowledge set which does not align with the qualifications of any existing airman certification.
- **Training Program Burdens:** Because of the wide variations with how some air carriers use the person performing the SCAF in support of special cargo loads, this method of certification would still require air carriers to provide specific training once the certificate is issued and before performing certificated duties. The FAA may not approve each training program, which would lead to less oversight. In addition, there would be duplication of training among air carriers. This duplication would raise costs given many air carriers use contractors and they would all be required to fully train each loadmaster without being able to take advantage of offering only a differences training course.
- **FAA Training:** This would have to be included in the additional training and guidance the FAA is currently developing for POIs and PMIs.

3.1.6. HYBRID (FAA-APPROVED SPECIAL CARGO PROGRAM AND REPAIRMAN SUBPART G)

This model would combine the benefits of the FAA-Approved Special Cargo Program and the Repairman Subpart G models, thereby providing a comprehensive FAA and air carrier certification and training approach for personnel involved in the preparation of special cargo load plans.

Benefits:

- **FAA and Air Carrier Responsibility:** Allows for direct FAA oversight of its certificated personnel and air carrier responsibility over its training program.

Concerns:

- **Multiple Certifications:** Personnel are individually certificated by the FAA while the air carrier is also certificated by the FAA. It may be difficult to determine where the duties fall for the FAA and the air carrier. The confusion created could result in conflicting or missing instruction.
- **Cost:** The cost to maintain the program would increase for both air carriers and the FAA.
- **Other FAA Office Involvement:** The Flight Standards Service Office (FSSO) may have to approve instead of accept a special loads section in the WBM (or an entire WBM) and follow 14 CFR part 91 for certification. This would increase the complexity of the FSSO to be fully functional in both an approved manual and part 91 special loads certification.
- **Flexibility for Use of Contractors:** The LCWG was concerned about the ability of 14 CFR part 121 air carriers to use foreign contract repairmen who would have to be certificated by the FAA. The working group also was concerned about how the FAA would control these certificates through the air carriers. The LCWG was further concerned about the process that would be used to revoke a repairman certificate applicable to a specific part 121 air carrier for an individual who is supporting multiple air carriers and how to communicate to the other air carriers this individual has lost their privileges, which could be difficult to implement and enforce.
- **Various Training Levels:** Depending on the air carrier (for example, small package, charter, or ACMI carrier), different levels of training may be needed. This could require further tasking to make sure all areas of responsibility are covered. Because of the complexity of training and the needs of different air carriers, this could become very burdensome on both the air carrier and the FAA to describe/annotate the authorizations and limitations on the repairman certificate.
- **FAA Training:** This would have to be included in the additional training and guidance the FAA is currently developing for POIs and PMIs.

3.1.7. DESIGNATED FAA REPRESENTATIVE

This option would authorize a person to perform the SCAF using a method similar to the designated engineering representative (DER) process as outlined in FAA Order 8110.37.

Benefits:

- **FAA Oversight:** This method supports the need for experts in the area of analysis using published airplane limitations. It would allow FAA oversight at the Aircraft Certification Office (ACO) and provide a very robust process which controls the individual completing the work, as it would require recurrent activity review by the FAA as well as annual recurrent training for the DER.

Concerns:

- **Not Applicable to All Job Functions:** The DER process method would not be appropriate for the SCLSF position. The SCLSF is for ensuring the proper execution of the already-approved SCAF plan. Because the person responsible for the SCLSF would not create any additional data, he or she would not complete a form similar to the DER form 8110–3. This lack of documentation of the SCLSF accomplishment would make recurrent reviews difficult to perform and present a problem in ensuring FAA management of their activities.
- **FAA Burden:** The designated FAA representative is appointed to act as the representative of the FAA Administrator. In accordance with 14 CFR part 183, this would require a local Flight Standards person to administer the selection process, causing a burden on local FSSOs from selection to administration. The designated FAA representative authority is typically given to licensed persons, such as aviation medical examiners, pilot examiners, technical personnel examiners, and designated aircraft maintenance inspectors. DERs may not have a formal license, but will usually have a higher level of formal education. It would be extremely difficult for the FSSO to measure the level of complexity under this program if applied to a SCAF when the FSSO would have to be the expert not relying on prior assumed knowledge. This would put an additional burden on the FAA ACO, which is already overtasked, creating another concern of timeliness in issuing the designation.
- **FAA Training:** This would have to be included in the additional training and guidance the FAA is currently developing for POIs, PMIs, and the ACO personnel.

3.1.8. AIRMEN OTHER THAN FLIGHTCREW MEMBERS

Under 14 CFR part 65, the group considered the processes for certificating mechanics and repairman, but it did not consider three other groups listed in part 65: air traffic controllers, aircraft dispatchers, and parachute riggers. An LCWG member suggested reviewing certification procedures for all airman other than flightcrew members under part 65 as an alternative. The group discussed this and determined the three other groups cited under part 65 do not contain any framework that could be used towards developing requirements for the certification of persons involved in operations involving special cargo.

Benefits:

- **None Identified:** There were no apparent benefits to this type of certification.

Concerns:

- **Overly Burdensome:** Certification based upon part 65 requirements for air traffic controllers, dispatchers, and parachute riggers would be extremely confusing, would not address working members' concerns, and would incur excessive time and costs without providing commensurate benefits.

3.2. EVALUATION ASPECTS

The LCWG assessed each of the models using the following aspects:

- **Effectiveness at Enhancing Safety:** accident/incident prevention (equipment and loss of life), awareness;
- **Operational Impact:** initial effort associated with implementing, considering air carriers, individual personnel, and the FAA;
- **Portability:** the ability or flexibility to allow individuals to support multiple air cargo operations;
- **FAA Impact:** the FAA's ongoing efforts associated with oversight, generation, and maintenance of training materials and administration of the method (did not consider effort associated with rulemaking);
- **Impact to Industry:** industry's ongoing efforts associated with oversight, generation, and maintenance of training and guidance material, program administration (effort associated with rulemaking not considered); and
- **Overall Financial Impact:** the overall benefit/cost impact to 14 CFR part 121 operators involved in transport of special cargo as realized through implementation of a particular option.

3.2.1. LIKERT SCALE

The Likert Scale is a point scale commonly used to allow the individual to express how much they agree or disagree with a statement or concept. It is the most widely used approach to scaling responses in survey research, such that the term (or more accurately the Likert-type scale) is often used interchangeably with a rating scale, even though the two are not synonymous. The scale is named after its inventor, psychologist Rensis Likert.

The LCWG used a Likert Scale to allow each member to express, in numerical form, the perceived effectiveness of each model identified for the evaluation aspects described above. Each alternative was given a 0–10 rating, with 10 being the most positive outcome and 0 being the most negative. No factoring was used and all categories were weighted equally. The highest total score indicated the solution was the most beneficial; however, the LCWG could elect to support or recommend a lower-scored option based on additional factors discussed by the working group members.

3.2.2. FURTHER EVALUATION OF OPTIONS WITH BEST SCORES

As the LCWG initially considered the eight different options for enhancing safety for transport of special cargo using a Likert Scale along with the aspects identified in section 3.2, two options rose above the other six. These two were the FAA-Approved Special Cargo Program and the Repairman Subpart G option. The other six options had one or more issues that prevented them from scoring as well. Many of these six options were impacted by a perceived high cost of implementation for both the FAA and industry, and many options did not score well because of the limiting nature or lack of portability the approach offered.

After the initial evaluation of options, the two best scoring options, the FAA-Approved Special Cargo Program and the Repairman Subpart G, were further evaluated in more detail. The options were evaluated to consider their applicability to the following elements, previously discussed in section 2:

1. Considering mitigation activities implemented since the NTSB recommendation was issued,
2. Applying the SCAF as the role the LCWG considered in addressing the ARAC tasking,
3. Limiting the scope to part 121 operations, and
4. Using the latest FAA definition for special cargo.

The following provides further discussion of those aspects when comparing the FAA-Approved Special Cargo Program to the Repairman Subpart G options, along with some comments—as appropriate—regarding the other options evaluated:

- **Effectiveness at Enhancing Safety:** Most of the options were fairly close in their effectiveness at enhancing safety of special cargo operations. The LCWG agreed the Designated FAA Representative option was least effective because of its failure to provide appropriate levels of certification coverage to both the SCAF and SCLSF positions (or other operational function as deemed appropriate), because these operational roles would generate no data to facilitate oversight of the role. Between the FAA-Approved Special Cargo Program and the Repairman Subpart G options, the

LCWG perceived the FAA-Approved Special Cargo Program had a slight advantage because this type of program could be used to provide awareness training of what is considered special cargo to a larger audience, similar to the awareness training that is part of existing carrier HAZMAT programs. Having this type of training available could help to ensure those who do not intend to carry special cargo, and who may not have the appropriate procedures and knowledge to do so, do not inadvertently carry special cargo because of their inability to identify it.

- **Operational Impact:** The LCWG agreed the two options with the most potential for negative impact to both air carriers and regulators were the A&P Mechanic and the Airmen Other than Flightcrew Members options. The rationale for this was the perceived amount of effort to create industry training materials and the generation of oversight procedures to be used by the FAA for ongoing monitoring of these individuals. The other options all had a perceived equivalent level of impact, with the Repairman Subpart G model providing slightly less impact than the FAA-Approved Special Cargo Program model. The rationale for this was because it was perceived the FAA-Approved Special Cargo Program may impact more people overall because of the awareness training discussed above. Even though the amount of additional training is perceived to be very small, it would still have a slightly larger impact over that of the Repairman Subpart G option.
- **Portability:** All of the options evaluated were fairly equal in their ability or flexibility to allow individuals to support multiple air cargo operations. The LCWG agreed the Designated FAA Representative option was least effective in supporting portability between air carriers. The FAA-Approved Special Cargo Program and the Repairman Subpart G options were both evaluated by the LCWG to be equally effective in supporting portability.
- **FAA Impact:** Both the FAA-Approved Special Cargo Program and the Repairman Subpart G options were rated to have the least impact on the FAA when considering the material and effort required to support ongoing oversight, training, and administration. This was a significant contributing factor to the low score for the Designated FAA Representative option, as it was perceived there would be a high impact to both the FAA and the industry to institute a system similar to the DER system requiring an FAA Order similar in nature to 8110.37.

- **Impact to Industry:** The options perceived to result in the most negative impact to industry were the Airman Other than Flightcrew Members and the A&P Mechanic options. The rationale behind this was the need for new materials and systems to ensure records demonstrating required compliance in accordance with the FAA certification and oversight of the person performing the SCAF are maintained by the air carrier. When comparing the FAA-Approved Special Cargo Program to the Repairman Subpart G option, the LCWG agreed the Repairman Subpart G model created slightly less impact to industry because of the need for awareness training under the FAA-Approved Special Cargo Program. Even though the amount of additional training would be small, it would still have a slightly larger impact than the Repairman Subpart G option. Because there is a potential for more people to be impacted within the industry by this type of training approach, the Repairman Subpart G model was agreed to have the least impact of the two options.
- **Overall Financial Impact:** The options perceived to result in the most negative overall financial impact were the Airman Other than Flightcrew Members and the A&P Mechanic options. The rationale behind this was the need for new materials and systems to ensure records demonstrating required compliance in accordance with the FAA certification and oversight of the person performing the SCAF are maintained by the air carrier. Both the FAA-Approved Special Cargo Program and the Repairman Subpart G options were determined to have the least overall financial impact when considering the material and effort required to support ongoing oversight, training, and administration.

4. WORKING GROUP RECOMMENDATION

After further evaluating the remaining two options, the LCWG determined, by general consensus, the FAA-Approved Special Cargo Program option was preferred for addressing the ARAC tasking. This FAA-Approved Special Cargo Program would identify the specific training required to confirm adherence to the DAH limitations and set forth the requirements for the knowledge, abilities, and skills required for the SCAF in support of a specific air carrier's special cargo operations.

4.1. DISSENTING POSITION FOR RECOMMENDATION

There was one dissenting position for this recommendation, which preferred the Repairman Subpart G option. The dissenting position states the Repairman Subpart G option ". . . creates a certification for personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes," which the ARAC tasking is asking for and the NTSB recommended. During face-to-face meetings, the group respectfully acknowledged and discussed the dissenting position.

The dissenting position believes a 14 CFR part 65 certification would provide for a standardized minimum level of skill, knowledge, and experience for air carrier employees and/or those contracted to the air carrier. The FAA would provide a certain level of oversight for the certification process and would ultimately be responsible for issuing and/or revoking certificates. The processes required to complete an individual's certification would be much more structured and transparent than what is currently done in the industry. The FAA's direct role with the certificated individual would add another layer of safety and accountability.

The dissenting position does not believe the FAA-Approved Special Cargo Program satisfies the ARAC tasking or the NTSB recommendations. It lacks a certification for persons engaged in operations involving the loading of special cargo, specifically, personnel responsible for the loading, restraint, and documentation of special cargo loads. It also does not recommend appropriate knowledge, experience, and skill requirements.

According to FAA ARM Committee Manual, "if a dissenting member(s) presents a written objection, the working group documents its position relative to the objection with the reason why the working group chose and retains its position."[17] To review the full details and rationale for the dissenting position and the consensus response, see Appendix A.

4.2. GENERAL CONSENSUS RECOMMENDATION

By general consensus, the LCWG recommends the FAA require air carriers conducting operations under 14 CFR part 121 to have the FAA-Approved Special Cargo Program. The working group strongly feels this option provides the best framework to enhance safety and allows the flexibility necessary for air carriers to implement a comprehensive program with a broader scope than certification. When deliberating on the option of FAA certification, the LCWG realized certification could prove very challenging for some air carriers to implement and

[17] Federal Aviation Administration Quality Management System. *The Office of Rulemaking Committee Manual ARM-001-015.* 2 February 2015. Page 95.

fall short of key elements that would offer more in safety benefits. The FAA-Approved Special Cargo Program would ensure air carriers are providing general awareness training for those who could be in a position to handle special cargo, but would not necessarily be in the same group of individuals that were certificated. Moreover, the implementation of this program by air carrier employees working outside the United States and contractors would be far more adaptable than a certification process. A potentially larger pool of individuals would be covered by this program. It also would be scalable to fit the size of the air carrier, while still providing FAA oversight through the FAA approval process and continuous improvement through SMS. For more details on the general consensus position and rationale for the recommendation, see Appendix A.

The FAA-Approved Special Cargo Program is based on a similar model already being used by the air cargo industry, part 121 subpart Z, Hazardous Materials Training Program. This program is very familiar to both the air carriers and the FAA. The FAA could certainly apply the regulatory framework provided in part 121 subpart Z to implement the FAA-Approved Special Cargo Program.

Although the FAA-Approved Special Cargo Program details would likely vary from air carrier to air carrier, there are certain minimum training elements that should be included:

1. General awareness/familiarization training: a larger population of employees should be trained on how to identify special cargo. Additionally, training should include company procedures on whom to contact when special cargo is recognized.
2. Function-specific training: any personnel exercising the SCAF responsibilities (a baseline skill set can be found in AC 120–85 under "Special Cargo Analysis Function (SCAF)" and "SCAF Responsibilities").
3. Ensure adherence to the DAH limitations.

The following provides the additional considerations used by the LCWG in arriving at the general consensus position:

- The FAA-Approved Special Cargo Program option provides an overall approach with an approved program. This ensures the air carrier can determine the appropriate knowledge and skills required for personnel performing a SCAF to comply with the DAH limitations in support of transporting special cargo.
- Many LCWG members believe the FAA-Approved Special Cargo Program option provides more assurance that contractors are covered appropriately for the function they are providing to the operation for which they have been contracted.
- Using an approach based on an existing model that is also used to mitigate the specific risks associated with the transport of a subset or category of cargo goods, such as HAZMAT, demonstrates the risks associated with the transport of special cargo could be mitigated in a similar manner through the FAA-Approved Special Cargo Program and without the need to provide FAA certification of personnel.

4.3. ADDITIONAL CONSIDERATIONS

In accordance with its tasking, the LCWG further discussed the possible effect on impacted parties.

4.3.1. ECONOMIC IMPACT

In developing this model, the LCWG researched incidents or accidents related to special cargo. The research covered 1993 through 2016 and involved part 121 U.S. registered transport category aircraft. One of the challenges was performing the search for incidents or accidents involving special cargo. Because the term "special cargo" had only been recently defined by the FAA (see section 2.4.3 for discussion on definition of "special cargo"), identifying any accident/incident which specifically involved special cargo was difficult.

Another challenge was that the FAA Inspector Accident Reporting Worksheet used to assign causal factors does not list cargo as a causal factor. It must be explained in a narrative text, which makes retrieving the information very difficult; therefore, the LCWG identified accidents or incidents involving special cargo by determining if special handling had likely been required for transport of the cargo as identified in the report narrative. Using this method, the search only identified five accidents or incidents that could be classified as involving special cargo. The oldest of these occurred in 2005. Because there is not a robust or accurate method to establish which incidents or accidents involved special cargo, the LCWG's ability to find applicable data that would support certification for special cargo was limited.

The LCWG used those accidents involving special cargo in the development of a benefits and cost impact model. Both the FAA-Approved Special Cargo Program and the Repairman Subpart G options were applied to this model. The full results of this model may be found in Appendix C.

4.3.2. RULE—PERFORMANCE-BASED

The FAA-Approved Special Cargo Program could be constructed and established in such a manner as to support a performance-based rule. The determination of the SCAF is based on specific job functions aligned with the DAH limitations; therefore, the training elements could be adapted to those job functions. The continuous improvement and oversight of the FAA-Approved Special Cargo Program could be accomplished through the air carrier's SMS program. Air carriers could collect data evaluating how effective their training programs are by reviewing issues they see in the field through voluntary reporting. The air carrier would then use this data to continually revise and improve its program. This would require the FAA to evaluate the new material under the approval process using their SAS, which is a risk-based process.

4.3.3. OVERSIGHT

The LCWG acknowledged the challenge will be establishing a framework to ensure the required oversight and training remain in place over time to support any option chosen by the FAA in addressing NTSB recommendation A–15–014. Without a robust framework to maintain a level of awareness within the industry, all the mitigations outlined in section 2.4.1 could be forgotten and replaced. The FAA-Approved Special Cargo Program framework includes items such as—

- Approved procedures tied directly to the DAH limitations;
- Effective and recurring FAA oversight;
- Easily understood and manageable system for both the air carrier and the FAA;
- Easily implemented into SMS;
- Cost effective for both the FAA and the air carrier;
- Promotes interdependency, which inspires critical thinking and ensures consistency;
- Awareness training for all involved to ensure everyone understands what special cargo is and what to do if it is encountered;
- Adaptable to all air carriers; and
- Adaptable to all aircraft, both present and future.

The LCWG general consensus position recommends the FAA-Approved Special Cargo Program as the best option to satisfy the ARAC tasking.

5. GLOSSARY

Acronyms and Abbreviations

14 CFR	Title 14, Code of Federal Regulations
49 CFR	Title 49, Code of Federal Regulations
49 U.S.C.	Title 49, United States Code
A&P	Airframe and Powerplant
AC	Advisory Circular
ACMI	Aircraft, Crew, Maintenance, and Insurance
ACO	Aircraft Certification Office
AD	Airworthiness Directive
AFM	Airplane Flight Manual
AFS–300	Flight Standards, Aircraft Maintenance Division
AGC	Office of the Chief Counsel
ALPA	Air Line Pilots Association, International
APO	Office of Aviation Policy and Plans
APO–300	Office of Aviation Policy and Plans, Regulatory Analysis Division
ARAC	Aviation Rulemaking Advisory Committee
ARM	Office of Rulemaking
AS	Aerospace Standard
BCF	Boeing Converted Freighter
CAA	Cargo Airline Association
CAMI	Civil Aerospace Medical Institute
CANIC	Continued Airworthiness Notification to the International Community
CFT	Cargo Focus Team
CG	Center of Gravity
CLS	Cargo Loading System
COMAT	Company Material
DAH	Design Approval Holder
DER	Designated Engineering Representative
DGR	Dangerous Goods Regulations
FAA	Federal Aviation Administration
FACA	Federal Advisory Committee Act

FSSO	Flight Standards Service Office
FTFP	Failure to Follow Procedures
HAZMAT	Hazardous Materials
IATA	International Air Transport Association
InFO	Information for Operators
JIMDAT	Joint Implementation Measurement Data Analysis Team
LCWG	Loadmaster Certification Working Group
M–ATV	MRAP All-Terrain Vehicle
MRAP	Mine-Resistant Ambush-Protected
MTO	Multimodal Transport Operator
NACA	National Air Carrier Association
NAS	National Aerospace Standard
NTSB	National Transportation Safety Board
OpSpec	Operations Specification
PLA	Professional Loadmaster Association
PMI	Principal Maintenance Inspector
POI	Principal Operations Inspector
SAE	Society of Automotive Engineers
SAFO	Safety Alert for Operators
SAS	Safety Assurance System
SCAF	Special Cargo Analysis Function
SCLSF	Special Cargo Loading Supervisor Function
SE	Safety Enhancement
SF	Special Freighter
SMS	Safety Management System
STC	Supplemental Type Certificate
TC	Type Certificate
TCDS	Type Certificate Data Sheet
TSO	Technical Standard Order
ULD	Unit Load Device
UPS	United Parcel Service
W&B	Weight and Balance

WBCP Weight and Balance Control Program

WBM Weight and Balance Manual

Definitions

Aircraft Loading Schedule. The loading schedule is used to document compliance with the certificated W&B limitations contained in the manufacturer's AFM and WBM. The loading schedule is developed by the air carrier based on its specific loading calculation procedures and provides the operational limits for use with the air carrier's W&B program accepted under AC 120–27E, Aircraft Weight and Balance Control.

Approved Unit Load Device (ULD) Cargo. Cargo loaded into a ULD, as defined by NAS 3610, SAE AS 6100, and TSO C90, or other approval standards, that is approved for carriage within the airplane as specified in the AFM/WBM approved by the TC or STC.

Bulk Cargo. Cargo usually transported as individual pieces and loaded into a compartment approved for bulk cargo by the AFM/WBM that is approved by the TC or STC. These items are generally loaded planeside and loaded directly into the bulk compartment.

Cargo. Passenger-checked baggage, freight, COMAT, special cargo, and HAZMAT. Cargo does not include passenger carry-on baggage.

Cargo Handling. An air carrier's methods of accepting, weighing, securing, and transporting cargo on the ground, as well as the loading and unloading of an aircraft.

Cargo Loading System (CLS). Equipment installed to the floor of an aircraft cargo compartment to restrain aircraft ULDs against the ground/flight loads. It usually consists of such items as rollers, side guides, and locks for securing ULDs to the aircraft structure. It does not include ULDs, barriers, and tiedown straps.

NOTE: The CLS is certified as part of either the aircraft's TC or an STC.

Certified Unit Load Device (ULD). A ULD meeting the requirements of TSO C90, Cargo Pallets, Nets and Containers (Unit Load Devices), as amended; STC requirements, if applicable; or other FAA-approved certification standards.

Company Materials (COMAT). Company material, commonly called COMAT, is an industry term used by air carriers to describe nonrevenue materials and supplies owned by the air carrier that are shipped by the air carrier in support of its operations.

Design Approval Holder (DAH). Aircraft manufacturers TC Holder and or STC Holder.

Floating Pallet. A ULD positioned over one or more pallet position and not fully restrained by the aircraft ULD restraint system but restrained to the aircraft structure by means of strapping to tiedown fittings.

Hazardous Materials (HAZMAT). Materials or substances meeting the definition of hazardous material in Title 49, Code of Federal Regulations (49 CFR) part 171, § 171.8.

Load Supervisor. An air carrier-determined name, such as loadmaster or load lead, identifying the job function of the person with overall responsibility for supervising the loading of the aircraft. This person is responsible for signing the load manifest. Refer to Title 14, Code of Federal Regulations (14 CFR) part 121, § 121.665, Load Manifest.

Multimodal transport. Also known as combined transport, this is the transportation of goods under a single contract but performed with at least two different means of transport; the air carrier is liable (in a legal sense) for the entire carriage, even though it is performed by several different modes of transport (by rail, air, and road, for example). The air carrier does not have to possess all the means of transport, and in practice usually does not; the air carriage is often performed by sub-carriers (referred to in legal language as "actual carriers"). The air carrier responsible for the entire carriage is referred to as an MTO.

Overhang Cargo. Cargo that extends beyond the perimeter of the pallet in at least one direction but still allows the net to perform its intended function. The pallet can still be restrained by the CLS and does not require additional straps to the aircraft structure.

Outsized Cargo. Cargo that exceeds the maximum allowable contour of an aircraft ULD such that the ULD must be loaded on board an aircraft as a non-CLS restrained ULD.

Pallet (Air Cargo). A flat platform with flat under-surface of standard dimensions, on which cargo is assembled and secured and which interfaces directly with the aircraft handling and restraint system.

Restraint. The securing of the cargo payload to the aircraft structure for flight and other loads.

Rigid Cargo. Cargo with a density that is rigid in nature, as defined in the aircraft manufacturer's W&B document.

Shoring. Utilization of beams to redistribute or "spread out" cargo loads beyond the cargo dimensions.

Special Cargo. Cargo that requires special handling and securing/restraining procedures within the limitations specified in the AFM/WBM approved by the TC/STC. Special cargo may be enclosed in an approved bulk compartment if the WBM has limitations supporting procedures for securing and restraining the special cargo.

Special Handling Procedures. Additional or unique procedures, as determined by the air carrier, which may be required for some cargo to protect the cargo or the aircraft during handling acceptance, loading, or in flight. HAZMAT must be handled per regulatory requirements.

Unit Load Device (ULD). A device for grouping, transferring, and restraining cargo for transit. It may consist of a pallet with a net or it may be a container.

Vendor. Any person or entity performing a service for the air carrier. This includes, but is not limited to, a freight forwarder, service providers, contractor, subcontractors, customs brokers, shipper, and another air carrier that performs cargo buildup, aircraft loading, and unloading for the air carrier. This also includes repair services provided by an FAA-certificated entity.

6. REFERENCES

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10. National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR–15/01, PB2015–104951, Notation 8710. Adopted 14 July 2015.

APPENDIX A. DISSENTING POSITION FROM PROFESSIONAL LOADMASTER ASSOCIATION AND CONSENSUS RESPONSE

The following dissenting position is submitted from the Professional Loadmaster Association representative. The PLA does not believe the FAA-Approved Special Cargo Program satisfies the Aviation Rulemaking Advisory Committee (ARAC) task[18] or the National Transportation Safety Board (NTSB) recommendations[19]. It lacks a certification for persons engaged in operations involving the loading of special cargo loads[20], specifically, personnel responsible for the loading, restraint, and documentation of special cargo loads[21]. Additionally, The General Consensus Recommendation does not establish or "recommend appropriate knowledge, experience, and skill requirements for the issuance of the certificates and appropriate privileges and limitations" as stated in the original tasking in the Federal Register[22], nor does it address the critical relationship/impact of special cargo to center of gravity limitations[23]. A draft for a proposed Title 14, Code of Federal Regulations (14 CFR) Part 65 Sub-part G was submitted which addressed all the issues above.

- Allowing air carriers to determine knowledge, skills and limitations as supported by the FAA-Approved Special Cargo Program continues and endorses the very industry conditions that were present in the National Airlines crash in Bagram, Afghanistan and in the Fine Air crash in Miami, Florida[24]. Additionally, allowing air carriers to determine and control specific training requirements and training levels does not support the FAA's belief that FAA oversight "outside of that normally conducted of a certificate holder's operations . . . is especially critical when special cargo is carried in an aircraft[25]."

- After the Fine Air crash, "the NTSB expressed concern that other cargo operators may have the same deficiencies that Fine Air had in its cargo loading and handling training programs[26]." In its follow-up, the FAA conducted audits of 14 CFR Part 121 supplemental cargo operators, and subsequently issued AC 120–27E and AC 120-85[27]. AC 120-27E provided weight and balance guidance for aircraft operated under 14 CFR

[18] Federal Register/Vol. 81, No, 92/Thursday, May, 12, 2016/Notices. Page 29609, Column 3.
[19] Ibid.
[20] Ibid.
[21] Ibid., Page 29610, Column 2.
[22] Federal Register/Vol. 81, No, 92/Thursday, May, 12, 2016/Notices. Page 29610, Column 2.
[23] Ibid.
[24] National Transportation Safety Board, Accident Report, *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan April 29, 2013*, NTSB/AAR-15/01, PB2015-104951, Notation 8710, Adopted July 14, 2015. Paras 1.10.5.4, 1.11.2.1, 2.4.1.
[25] Federal Register/Vol. 81, No, 92/Thursday, May, 12, 2016/Notices. Page 29610, Column 2.
[26] National Transportation Safety Board, Accident Report, *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan April 29, 2013*, NTSB/AAR-15/01, PB2015-104951, Notation 8710, Adopted July 14, 2015. Para 1.11.2.1.
[27] Ibid.

Parts 91 Subpart K, 14 CFR Part 125, and 14 CFR Part 135, not just 14 CFR Part 121[28]. AC 120–85 was not mandatory[29]. A 14 CFR Part 65 Certification will provide for a standardized minimum level of skill, knowledge and experience for air carrier employees, and/or those contracted to the air carrier.

- Proponents of the FAA-Approved Special Cargo Program emphasize the safety benefits of increased awareness in identifying Special Cargo. Identification of Hazardous Material is important for safe flight operations because of the wide variety of Hazardous Materials that can be entered into the air transportation system (intentionally or mistakenly) because they may appear to the untrained eye to be general cargo. Awareness is not the primary issue with respect to Special Cargo, but rather knowledge and skill with respect to loading, and restraint calculation and application. Most Special Cargo is readily identifiable by its physical characteristics and is not likely to enter the air transportation system via the general public, as is possible with Hazardous Materials. Reference the Bagram crash, National Air Cargo personnel had e-mailed National Airlines asking about any "additional precaution" concerning subject cargo,[30] showing clearly that "awareness" was not an issue in the accident, but rather experience, skill, training and accurate publications[31].

- The General Consensus Recommendation for a training program based on the existing HazMat model ignores the fact that Hazardous Material Training directs compliance with existing national and international publications (CFR 49 and IATA Dangerous Goods Regulations) which have been refined over decades. No such regulation exists for Special Cargo. Hazardous Material packaging and certification is concerned with the specific commodity being shipped, and whether it is a passenger or cargo-only aircraft, rather than the model-design-series of aircraft that it is carried on. Safe and correct loading and restraint of all cargo, to include Special Cargo, is necessarily driven by the model-design-series of aircraft that the subject cargo is carried on, thus preventing a single publication to be practical for Special Cargo loading training. This training must absolutely focus on specific technical skills, supplemented by training on the particular aircraft used by the air carrier. Pilots, while already having a pilot license, still receive training by the airline they work for and on the equipment they operate. A Part 65 Sub-part G certification provides for this type of training and the flexibility to tailor the training to the air carrier's needs.

[28] Federal Aviation Administration, Advisory Circular 120-27E, June 10, 2005. Paras 1.a.
[29] Federal Aviation Administration, Advisory Circular 120-85, June 20, 2005. Para 100.b.
[30] National Transportation Safety Board, Accident Report, *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan April 29, 2013*, NTSB/AAR-15/01, PB2015-104951, Notation 8710, Adopted July 14, 2015. Para 1.10.2.1.
[31] Ibid., Paras 2.1, 3.1 #5, 3.1 #6, 3.2.

- The LCWG elected not to use the term "Loadmaster" but instead used the term "SCAF" (Special Cargo Analyses Function). Both the Federal Register and the NTSB cite "the loadmaster's improper restraint of the cargo . . ."[32] which was deemed causal to the National Airlines B-747 crash. The term "SCAF" does not appear in in either the ARAC tasking in the Federal Register, or the NTSB report. Although not all air carriers have loadmasters, the term "Loadmaster" is accepted and understood in the air cargo industry. There are many different jobs involved in the loading and movement of cargo planes whether point-to-point, charter or ACMI operations. The lack of a FAA definition for Loadmasters and other positions has in some cases enabled the misappropriation of the Loadmaster duty title. The NTSB used the term "Loadmaster" throughout the report(s) concerning the Bagram 747 crash. The FAA has used the term Loadmaster in several publications to include but not limited to, job announcements, AC-120–85A and SAFO 13005. In fact, SAFO 13005 states, "Use at least a qualified loadmaster and a trained staff member to ensure loading and restraint processes are in accordance with your approved weight and balance program;". The reluctance of the LCWG to accept the Loadmaster duty position and title will only prolong the obstacles to the FAA exercising the much-needed oversight[33] of this critical safety-sensitive position.

Direction and standards from the FAA are needed in the field. During the investigation of the National Airlines crash, "The POI said that the review of loadmasters was based on other carriers' best practices because there was no guidance for the oversight of loadmasters and that the lack of guidance 'was part of the problem'[34]." A Part 65 Sub-part G certification will provide clear standards of knowledge, establish needed experience and skill requirements, and delineate privileges and limitations. A Part 65 Sub-part G will greatly improve safety in the transportation of Special Cargo not only for 14 CFR Part 121 operations, but also for operations falling under 14 CFR Parts 91 Subpart K, 14 CFR part 125 and 14 CFR part 135.

[32] Federal Register/Vol. 81, No, 92/Thursday, May, 12, 2016/Notices. Page 29610, Column 1.
National Transportation Safety Board, Accident Report, *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan April 29, 2013*, NTSB/AAR-15/01, PB2015-104951, Notation 8710, Adopted July 14, 2015. Para 3.2.

[33] Federal Register/Vol. 81, No, 92/Thursday, May, 12, 2016/Notices. Page 29610, Column 2.

[34] National Transportation Safety Board, Accident Report, *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan April 29, 2013*, NTSB/AAR-15/01, PB2015-104951, Notation 8710, Adopted July 14, 2015. Para 1.10.5.2.

Position and Rationale for General Consensus Recommendation

The general consensus recommendation, for 14 CFR part 121 air carriers who transport special cargo do so in accordance with the FAA-Approved Special Cargo Program. The recommendation was supported by eleven of the twelve LCWG members. One member of the group dissented with the recommendation, and that dissent can be found in section 4.1, with full details and rationale for the dissenting position above in Appendix A. The dissent is filed on behalf of the PLA. The dissenter favored adopting a regulation to be codified within the existing 14 CFR part 65 and creating a new subpart G to apply to "personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes."

While on its face modeling a regulation after existing part 65 seems to be a reasonable approach, doing so would create significant challenges for the air cargo industry. The dissenter in section 4.1 states, "part 65 certification would provide for a standardized minimum level of skill, knowledge, and experience for air carrier employees and/or those **contracted to the air carrier**" (emphasis added). It is extremely important to note the use of contractors or outsourcing the handling and loading of special cargo is common industry practice. Also, air carriers commonly employ foreign workers located outside the United States who are responsible for special cargo loads. Before any regulation is mandated, the agency must consider the impact on the regulated party. The complexity of FAA certificating individuals who are not employees of a company or employed outside the United States raised significant concerns about the process and oversight of these individuals. The dissent presumes FAA oversight would somehow be more effective with part 65 certification, but it does not address how that would apply to the many personnel located outside the United States. Moreover, for FAA certification under part 65 to be effective, an established and clear revocation procedure must be in place. It is unclear how any revocation procedures would be practical, much less feasible, with contractors of the air carrier working outside the United States. The FAA does not presently have regulatory authority over ground handling companies, who employ many of the workers who assist air carriers with special cargo loading and handling.

As an example, ground handler "ABC" contracts with four different air carriers. "ABC" supplies labor that handles special cargo. The FAA issues a certificate to these persons. However, if an "ABC" employee violates a procedure for one 14 CFR part 121 air carrier, it is presumed the carrier would notify the FAA to suspend or revoke that certificate. Because the "ABC" ground handler is not a regulated party, the ground handler has no obligation to notify the FAA of the violation, nor does the FAA have an obligation to notify "ABC" that the certificate has been suspended or revoked. An unsafe condition could arise if a person has their certificate suspended for one air carrier but could still be performing the function for other part 121 air carriers. This is a situation that part 121 air carriers cannot accept. Simply put, creating a subpart G under 14 CFR part 65 is not viable given the complexity of the air cargo industry and the use of contractors and workers outside the United States. The equivalent level of accountability and oversight can be accomplished with the FAA-Approved Special Cargo Program and developing such a program would enhance safety.

The FAA-Approved Special Cargo Program is intended to be a multifaceted, detailed, and performance-based program, covering, as specifically required by the ARAC's tasking, all "persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of special cargo load plans."[35] The dissent assumes the consensus recommendation does not outline the "appropriate knowledge, experience, and skill requirements . . . and appropriate privileges and limitations," as required by the ARAC tasking[36]. However, this assumption does not consider the applicability of the program will be based on job functions and will have to include the necessary knowledge, skill, and experience requirements to do those job functions. The FAA-Approved Special Cargo Program will require personnel performing special cargo functions to be trained according to their assigned duties. Additionally, the program will be approved by the FAA and will be scalable to include privileges and limitations. The FAA-Approved Special Cargo Program will allow for broader application to personnel engaged in the special cargo loads because it is based on job functions.

The FAA tasked ARAC with a specific assignment and this group must remain within the scope of its tasking. At the same time, this group is fully aware the impetus for this action was the NTSB Safety Recommendation A–15–014, but to take portions of the NTSB Safety Recommendation's language or try to determine the intent of what the NTSB meant is not the function of this group. That Safety Recommendation was directed to the FAA and the FAA directed ARAC with a specific tasking for a LCWG. The dissent filed by PLA mischaracterizes the correlations between the NTSB Safety Recommendation and the ARAC tasking. The majority of LCWG members fully support that the FAA-Approved Special Cargo Program satisfies the ARAC's tasking.

It is further outside the scope of this tasking to make the claim the general consensus recommendation does not "address the critical relationship/impact of special cargo to CG limitations." CG limitations are applicable to all cargo, whether it is special cargo or not. Air carriers are required to have procedures for trained and qualified personnel to perform a W&B and ensure cargo is loaded within the manufacturer's limitations for the aircraft. In the Federal Register notice for this tasking, the FAA states, "Persons performing special cargo loading functions **typically** prepare and validate the accuracy of aircraft load manifests and ensure the aircraft is loaded according to an approved schedule that ensures the aircraft's center of gravity is within approved limits" (emphasis added).[37] This statement was drafted by the FAA intended as background for the tasking. Much like language in a regulation's preamble, it is not mandatory, nor should it be taken to imply the consensus recommendation does not meet its obligation under the tasking.

The PLA dissent's assertion that the implementation of the FAA-Approved Special Cargo Program, where the air carriers determine the knowledge, skills, and limitations, "endorses the very industry conditions that were present in the National Airlines crash . . . and in the Fine Air crash" is an incorrect characterization of the general consensus recommendation. First, the PLA dissent does not account for many of the safety enhancements (SE) previously referenced,

[36] Ibid.
[37] Ibid.

especially the improved AC 120–85A, which sets recommended procedures and training guidelines for air cargo operations. Moreover, there will be an expectation by the FAA for certain training elements to be included in the program while still allowing the air carrier to modify the skill and experience requirements to fit its operations. It is unfair to characterize the recommendation for the FAA-Approved Special Cargo Program as doing nothing to change the environment that existed before these two crashes. The general consensus recommendation calls for an expansive program that must be approved by the FAA. Also, a very detailed list of SEs since the National Airlines crash is found in section 2.4.1. Secondly, the PLA dissent brings into the conversation the Fine Air crash, which did not involve special cargo. Because special cargo was not involved in the Fine Air crash, the LCWG determined it was outside the scope of the assigned tasking. Combining these two accidents in the same conversation further blurs the linkage between the assigned tasking and the general consensus recommendation of the LCWG.

For this LCWG to be successful, it must be guided by the direction as provided in the ARAC tasking. However, by mischaracterizing and taking portions of the NTSB accident report,[38] PLA attempts to lead the reader into a false impression by laying blame only on the industry, although the existing regulatory guidance and oversight had a role in the accident. PLA attributes NTSB's actions in the investigation of the National Airlines accident to a time more directly related to the Fine Air crash. The direct quotation from the NTSB report states, "During the investigation, the NTSB expressed concern that other cargo operators may have the same deficiencies that Fine Air had in its cargo loading and handling training programs."[39] PLA stops there; however, the rest of that quote goes on to state the NTSB "noted that FAA inspectors did not have the appropriate guidance material to evaluate training programs in cargo handling operations. As a result of the investigation, the NTSB issued multiple safety recommendations to the FAA addressing issues related to the training of cargo handling personnel and FAA oversight of cargo airlines."[40] This portion of the report is about NTSB Safety Recommendations, which were directed to the FAA. Any actions to address those Safety Recommendations are squarely outside the scope of the LCWG.

One premise for the FAA-Approved Special Cargo Program to enhance safety is the ability for air carriers to train a greater population of personnel, whether they are contractors, employees of ground handling companies, or employees outside the United States, in the identification of special cargo. Identification of the type of cargo is the first step in determining the correct procedures to follow. The safety benefits of general awareness training cannot be overstated. Industry standard practices of special cargo loads include personnel who perform the SCAF. Those personnel can vary by location, air carrier, and even the type of operation within the same air carrier. However, if a greater population of personnel are trained in the recognition of special cargo, then it is more likely the SCAF personnel will be notified to act before anything gets loaded onto the airplane. It is the awareness aspect that will trigger action and direction to contact the SCAF personnel. The consensus recommendation requires employees be trained in

[38] National Transportation Safety Board. *Steep Climb and Uncontrolled Descent During Take-off, National Air Cargo, Inc., dba National Airlines, Boeing 747 400 BCF, N949CA Bagram, Afghanistan, April 29, 2013*. NTSB/AAR-15/01, PB2015-104951, Notation 8710. Adopted 14 July 2015.
[39] Ibid.
[40] Ibid.

the recognition of special cargo whether the air carrier carries special cargo or not. The recommendation also requires those people who are receiving the cargo know who to call if they are not sure of the status of special cargo.

It is appropriate to note the term "loadmaster" is not defined by federal regulation. This LCWG recognized early on that lack of a regulatory standard would present some challenge. To infer the lack of regulatory definition of "loadmaster" in any way impeded the work of this group is incorrect. In fact, this group took the time to understand how air carrier's operations and procedures varied, especially around special cargo. This group focused on the job functions rather than a title, but in no way was the group reluctant to use the term "loadmaster." In fact, on focusing on job functions rather than on a title makes the consensus recommendation more expansive. The FAA-Approved Special Cargo Program would ensure no one job function or step in the special cargo transportation process is not covered.

The FAA-Approved Special Cargo Program would enhance safety for the persons engaged in the loading and supervision of the loading of special cargo to include the preparation and accuracy of special cargo load plans. The program will be customizable to an air carrier's operations and will have to be approved by the FAA. There will be continuous improvement and oversight of the program, like the processes under a safety management system (SMS).

APPENDIX B. LOADMASTER CERTIFICATION WORKING GROUP WORK PLAN

The following work plan was briefed at the September 15, 2016, Aviation Rulemaking Advisory Committee (ARAC) quarterly meeting.

Scope:

The Loadmaster Certification Working Group (LCWG) will provide to the Aviation Rulemaking Advisory Committee (ARAC) recommendations regarding the certification of persons engaged in operations involving the loading of special cargo. The FAA is seeking input on the decision to certificate person(s) engaged in part 121 cargo operations involved in the carriage of "Special Cargo" and if so, what method of certification should be used.

Operating Boundaries:

- Operate within the ARAC processes and procedures, including following the FACA requirements
- Remain within scope of the tasking

Authorized by: The FAA authorized and the ARAC accepted this tasking.

Members:

Chairperson:
Mark Phaneuf of Air Line Pilots Association (ALPA)

Vice Chair:
Martin McKinney of United Parcel Service

Working Group:
Darrin Noe of Boeing
Richard Brose of Federal Express
Steve Brewer of Kalitta Air
Erik Kaupa of Bendix King representing the Professional Loadmaster Association
George Paul representing National Air Carrier Association (NACA)
Yvette Rose of Cargo Airline Association (CAA)
Stephen Banks of National Airlines
Jeff Olver of Alaska Airlines
Peter Mejia of Northern Air Cargo
Lawrence Fine of Atlas Air

FAA:
Sandra Long Rulemaking
Paul Greer Senior Attorney
Stephen Grota Cargo Focus Team

Contractor:
Sandra Lamparello of PAI

Other Participants/Subject Matter Experts:

Subject matter experts may be invited to support the Working Group as a resource on an "as needed" basis. Observers may be allowed upon request to the Chair and approval of the Working Group.

Goals/Objectives/Expectations:

- Conduct a review and analysis of the assigned task and become familiar with any other related materials or documents.
- Draft and submit a work plan for completion of the task, including the rationale supporting such a plan, for consideration by the ARAC.
- Provide a status report at each ARAC meeting.
- Draft and submit the recommendation report based on the review and analysis of the assigned tasks.
- Present the recommendation report at the ARAC meeting.

Tasking:

The Loadmaster Certification Working Group is tasked to:

1. Provide advice and recommendations to the ARAC on whether safety would be enhanced if persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of special cargo load plans, be certificated. If the Working Group recommends certification of these persons, it should also provide recommendations regarding which specific operations should require the use of these certificated persons. Additionally, it should also recommend appropriate knowledge, experience, and skill requirements for the issuance of the certificates and appropriate privileges and limitations.
2. Determine the effect of its recommendations on impacted parties.
3. Develop a report containing recommendations based upon its analysis and findings. The report should document both majority and dissenting positions on its recommendations and findings and the rationale for each position. Any disagreements should be documented, including the rationale for each position and the reasons for the disagreement.

In developing this report, the Working Group shall familiarize itself with:

1. NTSB Aircraft Accident Report NTSB/AAR–15/01 PB2015–104951NTSB, with particular attention provided to Safety Recommendation A–15–14.
2. AC 120–85A, Air Cargo Operations.
3. Minutes of the July 30, 2015, B747 Special Cargo Load Meeting.

Issues/Actions:

- Review related documents and materials specific to special cargo, including SCWG notes and recommendations, and FAA guidance and policies
- Scrutinize AC 120–85A definition of "special cargo" as it relates to certification and determine if any changes are needed
- Determine scope of possible certification of person responsible for:
  - Special cargo analysis function (SCAF)
  - Special cargo loading supervision
- Determine process for approval, including who holds or manages the certificate
- Evaluate operational impact/safety benefits, including economics

Meetings:

Quarterly face-to-face meetings

Monthly TELCONs with screen sharing capability

Ground Rules:

- Accountability to the group with personal commitment
- Respectful behavior
  - Attack the problem, not the person
  - Punctuality is critical - Start/end meetings on time
  - One person talks at a time
- Actively participate in work-group meetings and task-group meetings
- Advocate for tasking; ensure safety is always met
- Represent organization without a personal agenda
- Work together to achieve the common goal of the tasking
- Be a student of the task; show up as learners
- Rely on each other's strengths and expertise; support each other

Schedule:

Meeting 1 – August 30–31, 2016, at FAA HQ 800 Independence Ave.

Meeting 2 – November 9–10, 2016, at Atlas Air Cargo, Huntsville, AL

Meeting 3 – February 7–8, 2017, at NACA HQ, Arlington, VA

Meeting 4 – May 9–10, 2017, AK Alaska Airlines HQ, Seattle, WA

Meeting 5 – August 15–16, 2017, at ALPA HQ, Herndon, VA

Meeting 6 – October 24–25, 2017, at ALPA HQ, Herndon, VA

Meeting 7 – January 16–17, 2018, at NACA HQ, Arlington, VA

Meeting 8 – April 9–10, 2018, at NACA HQ, Arlington, VA

Teleconferences will be held on the second Tuesday of the month at 1 p.m. starting in October 2016.

APPENDIX C. BENEFITS AND COST IMPACTS

U.S. Department of Transportation

FEDERAL AVIATION ADMINISTRATION

Benefit and Cost Impacts of the FAA-Approved Special Cargo Program and the Repairman Subpart G Models

Presented to the Loadmaster Certification Working Group

Office of Aviation Policy and Plans

Regulatory Analysis Division, APO–300

November 2017

Contents

I. Overview

The Loadmaster Certification Working Group (LCWG) considered eight certification methods in achieving the task of enhancing safety by certificating persons engaged in the loading and supervision of the loading of special cargo, to include the preparation and accuracy of special cargo load plans. The LCWG selected the top two certification methods: The FAA-Approved Special Cargo Program and the Repairman Subpart G options. The LCWG further evaluated these certification methods in more detail by assessing their benefits and costs impacts.

II. Benefits for the FAA-Approved Special Cargo Program and the Repairman Subpart G models

A. Type of Accident

The LCWG reviewed NTSB accident data from 1997 through 2016 and identified 5 special cargo accidents which might have been prevented if either the FAA-Approved Special Cargo Program or the Repairman Subpart G options were in place at the time of the accident. Of the 5 accidents identified by the LCWG, only one involved fatalities. These five accidents resulted in a total of seven fatalities and no injuries. In addition to the fatalities, there was substantial damage to the aircraft or complete hull loss as a result of these accidents. More specifically, one aircraft was destroyed, and 3 aircraft were substantially damaged. Only one accident involved cargo damage. Table 1 provides the accident date, accident number, operator name, number of casualties, aircraft damage, aircraft manufacturer and model, cargo damage, and accident severity for each of these accidents.

B. Benefit Model

We developed a model to estimate the benefits of the FAA-Approved Special Cargo Program and the Repairman Subpart G options. The benefit of avoiding an accident includes averted fatalities, serious injuries, minor injuries, aircraft damage, cargo damage, and investigation costs. The relationships of the model may be summarized as follows:

Benefits = (Fatalities + Serious injuries + Minor injuries + Aircraft + Cargo + Investigation) × Effectiveness

Where:

Fatalities = Fatality costs;

Serious injuries = Serious injury costs;

Minor injuries = Minor injury costs;

Aircraft = Aircraft damage cost;

Cargo = Cargo damage cost;

Investigation = Investigation cost; and

Effectiveness = Effectiveness measure for each certification method.

C. ASSUMPTIONS

In the benefit model, we assumed:

All monetary values were expressed in constant 2016 dollars.

In estimating benefit values, the FAA used $9.6 million[41] as the statistical value for avoiding a human fatality, $1,008,000 for avoiding a serious injury,[42] and $28,800 for avoiding a minor injury.[43]

Destroyed aircraft were valued at their replacement cost, aircraft with substantial damage were valued at their repair cost, and aircraft with minor damage were not included in this evaluation. We estimate the market value[44] to replace a Boeing 747–400 BCF at $8.75 million.[45] We estimate aircraft repair costs for accident number ANC11LA022 and accident number DCA15LA011 at $50,000 and $200,000, respectively.[46] Additionally we estimate the aircraft repair cost for accident number ANC14CA012 at about $21 thousand.[47]

We estimate cargo damage cost for accident number DCA13MA081 at $3.6 million.[48]

NTSB investigation costs are estimated at $216,850 per accident, and $31,350 per incident.

D. TOTAL ACCIDENT COSTS

Table 1 also provides casualty cost, aircraft damage cost, cargo damage cost, and investigation cost for each of these accidents, and the total cost of the accidents.

[41]Office of the Secretary of Transportation Memorandum. "Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in U.S. Department of Transportation Analyses—2016 Adjustment." 8 April 2016. <https://www.transportation.gov/sites/dot.gov/files/docs/2016%20Revised%20Value%20of%20a%20Statistical%20Life%20Guidance.pdf>.
[42]Ibid.
[43]Ibid.
[44]Market value is the appraiser's opinion of the most likely trading price that may be generated for an aircraft under the market circumstances that are perceived to exist at the time in question. Market value assumes the aircraft is valued for its highest, best use; the parties to the hypothetical sale transaction are willing, able, prudent and knowledgeable, and under no unusual pressure from a prompt sale; and the transaction would be negotiated in an open and unrestricted market on arm's-length basis, for cash or equivalent consideration, and given an adequate amount of time for effective exposure to prospective buyers.
[45] Airliner Price Guide: Future Market Values. Volume 6/78, Summer 2016, p.226.
[46] Source: Northern Air Cargo member, Personal Conversation.
[47] GRA, Incorporated. *Economic Values for FAA Investment and Regulatory Decisions, A Guide*. 31 December 2004.
[48] Source: U.S. Department of Defense Employee, Personal Conversation

Table 1. Total Accident Costs

Date	9/22/2005	3/30/2011	4/29/2013	11/25/2013	10/16/2014
Accident Number	CHI05IA273	ANC11LA022	DCA13MA081	ANC14CA012	DCA15LA011
Operator	Gulf and Caribbean Cargo	Northern Air Cargo	National Air Cargo	Tatonduk Outfitters	Aloha Air
Cargo or Pax	Cargo	Cargo	Cargo	Cargo	Cargo
Support Data for Accident Costs					
Casualty					
Fatalities	0	0	7	0	0
Serious injuries	0	0	0	0	0
Minor injuries	0	0	0	0	0
Aircraft Damage					
Aircraft damage	Minor	Substantial	Destroyed	Substantial	Substantial
Aircraft manufacturer	Convair Div. of Gen. Dynamics	Boeing	Boeing	Douglas	Boeing
Model/Series	440	737–301	747–400 BCF	DC–6	737–300
Cargo Value					
Cargo on flight?	Yes	No	Yes	Yes	No
Cargo was damaged?	No	Not applicable	Yes	No	No
Investigation					
Severity	Incident	Accident	Accident	Accident	Accident
Accident Costs					
Fatalities	$0	$0	$67,200,000	$0	$0
Serious Injuries	$0	$0	$0	$0	$0
Minor Injuries	$0	$0	$0	$0	$0
Aircraft damage	$0	$50,000	$8,750,000	$20,516	$200,000
Cargo value	$0	$0	$3,600,000	$0	$0
Investigation	$3,110	$216,850	$216,850	$216,850	$216,850
Total accident costs	**$3,110**	**$266,850**	**$79,766,850**	**$237,366**	**$416,850**

E. EFFECTIVENESS METHODOLOGY

The LCWG used a Joint Implementation Measurement Data Analysis Team (JIMDAT)-like method to assess the effectiveness of the accidents. This methodology was developed jointly by the aviation industry and FAA. The LCWG evaluated how effective each certification method might have been in averting each accident at the time it occurred.

The effectiveness rating can be viewed qualitatively in terms in terms of "high," "medium," or "low" probability the accident would have been prevented by the certification method. Numerical values are assigned corresponding to each of these qualitative assessments based on the consensus collective expert judgment of the LCWG team members. The level and percentage of effectiveness criteria follows:

5- >0.95 effectiveness. The proposed certification method directly addresses the causal factors and would prevent the accident in the future.

4- 0.6 to 0.9 effectiveness—"High". The proposed certification method directly addresses the majority of the causal factors and would probably prevent or is likely to reduce the risk of the respective accident, given the circumstances that prevailed.

3- 0.4 to 0.599 effectiveness—"Medium". The proposed certification method directly addresses one of several causal factors and is likely to reduce the risk of the respective accident, given the circumstances that prevailed.

2- 0.2 to 0.399 effectiveness—"Low". The proposed certification method indirectly addresses one of several causal factors and is likely reduce the risk of the respective accident, given the circumstances that prevailed.

1- <0.2 effectiveness. The proposed certification method is likely to have reduced the risk of the respective accident, given the circumstances that prevailed.

Tables 2 and 3 show the distribution of the effectiveness criteria for the FAA-Approved Special Cargo Program and the Repairman Subpart G models, respectively.

Table 2. FAA-Approved Special Cargo Program Effectiveness Scoring

Accidents \ Effectiveness	< 0.1	0.1 to 0.399, "Low"	0.4 to 0.599, "Medium"	0.6 to 0.95, "High"	> 0.95	Rationale
9/22/2005		0.292				Additional training may have made the crew more aware of special cargo issues and a recheck of the load may have occurred before second flight.
3/30/2011		0.104				Failure to follow procedures (FTFP), crew was trained, had procedure but did not follow.
4/29/2013				0.938		Load was clearly outside limitations of airplane flight manual (AFM)/weight and balance manual (WBM).
11/25/2013		0.125				DC-6 manual is older and does not contain clear requirements for special cargo. Because procedures are based on AFM/WBM, additional training may not have addressed this incident.
10/16/2014		0.208				FTFP, additional training will have minimal impact.

Table 3. Repairman Subpart G Effectiveness Scoring

Accidents \ Effectiveness	< 0.1	0.1 to 0.399, "Low"	0.4 to 0.599, "Medium"	0.6 to 0.95, "High"	> 0.95	Rationale
9/22/2005		0.267				If the crew had been certificated in special cargo, it may have made a difference (lower than the FAA-Approved Special Cargo Program due to smaller population trained in general awareness).
3/30/2011		0.100				FTFP crew was trained, had procedure but did not follow.
4/29/2013				0.938		Load was clearly outside limitations of AFM/WBM.
11/25/2013		0.125				DC-6 manual is older and does not contain clear requirements for special cargo. Because procedures are based on AFM/WBM, additional training may not have addressed this incident.

10/16/2014		0.133				FTFP, additional training will have minimal impact (lower than the FAA-Approved Special Cargo Program due to smaller population trained in general awareness).

F. Benefits of the FAA-Approved Special Cargo Program and the Repairman Subpart G

Using the accident cost information and the effectiveness scoring, the LCWG estimated the benefits of the FAA-Approved Special Cargo Program and the Repairman Subpart G models as displayed in the next table.

Table 4. Benefits of the FAA-Approved Special Cargo Program and the Repairman Subpart G Models

Date	Total Accident Costs	Effectiveness		Benefits	
		FAA-Approved Special Cargo Program	Repairman Subpart G	FAA-Approved Special Cargo Program	Repairman Subpart G
9/22/2005	$3,110	0.292	0.267	$907	$829
3/30/2011	$266,850	0.104	0.100	$27,797	$26,685
4/29/2013	$79,766,850	0.938	0.938	$74,781,422	$74,781,422
11/25/2013	$237,366	0.125	0.125	$29,671	$29,671
10/16/2014	$416,850	0.208	0.133	$86,844	$55,580

III. Cost Impacts for the FAA-Approved Special Cargo Program and the Repairman Subpart G

Tables 5 and 6 show the cost impacts of the FAA-Approved Special Cargo Program and the Repairman Subpart G models, respectively.

Table 5. Cost Impacts of the FAA-Approved Special Cargo Program

FAA-Approved Special Cargo Program—Based on AC	Cost Impact Level	Assumptions
Affected Entities		
Part 121 airlines carrying special cargo (75 possible)		
FAA		
Impact on Airlines		
Training Development/Enhancement (Recurring) (Higher impact on passenger airlines)	Low	Elements unchanged from AC 120–85A; all carriers complying with training requirements of AC already
Administrative: Manual Writing (Recurring)	Negligible	Elements unchanged from AC 120–85A; all carriers complying with training requirements of AC already
Administrative: Training Documentation (Recurring)	Negligible	Elements unchanged from AC 120–85A; all carriers complying with training requirements of AC already
Training Time (Initial and Recurrent/Difference)	Low	Elements unchanged from AC 120–85A; adding large group to awareness training requires low amount of time
Auditor and Oversight Program (Recurring)	Negligible	Addition to existing SMS/Auditing System
Auditing/SMS (Recurring)	Negligible	Addition to existing SMS/Auditing System
Possible Software Development Costs (Recurring)	Low/Medium	Uncertainty of reprogramming costs
Possible Additional Compliance Costs (Recurring)	Low	Depending on system and new FAA requirements
Overall Operational Impact	Low/Medium	Potential disruption to or loss of business; change to business model
Impact on FAA		
PMI/POI Review/Approve Manual (Recurring)	Low	Covered under Current Duties
PMI/POI Oversight (Recurring)	Negligible	Covered under Current Duties

Table 6. Cost Impacts of the Repairman Subpart G

Repairman Subpart G— Requires Rule	Cost Impact Level	Assumptions
Affected Entities		
Part 121 airlines carrying special cargo (75 possible)		
Certificated Individuals (SCAF & SCLS)		
FAA		
Impact on Airlines		
Training Development (Recurring)	Low	Elements unchanged from AC 120–85A; all carriers complying with training requirements of AC already
Administrative: Manual Writing (Recurring)	Negligible	Elements unchanged from AC 120–85A; all carriers complying with training requirements of AC already
Administrative: Training Documentation (Recurring)	Negligible	In accordance with part 65
Training Time (Initial and Recurrent)	Low	Lower than the FAA-Approved Special Cargo Program due to smaller pool of people required to be trained and no awareness training requirement
Auditor and Oversight Program (Recurring)	Negligible	Less than the FAA-Approved Special Cargo Program option
Auditing (Recurring)	Negligible	Adding only one element to current requirements
Possible Software Development Costs (Recurring)	Low/Medium	Uncertainty of reprogramming costs
Possible Additional Compliance Costs (Recurring)	Medium	Creates new element to existing certification scheme
Overall Operational Impact (Recurring)	High	Vendors/contractors are not employees of the company, which adds complexity and possible liability to the company

Repairman Subpart G— Requires Rule	Cost Impact Level	Assumptions
Additional Salary Cost Potential (Recurring)	High	Certificated individuals likely to be paid more
Certification Issuance (Recurring)	Low	Initial cost burden; may increase costs of issuing certificate if overseas or remote
Impact on Certificated Individuals		
None	Zero	Absorbed by company
Impact on FAA		
Auditor and Oversight Program	Low	Non-employee vendor/contractor status with possible foreign countries
Certification	Low	Initial cost burden; may increase costs of issuing certificate if overseas or remote
Administration/Software	Medium	Uncertainty of reprogramming costs and development

APPENDIX D. EXAMPLES OF SPECIAL CARGO

This appendix provides photo examples of cargo items which may be considered special cargo when being transported by air. It should be stated these photos do not provide examples of how special cargo is restrained during flight, and these photos make no claim to the final configuration of the cargo which was transported. These photos are simply meant to show examples of cargo often transported as special cargo when applying the Federal Aviation Administration (FAA) definition of special cargo as outlined in Operations Specification (OpSpec) A002.

Figure 1. By definition, this is considered special cargo because it requires special handling and restraining procedures.

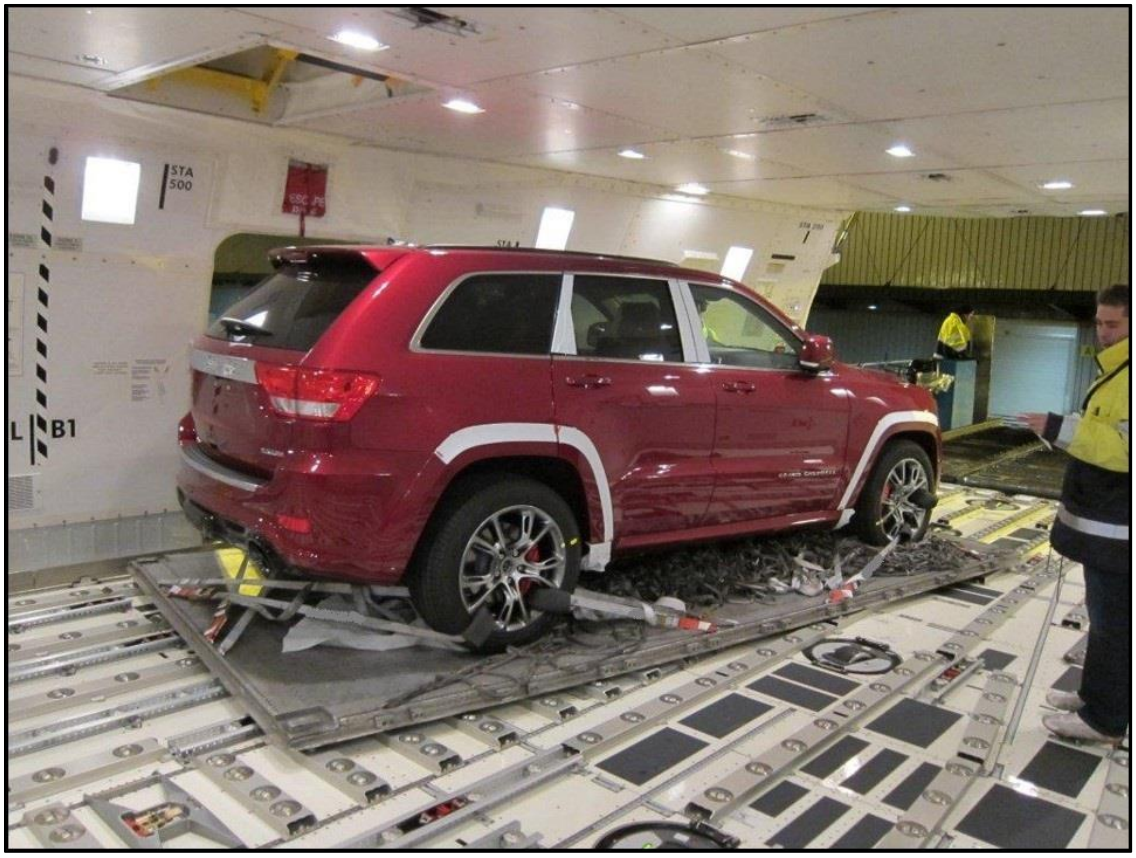

Figure 2. By definition, this is considered special cargo because it requires special handling and restraining procedures.

Figure 3. By definition, this is considered special cargo because it requires special handling and restraining procedures.

Figure 4. By definition, this is considered special cargo because it requires special handling and restraining procedures.

Figure 5. By definition, this is considered special cargo because it requires special handling and restraining procedures (for cargo not contained within the net).

Figure 6. By definition, this is considered special cargo because it requires special handling and restraining procedures.

Figure 7. Items classified as company materials (COMAT) may still be considered special cargo because they require special handling and restraining procedures.