

TRAINING, QUALIFICATIONS AND CERTIFICATION OF  
GROUND AND FLIGHT CREW

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## 1. Introduction

The air cargo industry is vital to the U.S. economy as well as to the economies of the rest of the world. Three-quarters of the world's air cargo departures occur in North America.<sup>1</sup> U.S air cargo operators move on average 3.1 billion revenue-ton-kilometers (RTK) of cargo each month for an average annual total of 36.7 billion RTK.<sup>2</sup> This segment of the airline industry today generates \$16.1 billion in revenue each year and it is expected to grow. Projections are that the air cargo industry will average a 6.4% growth rate over the next 20 years, tripling the current annual RTK by 2021.

Despite the growth and importance of this industry's link to the world's economy, civil aviation regulations (U.S. 14 CFR Part 121) governing the safety standards of the industry have not kept pace. The accident history continues to demonstrate a relatively high accident rate for all-cargo air carriers as compared to passenger air carrier operations. The accident rate is particularly high for the non-scheduled all-cargo air carriers. The prevention of all-cargo air carrier accidents will not improve unless the systemic reasons for these types of accidents are examined more thoroughly and we become more deliberate in our actions to improve regulatory standards that govern them.

This paper looks at the issues of flight and ground crew training, qualifications and certification factors from accident/incident history of primarily 14 CFR Part 121 all-cargo (no passengers) air carrier operations. The attempt here will be to try and identify the systemic factors involved in these issues from this operational record. Some other related issues are briefly covered.

## 2. Background

A study conducted by the National Aerospace Laboratory (NLR) of the Netherlands and the U.K. Civil Aviation Authority (CAA) [NLR/CAA] examined a sample of 606 fatal/hull loss accidents from 1970 to 1999. In North America, the fatal/hull loss accident rate (accidents per million flights) for "ad-hoc"<sup>3</sup> cargo operators was 2 times higher than for major cargo operators and almost 7 times higher than the rate for scheduled passenger operations. Of particular concern is the fact that the rate was even higher in the U.S. than for non-scheduled passenger operations in

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<sup>1</sup> "An Analysis of the Safety Performance of Air Cargo Operators," A. Roelen, A. Pikaar, W. Ovaas, Flight Safety Foundation, Flight Safety Digest, July 2001

<sup>2</sup> Boeing World Air Cargo Forecast, 2002-2003 Edition

<sup>3</sup> Operators with a small fleet of older generation aircraft flying a high percentage of non-scheduled flights on routes and into airports not generally served by major air carriers.

Africa and South America. The study showed a link between regional accident rates and economic performance. Roughly speaking, Africa with the highest accident rate of almost 17 accidents per million flights, has 6-7 accidents for every one in North America. However, its per capita GDP is the inverse: one dollar for every six to seven in North America, which tends to reinforce this economic link. In Europe, the accident rate of cargo operators is far better than in North America with little difference in those rates between passenger and cargo operators.

Another remarkable finding in the study was the significantly higher number of accidents in non-scheduled versus scheduled cargo operations – out of 90 cargo accidents, 76% occurred in non-scheduled operations. In an analysis of scheduled flight and individual operator cycle data it disclosed that 76% of the accidents occurred in only 39% of all cargo flights; the non-scheduled operations. Taking into account the accident data, the non-scheduled operations accident rate was found to be 5 times higher than for scheduled operations.

The NLR/CAA study also examined the types of accidents related to passenger and cargo operators. It showed that, with the exception of five types, there was no remarkable difference in the types of accidents between the two types of operations. The most frequent accident types involving both were *ground collision, engine failure, loss of control, undershoot, and fire/explosion*. The differences were related to *structural failures, collision with object, military intervention, cargo related, and wake vortex turbulence encounter*. The data showed that cargo operators had fewer accidents involving *runway overruns, criminal and weather-related events* than passenger operations. The study concluded that the higher fatal/hull loss accident rates of air cargo operators cannot be attributed to any single accident cause, but that all types occur more frequently in these types of operations. The most frequent causal factors for all types of accidents examined were: *Flight Handling; Inappropriate Action; Lack of Positional Awareness; Inadequate Professional Judgment; and Slow/Low On Approach* – all of which pertained to both passenger and cargo air carriers.

The frequency of the *cargo-related* accident type was about 4 per million flights during the 1970 to 1999 period. This type of accident was found to be caused by weight-and-balance problems related to improper loading or cargo shifting in flight, according to the study. Cargo air carrier accidents exceed those of passenger carrying accidents in both the *Takeoff* and *Climb* phases of flight as a result of these various types of accidents. This makes empirical sense since such problems would usually manifest themselves early in a flight. The numbers were either about the same or less for cargo than for passenger operations from the other four flight-phase categories chosen (*Cruise, Approach, Landing, Taxi*).

A review of the U.S. all-cargo air carrier accident/incident history<sup>4</sup> is indicative of our concern over these operations. For example, a review of all-cargo air carrier accidents from 1990 to 2003, revealed a total of 64 “N” registered aircraft in 14 CFR Part 121 operations.<sup>5</sup> Fifty-one occurred in the U.S. while 13 were outside the U.S. There were a total of 8 fatal accidents and 11 aircraft were destroyed. Of the total, 41 or 64% involved non-scheduled operations, which reinforces what the NLR/CAA study found. The total was almost split between day and night operations (33 day vs. 30 night) with one unreported or unknown light conditions. Of the 64, 45

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<sup>4</sup> Reports obtained from FAA NASDAC Briefs of NTSB accident/incidents investigations

<sup>5</sup> Includes two 14 CFR Part 91 operations to Part 121 certificate holders

or 70% were operational and 16 were related to mechanical problems.<sup>6</sup> Table No. 1 in Appendix A shows a breakdown of the accident data set.

A review of the all-cargo incidents investigated by the NTSB for the same period, 1990 to 2003, disclosed a total of 41, of which 23 or 56% were scheduled and 18 were non-scheduled operations. Most of the incidents occurred in the U.S. There were 23 incidents that occurred during daylight and 16 at night. The light conditions were not reported in two of the incidents. Of the total of 41 incidents, 63% were initiated because of mechanical reasons and 61% of the aircraft sustained minor damage. There was one incident that resulted in minor injury. Table No. 2 in Appendix A shows a breakdown of the incident data set.

What this overall U.S. occurrence data shows is that on average, there were about five accidents and 3 incidents per year involving U.S. all-cargo air carrier operations.

### 3. Discussion

For years ALPA has been concerned about cargo operations in general, particularly the carriage of hazardous materials by air. As far back as 1975, the President of ALPA expressed the Association's concerns about the quality and enforcement of the new Hazardous Materials Transportation Act of January 1975 before a transportation subcommittee of the House of Representatives. More recently, in 1997, the Association again expressed concern about a number of cargo issues, including HAZMAT, fire detection and suppression, and training among others. These concerns highlighted the critical need to ensure that cargo is properly handled, loaded and secured.

Based on the NTSB accident reports, there were seven<sup>7</sup> identified reports that raised questions about the adequacy of training, qualifications and certification factors involved with all-cargo operators. These factors were: unsecured cargo constraints, weight and balance not maintained, improper use of procedures, inadequate preflight inspection, improper use of controls, inadequate training, standards and supervision, improper aircraft trim setting, loss of control, inadequate aircraft equipment and manuals, and inadequate regulatory surveillance. The final report of one of the accidents, which occurred in June 2002 involving a tail strike from an aborted takeoff, was not available.

While the seven accidents chosen represent only 11% of the 64 accidents reviewed, one accident in particular highlights the consequences of inadequate standards, operator certification and regulatory oversight. This was the crash of a Fine Air DC-8, Flight 101, after takeoff from Miami International Airport on August 7, 1997, which killed all three flight crew members, a security guard on board and a motorist on the ground. Impact forces and post-crash fire destroyed the aircraft. Twelve nearby parked vehicles were destroyed and a building was damaged substantially by fire. In its investigation the NTSB found that the airplane had been

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<sup>6</sup> For this paper an operational accident is one not appearing to have a system or component failure or malfunction that initiated the accident and a mechanical accident is one that did.

<sup>7</sup> NTSB report numbers: DCA91MA021; CHI95LA049; CHI95LAO78; DCA97MA016; DCA97MA059; ANC02LA008; FTW02LA198. Two of the reports involved Part 91 operations to Part 121 certificate holders.

mis-loaded resulting in an aft center of gravity and an incorrect stabilizer trim setting. The Board determined that the causes of the accident were the result of the operator's failure to exercise operational control over the cargo loading process and the contract loading company's failure to load the airplane according to Fine Air's requirements. The Board arrived at thirty-six findings and made fourteen safety recommendations, of which eight were directly related to cargo operational and training issues.

In ALPA's view, these eight recommendations (A-98-45 thru A-98-52) point directly to systemic factors in the accident - inadequate company standards, processes, procedures and accountability, all of which should have been detected and corrected through initial certification and ongoing surveillance of the operator by the FAA. To varying degrees these same systemic factors are probably implicated in many other all-cargo air carrier accidents and incidents as well because there were a number of hard landings and some reported weight and balance problems in the accident data set. The incident record is mixed and dominated (63%) by mechanical-related occurrences. The limited data in the NTSB's computer generated reports did not permit a definitive determination of potential systemic factors in these cases for this paper.

### **3.1 Flight and Ground Crew Issues**

The U.S. occurrence data reviewed did not provide insight into why there were a substantial number of accidents in non-scheduled as compared to scheduled operations. As expected, it did show that there were higher numbers for all phases of flight for non-scheduled operations. The numbers for takeoff and landing ranged from 2 to almost 4 standard deviations from the mean of all phases of flight (Ref. Table No.1). This is not surprising given what we know about the history and risks normally associated with these two phases of flight in any operation. The data also showed that for takeoff, there were 5 accidents in non-scheduled and 3 in scheduled operations that occurred at night. Five were primarily operational and three mechanical, which resulted in 7 substantially damaged and 4 destroyed aircraft. The landing case is somewhat different in that most of the accidents (10) were non-scheduled operations that occurred in daylight hours. These were primarily operational accidents that resulted in 11 substantially damaged and 3 destroyed aircraft. Six of the landing accidents were at night, 4 in scheduled and 2 in non-scheduled operations. Four were operational, one mechanical and one was unknown. All of the aircraft sustained substantial damage.

The incident data showed just over half of them occurred in scheduled operations. The breakdown in the number of incidents in day and night operations were much closer in percentage than the differences in the number of scheduled and non-scheduled operations between the two types of occurrences. So, there did not appear to be a consistent trend in accidents and incidents based on these categories.

There are two remarkable findings from the data. First, is the extremely high number of operational *accidents* (70%) versus mechanical as previously mentioned. Second, is the high number of mechanical as opposed to operational *incidents*. This is just the opposite of what was expected based on the accident data. More analysis is required before any conclusions can be drawn about whether these findings are significant as compared to passenger operations. However, it was noted that mechanical malfunctions and failures were related to the use of

primarily older aircraft in both the accidents and incidents reviewed. In ALPA's opinion, the accident and incident history nonetheless justifies further examination to determine the reasons behind these findings. The effort just may lead to identifying additional accident preventive measures and whether training and standardization are causal factors not only involving pilots but maintenance technicians as well.

A National Aeronautics and Space Administration (NASA) study<sup>8</sup> suggested that overnight cargo flight crews are on average less experienced than those of passenger air carrier flight crews. We also note that physiological disruptions adversely affect flight crew performance. In the same NASA study, it also reported on the degradation in the quality of daytime sleep over nighttime sleep. While the U.S. data does not show any significant difference in the numbers between the night and day accidents, there remained a substantial number of night operations involved in these occurrences. ALPA all-cargo pilot members have reported getting trapped in what are called, "rolling delays" wherein departures are delayed because of cargo shipper difficulties leading to long duty days in addition to flight time. This further exacerbates the disruption of sleep patterns and circadian rhythms for flight crews in long haul international flights.

The NLR/CAA accident data show that there is very little difference in the distribution of the types of accidents and incidents between passenger and cargo operations. It simply shows that cargo operations have significantly more of them. This is supported by the NTSB "N" registered aircraft accident data as well. On the other hand, crew experience shows what is reported to be a statistically significant difference between passenger and cargo operations in the NLR/CAA study. But, when the pilot in command (PIC) has 11,000 versus 10,000 hours average experience, it seems unlikely that any definable cause could be attributed to this difference. Again, it is possible that the training between these two kinds of operations differ, despite the experience. To some extent training can be used to offset experience, and the converse is true as well.

Recent work on the industry Upset Recovery Training Aid Revision, following the American Airlines (AA587) accident, shows that, unlike test pilots, most transport category airline pilots had little understanding of the criteria under which Part 25 aircraft are certified. The information they have, and whatever upset recovery training they had been given, has been conducted "voluntarily" by their air carriers. It is not a regulatory requirement. Nevertheless it is critical that it be given equally to all-cargo and passenger air carrier pilots.

### **3.2 Current Regulatory Requirements**

Federal regulations, 14 CFR Part 119 do not require air carriers to have a Director of Training and Part 121 does not require all-cargo air carriers to have certificated airmen specializing in cargo loading issues (i.e. loadmasters) as an integral part of the flight crew. These individuals are employed at the discretion of air carrier management. Therefore, there are no knowledge, skills and/or ability requirements associated with these positions other than what the individual air carrier may require. The training and qualification requirements for crewmembers in general are contained in Subparts N and O of Part 121. These requirements apply equally to passenger

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<sup>8</sup> NASA Tech Memo 110380, Ames Research Center, February 1998)

as well as to all-cargo air carrier operators. There are no specific regulatory requirements in these subparts related to load planning curriculum for crewmembers. Weight and balance information and calculations are primarily covered under the subjects of aircraft limitations and approved Airplane Flight Manual as required by Part 121.419 and some are found in FAA advisory material<sup>9</sup>. With respect to the carriage of hazardous material, Part 121.433(a) addresses these training requirements and they apply equally to passenger and all-cargo operations.

In addition, regulatory requirements dealing with the contents and disposition of the load manifest are contained in Subparts U and V. These also apply equally to passenger and all-cargo operators. In order to be able to comply with these requirements, however, operators must provide some training to their crewmembers. The similarity in regulation between passenger and all-cargo operations supports the overall conclusion in the NLR/CAA study in which only minor differences in regulations were found.

Nonetheless, the absence of regulatory standards for load planning, licensing, qualifications and training of cargo loaders or loadmasters places primary responsibility on the air carrier and air safety inspectors to ensure that adequate requirements are in place to deal with these matters. But, the record shows that this situation has permitted costly mistakes. It also has allowed unresolved issues to remain, such as the discontinuities between the captain's responsibility and his or her authority over loading operations, and the adequacy of load planning documentation and verification procedures. In ALPA's opinion, these can be resolved through improved regulatory standards and surveillance, which will assist aviation safety inspectors through the approval and surveillance processes in shoring up deficient company processes and procedures. However, ALPA also believes that improved advisory material alone will not be sufficient. Moreover, attempts to make improvements have not been completely successful.

### **3.3 Past Safety Recommendations**

As the Fine Air accident points out, the NTSB's investigation identified fourteen areas it believed would correct many of the deficiencies uncovered, which again could be systemic issues within the all-cargo industry as well. The NTSB was able to classify four of its recommendations as Closed – Acceptable Actions. Three remain Open-Acceptable/Alternate Response and two remain Open – Unacceptable Response. The unacceptable responses dealt with insufficient FAA surveillance budget and resources needed to effectively oversee the industry in general (A-98-52) and the other dealt specifically with the training of flight crews to look for mistrim cues during taxi and initial takeoff rotation (A-98-44).

In its recommendation on mistrim cues, the NTSB also called for the FAA to require air carrier's using full flight simulators to provide Special Purpose Operational Training that includes an unanticipated pitch mistrim condition encountered on takeoff. While the FAA agreed with the intent of the recommendation, its response, which included input from the Air Transport Association and ALPA, concluded that additional training in this area was not necessary. However, the group believed that existing regulations were not adequate to address cargo-

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<sup>9</sup> Advisory Circular AC 120-27, "Aircraft Weight and Balance Control," and AC 121-27, "Guide for Air Carriers, Freight Forwarders, and Shippers in Obtaining Information Dealing With the Transportation of Hazardous Material by Air."



handling issues. The conclusion by FAA and industry resulted in the formation of the Cargo Strategic Planning Group within the FAA Flight Standards Division to review regulatory requirements and to produce an Advisory Circular addressing the issues. Notwithstanding these actions, with which the NTSB agreed, it maintained that flight crews of air cargo operators should get the Special Purpose Operations Training and it held open its recommendation pending the development of such training.

### **3.4 On-Going Prevention Actions**

It was anticipated that the new Advisory Circular would be published in 2001. Stakeholders continued to express concern and were later brought into the AC development process. This led to the preparation of the Air Cargo System Implementation Plan (ACIP). In its review of an early draft of the AC, ALPA noted that most of the NTSB's recommendations from the Fine Air accident were not addressed. Chapter 6, "Load Supervision, Load Verification, and Air Carrier Audits," of a later version contains primarily an outline of tasks that should be followed to handle cargo. ALPA believes the draft lacks sufficient detail and emphasis in areas that are essential to safely handling and loading cargo.

For example, in paragraph 6-1, it states that air carriers should [emphasis added] designate a trained, qualified, and authorized person or persons...to ensure: cargo is properly built up, weighed and restrained, properly loaded/unloaded, that all documents are accurately and properly completed, and flight crew are notified of damaged, missing or inoperative cargo compartment or equipment. ALPA believes these tasks are essential and cannot be done confidently unless these persons are thoroughly trained. In paragraph 6-2, it states that, "air carriers should designate personnel to provide information about how the aircraft was loaded to the pilot in command, or to air carrier authorized, trained, and qualified loading personnel." But, it does not state that such personnel should be trained. Load verification is another essential task in ALPA's view that must be done by trained personnel.

Chapter 7 in the draft AC provides suggested training areas the air carrier should undertake. While it outlines many important areas in individual tasks, it does not mention the company organization, safety policy, processes, documentation, communications, duties and responsibilities of key personnel, and the company's working relationship to vendors. The AC does not suggest that flight and ground crews receive a thorough orientation on how the company handles cargo; that is, a complete description of the air carrier's cargo handling system. Again, ALPA believes this kind of information is invaluable to employees because it provides them knowledge about and confidence in the company's cargo handling system and how it expects it to function. It helps to eliminate questions about responsibility and authority, indecisions, and discrepancies that ALPA members are confronted with daily in all-cargo line flying.

Additionally, there are no suggestions about how many hours or days the training should be and no examples of training curriculum or best practices are offered. A survey by Principal Inspectors of their cargo air carrier certificate holders would probably result in identifying additional guidance and best practices that would be helpful to other operators, line pilots and ground personnel.

The Commercial Aviation Safety Team (CAST) examined air cargo occurrences as a part of its Joint Safety Analysis Team remaining risk areas. It determined that cargo operations accounted for about 6.25% of the total number of departures over a ten-year period, but also accounted for twice the accident rate compared to passenger operations. The CAST determined that its 46 safety enhancements previously developed would, if implemented, reduce by 69% the fatal and hull loss cargo, turbine-powered aircraft accidents. The CAST effort is continuing to examine cargo operations. Its Joint Safety Analysis Team (JSAT) anticipates completing its analysis and development of additional safety enhancements of some cargo operations issues by May 2004. The Joint Safety Implementation Team (JSIT) is expected to complete its review of additional safety enhancements by December of 2004. Air carrier operators are represented in the CAST activity, many of which are all-cargo operators that have agreed to implement the previous developed safety enhancements.

### **3.5 Other Related Issues**

Until the last ten years, well established US all-cargo carriers have been one of the air carrier types where an aspiring pilot “stopped” along the way to fulfilling his or her goal of becoming a major airline pilot. In general, this resulted in a somewhat continual turnover of pilots for all-cargo operators. The principle reason that pilots “moved on” was because of the generally lower pay, and backside-of-the-clock work schedule with little prospect of improvement in career conditions. Some pilots stayed because the lack of a baccalaureate degree made them non-competitive for the major airline hiring process. Some stayed because they were older or because the work appealed to them and they benefited in some fashion. They became senior more rapidly and got into a captain’s position sooner than they would have had they been with a major passenger air carrier. To some extent, this continual turnover may be an important factor behind the high number of operational accidents highlighted in the accident data. Pilot turnover can have an adverse affect on the carrier’s ability to build and maintain the knowledge, skills and abilities needed in the challenging all-cargo operating environment.

Over the last ten years, the two largest U.S. all-cargo companies, Federal Express and United Parcel Service, reached a level of pay and benefits almost equal to the major passenger airlines. In the same period, other new companies are showing improvement in career possibilities, which likely will lead to less pilot turnover than was the case prior to 1992. At some of the smallest of these new all-cargo operators, however, nothing has changed. The movement of aspiring airline pilots between Part 121 companies has essentially ceased, and will remain so until the thousands of pilots on furlough are recalled. There will be some hiring at mostly the low-cost air carriers. A couple of them have managed to hold on to some pilots, but to many other pilots these air carriers were simply an alternative to a career stop at an all-cargo air carrier, on the way, ultimately, to a major airline. For the most part, major airline pilots view their all-cargo brethren as equal. In today’s economic climate, the careers of air carrier pilots in general are driven more by market factors and the relative health of the economy than by what kind of flying he or she does.

With regard to unique training requirements, the flight crew training provided by most of the all-cargo air carriers meets only the minimum regulatory requirements, based the experience of our

members. Despite the differences between passenger and cargo operations in terms of the size and weight of cargo, the nature of the cargo itself, the ground facilities and the amount of night flying that occurs, the minimums don't allow room for unique training. These all-cargo operators are, however, in compliance with regulations in maintaining such minimum training programs. In addition, there is rarely any investment made to find smarter, better methods, or inclusion of the latest training information unless forced by regulation. While this may be a defensible business decision, it often fails to take into account the safety risks involved in the decisions. Given the situation, the stumbling block to improvement may lie in the complexities of the rulemaking process. This prevents incorporating newer methods and information that will solve current and future safety challenges. No matter how difficult, we must become proactive and not simply wait for a significant accident event to drive the regulatory improvement process.

The FAA-funded American Institutes for Research 2001 Pilot Training Survey, by design, did not sample any cargo pilots. It did demographically determine that 11.2% of those sampled had come from a cargo background. This survey instrument could have provided an exceptionally keen view into the assessment of the all-cargo pilots' training experiences. This could have been used to compare it with that of their passenger air carrier peers to permit identifying any irregularities in training between the two types of operations.

On another issue, it was noted in review of the NTSB accident/incident data that there were only Preliminary reports available on fourteen accidents in the database. Most were foreign accidents and ten of the accidents are at least three years old or older. Three were fatal accidents in the 1995 and 1996 time period. There were three incidents outside the U.S. that occurred between 1995 and 1999 for which no final reports are yet available. The absence of the findings from these investigations detracts from our ability to determine the causal factors involved in these accidents and from which additional prevention efforts could be developed.

#### 4. Conclusions

Our review of recent studies on the safety performance of all-cargo operators worldwide underscores the concern that ALPA has had for some time over these kinds of operations. The fact that three-quarters of the world's cargo operations originate in North America is a sobering fact. Particularly in view of the high number of all-cargo "N" registered aircraft accidents in our region, which indicates that this is not a third world problem alone. A look at the U.S. accident/incident history for the last thirteen years further supports ALPA's concerns. It demonstrates that not all U.S. all-cargo air carriers have effectively managed the safety risks inherent in cargo air carrier operations. As pointed out in this paper, U.S. all-cargo air carriers experienced on average five accidents per year during this thirteen-year period. It is evident from this record that regulatory standards governing the operations of all-cargo air carriers have not kept pace with the growth and importance of this industry to our economy. The situation is disturbing in view of the sophistication of the U.S. aviation industry and the fact that we in North America come up short in comparison to Europe's accident record.

Many of the shortcomings in the U.S. "N" registered all-cargo aircraft accidents were the result of various causal factors. Those relating to training, qualifications and certification involved what we would have expected: improperly loaded cargo and constraint, inadequate weight and

balance, mis-trimmed aircraft, improper use of procedures, loss of control, inadequate equipment and manuals, and inadequate standards and supervision, etc. There is presently no distinction in flight crew training requirements between passenger and all-cargo operations. Yet, differences in the type of operation do exist, particularly in the environment in which they operate and the number of unscheduled operations that occur in this industry.

Accident data supports the conclusion that non-scheduled all-cargo operations are an important area worthy of further analysis. The extra effort would offer the insights needed to understand the nature of an apparent risk inherent in these operations and the actions needed to prevent them in the future. Given the high number of these accidents, the prevention potential is substantial. So, too, is the need to examine the high number of operational accidents and the high number of mechanical incidents in all-cargo operations. It is important to know whether these types of accidents are a reflection of pilot turnover, deficient training and standardization or a combination of the above. It is also important to understand the reasons behind the high number of incidents for mechanical reasons.

With respect to training in general and Special Purpose Operational Training in particular, whether it is for identifying mistrim conditions or for aircraft upset recovery, the responsibility for quality training rests heavily on the commitment of all-cargo air carrier operators. The regulations provide only minimum standards and leave a great deal of flexibility. Yet, while most passenger air carriers operate above these minimum standards, some all-cargo air carriers do not based on the experiences of our members. Had the training survey conducted by the American Institutes for Research included all-cargo air carrier pilots, the industry would have had suitable data from which to determine the validity of the practical experience offered from our members.

ALPA firmly believes that the nature of all-cargo operations necessitates the use of licensed and qualified loadmasters, which should be an integral part of the flight crew. A certified Aircraft Dispatcher has a significant role in the safety of today's airline. The work a "loadmaster" does is different, but no less significant to safety. Improved training and qualifications of loadmasters is an essential measure to achieving accurate cargo load planning, handling, loading and constraint tasks successfully, and in reducing the risks of accidents. These two fundamental requirements must also extend to ground handling personnel as well. The record supports the need for improved regulatory qualification and training standards to reduce the safety risks in air cargo operations. It also supports the need for improved guidance material. However, a review of the existing draft AC suggests it will not serve this purpose in its present form. More information, as cited in this paper, must be added to strengthen weak areas in the guidance.

This improved guidance material would also be beneficial to air carrier inspectors. It is needed to help standardize how all-cargo air carriers certificate holders are managed between regions and field offices. Inspectors must make an extra effort to examine all-cargo operators carefully in view of the lack of surveillance cited in accident investigations. Given the environment, route structure and the amount of night flying inherent in these operations, no doubt this is a challenge for inspectors. There must be adequate resources to accomplish this goal. The indication is that this fact may not get addressed soon since the NTSB is still holding its safety recommendation on this subject as an Open-Unacceptable Response from the FAA. The safety recommendations

made by the Board identify the systemic factors that included training issues in a major all-cargo operator accident. Furthermore, there are indications in the data that these factors may also be behind other all-cargo accidents as well. It is these systemic factors that have been impediments to additional safety risk reduction measures within the all-cargo industry.

With a dramatic CFIT accident reduction underway, it is hoped that implementation of the upcoming Upset Recovery Training Aid Revision will serve to help reduce the loss-of-control types of accident as well. These two predominant threats to air carrier safety could become very low risk occurrences if air carrier managements will commit to implementing this important new training aid update. In this regard, ALPA is concerned that all-cargo air carrier operators will be reluctant to embrace it, in view of the past accident history and because it is only voluntary. But, this training is just as important to all-cargo pilots as it is to passenger-carrying pilots. The traveling public and airfreight owners alike have a right to expect that they and their cargo will get to the intended destinations safely and reliably.

A solution to the remaining, repetitive-type accidents and their causes will require air carriers to make continual investments in prevention strategies and to participate in cooperative efforts in order to further reduce the already low accident rate. Current work on strategies, such as, threat and error management, active crew monitoring, prospective memory, and a whole host of other human factors solutions will become all the more important in striving to achieve this lower accident rate. This is achievable, and should be pursued. The CAST initiative must continue and new work must strive to take it further. For those all-cargo operators who participate and support the CAST activity, they have realized that these prevention strategies are beneficial to their business plans and operations. It is hoped that they will follow through with implementing the relevant safety enhancements. For the remainder of the all-cargo operators, they must realize that these enhancements are beneficial to them as well. The health of their operations depend on them examining more carefully the safety risks involved in their decisions.

## 5. Recommendations

As a result of this review, the Air Line Pilots Association, International makes the following safety recommendations to the NTSB:

1. Conduct a special study of 14 CFR Part 121 all-cargo and passenger air carrier operations to determine the systemic causes of the high number of accidents and incidents during non-scheduled operations. Determine if there are unique differences between non-scheduled and scheduled operations and identify additional prevention measures needed to reduce this high number. As a part of the special study, examine the all-cargo accident record to determine the systemic reasons behind the high number of operational accidents and determine whether this is attributed to pilot turnover, general deficiencies in training and standardization, or for other reasons, so that appropriate correctives measures can be taken. An investigation into the differences between European and U.S. all-cargo operations should also be performed
2. Also as a part of the special study, examine the all-cargo incident record to determine the systemic reasons behind the high number of mechanical failures and malfunctions and determine whether this is attributed to the use of older aircraft equipment, inadequate

maintenance and inspection, training, qualification and/or experience of maintenance technicians.

3. Re-examine the FAA's responses to Safety Recommendations A-98-47, 48, 50, and 51 to ensure that they are meeting the intent of the Board's recommendations.
4. Urge the FAA and the Cargo Strategic Planning Group to strengthen and issue the draft "All Cargo Operations" Advisory Circular and to include samples of best industry practices in the form of company-wide cargo loading system descriptions, policies and procedures, training curriculum and hours, and how outsourcing of cargo handling is done.
5. Review records for overdue final reports from foreign investigation authorities on all-cargo accidents and incidents and work with those States and ICAO to obtain the information, and update the database records.
6. Urge FAA to conduct a Pilot Training Survey among a suitable sample of all-cargo pilots, similar to that conducted by the American Institutes for Research among non-cargo pilots. Compare the resulting data with that already collected and analyzed in the initial study.
7. In order to ensure that all operators have a "one level of safety" baseline, urge the FAA to immediately begin the process of creating a new airman certificate under Part 65 for "loadmaster." Parallel work on the advisory material can be incorporated as appropriate, but this work should not be delayed until the advisory material is completed to start work on this key safety role.

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APPENDIX

Flight Phase	Sched	Non Sched	Light Conditions			Accident Type			Damage				Injury				Report Status	
			Day	Nite	Unk	Ops	Mech	Unk	None	Minor	Sub	Dest	None	Minor	Serious	Fatal	Prelim	Final
Parked	1	2	1	2	0	2	1	0	1	1	1	0	1	0	2	0	0	3
Taxi	4	5	4	5	0	8	1	0	1	0	8	0	8	0	1	0	0	9
Takeoff	4	7	3	8	0	6	5	0	0	0	7	4	8	0	0	3	1	10
Climb	1	4	2	3	0	2	2	1	1	0	3	1	3	0	1	1	1	4
Cruise	2	4	4	2	0	3	3	0	0	0	3	3	3	1	0	2	1	5
Approach	3	5	5	3	0	6	2	0	0	0	8	0	8	0	0	0	3	5
Landing	6	14	14	6	0	17	2	1	0	0	17	3	15	4	0	1	7	13
Unknown	0	2	1	1	0	1	0	1	0	0	1	1	1	0	0	1	1	1
Totals	21	43	34	30	0	45	16	3	3	1	48	12	47	5	4	8	14	50

Table No. 1 – Part 121 “N” Registered Air Cargo Accidents, 1990 to 2003 [Includes two Part 91 operations]

Flight Phase	Sched	Non-Sched	Light Conditions			Incident Type			Damage		Injury		Report Status	
			Day	Nite	Unk	Ops	Mech	Unk	None	Minor	None	Minor	Prelim	Final
Parked	2	1	2	1	0	0	3	0	0	3	3	0	0	3
Taxi	1	1	0	2	0	2	0	0	2	0	1	1	0	2
Takeoff	5	4	2	5	2	2	6	1	3	6	9	0	2	7
Climb	5	2	3	4	0	2	5	0	3	4	7	0	0	7
Cruise	5	3	6	2	0	3	5	0	6	2	8	0	1	7
Approach	3	2	5	0	0	2	3	0	1	4	5	0	2	3
Landing	2	5	5	2	0	3	4	0	1	6	7	0	1	6
Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	18	23	16	2	14	26	1	16	25	40	1	6	35

Table No. 2 – Part 121 “N” Registered Air Cargo Incidents, 1990 to 2003

**Note: For simplicity, light conditions reported as “dawn” (3) and “dusk” (1) were classified as “day” and “night” respectively.**