



A Report From the TWU

Aircraft Maintenance In America: Who Is Fixing My Plane?



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A Report by The Transport Workers Union of America, AFL-CIO Air Transport Division

A report by Aviation Professionals

Members of our union, with decades of experience in the airline industry, have reviewed government reports, industry data, and company-specific information regarding current practices in aircraft maintenance and repair.

Our findings raise serious concerns for all industry stakeholders, including airline workers, the traveling public, company officials and government regulators.

Key Findings:

- An increasing proportion of airplanes flown by U.S.-based airline carriers are maintained and repaired in overseas maintenance facilities, including locations such as China, El Salvador, Mexico and Chile.
- The Federal Aviation Administration (FAA) has jurisdiction to inspect overseas facilities, but lacks the personnel to do the job adequately.
- Workers in overseas repair facilities, working on U.S. aircraft used by U.S. passengers, are not subject to routine background checks or drug and alcohol tests. **At least one member of Al Qaeda was found working at a major maintenance facility in Singapore in 2003.** The faulty procedures that allowed this lapse in security have not been addressed.
- In addition to using overseas repair facilities, major U.S.-based airlines also outsource to U.S.-based companies, which lack proper oversight. **One company was found to have multiple employees working on critical maintenance tasks with falsified immigration documents.**
- The FAA Air Transportation and Safety Improvement Act now before Congress offers an opportunity to maintain the safety of U.S. aircraft and protect U.S. passengers. Recommended steps include:
 - Require all maintenance on U.S. aircraft take place in FAA-certified repair facilities.
 - Require all repair facilities to meet uniform standards, including background checks, drug and alcohol testing and aircraft mechanic certification.
 - Require, as a condition of certification, all repair stations to be subject to unannounced FAA inspections.

Is the traveling public safe and secure?

The Transportation Security Administration (TSA) checks the documents of every passenger who boards a plane in a U.S. airport, scans and searches carry-on and checked baggage, and subjects travelers to body scans and pat downs. While these practices are inconvenient and sometimes intrusive, they are generally accepted as a necessity to provide safety and security to the hundreds of millions of passengers who board domestic and international flights in U.S. airports every year.

Our review of aircraft maintenance and repair practices however, reveals a significant gap in the effort to maintain safety in our skies. While billions of dollars and hundreds of thousands of work hours are devoted to screening passengers, comparatively little effort is made to check on a much smaller group of people who play a critical role in airline safety: the workers who repair and maintain the aircraft of U.S.-based airlines.

We have discovered a potentially dangerous double standard: When repair and maintenance takes place in facilities owned and operated by major air carriers, workers and procedures are subject to rigorous screening and inspection by the Federal Aviation Administration. But when repair functions are outsourced to repair shops in the United States and abroad, inspection becomes much more lax, and in some cases non-existent.

Key questions for our industry:

- Are the areas in which maintenance and repair take place treated as sanitary corridors, with secure exit and entry, in the same way as passenger gates at airports?
- Does the FAA or any other agency conduct rigorous oversight of mechanics that have access to the most sensitive areas of the aircraft?
- Are all mechanics properly trained?
- Are they drug and alcohol free?
- Have they been subject to criminal background checks?

When aircraft repair takes place in facilities owned and operated by major carriers, the answer to all of these questions is an unequivocal **yes**. When work is outsourced to repair shops in the U.S. or overseas, the plain answer is... **we don't know**.

Many airlines contract out repair and maintenance functions to avoid rigorous FAA inspections

During the past decade, particularly after the financial pressures experienced by airline carriers following 9/11, many U.S.-based airlines have outsourced critical maintenance and repair work. A review of government documents and industry practices reveals that these repair facilities are not regulated or inspected by the Federal Aviation Administration in the same manner as the maintenance divisions run by the air carriers themselves.

This lack of oversight threatens our nation's history of operating the safest, most advanced air transportation system in the world – and may put the more than 700 million passengers who fly U.S. airlines every year at risk.

While many airlines originally resorted to outsourcing practices in order to cut costs, the plain truth is that **many airlines now prefer to contract-out these functions, precisely to avoid the routine and rigorous FAA inspections that take place in their own facilities.**

Table One: U.S. Industry Mechanic Population 2000-2009

Mechanic Headcount	2000	2009	Percent Change
All Passenger Airlines	64,248	42,774	-33%
Network (7 Airlines)	55,715	31,448	-44%
Low-Cost (7 Airlines)	3,630	3,300	-9%
Total Fleet Count	3,732	3,507	-6%

Prior to 1999, major U.S. carriers – including American, United, Northwest, US Airways, Delta, TWA and Continental -- all performed the overwhelming majority of their aircraft maintenance work in-house. Regional airlines also kept a large portion of their work internal and within the United States.

Beginning in the late 1990s, the in-house standard changed. The percentage of work outsourced in terms of maintenance dollars has risen from an average of 26% in 1999 to over 40% at seven major airlines in 2009. (The overall figure would be greater than 50%, except for the work still performed in-house by TWU-represented American Airlines mechanics¹.)

At the top six network carriers, over \$4 billion worth of work (approximately 30%) is sent outside the United States. A significant amount of wide body aircraft are currently being sent to China, Singapore, India and Central America, where the FAA lacks resources to adequately oversee repair work.

¹ BLS http://www.bts.gov/press_releases/2010/bts026_10/html/bts026_10.html

The Office of the Inspector General (OIG) at the U.S Department of Transportation (DOT) has audited the FAA’s capacity to oversee more than 1,000 licensed repair facilities around the world, and the results are disturbing. In the latest OIG report², out of eight major airline FAA inspection offices in the U.S., four accomplished less than 50% of their assigned inspection duties.

Overseas the issue of oversight gets even worse. There are approximately 100 FAA inspectors for roughly 700 aircraft repair stations outside the U.S. Within the U.S., by comparison, there are approximately 4,000 FAA inspectors for 4,200 aircraft repair stations.

Inadequate oversight, strained government resources and lack of consistent application of standards have created an alarming lack of uniformity in the critical area of aircraft maintenance and repair.

Airplanes maintained at facilities operated in-house by major carriers operate under one set of standards. Outsourced repair facilities in the U.S. operate under different rules – and airplanes maintained at overseas facilities are subject to yet another set of conditions.

Hundreds of millions of airline passengers, unfortunately, have no way of knowing when or where the aircraft they are flying on has been maintained or repaired, or under what conditions.

At American Airlines, TWU members have worked closely with management to keep control of the core function of aircraft maintenance. As a result, American has the lowest percentage of outsourced maintenance work of any major carrier, and has actually countered industry trends, with less work outsourced in 2009 than in 2001. (See *Table Two, above right.*) Passengers who fly on American Airlines can rest-assured that aviation professionals – certified by the FAA and subject to regular screening and background checks – are maintaining the company’s aircraft according to the highest industry standards. Passengers on other carriers have no such assurance.

**Table Two:
Percent Of Total Maintenance Dollars
Spent On Outsourcing**

% of Maint. Outsourced	2001	2009
American Airlines/TAESL	15%	12%
Continental	40%	45%
Delta	24%	31%
Northwest	28%	61%
United	18%	41%
US Airways	29%	60%

Hundreds of millions of airline passengers have no way of knowing when or where the aircraft they are flying on has been maintained or repaired, or under what conditions.

Aircraft Maintenance in America’s Airline Industry Today
The commercial aviation business is not a friendly place if you are looking for a calm and comfortable environment to work. Airlines are subject to extremes in energy costs, political upheaval, security risks, complex regulations, and changes in the world’s economies. While many other industries deal with the same issues, airlines routinely operate on thin profit margins and are quickly impacted by any change in the political, economic or regulatory environment. The past decade has been exceedingly stressful on all of the above fronts; as a result many core

maintenance functions within the U.S. airline industry have been outsourced to outside vendors, leading to a possible compromise of airline safety.

Outsourcing aircraft repair should be a significant concern to the traveling public because the FAA has neither the resources, nor a well-structured oversight system to ensure that aircraft maintenance is done properly. The U.S. DOT Office of the Inspector General (OIG) has repeatedly raised this issue³ during the last decade. To date, a majority of the serious safety issues raised by the OIG have not been addressed; several critical safety issues raised are seven years old.

² OIG AV-2011-026

³ July 8, 2003 AV-2003-047; September 30, 2008 AV-2008-090; December 16, 2010 AV-2011-026

U.S. employees working for airline carriers are required to participate in random drug testing and security background checks. This is not the case at all maintenance repair facilities.

Once the work is sent outside the U.S., the problem of employee oversight becomes an even greater concern. The FAA has the ability to perform inspections overseas; however, the number of FAA Inspectors is woefully insufficient. Many facilities outside the U.S. performing aircraft repair on U.S. aircraft or aircraft components have not been inspected for five years or more. To make matters worse, drug testing is not a requirement in foreign countries and background checks are not generally performed overseas.

In Beijing, AMECO overhauls aircraft with a staff of over 2,500 unlicensed mechanics, supervised by only five licensed mechanics – a ratio of 500 to 1.

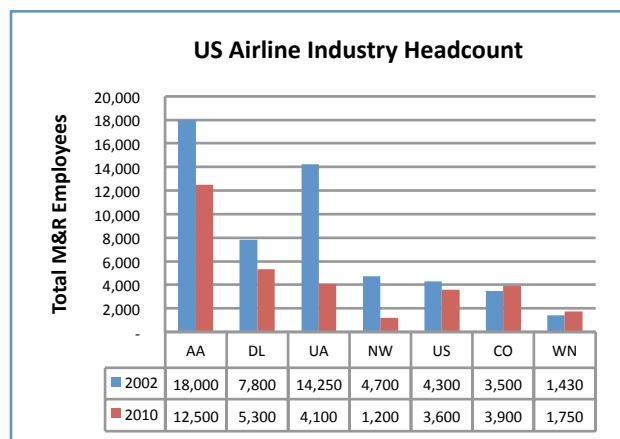
Who Is Maintaining the U.S. Airline Fleet?

During the average day, there are approximately 5,000 aircraft flying within the borders of the United States. Aircraft are flying at speeds of around 500 miles per hour and up to altitudes of over 40,000 feet. Today’s aircraft can carry up to 500 passengers and are an assembly of thousands of parts, complex electronics, and a variety of advanced materials.

Ever wonder who keeps these complicated technological marvels performing? Most passengers don’t and, to be honest, that’s what a well running aircraft maintenance department wants. Aircraft maintenance employees want you to enjoy your flight and to only be thinking about what is awaiting you at your destination. But, we must ask:

Does every aircraft maintenance organization run in this way?

Table Three: Mechanics Employed 2000-2010



Prior to 1999, the majority of U.S. airlines performed their routine aircraft line maintenance and aircraft overhaul in-house. Airlines wanted control over aircraft maintenance of their fleets; this allowed carriers to optimize their maintenance programs and maintain top- notch quality. Training was conducted consistently, the vast majority of aircraft maintenance technicians had background checks, were FAA licensed and drug-tested, and FAA inspectors would show up frequently to ensure proper compliance with safety regulations.

These conditions changed rapidly with the wave of bankruptcies that occurred early on in the first half of

the last decade. Most airlines sent a major portion – and in some cases all – of airframe overhaul to outside maintenance providers. In a very short period of time, U.S. airlines eliminated approximately 25,000 aircraft maintenance technicians and support staff positions. Who is performing this work now?

Initially, airframe overhaul work was sent to facilities within North America. However, much of this work has now been sent overseas. If you fly on a wide body aircraft operated by United, Delta, US Airways or Continental, it has most likely been overhauled in China, Singapore or Hong Kong. If you fly on a narrow body aircraft, it has most likely been overhauled in the U.S., El Salvador, Costa Rica or Mexico. At facilities outside of the U.S., the number of FAA-licensed mechanics with sufficient professional experience and training to carry out supervisory functions is not adequate to monitor the number of unlicensed mechanics who are carrying out the day-to-day work of aircraft repair.⁴

⁴ FAA Repair Station Database

In Beijing, for example, AMECO overhauls 747, 767, and 777 aircraft for United Airlines with a staff of over 2,500 unlicensed mechanics, supervised by only five licensed mechanics – **a ratio of 500 to 1**. At Aeromexico Maintenance in Mexico City and Guadalajara, Delta Airlines has its fleet of over 100 MD80s and MD90s overhauled by more than 550 unlicensed mechanics, who are overseen by less than 50 licensed mechanics – **a ratio of 10 to 1**.

In addition to inadequate professional supervision, there is a language problem in these operations. Proficiency in the English language is not a job requirement in these facilities, and the majority of maintenance workers in Mexico, China or other overseas locations do not read, write or speak fluent English. The international language of aviation however, is English – the language in which maintenance manuals and related documentation are written. Many of these foreign facilities do not translate the maintenance manuals into the workers’ native language, but instead require one of the FAA licensed mechanics to translate.

This means that at a facility like AMECO in Beijing, where one licensed mechanic is responsible for 500 unlicensed mechanics, he or she is also responsible for translating technical documents and maintenance requirements for hundreds of workers on a daily basis.

In The United States: Who Is Working On My Aircraft?

Since aircraft maintenance is a critical, safety-related function, one might assume that when work is outsourced to repair facilities in the U.S., these facilities would be held to the same safety, training and security standards as the maintenance repair facilities operated in-house by major carriers. Regrettably, that isn’t the case.

The major airframe maintenance repair outsourcers – AAR, TIMCO, Aviation Technical Services (ATS) and PEMCO – do not conduct background checks on their overhaul mechanics.

The major airframe maintenance repair outsourcers – AAR, TIMCO, Aviation Technical Services (ATS), and PEMCO – all operate in the U.S. None of these operators is required to conduct background checks on their overhaul mechanics. The issue surrounding the gap in aircraft security at these repair stations has been under discussion since 2004, but remains unresolved:

- *TIMCO – maintenance contractor for United, Delta and US Airways – was found to have multiple employees working on critical aviation maintenance structures who had falsified immigration documents. The employees were caught in 2005 during a federal investigation.*⁵
- *On November 18, 2009 the TSA issued a Notice of Proposed Rule-Making (NPRM) to address the significant gaps in security that exist at outside repair stations. Currently those employees that do not have access to the airfield operations area do not have to undergo security background checks. They are allowed however, to work on safety-sensitive structures, engines, and components.*⁶

At in-house aircraft maintenance repair stations at U.S. airlines, the requirements for security background checks are the same for all aircraft maintenance workers. United, American, Continental, US Airways, Southwest and Delta all have their repair station airline employees undergo background checks.

Companies such as AAR, TIMCO, Aviation Technical Services (ATS), and PEMCO are not required by law to conduct security background checks and they generally avoid such procedures. This results in a cost-savings for these companies – but does it guarantee safety for airline passengers?

A number of critical security issues have been raised in both U.S. and overseas facilities where aircraft maintenance work has been outsourced:

⁵ OIG DOT website <http://www.oig.dot.gov/library-item/3382>

⁶ NPRM 49 CFR, Subchapter C, Part 1554 http://www.tsa.gov/research/laws/regs/editorial_1878.shtml

- In 2003, at a Singapore major maintenance facility, **an Al Qaeda member was found to have been working on aircraft for Northwest**. This security gap was reported in a U.S. Inspector General Report in 2003⁷ as a serious concern that neither the FAA nor the TSA has jurisdiction over these employees under current regulations.
- In January 2011, the FAA proposed a fine of \$1.025 million at ST Aerospace for hiring 90 repair station employees at its San Antonio, TX facility without performing required drug tests. This facility performed overhaul work on Delta 757s during the period in question.

Overhaul work for United, US Airways and Delta is now done in China, El Salvador, Singapore and Mexico. Reports by government auditors and news media accounts indicate the work performed at these facilities may not be of the quality that U.S. airline passengers have come to expect from U.S.-based airline carriers.

For example:

- US Airways mechanics found incidents of door components installed backwards and crossed wires for critical engine instrumentation. All of this work was conducted at an Aeroman Aviation facility in El Salvador. During a NPR interview Aeroman mechanics stated that many of their co-workers did not speak English even though the manuals are not in Spanish.⁸
- Aeroman mechanics say managers pressure them to fix planes faster. For instance, if there's rust on a metal beam, but it's just a little over tolerance "the supervisor says, 'Oh, just leave it like that,' " the mechanic says, through an interpreter. 'There's no need to repair it.'"⁹
- The 2003 OIG report (AV-2003-047) detailed an incident of an aircraft operated by a US carrier that had been delivered as "airworthy" yet had over 6,000 discrepancies. The defects, including cracks and severe corrosion, were so bad that the air carrier submitted six service difficulty reports.

Table Four: Location of Airframe, Engine and Component Overhaul

Airline	Airframe Ov'h'l	Engines Ov'h'l	Components Ov'h'l
American	Tulsa, OK & Ft Worth, TX	Tulsa, OK & Ft Worth, TX	Tulsa, OK & Ft Worth, TX
Airtran	Outsourced Domestic	Outsourced Domestic	Israel & Outsourced Domestic
Alaska	Canada & Outsourced Domestic	Outsourced Domestic	Outsourced Domestic
Continental	Hong Kong & Outsourced Domestic	Spain & Outsourced Domestic	France & Outsourced Domestic
Delta	Hong Kong, China, Mexico & Outsourced Domestic	Atlanta, GA	Hong Kong, China, Mexico & Outsourced Domestic
jetBlue	El Salvador	Germany	Germany & Outsourced Domestic
Northwest	Singapore, China, Hong Kong & Outsourced Domestic	Singapore & Outsourced Domestic	Singapore, China, Hong Kong, & Outsourced Domestic
Southwest	El Salvador & Outsourced Domestic	Outsourced Domestic	Outsourced Domestic
United	China & Outsourced Domestic	San Francisco, CA	Hong Kong, South Korea & Outsourced Domestic
US Airways	El Salvador & Outsourced Domestic	Outsourced Domestic	El Salvador & Outsourced Domestic

Is The FAA Ensuring the Regulations Are Followed?

The FAA's oversight role has evolved along with the technology of aviation maintenance since the agency came in to being in 1958. The Airline Deregulation Act of 1978 changed the industry dramatically when new airlines entering the market brought in a new dynamic of competition. The purpose of deregulation was to allow greater access to air travel for more people.

7 OIG AV 2003 047

8 NPR October 2009 <http://www.npr.org/templates/story/story.php?storyId=113877784>

9 NPR October 2009

Passenger miles have increased steadily since 1978 – and as air travel has become more commonplace, aviation technology has improved. Aircraft have become safer, but also more complex to maintain. In addition, there has been a shift in how aviation maintenance is being monitored for compliance with safety regulations. In 1998, the FAA implemented the Air Transportation Oversight System (ATOS) in response to the newer generation of aircraft and information systems available. Aircraft did not need as much scheduled maintenance as in the past, and by analyzing the data, issues could be resolved quickly and safely.

In 2002, in the deteriorating economic environment following the 9/11 terrorist attacks, airlines started to lose the ability to borrow money to stem their losses. The FAA stepped up their oversight of airlines based on the concern that safety should not be compromised to lower costs.

In response to financial pressures, United, US Airways and Delta outsourced most – and, in some cases, all – airframe overhaul. Maintenance on nearly all wide body aircraft and some narrow body aircraft was moved to foreign repair stations. Outsourcers of aircraft maintenance promised airlines they could handle the new influx of work.

The FAA had implemented ATOS on airlines that performed most of their maintenance in-house, but this changed overnight. The FAA did not have the inspection staff in place to cover the new locations where maintenance was taking place. Airlines and the FAA did not move to adapt ATOS to properly oversee the change in work responsibility. Prior to 2002, The OIG at the U.S. Department of Transportation had signaled significant concerns about oversight. In the new environment for U.S. airlines, these issues were magnified many times over.

The FAA did not have the inspection staff in place to cover the new locations where maintenance was taking place.

- *In 1997, the National Transportation Safety Board (NTSB) recommended to the FAA¹⁰ that it 1) ensure that passenger aircraft maintenance receives the same level of FAA oversight, regardless of whether it was performed in-house or by repair stations 2) review the workload of inspectors assigned oversight responsibility for repair stations to ensure those inspectors have sufficient time and resources to perform surveillance.*
- *In a 2003 OIG report (AV-2003-047), it was noted that the FAA inspected one major US airline 400 times at its in-house facilities, yet only inspected its outsourced facilities seven times in 2002. Seven inspections, at a time when the airline was outsourcing 44% of its total maintenance, does not seem adequate to guarantee necessary oversight for a function that is critical to the safety and security of U.S. passengers and airline personnel.*
- *Also in 2003, the OIG stated “...the FAA has no mechanism in place to obtain information on how much work is outsourced, domestically or overseas. FAA inspectors believe it is not part of their oversight responsibility to track this information.”*
- *The FAA is not following its own risk assessment guidance. During the merger of Northwest and Delta, the FAA rated neither of those airlines as a higher risk even though the FAA lists “Merger or Takeover” as an area of increased risk requiring stepped up inspections.¹¹*
- *From FY2002 to FY2009, the FAA’s US Airways inspection office completed less than 25% of its inspection workload. US Airways outsourced 60% of their total maintenance spend in FY2009.*

How Can The Public Be Reassured Their Aircraft Is As Safe As Possible?

¹⁰ AV-2003-047

¹¹ OIG AV-2011-026 December 16, 2010

The U.S. has a long history of being the safest, most advanced air transportation system in the world. While the rapid shift to outsourced and overseas maintenance has not yet threatened this enviable record, **there is no guarantee that the current failure to conduct rigorous oversight and inspections across all maintenance platforms will not result in serious risks to the travelling public.**

Consistent uniform safety standards offer the best possible protection. Unfortunately, in the present environment, consistent standards are not applied across the three different types of facilities where aircraft repair and maintenance take place:

- In-house repair facilities operated by major carriers.
- Outsourced facilities in the United States.
- Outsourced facilities abroad, including facilities in China, El Salvador, Mexico and Singapore.

The following reforms are necessary to achieve a uniform standard that offers the highest assurance of safety and security for passengers on U.S.-based airlines:

- Require that all maintenance on all U.S. aircraft used in service be maintained in FAA-certified repair facilities.
- Require, as a condition of FAA certification, that all repair stations meet the same standards, including but not limited to, background checks, drug and alcohol testing, and aircraft mechanic certification.
- Reconfigure FAA inspection and oversight to place the greatest scrutiny on those repair stations where audits have determined the greatest risk to safety and security.
- Require, as a condition of FAA-certification, that all repair stations be subject to unannounced FAA inspections.
- Prohibit the FAA from certifying any repair station in any countries that prohibit unannounced inspections and immediately revoke existing certifications in these countries.

Leveling the Playing Field

On Capitol Hill, concerned legislators have been working to correct the problems with the current Federal aviation regulations. The FAA Air Transportation Modernization and Safety Improvement Act (S.223) passed the Senate in February 2011. The new bill addresses some safety issues, but misses out on others and must be strengthened in several key areas to offer the greatest possible protection to airline passengers.

- Inspections of foreign repair stations must be “required” by law, not “risk-based.”
- The U.S. Secretary of State and Secretary of Transportation must have legal authority to “require” not simply “request” drug and alcohol standards for foreign repair stations that work on the U.S. commercial fleet.
- In its current form, S.223 allows countries that sign bi-lateral agreements with the U.S. to conduct their own inspections on behalf of the FAA. While established regulatory agencies in Europe, Japan and Australia are equivalent to the FAA, many countries are not, and the safety of U.S. passengers should not be compromised based on agreements intended to promote greater foreign trade. The risk-based system is flawed, as noted in the OIG 2008 and 2010 reports,¹² and until the system is corrected, the FAA should be conducting the inspections.

Aviation professionals, as well as the travelling public, have a strong interest in requiring uniform, consistent inspection and monitoring of aircraft repair and maintenance work, wherever it takes place. The drug and alcohol testing, security background checks and frequent compliance inspections by the FAA that take place on a regular basis at airline-owned aircraft maintenance repair facilities should also be implemented in outsourced facilities, whether they are located in the United States or in another country.

As aviation professionals, TWU members are advocates for airline safety, and we will continue to advocate for common-sense measures which protect our members and the public.

¹² OIG AV-2008-057 June 30, 2008 and OIG AV-2011-026 December 16, 2010