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Solution Guide

Avoiding Problems With Tech Pubs

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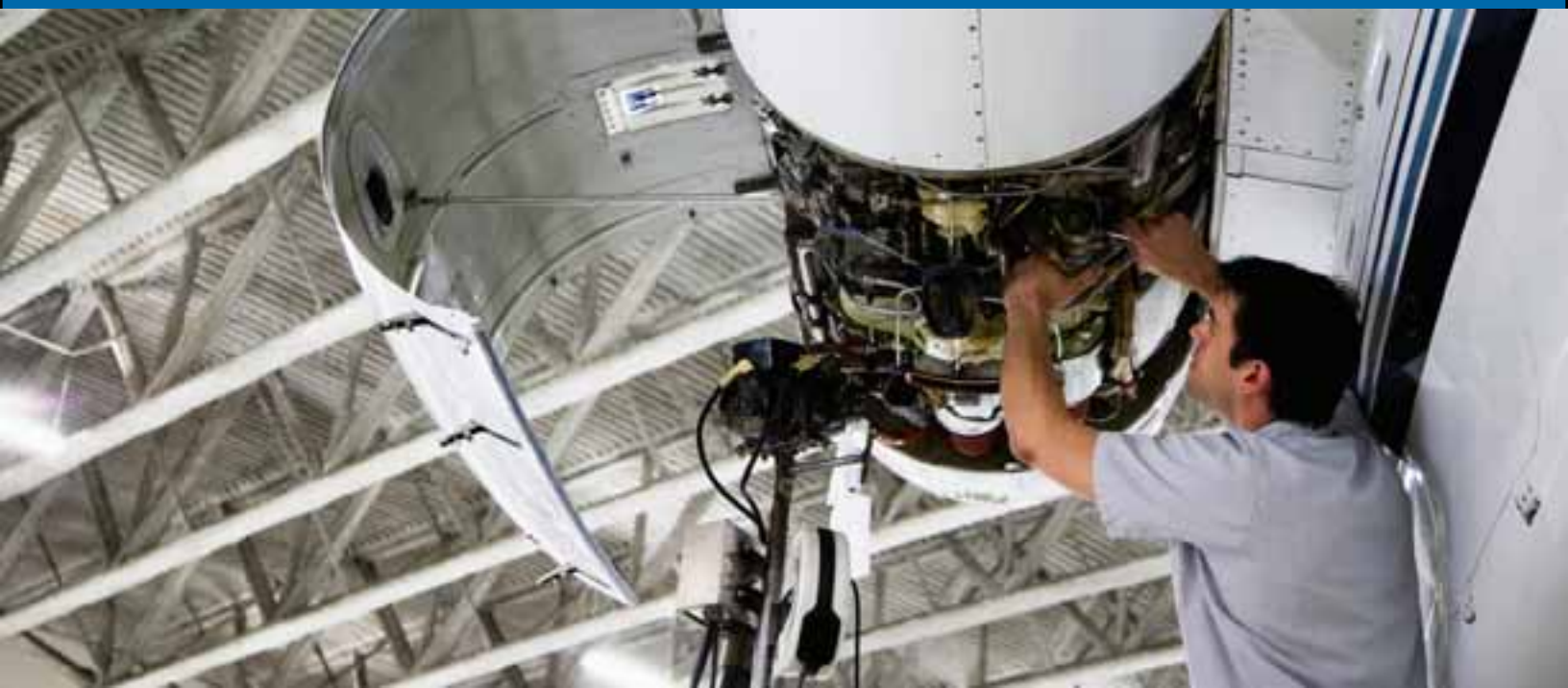


Introduction

Whether it's a straight forward line check on the ramp, or a major structural inspection in a hangar, it's mandatory that any repairs on an aircraft will be done by the book—using the latest available information. Surprisingly, this may not always happen. In fact, according to representatives of the FAA and industry, not only are some aircraft maintenance technicians relying on outdated publications to carry out repairs, but in some cases, repair manuals and related technical documentation aren't even consulted.

In the proceedings report of "Technical Documentation Challenges In Aviation Maintenance," a two-day workshop held by the FAA, these examples were cited:

- In an FAA study focusing on major malfunctions occurring within 90 days of a heavy maintenance check, failure to comply with maintenance documentation was cited as the number one reason for those malfunctions.
- A report by the Confidential Human Factors Incident Reporting Programme (CHIRP) from the United Kingdom indicated the top two most frequently occurring errors were: (1) information not used and (2) procedures not followed.
- An analysis of the FAA enforcement database reported that in nearly 900 "closed" cases, there were more than 850 actions taken against mechanics. Of those, some 36% were associated with not using the proper technical documentation—the primary cause for Enforcement Investigation Reports.
- An analysis of 14,267 NASA Aviation Safety Reporting System (ASRS) maintenance reports, logged from 2001 to 2011, showed that nearly 64%—about 9,000 of the incidents coded in the reporting system—were related to technical documentation, procedural challenges or both.

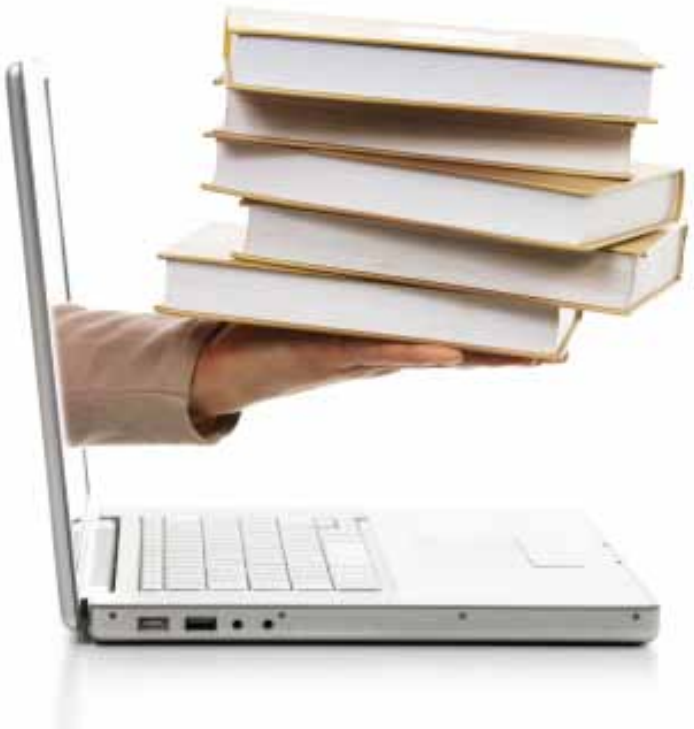
In these reports the three most common reasons for errors were:

- Non-use of documentation.
- Not using the most current document.
- Using the wrong document.

And, non-use of documents or using incorrect or outdated documents usually derives from the following:

- Failure to use the correct document because it is too difficult to find in a timely manner.
- The technician has no knowledge of the document's existence.
- The documentation is not available at the maintenance location.

Experts within the aircraft maintenance industry, along with current and former regulatory officials, have observed many of these issues with technical documentation and maintenance manuals throughout their careers. The non-use of documentation for routine repairs is perhaps the leading one, based on discussions with those experts.



Non-Use Of Documentation

"For routine tasks done on a fairly regular basis, such as a hydraulic pump or wheel change-out, there is widespread lack of technical manual use on the hangar floor," stated John Goglia, a former National Transportation Safety Board (NTSB) member, and now a consultant in flight safety and maintenance.

Goglia blames pressure from supervisors to complete a job to assure an on-time departure for the aircraft as one of the more common reasons why this happens. "Once you're encouraged to do this, you take the short cuts on the 'get-it-done items,' and often that means not taking the time to look for the manuals. It's an easy step to take to trust your own abilities."

According to Paul Lewandowski, Chief Inspector for Duncan Aviation in Lincoln, Nebraska, motivating technicians to use manuals every time they do a repair can be difficult at some repair stations. "Many technicians feel that (there are times when) using manuals can slow them down. They would prefer to rely on their own aptitude, and confidence in their ability to do the repair, without having to consult the manuals," he remarked. "This happens especially when routine repairs are involved and, in the mechanic's experience, the procedures for making those repairs have not changed for many years."

But, as Lewandowski pointed out, this presents the risk that the mechanic will be unaware of any recent changes impacting the repair. "A mechanic might consult a manual 50 times over the years to make a specific repair, and during that time the repair procedure has not changed. When he makes the repair the 51st time, he still assumes that there is no change to the manual—but that's just when a change may have been made."

"Many technicians feel that (there are times when) using manuals can slow them down."

Not Using The Most Current Document

Closely related to non-use of repair manuals is reliance upon those which are no longer current, and consequently do not reflect changes made by the original equipment manufacturer (OEM), such as maintenance alerts and service bulletins, or even airworthiness directives.

Often, this goes back to "document control," according to Sam Brant, Materials Manager for L.J. Aviation, an FBO, aircraft management and charter firm in Latrobe, Pennsylvania. "A mechanic removes a page from a manual, makes a copy of it, and then takes that copy to the shop floor," he noted. "At that point, it becomes an uncontrolled document, and during the period it is being used, an update to that page may be issued. But, the chances are that the technician who made the copy will continue to rely on it, with no knowledge that it may have been subsequently revised."

The risk of using outdated manuals is more common at those facilities that still rely on paper-based technical documents, according to Denny Pollard, a retired FAA maintenance inspector and now an independent aircraft maintenance consultant.

"Paper based documents tend to be out of date a great deal of the time, especially at Part 91 (private, not-for-hire) and Part 135 (on-demand charter and air taxi) operators, and at smaller repair stations, which generally do not have a technical service support group dedicated to ensuring that repair manuals are current," Pollard reported. Instead, he pointed out, the task of keeping manuals current is usually assigned to staff members who have other jobs to perform. "It may not be a priority, for them, and consequently, any revisions to the manuals can sit in their in-

boxes for weeks at a time," he said. "This is a very big issue today."

As Pollard explained, technically, a repair manual does not have to contain the latest revisions until it is actually used. "If the repair station is not diligent about checking to make sure that the manual is current, it is very likely that the mechanic will use one that is out of date. Once that is discovered, the latest documents will have to be ordered, which could delay the repair."

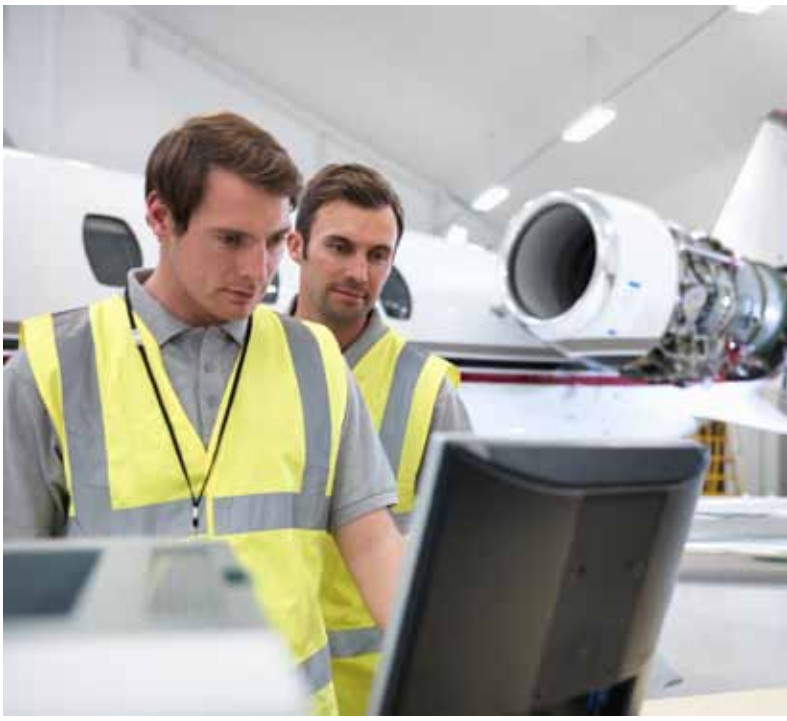
Using The Wrong Document

It is not out of the question for a technician to reference the wrong manual for an aircraft, especially when variants of a specific type are concerned. "There are always some possible disconnects between the manuals and the actual aircraft," said former NTSB member John Goglia. "Since variants may have somewhat different maintenance procedures, due to different system configurations and specs, it is very easy to grab the wrong manual."

Duncan Aviation's Paul Lewandowski agreed, pointing out that every corporate jet varies due to customization. "At Duncan Aviation, we work on approximately 30 core business jet types, and many have variants which present technical challenges for both airframe and engine work. This is particularly true when STC (Supplemental Type Certificate) work is involved, which requires the need to have the manuals that are unique to the (required) STC package."

Using incorrect technical documents is a "definite possibility," particularly in cases when a technician cannot verify that the data he is using is, in fact, incorrect, outdated, or not applicable to the model and serial number of the aircraft being serviced," reported Mike Weeks, Vice-President, Aircraft Services for Winston-Salem, North Carolina-based Piedmont Aircraft Services, a specialist in Beechcraft and Cessna Citation products.

"The problem is more often the fault of the repair station than the mechanic working on the aircraft, because they may not have the manuals—especially when dealing with an airplane long out of production," he said. "The older an aircraft model is, the less likely the repair station will have the correct manuals in stock." Weeks also observed that it's more likely that a repair station will subscribe only to those documents covering aircraft they work on all the time, and not the one-off job that shows up occasionally.



At Phoenix Heliparts, a helicopter MRO in Mesa, Arizona, Quality Assurance Manager Marcus Landry believes that part of the problem should be attributed to what he called "a lack of comprehensive understanding" on the part of the company. This lack of understanding includes "the FAA rules governing what technical data is approved and/or acceptable to substantiate the mechanics use of methods, techniques and practices acceptable to the administrator." Landry attributes this to lack of training, planning and tight deadlines, combined with heavy reliance on industry norms, and tribal knowledge passed on by senior employees.

Failure To Use The Correct Document Because It Is Too Difficult To Find In A Timely Manner

Paper documentation tends to get misplaced, and a time consuming search often conflicts with the need to complete a maintenance task when promised.

According to Dr. Bill Johnson, Chief Scientific And Technical Advisor-Human Factors for the FAA, a maintenance technician could literally spend a day or two just doing a paperwork search. "This becomes very uneconomical, because, by some estimates, paperwork searches could take as much as a third of wrench-turning time. Things can fall through the cracks under pressure to get the job done, so the implication is the search may not be as thorough as it could possibly be."

The Technician Has No Knowledge Of The Document's Existence

No aircraft maintenance technician, no matter how qualified, can possibly verify the existence of every single relevant technical document. In fact, mechanics do not always research changes driven by airworthiness directives and service bulletins, or compliance with mandatory OEM service bulletins. For this reason, a mechanic may not be aware that a solution to a maintenance problem exists, according to Bob Jones, Product Marketing Specialist for ATP in Brisbane, California.

One reason why is that the solution may not reside within a single document, but rather within a combination of technical publications. In the published proceedings of the FAA's February 2012 "Technical Documentation Challenges In Aviation Maintenance" conference, Bill Norman, President of MRO services for TIMCO Aviation Services an MRO catering to commercial airliners, reported that technical data is rarely found in one place.

"Technicians must assimilate information from multiple parts of a manual and even multiple manuals," said Norman as quoted in the conference proceedings. "Moreover, they are required to pull all reference data for a given task and wade through the data to determine exactly what is and is not applicable to the maintenance task."

The Document Is Not Available At The Maintenance Location

Often, technical data exists in resources other than the maintenance manuals such as in a separate STC or service bulletin not contained in the facility's library or database.

"In addition, the OEM may not provide the manuals for every component and subsystem on the aircraft, which means the technical data needed for a job will not be available," observed Piedmont Aircraft Services' Mike Weeks. He used an air conditioning system as an example.

"The repair facility may have to purchase separate manuals covering that particular system, which could have been installed on the aircraft out of the factory, or as an aftermarket job under an STC," Weeks explained. "Getting the correct servicing manuals could become a long and slow process since the technician may have to go to many different sources, only to find out that the

air conditioning supplier may have gone out of business. Even the owner of the aircraft may not have the manuals, or provide the most current repair data."

Weeks said that while most repair stations have the manuals in stock for the aircraft they are certified to work on, they may not, if another aircraft type drops in. Complicating things further, there is no guarantee that the repair manual on file will cover every component and subsystem on a particular aircraft.

The Electronic Solution

A first step in avoiding problems with technical publications may be as simple as moving from paper-based systems to electronic data libraries that are easily accessible by computer terminal within the maintenance facility, or remotely over the Internet using laptops computers, tablets or smart phones.

Fortunately, the trend away from paper manuals is progressing. Paul Mingler, Chief Consulting Engineer, Product Safety, for jet engine manufacturer GE Aviation, noted that the major OEMs are looking for ways to provide faster updates electronically, and in some cases with greater use of pictorial renderings. "That is being facilitated by the proliferation of tablet computers," Mingler noted.

When discussing some of the advantages of electronic technical documentation, the FAA's Dr. Bill Johnson reported that with accessibility on desktop or portable devices, any sections of a document being questioned could be highlighted and emailed to a supervisor or the OEM for clarification. "Connectivity among documents, through cross linkage of data from different sources; and transmission of pictures in real time to the engineering department, makes it easier to solve clarity of document issues."

Real-time accessibility on something as small as a notebook computer or hand held device assures that the right data is available when and wherever needed.

"Whenever our mechanics go on a road trip for an AOG emergency, they bring along a computer which contains the work order, the repair station procedures, the electronic maintenance manuals, and any required airworthiness directives or service bulletins pertaining to the aircraft for which compliance would be mandatory," said Paul Lewandowski of Duncan Aviation. "In the past, when we had a paper manual library, it often meant that a mechanic would have to make numerous trips between the library and the aircraft as repair procedures questions came up. Now that the library is available on a laptop, the mechanic takes the computer right to the airplane and calls up the library whenever a question arises. When you eliminate having to walk back and forth to get a question resolved, you encourage use of your technical manuals."

At L.J. Aviation, a shared digital library for all of the maintenance manuals for the 30 aircraft it has under management was established. "Even if we have more than one technician working on more than one aircraft, they all have access to the library and the most up to date information (from the OEMs) via computer terminals positioned in all the hangars," stated the company's Sam Brant. "It has eliminated any uncontrolled document

issues and has made for error-free use of the technical manuals."

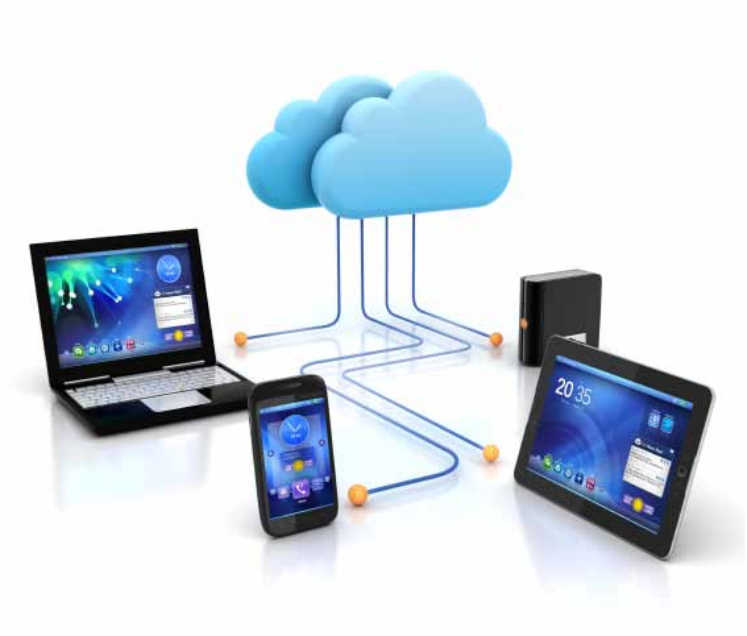
The shared digital library, Brant pointed out, contains all maintenance manuals pertaining to the airframes, engines, wheels and brakes—anything pertaining to the aircraft that would require an update at some point. "All of the digital information has been furnished to us directly… and this has made for an error free use of the documentation, and the technicians have more time in their work day to focus on repairs and servicing of aircraft."

More OEMs are moving to a cloud based maintenance manual solution because it saves them a huge amount of money involved with printing and distribution, observes consultant Denny Pollard. "For those in the field, they don't have to deal with numerous paper documents. All you have to do is plug in a laptop or iPad and download the document."

ATP Aviation Hub™ Cloud Application

With the ATP Aviation Hub™ Cloud Application, maintenance operations have access to the most advanced, single source, cloud-based solution in the industry. The ATP Aviation Hub cloud application provides an integrated, single point of entry, via Internet connection, to the maintenance documents from multiple OEMs and regulatory agencies, including service bulletins (SBs), airworthiness directives (ADs) and maintenance alerts, hosted on ATP's secure website. All revisions are automatically updated on a daily basis, ensuring that all users have access to the most current information from ATP without having to worry about whether the paper or disc updates have been performed.

"With cloud computing, there are, virtually, no geographical restrictions," explained ATP Product Marketing Specialist Bob Jones. Data can be accessed anywhere there is an Internet connection." Jones added that ATP has expanded its cloud service to include access on an iPad® or iPhone® with ATP's HubConnect™ App. The HubConnect app downloads and synchronizes the publications for mechanics in places where internet service might be unavailable.



Additionally, ATP's experienced staff of librarians and IAs work in the background to index, organize and validate all of the publications from the many various sources. Combining this backend work with ATP's advanced library management technology means that technicians using ATP's maintenance libraries can quickly find all of the relevant and critical information needed to perform a maintenance task in the quickest and most convenient way possible. This combination of single source library management and advanced technology improves mechanic productivity, supports the compliance and safety efforts of maintenance operations, and reduces AOG time for the operator.

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