DOWNLOAD PDF AIRCRAFT ENGINE MAINTENANCE

Chapter 1 : FAA Approved Aircraft Maintenance & Mechanic Training Programs

Aircraft maintenance is the overhaul, repair, inspection or modification of an aircraft or aircraft component.. Maintenance may include such tasks as ensuring compliance with Airworthiness Directives.

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Chapter 2 : GA Telesis - Aircraft, Engines, Maintenance & Solution-Based Services

The core competency of MTU Maintenance is engine maintenance and overhaul. Since its foundation, the company has handled almost 16, shop visits. When an engine comes for a shop visit, the first priority is to ensure downtime and maintenance costs are kept to a minimum.

The first thing to acknowledge is that anyone running a fleet of aircraft wants them in the air, not in a hangar being maintained. The result, ultimately, should be an engine that safely spends most of its time in the air. While static sensors have played an increasingly important role in monitoring engines and therefore optimising maintenance schedules, the tools in the IntelligentEngine programme are considerably more dynamic. Not only can they seek out the problems, they can â€" in their various animated forms â€" fix them, too. It should be stated that the ideas described here are at various stages of development. We have a great network of partners who support our work in this field and this is an area with the potential to revolutionise how we think about engine maintenance. The problem it is designed to resolve is the in-situ repair of compressor blades inside jet engines. These are subject to large volumes of air flow and can sometimes incur edge damage, which can be dangerous if left untreated. Repairing the blade in-situ is by far the most cost-effective approach. However, in-situ inspection and repair of jet engines are inherently difficult due to restricted access to internal components. Usually, the mechanic uses bore tools to manually enter the engine via an inspection port that is typically 9mm in diameter. It is dark inside the engine, so orienting and manoeuvring the tools is very challenging. It comprises a combination of rotary, prismatic and flexible joints, and was designed to replicate the degree of freedom of hand-held tools to repair a compressor blade in a matter of minutes rather than days. At the end of the collaborative project, which was part-funded by Innovate UK and the Aerospace Technology Institute, the prototype was demonstrated on an engine in a Rolls-Royce facility, a world first for this type of repair task. The probe is based around an off-the-shelf dental motor, so it can carry interchangeable tools, meaning the robot could eventually be used to perform a greater range of tasks for other sectors too. As well as with any Rolls-Royce engine, our robots could one day be used in other industries such as oil, gas and nuclear. This project is still under lab testing. They would then perform a visual inspection of hard-to-reach areas by crawling through the engine. These robots would carry small cameras that provide a live video-feed back to the operator, allowing them to complete a rapid visual inspection of the engine without having to remove it from the aircraft. The University of Nottingham is currently applying for research funding with Harvard University to bring the concept to life. Harvard has expertise in miniaturising robots, but it is not down to the 10mm unit yet. No longer will teams of specialists need to be flown round the world to repair engines. Local staff will insert devices that feed information to and are controlled from a single site, repairs effectively being carried out remotely. Savings in time and money would be considerable, but more importantly it would ensure maximum availability for keeping those aircraft engines in the air. With sensors and motion control now able to exist in miniature, is it time to use the advantages of digital tools to change the way that aeroplane engines are maintained?

Chapter 3 : Aircraft Engine Maintenance: For the Engine Mechanic: Boggess. Brimm: blog.quintoapp.com:

Aircraft engine resource for companies that install, inspect, repair, overhaul, machine, and do maintenance on aircraft engines. Aircraft engine maintenance and repair directory We use cookies to help you get the best experience when using our website.

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Chapter 4 : Aircraft Engine Hospital Shop: Engine Specialists & Repairs | Delta TechOps

Aircraft Engine Maintenance Run-ups An engine run-up is necessary after certain types of maintenance procedures are performed on an aircraft. To conduct these procedures, the aircraft will be taxied to one of four locations designated for run-ups on the airfield.

Therefore to review, the term maintenance means the inspection, overhaul, repair, upkeep and preservation of an aircraft and engine, including the replacement of parts , according to the FAA. The pilot in command of an airplane is responsible for: Determining whether the aircraft is in condition for safe flight. Having a Registration Certificate and a valid Airworthiness Certificate appropriately displayed in his aircraft during all operations. Having available in the aircraft an FAA-approved flight manual or operational limitations. Keeping abreast of current regulations concerning the operation and maintenance of his airplane and engine. Although maintenance requirements will vary for different types of aircraft, the FAA states that experience shows most aircraft will need some type of preventive maintenance after every 25 hours of flying time and minor maintenance at least every hours. The annual inspection is acceptable as a hour inspection, but the reverse is not true. The ADs specify the aircraft or component found to be unsafe by the FAA, and the conditions, limitations or inspections, if any, under which the aircraft may continue to be operated. The Federal Aviation Regulation requires a presentation showing the current status of applicable airworthiness directives, including the method of compliance, and the signature and certificate number of the mechanic or repair agency who complied with the AD. This includes those ADs of a recurrent or repetitive nature; for example, an AD may require a certain inspection every hours. This means that the particular inspection shall be made and recorded after every hours of flight time. The latter will tell what the trouble is and how to remedy it. The service bulletin usually addresses those items that affect safety of flight. In addition to service bulletins, Lycoming also publishes service instructions and service letters. A service instruction is product information that also becomes a part of the manufacturer maintenance manual, and therefore compliance with these publications by owners and operators is required. Preventive Maintenance Preventive maintenance means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations. The holder of a pilot certificate issued under FAR 61 may perform preventive maintenance on any aircraft owned or operated by the pilot that is not used in air carrier service or air taxi. All other maintenance, repairs, rebuilding or alternations must be performed by persons authorized to do so by the FAA. Owners and operators are reminded that certain FAA requirements must be met before a Progressive Maintenance program can be used. Aircraft Flight Test After Repair or Alteration The FAA reminds us that whenever a repair or alteration has been made to your aircraft or engine, the person authorized to return the aircraft to service should decide if the flight characteristics have changed or if operation in flight has been substantially affected. If the decision is affirmative, the aircraft must be flight tested before it may be used to carry passengers in accordance with FAR The test pilot must make an operational check of the maintenance performed and log the flight and findings in the aircraft records. Overhauled Engines A Lycoming overhauled engine puts you back in flight in no time. Exchange your like-model complete operating engine for full core value and update to the most current features and parts backed by a Lycoming warranty.

Chapter 5 : Engine Maintenance Programs for Business Jets | BCA content from Aviation Week

Aircraft engine overhauls are all about flying like new and they require careful planning. It all takes time and a maintenance scheduling. Imagine replacing your engine with one that has already been overhauled, all at a guaranteed price?

Some examples of design improvements to reduce corrosion on the Boeing Marceau, include: Major airline fleets include aircraft ranging in age from new to 25 years old. Consequently, the degree of corrosion protection incorporated into the airplane varies from limited protection for older aircraft to fairly extensive protection for newer aircraft. Corrosion control programs are tailored to individual fleets, depending on age, prior experience, flight environment and degrees of corrosion protection incorporated prior to the delivery of the aircraft DeRosa, All protective finishes are maintained and corrosion prevention compounds are applied during periodic maintenance. Critical areas that are prone to excessive corrosion include areas below the galleys, doorways, lavatories, cargo compartment subfloors, inside external fairings, and the bilges which are all treated at four-year intervals. Landing gear wheel wells and wing spars are treated yearly. Longer intervals of time are allowed between reapplications of corrosion prevention compounds in the case of less-severe environments. Aging aircraft repairs have typically involved upper-skin lap fastener replacement, nonbonded skin panel replacement, skin lap doubler repairs, frame reinforcement, entryway door and scuff-plate doublers, replacement bushings and clevis joints, bulkhead forging replacement, and selected landing gear component replacement. Based on service experience, the airlines have expectations that manufacturers of new aircraft will DeRosa, The objective of aging aircraft programs is to ensure the continued airworthiness of large transport aircraft as long as they remain in commercial service Curtis and Lewis, Because new materials and fabrication processes may yield different degradation and damage mechanisms, a preproduction review should ensure that the new aircraft design includes lessons learned from the existing aging fleet. Many of the steps needed to improve aging performance are detailed below. Most of these steps have now been incorporated into recent aircraft designs. The susceptibility of aircraft to corrosion and MSD fatigue can be reduced by the following steps: The present focus on aging aircraft will lead to better corrosion-resistant treatments for next-generation aircraft. Materials selection in wet areas, the design drainage schemes, the use of insulation standoffs, and sealing and finishing systems have all been improved. The benefits of these improvements should be evident during in-service performance of the Boeing and future aircraft. Liberal use of corrosion-preventive compounds applied in the aircraft assembly process and periodically in service, using a good corrosion control maintenance program, should minimize future corrosion concerns. Structural Composites As discussed in chapter 4 , prior to the latest generation of aircraft, which includes the Airbus A and the Boeing , structural composites have been used on aircraft flight control surfaces such as elevators, spoilers, ailerons, and rudders, as Page 64 Share Cite Suggested Citation: The National Academies Press. For these applications, honeycomb sandwich designs with thin 0. It follows that most of the experience with advanced composites has been obtained with this kind of construction. Previously, similar constructions with fiberglass skins and nonmetallic honeycomb core have been used. There is much less service experience with thicker-skin laminate designs that have been used in composite primary structure. In general, the service experience with composites indicates that damage occurs because of discrete sources such as impacts, lightning strikes, and handling rather than progressive growth caused by a fatigue condition Blohm, In addition to groundhandling damage, a recent survey by the International Air Transport Association, summarized in table , lists the particular causes of damage that occur in the current generations of composite structure IATA, The types of damage to composite components include disbonds or delaminations 45 percent , holes or punctures 35 percent , cracks 10 percent , and other damage 10 percent. An especially difficult maintenance issue resulting from these types of damage is when perforation allows the incursion of hydraulic fluids, water, and other liquids into the honeycomb core. Composites may also suffer loss of load-bearing capability due to resin charring and the potential for corrosion of adjacent metallic surfaces. Typical causes of composite service damage mechanisms are shown in table Service experience with thicker composite

laminate constructions, such as that used on primary structures on the Airbus A and Boeing , is not adequate enough to establish damage trends. Composite Repair The current methods used by the airlines to repair damage to aircraft composite structure secondary structure and primary flight controls depend on the extent of damage, the time available to perform the repair, and the time until the next scheduled maintenance visit. In approximately 80 percent of all cases, the damage is covered with adhesive-backed aluminum foil "speed tape" or temporarily repaired and deferred for a specific time to provide for interim or permanent repair or part replacement. Occasionally, temporary or permanent repairs can be performed by bonding or bolting a sealantcoated metal or precured composite overlay over the damage. Finally, most permanent repairs are accomplished with room-temperature curing, wet lay-up and precured patch techniques. Other permanent repairs use prepreg that cures under vacuum or autoclave pressures at temperatures lower than the cure temperature of the original structure. Repair resins are being developed that have relatively low cure temperatures, TABLE Most Common Causes of Composite Structure Damage to Aircraft Cause of Failure Moisture and chemical fluids attack 30 Other heat damage, fatigue, abrasion, and erosion 11 Bird strikes and hail damage 8 Runway rocks and foreign object damage 8.

Chapter 6 : Aircraft Engine Maintenance Run-ups | Port of Seattle

Aircraft engine maintenance: it's a bug's life With sensors and motion control now able to exist in miniature, is it time to use the advantages of digital tools to change the way that aeroplane engines are maintained?

Liked Save Saved Save for later Saved for later In this blog, we will show you what a jet engine is subjected to during a complete overhaul. Depending on the type, an engine has to be taken apart, cleaned and serviced every 3, or more flight cycles. This means an engine receives a major overhaul every five years, in addition to more frequent, less radical visits to the workshop. This eco-friendly building is named after Sir Frank Whittle, the British pilot who designed and patented the first turbo jet engine in Each engine is identified by a six-digit serial number and has its own maintenance plan and complete history data. There are all kinds of reasons why an engine might be replaced: You can read more about flight cycles in our previous blog. When this cycle limit is reached e. The work package level is then discussed in detail with engineering specialists, the production team and, of course, our customer. Other airlines, besides KLM, make use of our engine maintenance expertise. The result is an overview of all the work that needs to be done. One of these is a borescope inspection in which a camera is used to carry out an internal examination of the engine. This is the same technique used in hospitals to examine the inside of the human body. A very small camera attached to a flexible pipe is inserted into the engine through small holes distributed all around the engine. This enables the borescope operator to see right into the heart of the engine and view any irregularities, such as dents or cracks, on a large display. Nothing escapes attention using this technology. Rotating parts are located in the sections where large forces are generated, for example, in the compressor and turbine section. They are, obviously, subjected to more wear and tear than static parts. At a major overhaul, the engine is almost completely dismantled about 40, parts. These parts are inspected and some of them are sent to the engine manufacturer or to other KLM and Air France departments, who are specialised in different parts. There, the mechanics examine and repair the parts, according to the repair manuals, to make them fully functional again. Not in our shop. We have female mechanics on our team. Life-limited parts at the end of their life cycle have to be replaced with new ones. Some parts can be repaired at our top-notch repair shop, using robots and innovative techniques such as laser cladding or e-beam welding. Are you wondering what the most expensive part of an engine is? This component costs USD 1. This is equivalent to about five Ferraris type for the experts or an ultra-luxury villa with staff and pool. All the parts are collected and carefully assembled. Then the engine goes into the test cell. This is an insulated bunker where the engine is subjected to thorough testing under the toughest of conditions and all kinds of circumstances. If the engine passes the tests, a certified inspector carries out a final inspection and issues a Certificate of Airworthiness.

Chapter 7 : Cessna Aircraft | Jet, Turboprop and Piston Models

Engine maintenance is around 2/3 of total aircraft maintenance costs, but these are only ~5% of total Direct Operating costs for a single aisle. If these costs increase or decrease it varies the total operating costs with a fraction of a percent.

Chapter 8 : The Basics of Maintenance in General Aviation | blog.quintoapp.com

Even the "pros" of our industry admit they need to be reminded from time to time of the basics of General Aviation maintenance. Therefore to review, the term maintenance means the inspection, overhaul, repair, upkeep and preservation of an aircraft and engine, including the replacement of parts, according to the FAA.

Chapter 9 : Jet Engine Maintenance: This Is How We Do It - KLM Blog

In the course of operating an extensive worldwide fleet of aircraft that include A, A, A, B, B, B, B, B, MD, MD, and Regional Jet (RJ's), Delta TechOps has developed a knowledge and experience base in supplying ISO Certified aircraft

engine maintenance and propulsion engineering services.