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Propeller displaying different limits of repair. Photo courtesy of Jeff Simon. Most propeller issues fall into two categories: corrosion and physical damage.**Corrosion**One of the most insidious causes of propeller damage is corrosion. This includes external corrosion that is visible on the blades, as well as internal corrosion that literally eats away at the components within the hub of a variable-pitch propeller. Regardless of its location, corrosion reduces the structural integrity of the propeller as well as its performance. There are three distinct types of corrosion relative to propellers: surface corrosion, pitting, and intergranular corrosion. Surface corrosion occurs when the protective coating on the propeller has been removed from the face and leading edge of the propeller, most often by the effects of rain, sand, etc. This is fairly common and can be removed by a mechanic with emery or crocus cloth, followed by re-painting of the propeller as required.Pitting is a very specific and serious form of corrosion. Pitting corrosion consists of small, visible corrosion cavities extending inward from the metal surface of the propeller. Pits can grow on the surface, but are more commonly found where moisture is trapped, such as under decals left in place after propeller balancing or improperly installed de-icing boots. Any sign of pitting is serious and should be evaluated quickly in an effort to save the propeller from the junk heap.Intergranular corrosion is a form of corrosion internal to the metal structure itself. It is less common and more likely to be caused by a problem in the metal casting, but it too can be caused by trapped moisture under decals or around bolt holes.Physical damageThe most common forms of physical propeller damage are nicks, dings, and cracks on both the blades and the hub of the propeller. A propeller shop has the tools to do much more detailed inspections of propellers for cracks, including ultrasonic, eddy current, dye penetrant, and magnetic particle inspections. However, routine inspections for damage visible to the naked eye are a crucial starting point.According to the FAA's Advisory Circular AC 20-37E, "Limited minor repairs may be made on propellers by appropriately rated maintenance technicians either on the aircraft or when the propeller is removed. Minor dents, cuts, scars, scratches, and nicks may be removed providing their removal does not weaken the blade, substantially change weight or balance, or otherwise impair its performance." Its important to always use the propeller manufacturer's maintenance manuals for proper maintenance procedures and limits when working on a propeller. That said, the FAA provides some guidelines for minor repairs in AC 20-37E.For nicks, dents, pits, and cuts in the leading or trailing edges of blades, ensure that the bottom of the damage is removed first by rounding out and fairing in the repair only slightly deeper than the damage. Initial removal of material should be done using a fine cut file. All traces of file marks in the repaired area should be removed with number 240 emery cloth followed by polishing with number 320 emery cloth, then finished with crocus cloth or 600 grit emery cloth, and then visually inspected. An individual edge repair should not exceed a depth of 3/16-inch. The repair length should be 10 times longer than the depth of the repair.For gouges, cuts, and small dents on blade faces, ensure that the bottom of the damage is removed first by rounding out and fairing in the repair to form a saucer-shaped depression only slightly deeper than the damage. The initial repair should be accomplished by filing with a fine cut file parallel to the damage and finishing with 240 and 320 emery abrasive cloth, as in the manner of damage removal from blade-leading edges. Final polishing of the repair should be done with crocus cloth or 600 grit emery cloth. An individual repair should not exceed 1/16-inch in depth and the surface radius of curvature of the repair must not be less than 3/8-inch. Repair width should be 30 times the repair depth.Of particular note in these repair guidelines are the rules regarding the transitions and fairing out of the repairs. For leading edge repairs, the total repair length is 10 times longer than the depth of the repair. This is very important. It means that if you need to down 1/8-inch (0.125 inch) to get to the base of a nick, you will need to smooth out the repair over the distance of 1.25 inches. For blade face repairs, its 30 times. For a 1/16-inch deep repair (0.0625 of an inch), that's a 1.875-inch disk of repair area. Those are pretty big dimensions, more than one might assume without proper training. So, it pays to know proper maintenance practices such as this to ensure that repairs are made properly.We've just scratched the surface of propeller inspection and repair. Next time we will delve deeper and look at what happens when its time to get the prop shop involved for some real maintenance, repairs, and overhauls. Until then:happy flying! When it comes to your aircraft propeller, knowledge is power. In addition to our helpful resources and manuals, Hartzell Propellers technical team is always available to answer your questions about propeller maintenance, overhauls, repairs, and safety. Today, we want to shed some light on one of the most common questions we receive: When should I replace my aircraft propeller?Hartzells aircraft propellers are engineered to have a long service life. But just like any component on your aircraft, there inevitably comes a time when propeller replacement is necessary. So, how do you know when your aircraft propeller needs to be replaced or upgraded?Here are three situations where a propeller replacement makes sense:#1: Your aircraft propeller is damaged due to a strike or corrosionSome propeller damage is obvious. Unfortunately, prop strikes occur all the time due to hangar hazards, gear-up landings, and even rogue wildlife on the runway. Remember, never try to straighten bent propeller blades on your own. Take your aircraft to a reputable propeller repair facility to assess whether propeller blade repair is possible, or if a total propeller replacement is needed.Other types of propeller damage are not so apparent. While external corrosion is visible on the propeller blades, internal corrosion is far more insidious. Left undetected, internal corrosion can destroy the components within the propeller hub and render the propeller unairworthy. This type of corrosion is often only detectable during a complete propeller overhaul.#2: Your aircraft propeller has reached its operational life limitsits critically important to pay attention to your propeller manufacturers published overhaul limits. Flying your aircraft with a propeller beyond its intended service life isnt just inadvisable; its potentially dangerous. TBO limits are defined in terms of both flight hours and calendar time, whichever comes first. If you have a Hartzell propeller, you can find detailed information about the propeller overhaul limits for your specific model in Hartzell Service Letter HC-SL-61-61Y. If your prop is due for an overhaul, visit Hartzells world-class propeller service center in Piqua, Ohio, or one of our Recommended Service Facilities (RSF) located around the world.While the cost of a propeller overhaul varies by model, it can add up quickly, especially if you need to replace the propeller blades and multiple internal components due to damage, seal aging, and corrosion within the hub. In cases like this, you may discover there isnt a significant price difference between overhauling your legacy prop and upgrading to a new-generation design. Of course, you dont need to have an upcoming overhaul to upgrade your old prop, but it can be an opportune time to consider a propeller conversion. (Keep reading!)#3: You want to upgrade to a higher-performance propellerThe ability to make performance modifications is one of the best aspects of owning an airplane. If youre thinking about enhancing your aircraft, an aircraft propeller conversion is one of the smartest investments you can make!Here are some good reasons to consider upgrading your propeller:You want to try something new. Maybe youre planning to fly into backcountry strips, change from wheels to floats or skis, or make more cross-country trips. Youll need a prop that can match your mission!You want to improve performance. An upgraded propeller can offer performance advantages in a number of areas, from takeoff and climb to cruise speed.You want to make your airplane quieter. Switching to a new propeller can help to limit vibration in flight, which helps to reduce noise and provide greater comfort to passengers.You want to improve ramp appeal. Sleek, new propeller blades are a surefire way to add instant ramp appeal and increase the value of your airplane.Learn more about Hartzell Propellers Top Prop conversion program. ,the free encyclopedia that anyone can edit.110,331 active editors7,023,877 articles in English1qor Judge, Baron Judge, a British judgeNominative determinism is the hypothesis that people are drawn to professions that to fit their name. The term was first used in the magazine New Scientist in 1994, after its humorous Feedback column mentioned a book on polar explorations by Daniel Snowman and an article on urology by researchers named Splatt and Weedon. The hypothesis had been suggested by a psychologist in 1967, and has since been used to explain the career choices of many people. One explanation for nominative determinism is the theory of implicit egotism, which states that humans have an unconscious preference for things they associate with themselves. An alternative explanation is genetic: an ancestor might have been named Smith or Taylor according to their occupation, and the genes they passed down might correlate to aptitudes for those professions. (Fullarticle...)Recently featured: Donkey Kong LandHistory of education in Wales (17011870)White dwarfArchiveBy emailMore featured articlesAboutCongregation Shaar Hashomayim... that the Congregation Shaar Hashomayim (pictured) in Windsor, Ontario, was modelled after a synagogue in Montreal?... that NASA promoted the "faster, better, cheaper" approach to spacecraft missions in the 1990s?... that Black model Debra Shaw walked the runway in Bellmer La Poupe wearing a metal frame that generated controversy over a perceived reference to slavery?... that a spokesman for the Kaw Nation credited Robert L. Rankin with single-handedly preserving their language?... that multiple members of various royal families have competed in the Olympics?... that The Westeries led a piece of tin foil over the bell of a trombone to make it hiss?... that after runner Frej Liewendahl had broken Paavo Nurmi's five-year winning streak, he went to his hotel room with flowers to apologise?... that the crew of the US Coast Guard Cutter Dione repeatedly attacked the shipswrecks of oil tankers, believing them to be German U-boats?... that one issue facing tsunami sirens in New Zealand has been a youth subculture that steals sirens to compete for the loudest and clearest sound?ArchiveStart a new articleNominate an articleTrifid and Lagoon nebulaeThe Vera C. Rubin Observatory in Chile releases the first light images (example shown) from its new 8.4-metre (28ft) telescope.In basketball, the Oklahoma City Thunder defeat the Indiana Pacers to win the NBA Finals.An attack on a Greek Orthodox church in Damascus, Syria, kills at least 25 people.The United States conducts military strikes on three nuclear facilities in Iran.In rugby union, the Crusaders defeat the Chiefs to win the Super Rugby Pacific final.Ongoing: Gaza warIsrael warRussian invasion of UkrainetimelineSudanese civil warTimelineRecent deaths: John R. CasanRichard Gerald JordanFranco TestaRaymond LafammeGertrud LeuteneggerMaria VoceNominate an articleJune 27: Helen Keller Day in the United StatesDepiction of Pope Agatho678 Pope Agatho (depicted), later venerated as a saint in both the Catholic and Eastern Orthodox churches, began his pontificate.1800 War of the Second Coalition: French forces won a victory at the Battle of Neuburg, ending Austrian control over the River Danube.1905 First Russian Revolution: The crew of the Russian battleship Potemkin began a mutiny against their officers.1950 Korean War: Five North Korean aircraft attacked an American air convoy above Suwon Air Base in the first air engagement of the Korean War.2015 Ignition of corn starch caused a dust fire at a water park in New Taipei City, Taiwan, killing 12 people and injuring more than 400 others.Wilhelmina FitzClarence, Countess of Munster (b.1830)Frank Rathray Lillie (b.1870)Harry Pollitt (d.1960)Nico Rosberg (b.1985)More anniversaries: June 26June 28ArchiveBy emailList of days of the yearAbout2024 variant of the Men's T20 World Cup logoThe ICC Men's T20 World Cup, formerly the ICC World Twenty20, is a biennial world cup for cricket in the Twenty20 International (T20I) format, organised by the International Cricket Council (ICC). It was held in every odd year from 2007 to 2009, and since 2010 has been held in every even year with the exception of 2018 and 2020. In 2018, the tournament was rebranded from the World Twenty20 to the Men's T20 World Cup. As of the 2024 tournament, twenty-four nations have played in the T20 World Cup. Nine teams have competed in every tournament, six of which have won the title. The West Indies, England and India have won the title twice each, while Pakistan, Sri Lanka and Australia have won the title once each. Sri Lanka, England, Pakistan and India have each made three final appearances, while Pakistan has made six semi-final appearances. The best test in a non-Test playing nation is the second round appearance by the United States in 2024, while the worst playing nation is the United States in 2024. (Fullist...)Recently featured: Michelin-starred restaurants in TurkeyTimeline of PartygateSongs by Gen HoshinoArchiveMore featured listsWhitehead's trogon (Harporctes whiteheadi) is a species of bird in the family Trogonidae. It is endemic to the island of Borneo, where it is an uncommon resident in primary mountain forest. One of Borneo's largest trogons, at 29 to 33 centimetres (11 to 13 inches) long, it is sexually dimorphic. The male is crimson on the head, nape, and underparts, with a black throat and grey chest; the rest of its upperparts are cinnamon-coloured. The female is similarly patterned, but cinnamon-brown where the male is scarlet. The species is primarily an insectivore, but also eats various plant materials, including buds and seeds. Other than the timing of its breeding, typically between April and June, little is known about its breeding biology. It is classified as a near-threatened species, with population numbers thought to be declining and habitat loss a key threat. This male Whitehead's trogon was photographed perching on a branch near Munt Kinabalu in the Malaysian state of Sabah.Photograph credit: John HarrisonRecently featured: AtacamiteTurban Head eagleSpringbokArchiveMore featured picturesCommunity portal The central hub for editors, with resources, links, tasks, and announcements.Village pump Forum for discussions about Wikipedia itself, including policies and technical issues.Site news Sources of news about Wikipedia and the broader Wikimedia movement.Teahouse Ask basic questions about using or editing Wikipedia.Help desk Ask questions about using or editing Wikipedia.Reference desk Ask research questions about encyclopedic topics.Content portals A unique way to navigate the encyclopedia.Wikipedia is written by volunteer editors and hosted by the Wikimedia Foundation, a non-profit organization that also hosts a range of other volunteer projects: CommonsFree media repository MediaWikiWiki software development Meta-WikiWikimedia project coordination WikibooksFree textbooks and manuals WikidataFree knowledge base WikinewsFree-content news WikiquotesCollection of quotations WikisourceFree-content library WikispeciesDirectory of species WikiversityFree learning tools WikivoyageTravel guide WiktionaryDictionary and thesaurusThis Wikipedia is written in English. Many other Wikipedias are available; some of the largest are listed below. 1,000,000+ articles DeutschEspañolFrançaisItalianoNederlandsPolskiPortugusSvenskiTürk Vii 250,000+ articles Bahasa IndonesiaBahasa MelayuBn-Im-gCatalàIndaDanskĚestiEsperantoEuskaraMagyarNorsk bokmålRomnSimple EnglishShqipinaSrpskiSrpskohrvatskiSuomiTkeOzbeckha 50,000+ articles AsturianuAzərbaycancaBasoanskiBelgicGaelegoGalegoHrvatskiKurdLatviešuLietuviųNorsk nynorskShipislovenina Retrieved from D; "2Th this article is about the year 678. For the film, see 678 (film). For the Argentine TV program, see 6, 7, 8.Calendar yearYearsMillennium1st millennium1st millenniumCenturies6th century7th century8th centuryDecades650s660s670s680s690sYears67567667767867968068167678 by topicLeadersPolitical entitiesState leadersReligious leadersCategoriesBirthsDeathsEstablishments678 in various calendarsGregorian calendar67868DCLXXVIIIAb ur condita143Armenian calendar127 Assyrian calendar5428Baltic sea calendar599600Bengali calendar8485Berber calendar1628Buddhist calendar1222Burmese calendar40Byzantine calendar6186618Chinese calendar (FireOx)3375 or 31680 (EarthTiger)3376 or 3169Coptic calendar394395Discordian calendar1844Ethiopian calendar670671Hebrew calendar4384439Hindu calendars- Vikram Samvat734735- Shaka Samvat599600- Kali Yuga37783779Holocene calendar10678Iranian calendar5675islamic calendar5859Japanese calendarHakuchi 290Japanese calendar570571Julian calendar678DCLXXVIIIKorean calendar3011Minguo calendar1234 before ROC1234Nanakshahi calendar7905Seleucid era989990 AGTAl solar calendar12201221Tibetan calendar(female Fire-Ox)804 or 423 or 3490(male Earth-Tiger)805 or 424 or 348Pope Agatho 1 (678681)Year 678 (DCLXXVIII) was a common year starting on Friday of the Julian calendar. The denomination 678 for this year has been used since the early medieval period, when the Anno Domini calendar era became the prevalent method in Europe for naming years.The Siege of Thessalonica (676/678) ends, when the Slavens withdraw.Autumn Siege of Constantinople: Emperor Constantine IV confronts the Arab besiegers in a head-on engagement. The Byzantine fleet, equipped with Greek fire, destroys the Muslim fleet at Silyon.[1][2][3][4] ending the Arab threat to Europe, and forcing Yazid, a son of caliph Muawiyah I to lift the siege on land and sea. The victory also frees up forces that are sent to raise the two-year siege of Thessalonica by the local Slavic tribes.King thelred of Mercia defeats the Northumbrian forces under King Egfrith, in a battle near the River Trent. Archbishop Theodore helps to resolve differences between the two, thelred agreeing to pay a wergild to avoid any resumption of hostilities (approximate date).April 27 Emperor Tenmu holds divination for the purpose of proceeding to the Abstinance Palace.May 3 Princess Tchi suddenly takes ill and dies within the palace. Tenmu, her father, is unable to sacrifice to the Gods of Heaven and Earth.May 10 Tchi is buried at a place which could be Ak (Hygo Prefecture). Tenmu is graciously pleased to raise lament for her.Wilfrid, bishop of York, is at the height of his power and owns vast estates throughout Northumbria. After his refusal to agree to a division of his see, Egfrith and Theodore, archbishop of Canterbury, have him banished from Northumbria.April 11 Pope Donus dies at Rome, after a reign of 1 year and 160 days. He is succeeded by Agatho I, who becomes the 79th pope. He is the first pope to stop paying tribute to Emperor Constantine IV upon election.In Japan, the national worshiping to the Gods of Heaven and Earth is planned. Tenmu tries to select his daughter Tchi as a Sai to make her serve the Gods. However, Tchi suddenly takes ill and dies.The Beomeosa temple complex in Geumjeong-gu (modern South Korea) is constructed, during the reign of King Munmu of Silla.Childebert III, Merovingian Frankish king and son of Theuderic IIIChildebrand I, duke of Burgundy (d. 751)Kinich Ahk'ab Mo Nabh III, Maya ruler of PalenqueApril 11 Pope DonusMay 3 Tchi, Japanese princessAbdullah ibn Aamir, Arab general (b. 626)Iwine, king of Deira (approximate date)Aisha, wife of MuhammadArbogast, bishop of StrasbourgNathalan, Scottish bishopWechter, Lombard duke of FriuliZhang Wenguan, chancellor of the Tang dynasty (b. 606)ˆ Haldon 1999, p.64.ˆ Lillie 1976, pp.7879.ˆ Treadgold 1997, pp.326327.ˆ Mango & Scott 1997, p.494. Haldon, John F. (1990). Byzantium in the Seventh Century: The Transformation of a Culture (revised ed.). Cambridge University Press. ISBN 978-0-521-31917-1. Lillie, Ralph Johannes (1976). Die byzantinische Reaktion auf die Araber. Studien zur Strukturwandlung des byzantinischen Reichs in 7. und 8. Jhd. (Byzantine Reaction to the Expansion of the Arabs. Studies on the Structural Change of the Byzantine State in the 7th and 8th Cent.) (in German). Munich: Institut für Byzantinistik und Neugriechische Philologie der Universiät München. OCL