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A Study on Aircraft Structure and Application of Static Force

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Abstract. In particular, the neural network approach to Demister-Schaefer theory has been demonstrated. Different modulus adherents, so that the adhesive pressures are approximately the same part of the vertical stabilizer was selected and reconstructed using the structure design of the hybrid wing body plane during the preliminary design phase. Due to the high number of design variables and various repairs, adhesive bonded fiber-composite joints or reinforcements are a challenging optimization problem, and this sheet directly affects structurally efficient and minimal damage by lightning strikes on aircraft structures. Parent systems rather than standard repairs. In the first part, the phenomenon of lightning curve connection in aircraft was introduced. Certain bonded joints offer more effective repairs than conventional mechanical joints, which are not fully credited with reducing their performance, and have important needs in most countries of the world. This article focuses on introducing integrated structural features and background, including application for civil aviation and flight qualification requirements, and the main purpose of this study is a computer-assisted materials selection tool. - Reinforced alloy. This paper explores the distribution of dynamic load identification given the unknown but limited uncertainties in aircraft configuration. This is the second of two documents on the structure of the Northwest Pacific Hurricane This sheet describes various structures Thin metal sheets are widely used to create different types of space structures due to its flexibility and ability to easily create any type of structure. Resource based to identify damage this article discusses the use of taxonomies.
Keywords: Aircraft structure; Fatigue Cracking; Structural health monitoring; Static Strength.

1. Introduction

Subject to forces and moments - Circular frames, linear strings and leather Lightweight structural environment made of panels Structure - from machine or sheet metal is developing. Each structural element must be precisely prepared and assembled; today we need to become the safest modern aircraft we can fly. Comparison of different types of aircraft The fuselage system truss system is often used in light aircraft, a truss system is usually made of welded steel tube truss (can also be made of wood) geodetic system monotone semi monotonous. Aluminum, titanium and alloy are used to build aircraft structures. Titanium is used in the manufacture of various parts of aircraft and in the manufacture of engines. Advances in the materials and processes used to build airplanes led to the evolution of everything from simple wooden planks to today's elegant aerodynamic flying machines. With the continued development of the power plant, the structures of the "flying machines" changed considerably. The wings and landing gear are made of titanium. Aluminum alloys are widely used in air fuses and other engineering structures and alloys, where low weight and corrosion resistance are highly desirable. Suitable for making aluminum aircraft, If so it is lightweight and strong. Due to the high requirements for performance and lightness Space structures are different from other structures. Composite materials, typically for modern space structures Advanced multifunctional products and requires the use of thin-walled constructions.

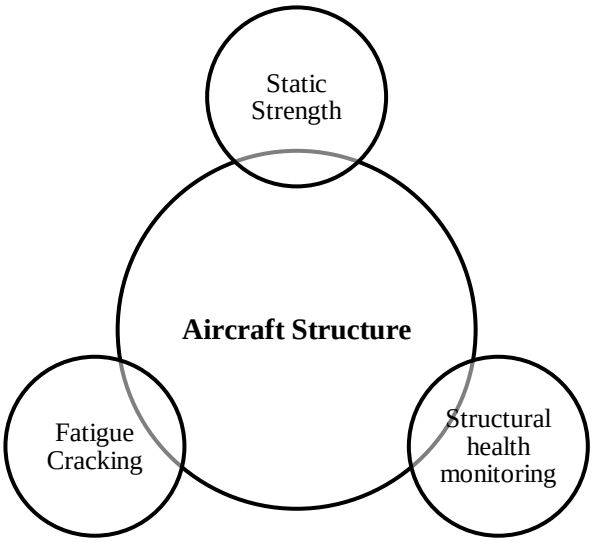

FIGURE 1. Aircraft Structure

2. Aircraft Structure

The "price of spacecraft alloys" has always been an issue when designing a new aircraft and determining the materials (metals or alloys) to be used in the airframe. Weight loss will be followed by fatigue and constant tiredness. Automation processes are generally associated with the creation of joint aircraft structures ATL in these three processes And FP machines are very "automatic". **[2]** Has been manufacturing Primary air fuse and wing structures It is riveted structures but not a direct competitor process dominated. The purpose of this article should not be explained for the use of riveting for most primary structural systems. **[13]** Developing new techniques for adjusting highly mounted hybrid aircraft structures. First used by the US Navy Evaluate the product metal mechanical joints for comparison with smooth attachment. **[7]** Continuous integration of components in aircraft configurations is more important than ever to maintain maintenance and defects Security Causes and Failure Predictions. Alloys to you, composite circulating exhibit decay defects without any symptoms after possible impacts, this makes the traditional visual inspection method completely irrelevant. Furthermore, it offers a wide range of research techniques based on the conductive vortex current of those carbon composite materials. The complication of these materials is routine ultrasound non-invasive detection Techniques take more time and are more expensive to set up in large areas. **[10]** Although these methods are the reliability of realistic aircraft structures, they belong to the category of specialized methods for analysis. General Methods Sometimes even more complex models need to be considered. **[22]** The safety and reliability of each aircraft cannot be guaranteed and the capability of the aircraft cannot be fully exhausted. To address these issues, the aviation system of Health Inspection Technology has been developed. This technology provided key technological approaches to concept and Health monitoring based on intellectual information And proposed health research technology. **[26]** Flight qualification requirements also have an impact on aircraft design. Obviously, any new airline must meet official requirements. Damage tolerance requirements are very interesting in the current context. By their very nature, the needs of the authorities do not fully reflect recent experience and current understanding. **[30]**

3. Fatigue Cracking

Fatigue accidents Air fatigue has significantly affected the development of our approach to problems. As discussed in Williams' instructional article, two comet crashes have attracted worldwide attention, although there have been severe fatigue failures before. Used to replace high crack sensitivity Composition. The structure is not really a secure system. These cracks were present in the Rigorous testing and analysis beyond the primary structure and critical length carried out to design the final valuesand demonstrate the structure's ability to recover static and fatigue strength. [37] Two approaches are discussed here: Based on any addresses proven ability of a connection system to predict fatigue behavior and ensure the stability of its environment. The second concept of "smart patch" Based on, patch The system monitors its own health. The study predicted that the fatigue cracking system in parents would grow at an acceptable rate and set up gaps. [1] Many aircraft manufacturers adhere to this principle. These strategies are aimed at ensuring that fatigue cracks are detected by examining them before failure. In the case of aluminum alloys achieving slow crack growth, the allowable design stress levels are relatively low compared to the standard strength values. [29] Fatigue phenomenon and related problems Prediction of fatigue properties of structural components. In Feedback against feedback fatigue, concise results are provided based on damage tolerance, while triggering a Fuse-pack Failure to connect the engine pylon to the front spar does not provide a complete cure. Analysis revealed that the Fuse-pin design is not optimal, but of pylon attachment the load spectrum was initially higher than expected. [46] This article addresses the requirements of the Air Qualification Certification for Joint Aircraft Framework in FAR and its compliance with verification materials, certification process, and composite aviation system certification for aerodynamic stability, fatigue and damage tolerance, and aerodynamic instability and transport type Plane. This article aims to provide technical support for integrated Framework Certification for Domestic Transport Type aircraft related to the use of TC, and to present. [4] The connection is satisfactory. Under the load of fatigue, calculated by the adhesive the maximum cutting strain is currently comparable to a design that allows twice the elastic cut strain. To provide highly stable and regenerated Data for use in critical applications. The bulk of the cut-off strain energy in the adhesive bond appears to be a reliable parameter output ratio. The area requires more work. Used in bonded repairs Fatigue tolerance of adhesives and cutting strain limit Strain into parameters to describe fatigue behavior Energy output rates are explored. This information is 48 mm from the skin of the wing under the aircraft used in adhesive-bonded joint repair development for elongated cracks. [8]IDT sensors, Evaluated using actual fatigue flight area Aircraft used for fatigue testing System. Overall the fatigue test model Dimensions are approximately 2 m x 0.5 m. Pitch-C and Pulse-echo mode for both aircraft Mark the inner wall of the cut-out window section successfully detected the presence of induced fatigue cracks on the surface. A good redundancy in crack detection was demonstrated by Many IDT sensors are two different Using detection methods using detection methods detected prolonged fatigue testing over time. **[43]**

4. Structural Health Monitoring

Provides structural health monitoring the health of the patch system Or an alternative approach to monitoring integrity an autonomous, perhaps Continuous foundation. Once a detection system is installed, SHM has the advantage over most NDI

techniques to instantly track hard or hidden architecture Structural health monitoring. Initial knowledge Location initial failure requires sufficient strain sensors to allow the precise location of the adequately covered sensor or structurally important areas. The use of multiple strip-gauge sensors is a somewhat reflective latter approach. [3] In structural health monitoring Most techniques used are elastic guided on the basis of the waves. When created in the host system, some Waves give elasticity uniqueness Guided as, and less energy also called plate waves because they cover all medium-thick surfaces of the spread have the ability to explore. Their wavelength is only comparable to the host system thickness. The probe can know the timing of the flying waves and calculate its position and localize to unexpected echoes generated by the defects by the temporary identification. [11] In recent Machine learning techniques for many years widely used train learning using measured data from undamaged and damaged structures, and uses a Conditional label assignment machine for Data never seen before. Simple problem in SHM is damage detection. This is in machine learning. It is an easily done environment and an innovative diagnostic tool. [6] Structural health monitoring of transport vehicles However, it is difficult to use BOTDR for space structures without further improvement in space resolution. In Attitude to the Portal Monitoring System, there are other issues that need to be addressed for the use of the obligatory and explicit. At the vibration level of such dynamic conditions, the measurement loses reliability due to its long measurement time. Some researchers Conducted to solve these problems. [23] There is a growing desire to reduce the operating costs of commercial aircraft. Built-in health monitor the practical application of the technologies is expected Because of aircraft SHM Technologies Maintenance costs and have the potential to reduce maintenance idle time. Distributed optical fiber sensor for a wide range of study areas, in commercial aircraft is therefore suitable for health monitoring for this application. Measurements can measure a wide area using brightness scattered light, and many studies have been conducted. [34] Developed structural health monitoring technology Tested on aircraft structural components. In some cases, these elements Optical time domain reflection (PODR) is a well-known method; But Pot DR low spatial resolution has and has a long measurement interval. [34] Developed structural health monitoring technology Tested on aircraft structural components. In some cases, these elements may present unusually complex shapes, and while there are many SHM sensor concepts, geometric problems may play a key role in determining the detection method. The application is under consideration. The current investigation considers one of these complex geometric phenomena to include important structural elements that create fatigue cracks in critical areas, which can affect the entire life of the aircraft Safety of aircraft and crew. Recently, this issue was referred to a representative of SHM. Given the opportunity to evaluate the sensor feedback in the air. Geometry of areas of interest Due to the complexity, Vibration in the lower megahertz range To create Raleigh surface waves with frequencies Miniature IDT sensors were used. Before Exhaust test of actual aircraft configuration, Fat loading for their operation under the conditions the IDT sensors was tested in small tension fatigue test models. **[40]**

5. Static Strength

Element disabled by Birth feature in ANSYS software. Produced decay results machine Simulations are compared with real machine data. The two deviation tendencies appear to be identical. The validity of the analysis method And the defined element analysis model were verified. Predict and control the proposed mechanical failure several methods are used. [81] Structural strength is Necessary for Design and evaluation. Current overall ground strength test systems Communicate between sensors and data acquisition facilities Use a large number of wires. Centralized data processing Performance in test projects and Enables lack of intelligence. Wireless sensor network technology Cable based of aeronautical ground test systems is expected to address the limitations. Provides the aircraft based on the wireless sensor network strength test system design and evaluation of the actual aircraft model. Application layer interface Designed [44] to explore the structural strength of aircraft one of the most important methods is standard testing of ground testing facilities. Traditionally, for aircraft structures Cable based AST systems usually for sensors and centralized data acquisition systems Used for interpersonal communication includes a large number of wires. These wires may be complicated in the configuration of the model, it has high installation costs and Brings inefficient maintenance. Sensors their data since there is no way to process it locally, Integration of all measured data into a Centralized data server, Responsible for storage and processing. If there are hundreds or thousands of test sensors in AST systems, one of the test task calculations would be to make the centralized test method more burdensome and time consuming. [35] The standard tensile was tested on the specimens with a small incision in the middle, before being stretched to 15–20% and left in the extended position. The development of the initial scratch seen in this experiment reflects the fatigue seen under many practical conditions. [73] Fixed simulations of strength Simulation and have an average error of 12.9% between test data. The percentage difference for erection averaged 23.5%. Worth more than predictions reconstruction Simulations, the latter being considered a test copy, so more expensive. Experimentation is required. CPU time is also important. In this endeavor, Use of shell components allows calculations to be made effectively using micro-dynamic analysis formulas. **[68]**

6. Conclusion

A flying plane is subject to forces and moments, and changes constantly as the plane moves through its aircraft Aluminum, titanium and alloy are used to build aircraft structures. Titanium is used in the manufacture of various parts of aircraft and in the manufacture of engines. Advances in the materials and processes used to build airplanes led to the evolution of everything from simple wooden planks to today's elegant aerodynamic flying machines. [Intro] Has been

manufacturing More than 50 years Primary air fuse and Wing structures. It riveted a direct competitor is process structures but not dominance. The most basic riveting application for structural systems. It is a direct competitor process, but not dominated by structures but. Excessive use of riveting or excessive use of adhesive bonding in aircraft for most primary structural systems construction. [13] The safety and reliability of each aircraft cannot be guaranteed and the capability of the aircraft cannot be fully exhausted. To address these issues, the aviation system has developed a new approach. This technology provided key technological approaches to concept and Based on intellectual information Health monitoring and proposed health research technology. [26] Developed structural health monitoring technology Tested on aircraft structural components. In some cases, these elements may present unusually complex shapes, and while there are many SHM sensor concepts, geometric problems may play a key role in determining the detection method. The application is under consideration. The current investigation considers one of these complex geometric phenomena to include important structural elements that create fatigue cracks in critical areas, which can affect the entire life of the aircraft Safety of aircraft and crew. Recently, for evaluating SHM sensor feedback in space this issue was presented as an opportunity to a delegate. Due to the geometric complexity of the areas of interest, Vibration in the lower megahertz range in Raleigh to create surface waves with frequencies Miniature IDT sensors were used. Before the fatigue test on the actual aircraft configuration, IDT sensors under fatigue loading conditions were tested on compact tension fatigue test models for their functionality. [40] Fixed simulations of strength Simulation and have an average error of 12.9% between test data. The percentage difference for erection averaged 23.5%. Worth more than predictions reconstruction Simulations, the latter being considered a test copy, so more expensive. Experimentation is required. CPU time is also important. In this endeavor, Use of shell components allows calculations to be made effectively using micro-dynamic analysis formulas.**[68]**

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