Aircraft Hydraulic System

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Syllabus for Airplane Hydraulic Mechanic (SSN 528). United States. National Guard Bureau 1950

Aircraft Hydraulic Systems Jeppesen Sanderson, inc 1985-01-01 A textbook with a thorough treatment of the history, theory, operation, servicing, and troubleshooting of hydraulic systems for all types of aircraft. The book includes a presentations of hydraulic systems from the basic physical laws, through the components, to the complete hydraulic and pneumatic systems.

Aircraft Hydraulic Systems Edward William McDonough 1940

Aerospace Hydraulic Systems Wayne Stout, Phd 2013-04-25 The book addresses hydraulic system operation and design from an aerospace perspective. The book covers issues of fluids and fluid flow, component operation and system design. Component sizing methods, mathematical relationships and modeling equations are presented for each component. A methodology for system level modeling and simulation is also presented. Numerous examples and worked sample problems are included.

Electro Hydraulic Control Theory and Its Applications Under Extreme Environment Yaobao Yin 2019-02-16 Electro hydraulic Control Theory and Its Applications under Extreme Environment not only presents an overview on the topic, but also delves into the fundamental mathematic models of electro hydraulic control and the application of key hydraulic components under extreme environments. The book contains chapters on hydraulic system design, including thermal analysis on hydraulic power systems in aircraft, power matching designs of hydraulic rudder, and flow matching control of asymmetric valves and cylinders. With additional coverage on new devices, experiments and application technologies, this book is an ideal reference on the research and development of significant equipment. Addresses valves' application in aircrafts, including servo valves,

relief valves and pressure reducing valves Presents a qualitative and quantitative forecast of future electro-hydraulic servo systems, service performance, and mechanization in harsh environments Provides analysis methods, mathematical models and optimization design methods of electro-hydraulic servo valves under extreme environments

Manual NGB. United States. National Guard Bureau 1950

Military and Commercial Aircraft Hydraulics Raymond N. Greif 1944

Aircraft Hydraulic Systems William A. Neese 1991 Covering all the basic subjects required for successful completion of the hydraulic and landing gear section of the FAA airframe test, this book can be used for introductory courses in aircraft hydraulic systems and component technology.

Hydraulic Unit with Cyclogram Control for Scavenging Aircraft Hydraulic Systems A. I. Privalov 1969 The patent involves a hydraulic unit with cyclogram control for breaking in aircraft hydraulic systems, consisting of a hydraulic pump located on a hydraulic tank, intake and pressure lines with filters, return valves, measuring devices, on-board sockets, a radiator, and a hydraulic accumulator connected to the intake line. To automate the measuring device of the hydraulic system in the aircraft being inspected, after the hydraulic system has been broken in at a given pressure, and to automatically replace the working fluid while removing air from the aircraft's hydraulic system, the unit is equipped with a discharge line connected through an electromagnetic valve to the intake line and through a safety valve to the hydraulic tank; an intermediate pressure line is connected through the measuring device and the electromagnetic valve to the compressor line, and through a throttle to the intake line. At this point in the intake line are placed low and high-pressure indicators, which the booster pump switches on and off when certain pressure limits are attained. (Author).

Hydraulic Circuit Breaker for Aircraft Hydraulic Systems Neil J. Pierce 1969 Automatic failure isolation in aircraft hydraulic systems, to reduce the probability of a single hit causing the loss of the complete system, can be accomplished by a number of methods. Reservoir level sensing, (RLS) senses a loss of fluid from the total system, and initiates a search for the failed subsystem. Flow sensing and comparison senses a loss of fluid from the subsystem, and shuts off the supply. Subsystem isolation allows transfer of power but prevents fluid transfer between the system and subsystem. Miscellaneous methods enable a loss of fluid to be sensed and shut off. The object of this part of the program was to collect and tabulate all the available data related to the subject from government and industry sources. The tabulated data was then used to compare the various techniques with the requirements for F-4 and F-15 type aircraft in the second phase of the study. The best concept from each of the three basic categories (RLS, flow comparison, isolation) was selected. (Author).

Fire Resistant Aircraft Hydraulic System E. T. Raymond 1982 This document reports a study to select a nonflammable hydraulic fluid for possible use in future military aircraft in which the Halocarbon Products Corporation AO-8 chlorotrifluoroethylene (CTFE) fluid was selected as the most promising fluid which meets the specified Aero Propulsion Laboratory and Aeronautical Systems Division nonflammability criteria. It also reports the results of the component compatability tests conducted to evaluate that fluid under typical system conditions.

Aircraft Maintenance and Repair, Seventh Edition Michael Kroes 2013-04-23 GET UP-TO-DATE INFORMATION TO PERFORM RETURN-TO-SERVICE AIRCRAFT MAINTENANCE AND PASS YOUR FAA AIRCRAFT CERTIFICATION! Aircraft Maintenance & Repair, Seventh Edition, is a valuable resource for students of aviation technology that provides updated information needed to prepare for an FAA airframe technician certification – and can be used with classroom discussions and practical application in the shop and on aircraft. This expanded edition includes recent advances in aviation technology to help students fi nd employment as airframe and powerplant mechanics and other technical and engineering-type occupations. For easy reference, chapters are illustrated and present specific aspects of aircraft materials, fabrication processes, maintenance tools and techniques, and federal aviation regulations. THIS UPDATED EDITION INCLUDES: Modern aircraft developed since the previous edition, such as the Boeing 777, the Airbus A330, modern corporate jets, and new light aircraft New chemicals and precautions related to composite materials Current FAA regulations and requirements FAA Airframe and Powerplant certification requirements 8-page full-color insert The newest maintenance and repair tools and techniques Updated figures and expanded chapters

Aircraft Hydraulic Systems W. L. Green 1985 A comprehensive introduction to aircraft hydraulic systems and components and their applications, in which description and analysis are supported by worked examples, exercises, and numerical questions, thus allowing readers to gauge their progress in the subject.

Aircraft Hydraulic Systems Dynamic Analysis. Volume II. Transient Analysis (HYTRAN) Computer Program Technical Description 1977 The hydraulic transient analysis (HYTRAN) computer program has been developed to simulate the response of a hydraulic system to sudden changes in flow demand by the system loads. For selected component temperatures, pump RPM, and initial steady state conditions, the program will calculate the pressures and flow amplitudes resulting from changes in flow demand or some other controller input. It will predict transient pressures due to waterhammer and the onset of cavitation due to the opening and closing of valves. The engineering input data to the program is normally available to a design engineer. When specialized components are required that are not covered by existing subroutines, these may be simulated by adding to the program.

Breakdown of Preservative Fluid MIL-PRF-46170 in Aircraft Hydraulic Systems

2001 This document summarized a series of laboratory tests performed to identify material forming on hydraulic system filters of fleet aircraft. Additional information obtained from outside sources is also summarized for background. Laboratory pump testing showed rapid filter dogging with small amounts of preservative fluid (MU-PRF-46l70) in the system. Similar conditions with 100% hydraulic fluid (MIL-PRF-83282) did not clog filters at these rates. Preservative fluid at elevated temperatures showed breakdown, increase in acid number, and chemical attack of test coupons while hydraulic fluid alone does not degrade. Preservative fluid is not compatible with operating aircraft hydraulic systems.

Aircraft Systems Ian Moir 2011-08-26 This third edition of Aircraft Systems represents a timely update of the Aerospace Series' successful and widely acclaimed flagship title. Moir and Seabridge present an in-depth study of the general systems of an aircraft – electronics, hydraulics, pneumatics, emergency systems and flight control to name but a few - that transform an aircraft shell into a living, functioning and communicating flying machine. Advances in systems technology continue to alloy systems and avionics, with aircraft support and flight systems increasingly controlled and monitored by electronics; the authors handle the complexities of these overlaps and interactions in a straightforward and accessible manner that also enhances synergy with the book's two sister volumes, Civil Avionics Systems and Military Avionics Systems. Aircraft Systems, 3rd Edition is thoroughly revised and expanded from the last edition in 2001, reflecting the significant technological and procedural changes that have occurred in the interim – new aircraft types, increased electronic implementation, developing markets, increased environmental pressures and the emergence of UAVs. Every chapter is updated, and the latest technologies depicted. It offers an essential reference tool for aerospace industry researchers and practitioners such as aircraft designers, fuel specialists, engine specialists, and ground crew maintenance providers, as well as a textbook for senior undergraduate and postgraduate students in systems engineering, aerospace and engineering avionics.

High-performance Vane Pump for aircraft hydraulic systems David L. Thomas 1975 The purpose of this hydraulic-pump technology-development project was to investigate the feasibility and applicability and to demonstrate the capability of new vane-pump concepts to meet future aircraft hydraulic-system requirements. The specific objective was the development of a pressure-compensated hydraulic pump to deliver 45 gpm at 4000 psi while operating at 30,000 rpm with MIL-H-5606B hydraulic fluid. The new pump concepts were the product of previous Air Force programs and included a pivoting-tip vane for hydrodynamic load support and a two-lobed deformable cam ring for variable displacement. During this program both component experiments and pump evaluations were performed.

Aircraft Hydraulic Systems Dynamic Analysis 1977 This report describes the continued development and test verification of digital computer models used to simulate hydraulic systems under dynamic conditions. Frequency and transient

models of a variable delivery vane pump and a fixed displacement piston-type hydraulic motor are included. Additional verification and development of the transient model for the piston-type hydraulic pump was accomplished. Verification and development of a computer program to describe the mechanical response of a hydraulic line to internal excitations from a hydraulic pump was begun. This effort was a continuation of the basic contract wherein four computer programs for hydraulic system dynamic analysis were developed.

Aerospace Military Aircraft Hydraulic System Characteristics Society of Automotive Engineers 2001

Aircraft Hydraulic Systems W. L. Green 1985 A comprehensive introduction to aircraft hydraulic systems and components and their applications, in which description and analysis are supported by worked examples, exercises, and numerical questions, thus allowing readers to gauge their progress in the subject.

Aircraft Hydraulic Equipment United States. Bureau of Naval Personnel 1945

Commercial Aircraft Hydraulic Systems Shaoping Wang 2015-10-09 Commercial Aircraft Hydraulic Systems: Shanghai Jiao Tong University Press Aerospace Series focuses on the operational principles and design technology of aircraft hydraulic systems, including the hydraulic power supply and actuation system and describing new types of structures and components such as the 2H/2E structure design method and the use of electro hydrostatic actuators (EHAs). Based on the commercial aircraft hydraulic system, this is the first textbook that describes the whole lifecycle of integrated design, analysis, and assessment methods and technologies, enabling readers to tackle challenging high-pressure and high-power hydraulic system problems in university research and industrial contexts. Commercial Aircraft Hydraulic Systems is the latest in a series published by the Shanghai Jiao Tong University Press Aerospace Series that covers the latest advances in research and development in aerospace. Its scope includes theoretical studies, design methods, and real-world implementations and applications. The readership for the series is broad, reflecting the wide range of aerospace interest and application. Titles within the series include Reliability Analysis of Dynamic Systems, Wake Vortex Control, Aeroacoustics: Fundamentals and Applications in Aeropropulsion Systems, Computational Intelligence in Aerospace Engineering, and Unsteady Flow and Aeroelasticity in Turbomachinery. Presents the first book to describe the interface between the hydraulic system and the flight control system in commercial aircraft Focuses on the operational principles and design technology of aircraft hydraulic systems, including the hydraulic power supply and actuation system Includes the most advanced methods and technologies of hydraulic systems Describes the interaction between hydraulic systems and other disciplines

Aircraft Hydraulic Systems Dynamic Analysis. Volume VI. Steady State Flow Analysis (SSFAN) Computer Program Technical Description Ray Levek 1980 SSFAN is

a steady state hydraulic flow and pressure analysis computer program. Its primary purpose is to analyze non-linear resistance aircraft hydraulic systems. The program handles complex flow networks containing flow and/or pressure discontinuities such as unbalanced area actuators and check valves. Solutions for a combination of simultaneously operating subsystems are easily obtained. The program is designed using a building block approach so that new component or element models may be added with minimum change to the main program. The solution method is a Matrix type, using iteration to obtain a final flow and pressure balance. The program internally corrects viscosities for pressure, determines whether flow is laminar, transition or turbulent for use of appropriate resistance factors and corrects reservoir pressure for altitude effects. A Quasi-transient section has been added to allow multiple steady state calculations when simulating subsystem operations. The data is stored and can be printed in either tabular form or computer plot form. The program was written with the aircraft hydraulic system designer in mind. The terminology and units are commonly used terms such as fluid viscosity in centistokes, temperatures in degrees Fahrenheit and flow in gallons per minute. Conversion of units for calculation is accomplished internally in the program. (Author).

Aircraft Hydraulic Systems Dynamic Analysis Component Data Handbook 1980 The component data handbook has been developed to aid users of the aircraft hydraulic system dynamic analysis computer programs HSFR, SSFAN, and HYTRAN in selecting input data. The handbook provides brief descriptions of the general usage components modeled by these computer programs, tabulates the necessary input data for each program and catalogs typical data trends or actual input data of components that have been simulated.

Aircraft Hydraulics Simplified David Vine 1943

Initial Development of an Aircraft Hydraulic System Fluidic Circuit Breaker David H. Smith 1970 The report describes the initial development of an aircraft hydraulic system circuit breaker for protection against major system leakage in the event of airplane damage. The circuit breaker compares supply and return flows, and all its functions are controlled by hydraulic fluidics. Successful circuit shutdowns were demonstrated, and recommendations are made to bring the unit to flight status. (Author).

Aircraft Hydraulic Systems Dynamic Analysis. Volume V. Steady State Flow Analysis (SSFAN) Computer Program User Manual Ray Levek 1977 SSFAN is a steady state hydraulic flow and pressure analysis computer program. Its primary purpose is to analyze non-linear resistance aircraft hydraulic systems. The program handles complex flow networks containing flow and/or pressure discontinuities such as unbalanced area actuators and check valves. Solutions for a combination of simultaneously operating subsystems are easily obtained. The program is designed using a building block approach so that new component or element models may be added with minimum change to the main program. The solution method is a Matrix type, using iteration to obtain a final flow and pressure balance. The program internally corrects viscosities for pressure,

determines whether flow is laminar, transition or turbulent for use of appropriate resistance factors and corrects reservoir pressure for altitude effects. The program was written with the aircraft hydraulic system designer in mind. The terminology and units are commonly used terms such as fluid viscosity in centistokes, temperatures in degrees Fahrenheit and flow in gallons per minute. Conversion of units for calculation is accomplished internally in the program. (Author).

Aircraft Hydraulics United States. Naval Air Technical Training Command 1951

Aircraft Hydraulics Harold W. Adams 1943

Aircraft Hydraulic Systems William A. Neese 1984

Study of the Design of an Aircraft Hydraulic System James E. Ross 1957

Hydraulic System Components, Aircraft and Missiles, General Specifications for 1998 This specification covers the general requirements that are common to most hydraulic components used in aeronautical hydraulic systems.

Aircraft Hydraulic System Dynamics Alvin W. Waterman 1973 It is desirable to use computerized analysis techniques in place of costly ground testing and outmoded hand calculations as methods of analyzing aircraft hydraulic system dynamic performance. The current potential for accomplishing this objective was assessed to establish recommendations for future development. Criteria established as desirable features were the use of digital programming and building-block concepts in each of three technical areas (Transient Response, Frequency Response, and Thermal Analysis) needed to describe a composite of system performance. Basic development work was determined to be accomplished in all three technical areas, but in no area did these efforts meet the USAF objectives. Transient Response capability needs improvement to simulate frequency-dependent friction and cavitation characteristics. Frequency Response programming requires much improvement in the technique for analyzing pump/system interactions. Thermal Analysis steady-state analysis programming needs to be expanded to provide transient capability. These efforts are recommended to be accomplished in a coordinated 5-year program with continuous parallel effort being conducted in each of the three technical areas. These efforts involve evaluation of performance characteristics, development of programming subroutines, validation testing against typical aircraft system operational performance, and documentation of programming for general industry use. (Author).

Aircraft Hydraulic Design George R. Keller 1957

Aerospace Military Aircraft Hydraulic System Characteristics 2001

Aircraft Hydraulic and Pneumatic Power Systems R. E. D. Dot RED DOT PUBLICATIONS 2017-12-10 The word "hydraulics" is based on the Greek word for

water and originally meant the study of the physical behavior of water at rest and in motion. Today, the meaning has been expanded to include the physical behavior of all liquids, including hydraulic fluid. Hydraulic systems are not new to aviation. Early aircraft had hydraulic brake systems. As aircraft became more sophisticated, newer systems with hydraulic power were developed. Hydraulic systems in aircraft provide a means for the operation of aircraft components. The operation of landing gear, flaps, flight control surfaces, and brakes is largely accomplished with hydraulic power systems. Hydraulic system complexity varies from small aircraft that require fluid only for manual operation of the wheel brakes to large transport aircraft where the systems are large and complex. To achieve the necessary redundancy and reliability, the system may consist of several subsystems. Each subsystem has a power generating device (pump) reservoir, accumulator, heat exchanger, filtering system, etc. System operating pressure may vary from a couple hundred pounds per square inch (psi) in small aircraft and rotorcraft to 5,000 psi in large transports.

The Dynamic Simulation of an Advanced Aircraft Hydraulic System David W. King 1996

Power Efficient Hydraulic Systems. Volume 2. Hardware Demonstration Phase Richard V. Hupp 1988 Energy saving concepts for aircraft hydraulic systems were studied in a two-phase program. Task I was an investigation of methods and techniques to reduce overall hydraulic system power requirements by lowering system demands and increasing component efficiencies. Task II involved hardware demonstration tests on selected concepts. Task I: Study phase. A baseline hydraulic system for an advanced aircraft design was established. Twenty energy saving techniques were studied as candidates for application to the baseline vehicle. A global systems analysis approach was employed. The candidates were compared on the basis of total fuel consumption and six qualitative factors. Task II: Hardware demonstration phase. Two techniques demonstrated for energy savings were control valves with overlap and dual pressure level systems. Tests were conducted on control valves, a servo actuator, dual pressure pumps, and a lightweight hydraulic system simulator. Valves with 0.002 in. overlap reduced system energy consumption 18% compared to using valves with zero lap. Operation at 4000 psi reduced system energy consumption 53% compared to operation at 8000 psi. Pressure level switching was accomplished with excellent results. Keywords: Aircraft hydraulic systems.

Aircraft Hydraulics: Hydraulic systems Hugh Conway 1957

Investigation of Pressure Surges in Aircraft Hydraulic Systems 1952 Theoretical and experimental studies were made to determine the effects of numerous system and component parameters on the magnitude and frequency of pressure surges which occur upon opening or closing a valve in a hydraulic system. It was found necessary to consider the system as a composite unit, due to the complex manner in which the effective resistances, inductances, and capacitances of the system components affected surge characteristics. Electric analogs have been proposed as a convenient means for system analysis, and theoretical approaches for their

practical application have been developed. Analytical studies of existing and experimental data were made to determine the effect of pressure surges on the fatigue characteristics of various hydraulic system components. These studies indicated the magnitude of the surge to be of primary concern, with frequency and rate of pressure rise showing only secondary effects. Secondary high-frequency oscillations were found particularly undesirable because of their excessive peaks, but certain information pertinent to their control has been obtained.