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Aerodynamic Loads on a Leading-edge Flap and a Leading-edge Slat on the NACA 64A010 Airfoil Section
Oscillatory Aerodynamic Loads on Low-aspect-ratio Wings in Subsonic Flow
An Analysis of Once-per-revolution Oscillating Aerodynamic Thrust Loads on Single-rotation Propellers on Tractor Airplanes at Zero Yaw
Aerodynamics of Wind Turbines
Rotor/body Aerodynamic Interactions

WALSH ALICE

Computation of Rotor Aerodynamic Loads in Forward Flight Using a Full-span Free Wake Analysis Springer Science & Business Media
Wind power is an increasingly significant renewable energy resource, producing no environmentally damaging CO2 emissions. The efficient production of electricity by wind turbines relies on aerodynamics: Aerodynamics of Wind Turbines provides the fundamental solutions to efficient wind turbine design. Following a historical introduction, Part 1 of Aerodynamics of Wind Turbines is concerned with basic rotor aerodynamics, while Part 2 deals with structural aspects of the wind turbine and calculation of the loads on it. Topics covered include increasing mass flow through the turbine, performance at low and high wind speeds, assessment of the extreme conditions under which the turbine will perform and the theory for calculating the lifetime of the turbine. The classical Blade Element Momentum method is also covered, as are eigenmodes and the dynamic behavior of a turbine. Aerodynamics of Wind Turbines is an essential reference for both engineering students and others with a professional or academic interest in the physics and technologies behind horizontal axis wind turbines. It will provide a sound understanding of the mechanisms behind the generation of forces on a wind turbine.
Transonic Wind-tunnel Investigation of Aerodynamic-loading Characteristics of a 2-percent-thick Trapezoidal Wing in Combination with Basic and Indented Bodies Earthscan
A wind-tunnel investigation was conducted in which independent, steady-state aerodynamic forces and moments were measured on a 2.24-m-diam, two- bladed helicopter rotor and on several different bodies. The objective was to determine the mutual interaction effects for variations in velocity, thrust, tip-path-plane angle of attack, body angle of attack, rotor/body position, and body geometry. the results of the investigation show that the body longitudinal aerodynamic characteristics are significantly affected by the presence of a rotor and hub, and that the hub interference may be a major part of such interaction. This report presents the effects of various parameters on the interactions and discusses the difficulties encountered in determining the effect of the body on the rotor performance.
High Reynolds Number Subsonic Aerodynamics John Wiley & Sons
A previous report, NACA TN 3007, gave force and moment data for the NACA 64A010 airfoil section equipped alternately with a flap and a slat at the leading edge, and with a split flap and a double-slotted flap at the trailing edge. The present report presents the chordwise distributions of pressure measured concurrently with the force and moment data of NACA 3007. The pressure data for the leading-edge flap and slat have been converted into coefficients of normal force, chord force, and moment based on the geometry of the leading-edge device.
Aerodynamic Loads on an Isolated Shrouded-propeller Configuration of Angles of Attack from -10 Degrees to 110 Degrees Earthscan
Progress in space safety lies in the acceptance of safety design and engineering as an integral part of the design and implementation process for new space systems. Safety must be seen as the principle design driver of utmost importance from the outset of the design process, which is only achieved through a culture change that moves all stakeholders toward front-end loaded safety concepts. This approach entails a common understanding and mastering of basic principles of safety design for space systems at all levels of the program organisation. Fully supported by the International Association for the Advancement of Space Safety (IAASS), written by the leading figures in the industry, with frontline experience from projects ranging from the Apollo missions, Skylab, the Space Shuttle and the International Space Station, this book provides a comprehensive reference for aerospace engineers in industry. It addresses each of the key elements that impact on space systems safety, including: the space environment (natural and induced); human physiology in space; human rating factors; emergency capabilities; launch propellants and oxidizer systems; life support systems; battery and fuel cell safety; nuclear power generators (NPG) safety; habitat activities; fire protection; safety-critical software development; collision avoidance systems design; operations and on-orbit maintenance. * The only comprehensive space systems safety reference, its must-have status within space agencies and suppliers, technical and aerospace libraries is practically guaranteed * Written by the leading figures in the industry from NASA, ESA, JAXA, (et cetera), with frontline experience from projects ranging from the Apollo missions, Skylab, the Space Shuttle, small and large satellite systems, and the International Space Station. * Superb quality information for engineers, programme managers, suppliers and aerospace technologists; fully supported by the IAASS (International Association for the Advancement of Space Safety)
Aircraft Aerodynamic Design with Computational Software Createspace Independent Publishing Platform
This outstanding thesis characterises the aerodynamic flow around a container freight train; investigating how changing container loading configurations affect the magnitude of aerodynamic forces measured on a container. 1/25th scale moving-model freight train experiments were carried out at the University of Birmingham’s TRAIN rig facility to investigate slipstream velocities and static pressure, as well as measuring, using a specifically designed on-board pressure monitoring system, the aerodynamic loads on containers. Results were compared with full scale data and assessed in terms European standards for trackside worker and passenger safety limits. Rail vehicle aerodynamic studies have tended to previously focus on high speed passenger trains in line with increases in train speed. The research presented within this thesis highlights the issues associated with the aerodynamic development around a freight train, providing the foundations for further research and a basis from which to develop international safety standards in relation to freight, as well as high speed trains.
Index of NACA Technical Publications Cambridge University Press
The results presented in this paper indicate that the effects of stores on wing load distribution at subsonic speeds may be predicted by available methods at the lower angles of attack where wing flow separation is negligible. At the higher angles of attack where wing flow separation exists, a store located inboard on a swept wing may act much like various devices designed to delay wing

pitch-up by reducing the loss in load at the wing tip due to flow separation. Furthermore, the results indicate that the normal force and pitching moment of a store located at the wing tip can be calculated quite well by available methods. On the other hand, no theoretical procedure is available to calculate the severe lateral forces and moments encountered at zero sideslip on an inboard arrangement of stores on a swept wing.

Aerodynamics of Space Vehicles Computation of Rotor Aerodynamic Loads in Forward Flight Using a Full-span Free Wake AnalysisComputation of Rotor Aerodynamic Loads in Forward Flight Using a Full-Span Free Wake Analysis

The development of an advanced computational analysis of unsteady aerodynamic loads on isolated helicopter rotors in forward flight is described. The primary technical focus of the development was the implementation of a freely distorting filamentary wake model composed of curved vortex elements laid out along contours of constant vortex sheet strength in the wake. This model captures the wake generated by the full span of each rotor blade and makes possible a unified treatment of the shed and trailed vorticity in the wake. This wake model was coupled to a modal analysis of the rotor blade dynamics and a vortex lattice treatment of the aerodynamic loads to produce a comprehensive model for rotor performance and air loads in forward flight dubbed RotorCRAFT (Computation of Rotor Aerodynamics in Forward Flight). The technical background on the major components of this analysis are discussed and the correlation of predictions of performance, trim, and unsteady air loads with experimental data from several representative rotor configurations is examined. The primary conclusions of this study are that the RotorCRAFT analysis correlates well with measured loads on a variety of configurations and that application of the full span free wake model is required to capture several important features of the vibratory loading on rotor blades in forward flight. Quackenbush, Todd R. and Bliss, Donald B. and Wachspress, Daniel A. and Boschitsch, Alexander H. and Chua, Kiat Unspecified Center AERODYNAMIC LOADS; COMPUTATIONAL FLUID DYNAMICS; HELICOPTERS; HORIZONTAL FLIGHT; ROTARY WINGS; ROTOR AERODYNAMICS; ROTOR DYNAMICS; WAKES; UNSTEADY AERODYNAMICS; VIBRATORY LOADS; VORTEX SHEETS; VORTICES...

Division of Aerodynamic Loads on a Semispan Tilting-ducted-propeller Model in Hovering and Transition Flight Butterworth-Heinemann

Rotorcraft integrated dynamics analysis is a very difficult task, which showed only partially successful results in current practice. However, the need for reliabletools that couple the structural dynamics and the aerodynamics of rotorcraft is strong, and satisfactory results cannot be obtained with existing software.

Aerodynamic Loads on a Rotorcraft Main Rotor Blade Springer

As an introduction to aircraft aero elasticity and dynamic loads, this book will not only be welcomed by junior practitioners in industry and graduate students, it will also form an excellent basis for several university courses on aero elasticity.

Unsteady Aerodynamic Load Estimates on Turning Vanes in the National Full-scale Aerodynamic Complex

This volume contains a selection of the papers presented at the Fourth Symposium on Numerical and Physical Aspects of Aerodynamic Flows, which was held at the California State University, Long Beach, from 16-19 January 1989. It includes the Stewartson Memorial Lecture of Professor J. H. Whitelaw, and is divided into three parts. The first is a collection of papers that describe the status of current technology in two- and three-dimensional steady flows, the second deals with two- and three-dimensional unsteady flows, and the papers in the third address stability and transition. Each of the three parts begins with an overview of current research, as described in the following chapters. The individual papers are edited versions of the selected papers originally submitted to the symposium. Four years have passed since the Third Symposium, and certain trends be come clear if one compares the papers contained in this volume with those of previous volumes. There are more three- than two-dimensional problems consid ered in Part 1 and the latter address more difficult problems than in the past, for example, the extension to higher angles of attack, to transonic flow, to leading edge ice accretion, and to thick hydrofoils. The large number of papers in the first part reflects the emphasis of current research and development and the needs of industry.

Dynamic and Aerodynamic Loads on a Stall-regulated Vawt

An initial experimental investigation has been completed on the aerodynamic load imposed on the wing of an airplane model by a blast-induced gust which increased the angle of attack well beyond the stall angle. Pressure distributions at intervals of 1 millisecond were derived along the wing chord. Comparison of these distributions with distributions obtained from steady-flow wind-tunnel tests and potential-flow calculations showed that neither of the latter methods was adequate to predict the loads in the transient conditions of the blast. A traveling peak of negative pressure was disclosed that is believed to be of significance for the high angle-of-attack case. It was attributed to a vortex formed by the diffraction of the blast wave around the wing. The normal-force coefficients obtained from the flight pressure distributions were approximately twice those predicted from wind-tunnel tests for the first 12 milliseconds after blast arrival or for about 75 percent of the time the angle of attack was above the stall.

Introduction to Aircraft Aeroelasticity and Loads

"Aerodynamics of Wind Turbines is the established essential text for the fundamental solutions to efficient wind turbine design. Now in its second edition it has been entirely updated and substantially extended to reflect advances in technology research into rotor aerodynamics and the structural response of the wind turbine structure. Topics covered include increasing mass flow through the turbine performance at low and high wind speeds assessment of the extreme conditions under which the turbine will perform and the theory for calculating the lifetime of the turbine. The classical Blade Element Momentum method is also covered as are eigenmodes and the dynamic behaviour of a turbine. The new material includes a description of the effects of the dynamics and how this can be modelled in an 'aeroelastic code' which is widely used in the design and verification of modern wind turbines. Further the description of how to calculate the vibration of the whole construction as well as the time varying loads has been substantially updated."--Publisher's website.

NASA Aerodynamics Program

This modern text presents aerodynamic design of aircraft with realistic applications, using CFD software and guidance on its use. Tutorials, exercises, and mini-projects provided involve design of real aircraft, ranging from straight to swept to slender wings, from low speed to supersonic. Supported by online resources and supplements, this toolkit covers topics such as shape

optimization to minimize drag and collaborative designing. Prepares seniors and first-year graduate students for design and analysis tasks in aerospace companies. In addition, it is a valuable resource for practicing engineers, aircraft designers, and entrepreneurial consultants.

Unsteady Aerodynamic Loads During Reentry of the Straight-wing Orbiter Configuration

Computation of Rotor Aerodynamic Loads in Forward Flight Using a Full-span Free Wake AnalysisComputation of Rotor Aerodynamic Loads in Forward Flight Using a Full-Span Free Wake AnalysisCreatespace Independent Publishing Platform

Kalman J. Grunwald and Kenneth W. Goodson

Pressure data have been obtained in the Langley 8-foot transonic tunnel at Mach numbers from 0.80 to 1.115 and angles of attack from 0 to 20 degrees for wing-body configurations employing a thin trapezoidal wing in combination with basic and indented bodies. The wing had 26.6 degrees sweepback of the quarter-chord line, an aspect ratio of 2.61, a taper ratio of 0.211, and 2-percent-thick symmetrical circular-arc airfoil sections parallel to the plane of symmetry. Results are also presented for the basic body alone. Reynolds numbers for the tests were on the order of 2,600,000, based on the wing mean aerodynamic chord.

The Aerodynamics of a Container Freight Train

The problem under examination is the prediction of aerodynamic loads due to the influence of high longitudinal accelerations, over the entire range of flight speeds, for elongated slender bodies such as interceptor missiles. A survey is presented on existing theoretical methods, which generally cover apparent mass in incompressible flow, small-perturbation techniques for transonic and lower supersonic speeds, and 'snowplow' theory for the hypersonic range. Citations are made to the important literature on each, along with a critique of their applicability and a few numerical examples. By way of attempting to remedy a current deficiency at intermediate supersonic Mach numbers, a new theoretical method is developed and applied to accelerated wedges with attached shock. One consequence of this work is that acceleration effects appear to be higher than anticipated in certain ranges. Suggestions are made for the extension of this method to other two- and three-dimensional shapes. The report closes with conclusions and recommendations regarding much-needed future research. (Author).

A series of flight measurements of the loads applied to the horizontal tail surfaces of a fighter-type airplane were made. The results were analyzed and found to verify the fact that a knowledge of the tail-load parameters will permit the calculation of the horizontal-tail load. The influence of sideslip on the horizontal-tail load was determined and the critical conditions for design are enumerated.

Sensitivity Analysis of Unsteady Aerodynamic Loads in Cascades

Some Notes on the Aerodynamic Loads Associated with External-store Installations

Aerodynamics of Wind Turbines

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