DESIGN A NEW AIRCRAFT - Diseñar un Nuevo Avión - Part 5A - Stress calculation and structural dimensioning. Static loads and materials allowable stresses - Cargas es (Spanish Edition)

Juan José Sánchez de Dios

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In this section of the book, are included only part of a total set of 300 working sheets, which are compilations and summaries of some pages from about twenty workbooks of daily use. The work notes have been used and written -non continuously-, during 35 years of experience an dedication to Aircraft Structures, in Stress, Design, and other related areas. It is not a continuous work or made in appropriate order, but they represent some of the knowledge and practices to be developed during the work of an engineer in Aircraft Structural Design. The abstracts of the workbooks, were not created with the intention of been publicized, but due the interest aroused among some colleagues, are edited in a non-personal profit.

Computers have changed the design procedures and the use of information, but the basic concepts of engineering and materials have not changed during the time and they allow, without any doubt, a more consistent and successful decision making. Many of these concepts are included in this manual. They allow a real and practical approach to the foundations of engineering design. The chips include a wide variety of concepts such as: real airplane structural configurations, processes, techniques and manufacturing requirements, criteria for minimum cost and weight, common standard design practices and it must also be highlighted some important details of Concurrent Engineering processes, which are the main cause of success or failure in the design of a new aircraft project.

This chapter includes the following:

5ACÁLCULO Y DIMENSIONADO ESTRUCTURALSTRESS CALCULATION AND STRUCTURAL DIMENSIONING
5.1Cargas y esfuerzos admisibles. Estática y fatigaLoads and allowable stresses. Static and fatigue
5.1.1Cargas generales en diseño de avióNGeneral loads in aircraft design
5.1.2Factores de carga de diseño en el avión MD91/92Design load factors applied to the MD91/92

5.1.3Cargas de presurización e inercialesPressurization loads and inertial loads
5.1.4Cargas calculadas frente a ensayosCalculated loads versus static tests
5.1.5Resistencia aerodinámica y recomendacionesAerodynamic drag and recommendations
5.1.6Cuerpo esbelto. Fabricabilidad y costesAerodynamic bodies. Manufacturability and costs
5.1.7Pre-dimensionado en tracción. Safe life en CN235Pre-dimensioning for traction. Safe life in CN235
5.1.8Perturbaciones por temperatura en HermesHermes temperature disturbances on materials
5.1.9Admisibles por fatiga en el FLAAllowable due to fatigue for FLA aircraft
5.1.10Concentración de esfuerzos en el MRTT y Boom de AirbusStress concentration factors for Airbus MRTT and Boom
5.1.11Fatiga y tolerancia al daño. Objetivos de diseñoFatigue and damage tolerance. Design goals
5.1.12Misiones de fatiga típicas, logística y táctica en el FLALogistical and tactical missions for fatigue in FLA
5.2Cálculo. Dimensionado básicoStress. Basic dimensioning
5.2.1Cálculo de orejetasAircraft lugs calculations
5.2.2Criterios de pandeo de chapas y placasBuckling criteria for sheets and plates
5.2.3Pandeo de vigas y columnasBuckling of beams and columns
5.2.4Pares de apriete por métricasMaximum torque for screw and nuts
5.2.5Pares de apriete. Deformaciones y montajeTorque. Deformations while assembling
5.2.6Aplastamiento y cortadura admisiblesShear and bearing allowable loads
5.2.7Esfuerzos plásticos admisiblesLimited stresses using plastic effects
5.2.8Stress corrosión. Dirección del granoStress corrosion for materials due to grain direction
5.2.9Fibras en el metal y resistencia a la corrosiónFibers in metals and effects on corrosion resistance
5.2.10Trabajo en frío y fatiga residualCold working effect and residual fatigue
5.2.11Pandeo de paneles anisotrópicos. FatigaBuckling of anisotropic panels. Fatigue
5.2.12Notas de diseño en componentes de fibrasDesign notes for fiber component design
5.2.13Ensayo de fatiga. Criterios básicos de dimensionadoFatigue test. Basic dimensioning criteria

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