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飞机结构可靠性分析数学模型

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A MATHEMATICAL MODEL FOR RELIABILITY ANALYSIS OF AIRCRAFT STRUCTURE

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摘要 本文提出飞机结构可靠性分析的基本公式。在公式中,针对单危险部位结构,综合考虑了结构静强度,初始裂纹长度,疲劳裂纹的萌生、扩展与失稳,结构残余强度,载荷统计分布,裂纹检出概率、检查周期,意外损伤,事故讯息等因素。用此数学模型,可以定量地分析各种因素对可靠性的影响,并对飞机结构各种疲劳设计准则进行评价。

关键词：

Abstract： This paper presents a set of fundamental equations for reliability analysis of aircraft structures. For a single-critical-point structure, it considers the following factors: the static strength of structure, initial crack, the initiation and propagation and unstability of fatigue crack, the residual strength of structure, the statistical distribution of load, the probability of crack detection, the periods of overhaul, accident damage, the communication of damage among fleets etc. Based on this mathematical model, the influence of the various factors to reliability can be analyzed quant-itively, and the various criteria for fatigue design of aircraft structure can be evaluated from the aspect of reliability.

Keywords：