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飞机载荷谱编制的新方法研究

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NEW METHOD OF DRAWING UP AIRCRAFT LOAD SPECTRUM

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摘要

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摘要

通过对国内外飞机平均载荷谱编制方法的研究, 首先指出有编谱方法存在的问题, 最后给出一种以代表每种实测科目的中值寿命(或损伤)的起落进行编谱的新方法。按这种新方法编谱, 可以保持实际飞行科目各动作间的真实先后顺序和各动作的真实载荷状态(载荷大小和作用位置, 下同), 可以真实地反映出载荷作用顺序和真实载荷状态对寿命的影响, 因此可以提高定寿的可靠性。本方法还可以大大简化编谱中的计数和计算, 从而可以减少编谱的工作量, 提高工作效率。

关键词: 中值寿命 载荷谱编制方法 载荷出现顺序

Abstract:

For nearly 20 years, "Rain Flow Counting Method" has been generally used to draw up the aircraft load spectrum over the world. This paper points out that "Rain Flow Counting Method" has serious disadvantages, i.e. it can not consider the sequence of flight load appearance and the loading condition of peak and valley points for each load. Many researches and tests have all proved that the load acting sequence and the loading condition have a great effect on the aircraft structural fatigue life. So the load spectrum drawn up by means of "Rain Flow Counting Method" is not accurate enough to aircraft structural life determination. The author has studied a new method using the mean lives takeoff and landing of actually measuring Courses to draw up the aircraft F BY F load spectrum, which uses the formula derived in this paper to calculate the mean life of each flight course actually measured, and joining them stochastically, i.e. to draw up the F BY F mean life load spectrum. This spectrum can keep the sequence of flight loads and the loading conditions of load peak and valley points unchanged, so as to increase the accuracy of aircraft structural life determination. By means of this method, load spectra for many types of aircraft have been drawn up and successfully used to make the full scale fatigue tests and life determination for these aircraft, achieving good results.

Keywords: mean life method of drawing up load spectrum sequence of load appearance

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