



航空学报 » 1996, Vol. 17 » Issue (3) :302-309 DOI:

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多处损伤特性的研究

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STUDY OF THE BEHAVIOR OF MULTIPLE SITE DAMAGE

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摘要

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摘要 对老龄飞机结构中存在的多处损伤 (MSD)进行了研究。从 MSD试件的裂纹扩展实验中得出 :MSD服从净截面屈服破坏准则 ;MSD使剩余强度明显降低,临界裂纹尺寸大大减小,裂纹扩展寿命显著缩短,从而使损伤容限能力减退,破损安全不复存在。试用组合法求解 MSD裂纹的应力强度因子,并将其用于 MSD裂纹的扩展分析,所得裂纹扩展寿命计算结果与实验符合良好

关键词: 多处损伤 裂纹 应力强度因子 裂纹扩展寿命

Abstract: A laboratory study of multiple site damage (MSD) in aging airplanes was conducted. A net section stress criterion was found to be well correlated with the failure of MSD specimens. The tests also showed that in the presence of MSD, the residual strength of the structure, critical crack length and even crack propagation life are greatly reduced in comparison with the isolated cracks considered by the current damage tolerance requirements. On the other hand, based on the stress intensity factor solution using a compound method, the prediction of MSD crack propagation life is well fitted with test results.

Keywords: multiple-site-damage cracks stress intensity factor crack propagation life

Received 1994-10-19; published 1996-06-25

引用本文:

倪惠玲. 多处损伤特性的研究[J]. 航空学报, 1996, 17(3): 302-309.

Ni Huiling. STUDY OF THE BEHAVIOR OF MULTIPLE SITE DAMAGE[J]. Acta Aeronautica et Astronautica Sinica, 1996, 17(3): 302-309.

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