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纤维排列方向对含圆孔的各向异性板应力场影响的仿真分析

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摘要

针对含圆孔的复合材料板，
在外界荷载作用下通常会引起孔周围区域的应力集中的问题。根据复变函数理论建立了计算模型。采用仿射变换的方法得到了准确描述应力场的复变应力函数。按照所建立的数学模型对含有圆形孔的复合材料板进行了应力分析。探讨了不同的纤维排列方向对孔边应力集中系数的影响。仿真分析了两个主方向的杨氏模量的变化对孔边应力的影响。

关键词 材料检测与分析技术 含孔复合材料板 应力集中 正交各向异性 纤维排列方向 仿真分析

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Simulation on effect of fiber orientation on stress field of orthotropic composite plate with circular holes

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Abstract

There arise usually the serious stress concentration around the hole in the composite plate with circular holes under the external loads. A calculation model of stress field of the composite plate with circular holes was built according to the theory of complex variable function. The complex stress function were derived by the affine transformation to describe accurately the stress field. The stress analysis of the composite plate with circular holes were performed by the model simulations, revealing the effects of the fiber orientation on the stress concentration and the Young's module in the two main directions on the hole edge stresses.

Key words:

Key words material test and analysis composite plate with circular holes stress concentration orthotropy fiber direction; simulation

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