

钢筋混凝土结构基于耐久性劣化度的可靠性分析

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摘要: 结构耐久性的不足将引发其性能的劣化, 并导致结构可靠度的降低。根据已建立的两种劣化度模型及极限状态法, 以碳化深度和锈胀开裂两种不同的耐久性劣化度为指标, 提出了混凝土结构使用寿命全过程可靠度的计算方法。结合工程实例, 以荷载作用下的混凝土结构在碳化环境中的劣化问题为例, 构建极限状态函数, 基于两种劣化度模型, 对其运用可靠度理论进行分析, 得到了基于耐久性劣化度的结构可靠度求算方法。研究结果表明: 可靠度与结构的混凝土保护层厚度及碳化速率的统计数值或钢筋锈蚀量密切相关。计算方法可为分析在役工程的耐久性提供参考。

关键词: 钢筋混凝土; 可靠度; 极限状态函数; 耐久性劣化度

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Reliability analysis of reinforced concrete structure based on durability and deterioration grade

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Abstract The durability deficiency of a structure can cause its performance deterioration and lead to lower structural reliability. Based on two deterioration grade models and limit state method established, reliability calculation method for whole service life of concrete structure was suggested using two different deterioration grades for durability as indexes. Combined with actual engineering examples, the limit state functions were set up with an example of carbonation degradation problem of concrete structure under load and then were analyzed based on the two deterioration grade models by applying reliability theories. The calculation method of structure reliability based on durable deterioration grade was researched in this paper, which provided reference for analyzing the durability of engineering structure in service. The results show that durability of structures and the statistical values of concrete cover thickness and carbonation rate or the amount of steel corrosion are closely related.

Keywords reinforced concrete; reliability; limit state function; deterioration grade for durability

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