

火灾下有粘结预应力混凝土简支梁板的变形非线性分析

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摘要 采用ANSYS程序计算得到梁板截面的温度场, 然后用FORTRAN语言编写程序对高温下有粘结预应力混凝土简支梁板的变形进行了非线性分析。在非线性分析过程中, 采用纤维元模型, 考虑了力与温度的相互耦合的影响, 得到梁板沿长度方向各个截面的弯矩-曲率关系, 采用共轭梁法计算了火灾下有粘结预应力混凝土简支梁板的变形。将程序计算结果与有关文献的试验数据进行比较, 吻合程度较好。同时,

分别对大跨度有粘结预应力混凝土简支梁和板在ISO标准升温情况下的变形进行了非线性分析。经过计算可知, 大跨度有粘结预应力混凝土简支梁在正常设计荷载水平下具有较高的耐火极限。

关键词 [土木工程结构](#), [火灾](#), [预应力混凝土](#), [变形](#), [非线性分析](#)

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Nonlinear analysis on deflection of prestressed concrete bonded simply supported beam and slab subjected to fire

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Abstract The temperature fields of the beam and slab were calculated by ANSYS program, and the nonlinear analysis on the deflection of the prestressed concrete bonded simply supported beam and slab subject to fire was performed by the compiled FORTRAN program. In the nonlinear analysis a fiber element model was adopted and the coupling effect of the load and temperature was taken into account. The bending moment versus curvature relationship in all sections along the span of the beam and slab was got through analysis. The deflections of the prestressed bonded simply supported beam and slab subject to fire were obtained using the method of conjugate beam. The calculation results by the program were compared with the experimental data in related references, and a good agreement was demonstrated. Besides, the nonlinear analyses were also done on the deflections of the large span prestressed concrete bonded simply supported beam and slab respectively in ISO standard temperature rise conditions, and the results show that the large span prestressed concrete bonded simply supported beam has a good fire resistance under the normal design load level.

Key words [civil architectural engineering](#) [fire](#) [prestressed concrete](#) [deflection](#) [nonlinear analysis](#)

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