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# 地基不均匀沉降对框架结构影响的有限元分析

## Finite element analysis on non-uniform settlement of foundation on RC frame structures

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中文摘要：

　　利用ANSYS有限元程序分析某三层框架中柱柱脚不同沉降量作用下上部结构产生附加内力的规律。首先,定义"solid65"实体单元建立框架三维整体模型,分析的结果可以供子模型施加切割边界自由度约束时调用。其次,建立精密划分单元的三跨框架梁子模型。从梁纵向钢筋的应力分析结果可以看出,随着中间柱脚处沉降变形的增大,框架梁边柱支座处上部钢筋和中柱支座位置下部钢筋的应力明显增大,而且边柱支座上部钢筋应力增加更快。中间柱脚处沉降变形达到0.03 m,梁的转角约为1/250时,边柱支座上部钢筋应力超过屈服强度,造成构件的破坏。框架梁裂缝最初出现在边柱支座的上部与中间柱支座的下部;随着中间柱脚处沉降的增加,边柱支座上部与中间柱支座下部的裂缝不断扩展和增大,而且中间跨梁跨中的下部也出现了裂缝。

英文摘要：

　　The law of additional internal force of superstructure under non-uniform settlement of median pillar socle of a three-floor frame structure was analyzed using ANSYS finite element program. The three-dimensional integral fimite element model of frame structure was established with SOLID65 element, and analysis results can be used by sub-model when applied incision boundary freedom restriction. Sub-model of three-span frame beams at was established, which was fine meshed. Stress analysis results of longitudinal bars showed that the stress of top bars of frame beams at side pillar support and bottom bars at central pillar support augmented obviously with increasing settlement deformation of central pillar socle, and the stress of top bars at side pillar support increased more quickly. When settlement deformation of central pillar socle reached 0.03 meter, the rotation angle of the beams was about 1/250, and the stress of top bars of side pillar exceeded yield strength, then the members failed. Cracks of frame beams appeared initially at the top of side pillar support and bottom of central pillar support, and the cracks developed and augmented with increasing settlement deformation of central pillar socle, and cracks at the bottom of midspan of median span beams emerged.

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