

Effect of the rigidity of columns and the dimensional changes in beams on post-tensioning forces

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Civil Engineering

July 1979

Abstract

The purpose of this study is to determine the amount of prestressing force that goes into bending to columns or rigid walls during the process of post-tensioning the beams of a building frame, thus reducing the effective prestressing force in the beams.

Various cases of building frames are considered and the post-tensioning forces are applied storey by storey as the building construction progresses. The frames vary from one bay one storey building, to four bays and upto twenty storeys high building. Three cases of rigid shear walls in high rise building are studied. The effect of dimensional changes in the beams, such as creep, shrinkage and temperature decrease on the post-tensioning forces is also studied. Effect of the degree of base fixity is also investigated. The results of the analysis are interpreted into diagrams and charts that the designer would be able to use to estimate the amount of wasted post-tensioning forces going into bending the columns or shear walls. The IBM Computer 370/158 in the UPM Data Processing Center is used for the analysis of the building frames.