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Structural Technical Report 2

Pro-Con Structural Study of Alternate Floor Systems

Executive Summary

This report examines the existing loading conditions present in 110 Third Avenue and the appropriateness of the floor system that resists gravity loads. It also proposes four alternate floor systems to compare and contrast them to the existing system. Each system is examined for cost, constructability and conduciveness to use in a residential mid-rise setting. The current system uses an 8" flat plate CIP concrete system. Several advantages in using a flat plate system make it a convenient and cost effective system, as explored in the following report.

The four systems proposed in the report are a skip joist system, precast hollow core slab system, flat slab with drop panels system, and a steel system using composite decking. Note the steel system was examined in order to explore the use of an alternate material as the dominant structural support. Each system could be applied to 110 Third Avenue with little difficulty, but only two were effective alternatives. A skip joist system was disqualified because of the large increase in overall depth of the floor system that would be necessary. In addition, a skip joist system would be more appropriate for larger spans as the formwork costs would greatly offset any other advantages it presents. The hollow core precast slabs were a good alternative, although they would require the addition of beams throughout the floor for support. The system would maintain an 8" depth throughout the floor except along column lines where beams are located. This system should continue to be examined. A flat slab system with drop panel is also a viable system for use in 110 Third Avenue. It reduces overall depth of slab while resisting punching shear, thus saving costs (except with respect to formwork) while maintaining structural capacity. Depth of the flat slab system only increases existing depth by .75" per floor. Therefore, the flat slab system with drop panels should be examined in the future. Finally, the steel system is too deep for use in 110 Third Avenue, because it would require the loss of a floor of apartments. It should not be considered further.