

Anthony Perrotta – Structural Option  
Overlook Towers – Herndon, VA  
Technical Assignment #2  
October 27, 2006



## Executive Summary

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This technical assignment will focus on the flooring system for Overlook Towers. The existing system is described in detail along with the design considerations and loading calculations. Four alternate flooring systems are also analyzed and considered a potential system for the building. Through rough calculations, computer models and economic considerations the systems will be compared and a conclusion will be made whether the chosen system is a viable option for the building conditions.

The existing floor system for Overlook Towers is a composite deck supported by A992 wide-flange steel frames. The deck is composed of 3 ¼" lightweight concrete (115 pcf) and a 3" 18 gauge composite steel deck. The following are the four alternate systems:

- Open-web Steel Joist
- Pre-cast hollow-core plank
- Pre-cast Double-T plank
- Post-tensioned slab

The option that can be ruled out immediately is the open-web steel joist system. It is just not practical for an office building. Vibrations would be too much of a problem. Another problem with the system is its difficulty to fireproof. This may be a possible roofing system, but not for a flooring system. The pre-cast hollow core planks can also be eliminated; the self weight alone is enough for disqualification. This system may allow for a quicker erection time and easier fireproofing than steel joists; however, it is still not practical when compared to the last two alternatives.

The existing system is one of the better options. This is a common system to work with and relatively cheap to construct. Post-tensioning and the double-T plank were found to be viable alternatives to the current system. Both systems have smaller depth and roughly weigh the same. The double-T, in all probability, will require a larger foundation but may reduce construction time, considering it is pre-cast. The complexity of post-tensioning concrete may be reason enough to exclude this option. Although the system would cost more, the 46' span is easily achieved.