

SIGNAL HILL PROFESSIONAL CENTER

Manassas, Virginia • Morabito Consultants



Joseph Henry, Structural Emphasis

Dr. Hanagan, Thesis Advisor

Senior Thesis Proposal

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EXECUTIVE SUMMARY

The Signal Hill Professional Center is a four story suburban office building thirty miles west of Washington along Interstate 66. A typical prototype of Northern Virginia suburbs, this building features 68,000 square feet, including four aboveground floors of open office areas and one underground parking area. Where the parking area extends beyond the footprint of the office structure, a driveway wraps around the building, providing access to the first floor.

What is not typical of this building is that it incorporates a composite steel system over its typical 20'-0" x 30'-0" bay to accommodate larger spans, heavier loads, and smaller floor section depths. Though aesthetically it may resemble surrounding office buildings, structurally, most buildings in the area are concrete. Where height restrictions in nearby Washington dictate that most new office buildings and residences use concrete systems to reduce floor section depth, the corresponding construction field and local labor have come to specialize in concrete. Therefore, with these regional influences combined with complicated connections between the undulating parking area and first floor diaphragm, it seems quite unusual that this building would be designed in steel.

Therefore, as a Senior Architectural Engineering Thesis Project:

- The Signal Hill Professional Center will be redesigned as a flat-plate concrete system. The benefits of this system, from reduced vibrations to simplified connections to smaller floor section depths, will be compared to the benefits of a composite steel system. The architectural implications of a new column layout must be assessed.
- To improve the sustainability and livability of the structure, a green roof system will be added to the already-flat roof, which should improve thermal resistance, reduce runoff, and add additional space to the building. Both the steel and concrete system will be assessed for their ability to accommodate this alteration in terms of gravity and lateral loads. The possibility of access to the green roof will become an architectural consideration.
- Using the M Group Architects, Morabito Consulting Engineers, and R.S. Means as resources, a material takeoff and estimate, along with an approximate construction schedule, will reveal which system is most efficient for the given suburban office building design problem.