

EXECUTIVE SUMMARY

House of Sweden is located in Georgetown, Washington, D.C. This development is a single foundation with two towers rising from the site. It is a multi-use facility housing the Swedish Embassy, along with office, commercial, and residential spaces. Seven levels exist in the north building and six in the south. The primary structural system is a two-way post-tensioned slab with drop panels. Shear walls exist in the north building for lateral support, but both the north and south buildings are concrete moment frames.

Depth Study: Steel Re-design of the Structural System

During Technical Report II, A Structural Study of Alternative Floor Systems, it was found that a composite deck and beam system might prove to be a viable alternative for the building. This system has comparable slab depth and overall cost, and it is more easily constructed than the post-tensioned. Steel as a solution is also able to cut down on the floor weight by approximately half, which will lead to a reduction in seismic base shear and may cause wind to control the design of the lateral system. A look at moving the mechanical equipment from the penthouse to the basement or a sub-basement will also be considered. This is proposed as two alternatives. Alternative I, the system will be re-designed in steel with too much loss of floor-to-floor height. The room gained from moving the mechanical system will be distributed to the floor to gain back this height. Alternative II, the system will be re-designed in steel and the existing plans remain the same. When the mechanical equipment is moved, an extra floor is gained and will need to be taken into account for load purposes.

Breadth I: In-Depth Cost and Schedule Analysis

Due to the use of steel instead of concrete, curing time and formwork construction time is eliminated, but procurement time may increase and must be considered. The impacts of the re-design on the schedule and project cost will be analyzed to determine if this is an economical alternative to the current system. General contractors, sub-contractors, and vendors will be consulted to ensure this is as true to life as possible.

Breadth II: Mechanical Equipment Movement Analysis

Moving the mechanical equipment will impact many different parts of the building, along with possibly impacting the occupants. Impacts to the foundation will be studied, along with vibration and acoustic considerations for the occupants if time permits. A look at the waterproofing will occur and be detailed for construction. A layout of the mechanical ductwork will be designed based on the location of the new mechanical room. From this study, conclusions can be drawn as to the viability of the move.