

EXECUTIVE SUMMARY

The existing steel structure of Orange Regional Medical Center effectively handles the various loadings it is exposed to; this was made clear from earlier technical reports. However, there were areas that raised interest and brought up the question of whether a more efficient system exists. From the first look at the existing lateral system, one would question whether fifty lateral frames is necessary to control lateral drifts. From this question, it was determined to redesign the structure of ORMC as a concrete flat slab system, using moment frames for lateral support.

From early analysis in this report, it was made clear that the flat slab system would be effective against gravity loading, with all deflection, shear and moment values falling well within their limits. However, once the building was subjected to seismic loading, which was the predominant lateral force, issues arose in moment capacity and story drifts. The 8,394 kip base shear caused moment concentrations at the columns of the second floor where the building geometry changes. As an end result, it was determined that shear walls were necessary around the elevator shafts to control these forces and bring down the story drift values. The moment frames still serve as the primary lateral resistance system, taking over 75% of the lateral load. This was accomplished with an 11 inch slab teamed with column sizes of 30x30's spanning the entire height, 20x20's for the lower section, and 24x24's in the administration wing to control drift values.

A cost and schedule analysis was run for comparison purposes with the existing structure. The results showed that the concrete system would cost roughly \$20 million. This is almost twice the cost of the existing structure, and since ORMC had to work with a tight budget, this ultimately labeled the flat slab system as not being a viable alternative. The construction schedule yielded expected results with the concrete system taking about six weeks longer to construct. This also adds cost to this system and gives additional reasons for why the concrete system would not be a better alternative.

Successful architectural layouts were established in a redesign of the medical departments. The goal was to provide efficient flow by placing the Emergency Room, Operating Room, and Intensive Care Unit next to one another. This redesign only impacted the first and third floors, but all departments were able to maintain their existing square footage. The redesign also focused on comfort by relocating the healing garden to the second story roof where it would be more accessible to patients and also provide better window views. This raised concerns with the structural force concentration on the second story. The added weight of the green roof would require either the upsizing of columns or the addition of shear walls. Ultimately, this would be a call made by the owner.