New Middle School

Geneva, IL

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Executive Summary

The following is a senior thesis report for the department of Architectural Engineering at the Pennsylvania State University. This report focuses on the New Middle School at Geneva Community Unit School District #304 in Geneva, IL. A large portion of the essential building statistics and information, which is discussed in depth in the first 12 pages of this report, can be found on the previous page.

The rest of the report is dedicated to three specific analyses with respect to the New Middle School. The first analysis explores the implications of switching from the current burnished face CMU wall system in building B to a lighter metal stud wall system. Factors such as cost, constructability, and impact on the structural system were considered. This analysis shows that by switching to a metal stud wall a savings of $465,000. Most of this savings was realized in the wall type, although minimal savings were made by re-sizing the steel beams. If this system were also utilized on the first floor of building B, the savings could be extended to roughly $850,000.

The second analysis concerns the exterior wall type for building B. The existing wall type is a combination wall with CMU, 3" of rigid foam insulation, and a course of face brick. Alternate wall types will be analyzed with respect to cost impact, schedule impact, and energy impact due to changed R-values. These wall types will include precast concrete with face brick, tilt-up wall panels with a Nitterhouse brick façade system, and a Slenderwall system from Smith Midland precast concrete manufacturer. The analysis shows that although the existing wall system takes the longest to complete, it is the least expensive and has the best insulation performance. The tilt-up system proved to be infeasible for this project. The other wall systems had a lower overall R-value and more expensive which offset the benefits of their schedule reduction.

The third analysis takes a closer look at the process by which school districts build new buildings. Specifically focusing on green design and construction and why more schools aren't built green. In completing this research, I found that all of the projects that were green or LEED certified were the direct result of the architect pushing the idea to the school district. These architects all had previous experience designing green. Most of the school districts also seemed unaware of government incentives for building green. I believe that all architects should become better educated in green design and building materials. I also found that more could be done with government incentive programs, to encourage schools to build green with the green of money.

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