



Executive Summary

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Construction Management

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Wednesday, April 9th, 2014

Abstract

This report details four technical analyses that pertain to the means and methods of construction at Cardinal Wuerl North Catholic High School in Cranberry Township, PA. It also focuses heavily on how a project team can positively influence facility management by clearly defining their goals. The building covers 180,000 SF and two stories above grade in the classroom wings, one below grade for the cafeteria and MEP areas, and primarily one story above grade (with varying heights) everywhere else including athletic areas, the auditorium, and the arts wing. The four areas of analysis hope to provide the client with a better final product by reducing costs and schedule duration by prefabricating the exterior skin and improving the effectiveness of turnover to the FM by reducing lifecycle costs of finishes and delivering all information efficiently.

Analysis Descriptions

Technical Analysis #1 describes the efforts in implementing prefabricated exterior masonry panels. The original method of stick-built construction from metal studs to brick veneer took roughly six months to complete and was the cause of heavy site congestion and coordination. So, Sto Panel Technologies' Brick Insulated wall panel system was analyzed for integration at CWNCHS. This was the only system considered due to the heavy architectural, thermal, and structural requirements of the exterior skin. The cost proved to be too expensive to work with this building, most likely due to the complicated geometry and relatively shallow wall heights, but all aspects were heavily scrutinized to prove that this would indeed be the case. Regardless of the predicted overall schedule reduction of several weeks, the general conditions reductions would not outweigh the much larger overall cost difference \$814,293.86 in favor of the original method. Accompanying this analysis are architectural and structural breadths to determine watertight applications of prefabricated panels and the structural transfer of brick veneer on the foundation to panels bearing on the superstructure.

Technical Analysis #2 describes the methods of lifecycle cost analyses on the finish materials at CWNCHS. The finishes division of the Value Engineering report comprised 19.7% of the total reported cost deductions. This analysis serves to challenge the figures that were reported based on a lifecycle costs based on maintenance, repair, refinishing, replacement, etc. rather than the initial costs of construction alone. The decision to use VCT rather than carpet in the auditorium was changed due to present value lifecycle costs and it was reported that the present value lifecycle cost the analyzed VE items is 69% less than what was projected.

Technical Analysis #3 serves as an industry research topic in the Efficient and Effective Turnover of Facilities Management Information. This topic was presented to me at the PACE Conference and directly relates to CWNCHS since the focal point of BIM applications was record modeling for facilities management utilization. This analysis also provides a matrix for owners to decide on how to go about efficiently and effectively delivering information to a facility manager in order to maintain the building

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as best as they are able to. For CWNCHS, it was recommended to utilize Onuma software for facility management as well as to determine training procedures as early as possible to minimize costs.

Technical Analysis #4 analyzed alternative roofing systems to the TPO that was installed at CWNCHS. TPO Roofing that is fully adhered to the substrate causes problems for cold weather installation due to the 25 deg. C temperature threshold that is required by the adhesive. This caused a heavy re-sequencing effort on this project to maintain the substantial completion date of January 31st, 2014. Mascaro was already having issues with keeping this date due to the late turnover of the building pad and these issues came when they were trying to achieve building dry-in. This analysis proposes to use the Duro-Last PVC roofing system product that estimates roughly 75% prefabrication. It can be installed in winter months, is more cost effective than the TPO system that was installed at CWNCHS, and reduces substantial completion date.