

A Methodology for Investigating the Total Cost of “Lean” Site-Built vs. Prefabricated Hospital Bathrooms

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The decision to go with site-built versus prefabricated building components is one tackled by AEC professionals more and more frequently as the construction industry strives to increase efficiency and lower costs. Prefabrication is often viewed as a means of decreasing time and cost, while increasing quality and consistency. Lean construction methods have been transforming the way projects are delivered by managing work flow and reducing process inefficiencies. It is by no means a simple task to make a thorough, accurate, and reliable comparison of “lean” versus “prefab” construction processes. This paper describes a method for analyzing and extracting data from a successful lean project pull-plan and translating it into a detailed process map for a specific construction sub-process. This research focuses on lean site-built hospital bathrooms and examines the specific case of a new 150 bed hospital currently under construction in the United States. Pull-plans provided by the hospital Owner and CM/GC firm were analyzed and the rough-in and finish installation data for bathrooms extracted. The pull-plan data was organized in terms of task duration and number of hand-offs. The time spent on coordinating the pull planning sessions and other relevant coordination efforts were gleaned from direct questioning of the project management team. Data was also collected relating to RFIs, design changes, submittals, and construction delays or problems. The collected data was then used to develop a detailed cross-functional process map in the form of a “swim lane diagram” (SLD) for this particular lean hospital bathroom construction. The Owner or CM/GC can easily load the SLD with their known project cost data to arrive at a total cost for the site-built bathrooms. The goal of this research is to establish sound methodology as a template for future and ongoing research aimed at comparing the total cost of lean site-built bathrooms with the prefabricated equivalent. Future research will focus on using similar methodology for mapping the factory built bathroom process, and will also include project cost data and quantitative results where possible.

Key Words: Lean Construction, Site-Built, Prefabrication, Pull-Plan, Swim Lane Diagram