

Chaiyos Luksanavilai 2010: Analyzing and Improving the Operation of Repetitive Construction through Simulation: A Case of Housing Projects. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Suneerat Kusaldasai, Ph.D. 213 pages.

Construction is a complex process because it consists of several activities to be performed in sequences, especially repetitive construction which requires continuity of workforce during the operations. Delay occurred in bottleneck activities usually prolongs project duration. Generally, obstacles during construction lead to the uncertainty of the process time, and this makes an accurate estimation of project duration to be impossible.

This research aims at implementing STROBOSCOPE simulation model to analyze the operations of repetitive construction, using a housing development project as a study case. Research started with site observations to investigate construction process, work duration, as well as obstacles causing work interruptions and/or delays. Then the simulation model of twenty housing units was developed in four scenarios: (1) a model using budgeted activity durations, (2) a model using actual activity durations, (3) a model using actual durations without controllable disruption as activity duration, and (4) a model using actual working days as activity duration. According to the result, it was found that project duration of the scenario using actual activity durations was greater than that of using budgeted durations, and these two cases had different critical activities. When the third scenario is compared with the fourth one, it was evident that, in this case, weather conditions had relatively small impacts on project duration, even in a rainy season. In addition, this thesis proposed a recommendation of how to reduce the duration of a repetitive construction project by eliminating or minimizing causes of work interruption, especially those of critical activities in every unit, known as bottleneck activities. Moreover, the method of postponing starting times of certain activities was introduced in the model to reduce the idle time between construction units and to make the flow much more efficient.

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Thesis Advisor's signature