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# BIM and LPS improve project management

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There is some discussion in construction today about which is better to use — Building Information Modeling (BIM) or Lean Construction. You need to consider what each process offers before choosing one over the other.

BIM is the process of generating and managing building data during a building's life cycle. BIM uses 3-D, real-time, dynamic building modeling software to increase productivity in building design, construction and maintenance. BIM includes building geometry, spatial relationships, geographic information, and quantities and properties of building components. BIM can include 4-D simulations to see how part or all of the facility is intended to be built.

While Miller Bonded Inc., a mechanical contractor in Albuquerque, N.M., had been using 3-D drawings for several years for its own work, the company decided to take it a step further and use BIM on a project for the University of New Mexico. The architect/engineering design firm met with Miller Bonded, the general contractor and other key subcontractors on the job to see the building before it was built. In just one area, the model identified more than 40 conflicts where the ceiling needed to be lowered to accommodate the utilities. When the design engineers saw the conflicts, they volunteered to lower the ceiling.

Miller Bonded had paid for the modeling cost and when it reported that its detailing costs would be over budget, the project manager for the job had Miller Bonded submit a change order of about \$25,000 to cover the additional costs. It would have been much harder to get the designers to lower the ceiling or to fund a change order if it was not a BIM job. Everyone on the project saw the savings from using BIM. It helped reduce workspace conflicts and construction problems that are not seen in typical design efforts, but surface during construction.

## Last Planner System

The Last Planner System (LPS) is one tool of Lean Construction that is popular among contractors. In construction, the “last planner” is known as the field supervisor/foreman who assigns work to the crews. LPS consists of developing and using several key plans along with a weekly meeting and constraints measurement.

The master schedule is common to all major construction projects. The LPS breaks the master schedule into phase schedules. The team of trades and management, responsible for specific work in each of their phases, develops that phase's schedule. The phase schedule identifies the major activities and the rules for release of

work to move from one activity to the next. The phase schedule becomes “our” schedule for the job not “your” or “my” schedule.

Activities developed in the phase schedule go into a look-ahead plan when they are six weeks from being done. These activities are magnified into tasks, showing greater detail. Each task is screened, using a checklist to assure that all requirements are made ready, so tasks can be performed.

The last planner develops a weekly work plan by selecting those tasks that are ready to be done and critical per the schedule from the look-ahead plan. Only work tasks that are ready, regardless of when they should be performed, are to go on the weekly work plan. Typical construction work is driven by schedule, not task readiness. When project managers push the sub-contractors to start work that isn't ready, the crew usually spends additional time, returning later to finish the task. The weekly work plan is the foreman's commitment plan, and since it is made up of tasks ready to be done and committed to by the foreman, it has a much higher likelihood of being completed that week.

At the end of each week, the last planner identifies any constraints that kept him from doing the work as planned. These constraints are analyzed in a weekly coordination meeting and action is taken to prevent future occurrences. Part of this weekly cycle is measuring the percent of work completed.

While Jim Teston worked with TDIndustries, a mechanical contractor in Dallas, as an internal consultant, he did his master's thesis on LPS. He studied 50 large jobs, completed by TDIndustries, and found that some jobs were done the typical way most contractors manage projects, but 11 were done using LPS. For jobs not using LPS, the average productivity ratio was 0.97 or 3% better than the estimates. Jobs using LPS average 0.88 or 12% better than the estimates. The research found that using the LPS resulted in a savings of more than \$1.5 million!

There are now so many documented, successful construction projects using LPS that it has proven to be a better way to manage work. BIM is a great tool, but the savings it generates can be lost in the installation if not managed well. Lean Construction improves project management if applied correctly. However, both BIM and LPS improve how projects are planned and executed, but need to be applied to the building process correctly.

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