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Lean Project Delivery System

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LEAN PROJECT DELIVERY SYSTEM

THE NEED

To extend to the construction industry the Lean production revolution started in manufacturing. This production management based approach to project management maximizes value delivered to the customer while minimizing waste. While designing and building are different from manufacturing, the principles drawn from Lean Production Management can be applied through techniques tailored to the project setting. Taken together these principles and techniques form the basis for a Lean Project Delivery System

The Lean Construction Institute, (LCI), founded in August 1997, is currently doing research to develop knowledge regarding the design and implementation of project based production systems in the design, engineering, and construction of capital facilities.

THE TECHNOLOGY

Lean Project Delivery System (LPDS) model consists of 13 modules, 9 of which are organized in 4 interconnecting triads or phases extending from project definition to design to supply and assembly, plus 2 production control modules and the work structuring module, both conceived to extend through all project phases, and the post-occupancy evaluation module, which links the end of one project to the beginning of the next.

- The Project Definition phase consists of the modules: Needs and Values Determination, Design Criteria, and Conceptual Design.
- Lean Design consists of Conceptual Design, Process Design, and Product Design.
- Lean Supply consists of Product Design, Detailed Engineering, and Fabrication/Logistics.
- Lean Assembly consists of Fabrication/Logistics, Site Installation, and Testing/Turnover.
- Production Control consists of Work Flow Control and Production Unit Control.
- Work Structuring and Post-Occupancy Evaluation are thus far only single modules.





The LPDS will be developed as a philosophy, a set of interdependent functions (the systems level), rules for decision making, procedures for execution of functions, and as implementation aids and tools, including software when appropriate.

The domain for the LPDS is defined by the intersection of projects and production systems. We call this domain project-based production systems. Some LPDS modules will be applicable to projects that do not involve the designing and making of artifacts, and possibly also applicable to some types of production systems that are not executed through projects. For example, the production control modules may be applicable to project management generally, and also to all production systems driven primarily by directives rather than by predetermined routings between processing steps or machines. Even so, the LPDS will apply as a whole specifically to temporary production systems such as those used for new product development or capital facilities. Essential features of LPDS include:

- the project is structured and managed as a value generating process
- downstream stakeholders are involved in front end planning and design through cross functional teams
- project control has the job of execution as opposed to reliance on after-the-fact variance detection
- optimization efforts are focused on making work flow reliable as opposed to improving productivity
- pull techniques are used to govern the flow of materials and information through networks of cooperating specialists
- capacity and inventory buffers are used to absorb variability
- feedback loops are incorporated at every level, dedicated to rapid system adjustment; i.e., learning.

BENEFITS

Lean construction is a new way to design and build capital facilities. Essential differences between lean project delivery system and current forms of project management include:

- Project Control is redefined from "monitoring results" to "making things happen." Planning system performance is measured and improved to assure reliable workflow and predictable project outcomes.
- Project Performance is optimized at the project level. Current practice attempts to optimize each activity and thus reduces total performance.
- Project Delivery is the simultaneous design of the facility and its production process. This is concurrent engineering. Current practice, even with constructability reviews is a sequential process unable to prevent wasteful iterations.
- Project Value to the customer is defined, created and delivered throughout the life of the project. In current practice, the owner is expected to completely define requirements at the outset for delivery at the end, despite changing markets, technology and business practices.



- Coordinating action through pulling and continuous flow, as opposed to traditional schedule driven push with its over-reliance on central authority and project schedules to manage resources and coordinate work.

Decentralizing decision making through transparency and empowerment. This means providing project participants with information on the state of the production systems and empowering them to take action.

BARRIERS

Conceptual - that is our activity centered thinking which is really a lack of theory. Moving to lean is a real paradigm shift and contradicts much of current practice.

POINTS OF CONTACT

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REFERENCES

- Ballard, Glenn. Lean Project Delivery System. Internet <http://www.leanconstruction.org/lpds.htm>. Jul, 23, 2000
- Womack, James P. et al. The Machine That Changed the World: the Story of Lean Production. HarperPerennial, New York. New York. 1991

REVIEWERS

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