

Lean Construction

PROJ_MGT 434

Course Objective:

Lean can be defined as creating predictable, reliable, and uninterrupted workflow by eliminating nonvalue-added activities. Simply put, it's about doing more of the "right" work and less of the "wrong" work. Distinguishing what is "right" and what is "wrong" is the first act. The objective of taking this course is to gain a working knowledge of the fundamental principles of lean and to learn how to immediately apply them in your business and on your projects. Studying, teaching, and applying lean tools and techniques will help leaders of the built environment create high performing teams that are continuously learning and solving problems, resulting in delivering projects faster and with higher quality.

Week-by-week description of the course:

Week 1 The History of Lean and the Significance of the Eight Wastes

Lean is rooted in Toyota culture and their unique production system and the broad objective is to eliminate waste from all work processes.

- Origins and Essence of Lean
- Eight Major Wastes (Non-value-added work)
- Two Pillars of The Toyota Way
- 4P Model of the Toyota Way
- Five of Principles of Lean Thinking
- Toyota Production System (TPS)

Week 2 The Two Pillars of the Toyota Way

Toyota Motor Corporation painstakingly built and steadfastly operates their company on two unwavering and guiding values. These corporate ideals point lean practitioners to true north and govern all thinking and behavior.

- Respect for People – Integrate and trust those doing the work
- Continuous Improvement – Plan, Do, Check, and Adjust (Scientific Method)

Week 3 The 4P Model of the Toyota Way

Fourteen principles constitute The Toyota Way. These fourteen principles are the foundation of the Toyota Production System (TPS). These principles are divided into four reinforced and interconnected categories.

- Philosophy – Long-term thinking
- Process – Eliminate waste
- People and Partners – Respect, challenge, and grow them
- Problem Solving – Continuous learning and improvement

Week 4**The Five Lean Principles**

Lean thinking is the antidote to waste. It supplies a method to do more with less -- less effort, less equipment, less time, and less space all the while achieving improved customer satisfaction.

- Value – Transforming fit, form or function such that the customer is willing to pay
- Value Stream – Interdependent processes or actions to deliver value
- Flow – Uninterrupted value-added work
- Pull – Serve the next step on their demand
- Seek Perfection – Endless pursuit of reducing effort, time, space, cost, and mistakes

Week 5**The Toyota Production System (TPS)**

TPS is a sound and proven method to create standard, stable, and reliable processes. It starts with the goals of best quality, lowest cost, and shortest lead time. People, teamwork, and reducing waste are at its core.

- Just-in-time – Deliver the right parts in the right amount at the right time
- Built-in quality – Make problems visible
- Leveled Production (or workflow) – Keep systems stable and allow for minimum inventory
- Visual Management – Use simple visual indicators to determine if standards are being followed

Week 6**Lean Tools Customized for Design and Construction**

There are many subtle differences between manufacturing and construction; for example, in a factory the people remain in place and the pieces and parts move, but in construction it's vice-versa. Certain lean techniques adopted from manufacturing have been creatively adapted for design and construction.

- Integrated Project Delivery (IPD)
- Target Value Delivery (IPD)
- The Last Planner System (LPS)

Week 7**The Last Planner System (LPS)**

LPS is a highly collaborative, commitment-based, pull planning system that integrates what should be done, what can be done, what will be done, and what was done. It is driven by reliable promises and handoffs of work along with continuous learning based on constraint and variance analysis.

Master Scheduling (MS) – Major milestones and long-lead items

- Phase Pull Planning (PPP) – A target condition or future state
- Six Week Look-ahead Planning (6WLA) – Make work ready and re-plan as required
- Weekly Work Planning (WWP) – Unencumbered work promises for the next week
- Percent of Plan Complete (PPC) – How accurate is the plan

Week 8 Visual Decision Plotter (VDP)

Increased recent scrutiny of constraints that interrupt workflow in both design and construction have been traced upstream to expose poor decisions or indecisiveness as the root cause. TVD, a lean version of Choosing by Advantages, is a collaborative method that reinforces making sound, visual, and timely decisions. VDP can guide, inform, and improve procurement, hiring, budgeting, and unlimited other administrative choices.

- Alternatives – Measure and illustrate the importance of each option
- Factors and Criteria – Sharpen thinking to reveal the most relevant details
- Attributes – Simplify deciding by choosing from the accrued value illustrated
- Advantages – Record rationale with visual decision outputs that improve insight and reporting

Week 9 Emotional Intelligence (EI)

Intense focus on the concept of emotional intelligence (EI), its importance, how it's measured, how it can be improved, and the powerful results it has on lean processes. This class focuses on the pillar of "Respect for People" and how to achieve that while implementing lean.

- Basics of emotional intelligence
- How EI is measured
- How EI can be improved
- How EI ties into lean processes
- How to incorporate EI concepts into LPS and pull planning

Week 10 Final Assessment: Socratic Seminar**Grade Determination:**

Webinar Participation.....50%

Homework.....25%

Final Assessment25%

Text:

No text required

Homework:

Cornell notes from each video-taped lecture

Instructors:

Rich Seiler plus leading industry executives and lean practitioners