Introduction

Work Structuring can be described as a path taken from chaotic work to optimized work. It involves implementation of a number of strategies and tools, including defining standard processes, working to optimize those processes, and seeking one-piece flow; while employing tools such as mistake-proofing and built-in quality. The construction industry must work to eliminate the celebration of heroic behavior—taking on a nearly impossible task and putting the project at risk—by taking a step back and being more intentional about work structuring. The potential exists for significant transformation, resulting in massive improvements in productivity and quality.

The complaint that standardization stifles creativity isn’t valid. Rather, standardization creates the platform from which innovation can spring.
1.0 Why

The fundamental grounding of Work Structuring involves the identification of repetitive processes and subsequent structuring into standard work. Repetitive actions can be transformed into standard processes. The complaint that standardization stifles creativity isn’t valid. Rather, standardization creates the platform from which innovation can spring. Companies should always seek the new standard. Additionally, the complaint that construction isn’t repetitive isn’t valid either. While every project itself is a different product, the processes that make up the final product repeat from one project to another.

Standardization and optimization produce outcomes that include higher quality of work, better safety, increased efficiency and higher productivity. These results are sought universally by all organizations.

Foster the improvement process by teaching people to think of work process in terms of mistake-proofing.

2.0 How

As with many Lean approaches, Work Structuring seeks to optimize the whole. For work structuring to be effective, there must first be an awareness of local optimization, followed by an understanding of how the various local systems interact from the perspective of global optimization. Under Work Structuring, a system-centric view is preferable to a product-centric view, with the key focus being the integration of systems. Local improvements must be evaluated within the context of the entire project; building to a global level is a logical progression.

Work Structuring often begins with an effort to standardize repetitive work. However, it is important to note that non-repetitive work is ripe for improvement as well. In non-repetitive work, individuals should seek hidden repetition and find opportunities to optimize and strengthen connections and the handoff of work.

Companies should always seek the new standard by elevating the baseline through innovation. As new innovations arise, the baseline moves in concert to become the new better practice that is spread through the company as the updated standard. This cycle can repeat perpetually and is the basis of Continuous Improvement.
The contractual terms can help or hinder the ability of the team to optimize the whole and properly structure work. Traditional ways can hinder in optimizing work but relational contracting methods such as an Integrated Form of Agreement (IFoA) can help overcome the methods of the past. An identified standard process can be used as a baseline for continuous improvement. Refining the balance.

Mistake-proofing can be a powerful tool in Work Structuring. A mistake-proof step in a process prevents the one doing the work from performing the step incorrectly. A simple example can be taken from operating a car. In most cars with an automatic transmission, the car cannot be started unless it is in park or neutral. Most of these cars cannot shift out of park unless the brake pedal is depressed. Furthermore, the key cannot be removed unless the car is placed in park. Most cars with a manual transmission will not start unless the clutch is depressed. These are examples of mistake-proofing because they only allow the driver to behave in one, optimal, safe manner.

Built-in-Quality can also significantly shape Work Structuring. Building in quality improves the work by reducing or eliminating the need to check or monitor a process. Most critically, quality occurs at the point where a discrete step in the process occurs instead of at the end of a process where defective work has already taken place.

Document the new process in a visual manner and distribute to all workers who will implement it. Post the process so it can be seen and referenced from where the work is being performed.
Traditionally, the work product was inspected in a finished state, meaning that any defect that occurred would have been replicated multiple times. With Built-in-Quality, elements requiring inspection or verification are addressed at the point where they are implemented, often through a mistake-proofing process. An excellent example comes from the original Toyota loom, which featured a device that stopped the loom when a thread broke. Rather than having to constantly monitor the loom or waiting to find that the woven goods were defective, the Built-in-Quality of the device removed the need for monitoring or checking.

3.0 What

Work Structuring involves the following steps:

1. Identify an activity with repetitive work: Carefully examine the work your organization performs. Select an activity that is repeated frequently and that has some number of discrete steps. Start with a common process that is relatively simple, and yet still substantial. This increases the chance of beginning your improvement effort with an easy win, a key component to initial buy-in for the Work Structuring effort. Start small to gain experience through repetition, then take on increasingly difficult and complex processes as your team gains experience.

2. Develop a standard process for executing the repetitive work: Carefully map the steps of the activity in a thorough manner. Involve the people who perform the work and have them work together, using sticky notes to illustrate their discussion. Pay careful attention to detail and be prepared to spend time defining what each step entails. Encourage participants to share their stories of performing the work—what went well, what didn’t work as planned, what they wish they had to do the job better. Translate these recommendations into steps for the process. It is important to reach consensus on how to best do the work with the people present in the process. Also, define what you are seeking to improve and how you will measure it. Common metrics include greater installation speed; fewer workers required; less material needed; reduced number of errors, etc.

3. Implement the standard process: Document the new process in a visual manner and distribute to all workers who will implement it. Post the process so it can be seen and referenced from where the work is being performed. Plan for review and training of the standard process and prepare to monitor its initial implementation with all workers. Seek agreement that people will rigorously follow the standard process, even if it is not the way that they have personally performed the work in the past. Monitor the outcome of the process against the developed metrics. Publish and celebrate the results.
4. Encourage innovation from those executing the standard process: Incentivize compliance with the standard by promising the opportunity for innovation. Explain that workers can start with the standard process as the baseline and that when they find a better, more innovative way to perform a step in the process, their innovation will become part of the next standard process and will be spread across the organization. Recognize innovation by publicly celebrating the innovator and the improvement they made. Explain that this cycle of standard > improvement > new standard > improvement will continue forever. Tie the improvements back to the metrics and share the story of how each improvement helps to better meet the metric.

5. Stabilize the standard process, then stress to optimize: Once you are comfortable that the standard process has taken hold and the team has achieved results as demonstrated by measuring against the metrics, begin to optimize the standard process. Reassemble the people performing the work and challenge them to push steps in the process. Work step by step with the intent of maximizing each step until it breaks. Then, stop and assess why the step broke and refine how it is performed. Stress the process until the team reaches an optimal state. As you develop more standard processes, move from one to the next, stressing to optimize. Don’t stress more than one process at a time to avoid over burdening the team, but maintain a vigorous rotation so that there is an improvement effort occurring at all times. Then, continue to cycle through various processes. Before you know it, your team won’t just be performing the work—they will be perpetually improving the way that they work.

6. Seek opportunities for mistake-proofing steps in the process: Foster the improvement process by teaching people to think of work process in terms of mistake-proofing. Challenge them to structure the process in a manner that reinforces the correct method by removing the opportunity to perform the work incorrectly.

7. Introduce elements of built-in quality to the process: Establish gateways in the process where work is checked for quality. At a minimum, place these at points where work is handed off from one stakeholder to another, both internal and external to the organization. Once established as gateways, work to pull the elements of the quality check upstream into the process. Couple these built-in-quality elements with mistake-proofing to further decrease the chance of defects.
4.0 When

The timing of Work Structuring is key to its successful implementation on a project. As a general rule, the earlier Work Structuring is performed the better, in order to achieve maximum impact. Implementing later in the project can still bear fruit, so it should always be considered.

Work Structuring should be discussed within the Pull Planning Process. Once developed, it should cascade down and be monitored and improved at the weekly work planning levels, allowing it to be refined and improved over time.
CHAPTER 39 – WORK STRUCTURING
Additional Readings

2 Update on Target Value Design 2 TVD Update ppt

3 Production Control Principles

9-15-08 Lean Construction Opportunities Ideas Practices

A Lean And Agile Construction System As A Set Of Countermeasures To Improve Health, Safety And Productivity In Mechanical And Electrical Construction

A Project in Review-Owner Case Study-Message to the Facilities Team

Aiming for Continuous Flow

Analysis of lean construction practices at Abu Dhabi construction industry

Analyzing User Costs in a Hospital Methodological Implication of Space Syntax to Support Whole-Life Target Value

BIM and Value Stream Mapping Robert Mauck

Born to be Lean

Case Study of Using an Integrated 5D System in a Large Hospital Construction Project

Commercial Terms to Support Lean Project Delivery

Implementing Pull Strategies in the AEC Industry

Lean Design - Process Tools -n- Techniques
Competing Construction Management Paradigms

Design of Construction Operations

D DekkeronProcedures

Discrete Event Simulation Enhanced Value Stream Mapping An Industrialized Construction Case Study

Editorial Lean and Integrated Project Delivery

FullerTheoryofDrivingBehavior

Flow Driver - A System for Reducing Fabricator Lead Time

Historical Context of Lean Construction

Identification of potential improvement areas in industrial housing A case study of waste

Implementing Edge

Implementing Lean Construction Understanding and Action

Integrated agreement on one page

Integrated Project Delivery An Example Of Relational Contracting

Investigation into the nature of productivity gains observed during the Airplane Game lean simulation

Investigation of the Supply Chain of Wooden Door

Jackson Federal Building Case Study

Kaizen and Job Satisfaction – A Case Study in Industrialized Homebuilding
KanBIM Workflow Management System Prototype implementation and field testing

LCI Congress Presentation 2012-Bagatelos and Lean Stream FINAL

Lean Construction - 2000 to 2006

Lean Construction as a Strategic Option Testing its Suitability and Acceptability in Sri Lanka

Lean Construction Practices and its Effects A Case Study at St Olav's Integrated Hospital, Norway

LEAN CONSTRUCTION THE CONTRIBUTION OF ETHNOGRAPHY

Lean for Field Operations-Brian Lightner

Lean principles in industrialized housing production The need for a cultural change

Lean production, value chain and sustainability in precast concrete factory - a case study in Singapore

Lean Project Delivery System

Learning to see the Effects of Improved Workflow in Civil Engineering Projects

Phase Scheduling

PPC2000 Association of Consultant Architects Standard Form Of Project Partnering Contract

Process Flow Improvement Proposal Using Lean Manufacturing Philosophy And Simulation Techniques On A Modular Home Manufacturer

Production System Design - Work Structuring Revisited
Projects in Review-Integration of Lean Tools and Takt Planning-4

Projects in Review-Revolutionizing Construction Management with Lean and Last Planner

Reliable Schedule Forecasting in Federal Design-Build Facility Procurement

Rethinking Lookahead Planning to Optimize Construction Workflow

Schedule for Sale Workface Planning for Construction Projects

Social Construction Understanding Construction in a Human Context

Step-by-Step Modularity - a Roadmap for Building Service Development

Target Value Design Case Study - Patrick Vasicek

Target Value Design Current Benchmark

The Application Of Lean Principles To In-Service Support A Comparison Between Construction And The Aerospace And Defence Sectors

The Combination of Last Planner System and Location-Based Management System

The Impact of Path Dependencies on Lean Implementation within a Construction Company - A Case Study

Using Quality Function Deployment in the Design Phase of an Apartment Construction Project - Luiz Gargione

Work Structuring