

CHAPTER 3



WASTE

1.0 Why

Studies have shown that about 70% of the activities performed in the construction industry are non-value add or waste. Learning to see waste would dramatically affect this ratio.

Waste is anything that does not add value.

Waste is all around, and learning to see waste makes that clear.

2.0 When

The process to see waste should begin immediately and by any member of the team. Waste is all around, and learning to see waste makes this clear.

3.0 How

Observations

Ohno Circles

1st Run Studies/Videos

Value Stream Maps

Spaghetti Diagrams

Constant Measurement

4.0 What

There are seven common wastes. These come from the manufacturing world but can be applied to any process. They specifically come from the Toyota Production System (TPS). The Japanese term is *Muda*.

There are several acronyms to remember what these wastes are but one of the more common one is TIMWOOD. (T)ransportation (I)nventry (M)otion (W)aiting (O)ver Processing (O)ver Production (D)effects.

Transportation

Unnecessary movement by people, equipment or material from process to process. This can include administrative work as well as physical activities.

Inventory

Product (raw materials, work-in-process or finished goods) quantities that go beyond supporting the immediate need.

Motion

Unnecessary movement of people or movement that does not add value.

Waiting

Time when work-in-process is waiting for the next step in production.



Look for and assess opportunities to increase value through waste reduction and elimination.

Over Processing

More processing than is needed to produce what the customer requires. Perhaps the hardest to detect and eliminate.

Over Production

Making something before it is truly needed. This is a particularly serious form of waste because it leads to other forms of waste.

Defects

Production that is scrap or requires rework. There are many more forms of waste beyond the seven listed. Continue to look for and assess opportunities to increase value through waste reduction and elimination. Some other common wastes that have been identified are listed next.

Underutilized Talent

Many people consider this one the eighth waste. It is essentially underutilizing the talents or resources that are available.

Over Burdening

The Japanese word is *Muri*. This is excessive demand on a system that causes the system to produce beyond its reasonable capacity. Pushing a machine or person beyond natural limits. Over burdening people results in safety and quality problems. Over burdening equipment causes breakdowns and defects.

Unevenness

The Japanese word is *Mura*—fluctuation in demand that causes the workflow to be uneven.

Waste is Disrespect

Waste is disrespectful to people. Any of the wastes described interfere with the environment that an individual works in. Waste consumes resources and skill.



For additional readings and information, please see the below information.

CHAPTER 3 -- WASTE

Additional Readings

[2 Update on Target Value Design 2 TVD Update ppt](#)

[5.2 Mechanical Systems](#)

[5.3 Model Based Estimating for Target Value Design](#)

[5.4 Case Studies of VDC for Lean Project Delivery](#)

[5.6 VDC for Lean Project Delivery A3s](#)

[9-15-08 Lean Construction Opportunites Ideas Practices](#)

[A Lean Modeling Protocol for Evaluating Green Project Delivery](#)

[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](#)

[Conflicts Between Contract Law and Relational Contracting](#)

[Creating Value A Sufficient Way To Eliminate Waste In Lean
Design And Lean Production](#)

[Developing the True North route map as a navigational compass in a construction project management organisation](#)

[Editorial Lean and Integrated Project Delivery](#)

[Generic Implementation of Lean Concepts in Simulation Models-1](#)

[Identification of potential improvement areas in industrial housing A case study of waste](#)

[Implementing Integrated Project Delivery on Department of the Navy construction projects](#)

[Implementing Lean Construction Understanding and Action](#)

[Interaction in the construction process-System effects for a joinery-products supplier](#)

[Investigation into the nature of productivity gains observed during the Airplane Game lean simulation](#)

[Investigation of the Supply Chain of Wooden Doors](#)

[Jackson Federal Building Case Study](#)

[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 Construction Where Are We And How To Proceed](#)

[Lean in Design](#)

[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](#)

[Learning to see the Effects of Improved Workflow in Civil Engineering Projects](#)

[Moving on - Beyond Lean Thinking](#)

[Owner Perspectives-Disney](#)

[Phase Scheduling](#)

[Presentation 02-The Big Room-final](#)

[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](#)

[Reverse Phase Scheduling Slides - George Zettel](#)

[Safety-A Lean Transformation](#)

[Schedule for Sale Workface Planning for Construction Projects](#)

[Site Implementation and Assessment of Lean Construction Techniques](#)

[Target Costing - Glenn Ballard](#)

[Target Value Design Case Study - Patrick Vasicek](#)

[The Application Of Lean Principles To In-Service Support A Comparison Between Construction And The Aerospace And Defence Sectors](#)