Manufacturing Wastes Stream: Toyota Production System Lean Principles and Values

Mohammed Hamed Ahmed Soliman

Published by personal-lean.org, 2023.

While every precaution has been taken in the preparation of this book, the publisher assumes no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein.

MANUFACTURING WASTES STREAM: TOYOTA PRODUCTION SYSTEM LEAN PRINCIPLES AND VALUES

First edition. October 2, 2023.

Written by Mohammed Hamed Ahmed Soliman.

Table of Contents

Dedication

I created this book with the help of more than fifteen different business resources. These academic articles and books are all cited at the end of this book. A number of people have influenced my learning journey and my entire career. I would like to acknowledge them here.

Esraa Soliman: My lovely wife and partner. She encouraged me to write and publish this work. In fact, she always encourages me to do creative work.

Jeffrey Liker: Professor at the University of Michigan and author of *The Toyota Way* and the amazing Toyota series of books. His impressive work on Toyota inspired and influenced my learning about the Toyota Production System. I would really like to thank him for his indirect involvement in this work. Many examples included in this book were originally from his books. Although I have never met Jeff face to face, we have had great communications over social media platforms.

Chris Duklet: A lean manufacturing leader from the United States who work in the field of health care. He has contributed to this work by reviewing the book prior to publication and giving me useful recommendations and advice.

Attia Gomaa: Professor at the American University in Cairo who influenced my teaching career at the university and taught me how to become a good trainer.

Steven Borris: A business consultant, author, and friend from England who influenced my writing career.He encouraged me to write and publish. Steven was my mentor on lean manufacturing, helping me first to understand the basics, after which I developed my understanding through deep practice and self-directed learning.

Eslam Soliman: My friend and a professor at the Assiut University. His PhD is from the University of New Mexico. He has influenced my entire writing career by giving me recommendations and advice on how to write and publish. He revised my published works many times and kept inspiring me after every piece I wrote and published.

Manufacturing Wastes Stream
Toyota Production System Lean Principles and Values
***Second Edition**

First edition. 2022
Second edition. 2023
Written by: Mohammed Hamed Ahmed Soliman
Published by: www.personal-lean.org

Introduction

"Waste removal increases the profitability of any business. Processes are classified into value added and waste. The seven deadly wastes that could exist in any manufacturing process originated in Japan and are defined in the Toyota production system (TPS). The main goal became removing them. For each waste, there is a strategy to remove or eliminate it. What is less likely is that managers will know how any of these issues are affecting them and increasing costs. To remove each waste, you have to understand where it comes from, why it exists, and how it affects your business."

In the economic recession, many companies are taking abstinence procedures to reduce costs. This might include layoff labors and reducing some wages. Actually, those actions might work for only a short period. Afterwards, the situation may return and in worse shape unless the company changes its way of doing things, including enacting a culture of continuous improvement. This puts us back to why the Toyota production system has been created.

Chapter.1

Lean Principles

Lean is the other name for the Toyota production system. It has some principles that should be the goal of any successful production system. All goals are intentionally looking from the perspective of the customer. The five principles of lean are defined below:

1. Value: Specify what adds value to the customer and what doesn't. The customer needs a good quality, good prices, and good delivery speed. Quality should meet the customer's expectations, no exception. Non-value-added processes are those works that customer is not willing to pay for. They add cost to the product and delay the process.

2. Value stream: This involves every step of the process, starting with the supplier and ending with the customer. Every step must bring the product closer to completion and add value to it.

3. Make the product flow: All obstacles that constrain the flow of the parts through the manufacturing process must be removed. Lean strives for one-piece flow, which is about providing smooth flow for each piece of product with no wastes in time, performance, and quality in order to deliver the right product on time to the customer.

4. Pull not push: Produce what customers need and avoid over productivity, which creates the most waste in any production process. By producing more than the customer demands, you are investing all your resources, including money, space, manpower, equipment, tools, material, etc., in building an inventory that may not be sold for a period of time.

5. Strive for perfection: There must be a vision for perfection. Companies should strive to continuously improve the process rather than be good at what they are doing. Processes tend to slip back and lose their sustainability if the cycle of continuous improvement, or plan-do-check-act cycle, has not been repeated continuously.

What are the Seven Wastes?

The seven wastes are those non-value-added steps that create obstacles to the flow of the stream, add cost to the product, reduce quality, and delay the delivery to customers.

For example, suppose there is a manufacturing process consisting of several processes, such as cutting, casting, assembly, handling, maintenance, inspection, and changeovers. The added value works, which involve making what customers need, are just a few processes: cutting, casting, and assembly. The others are those non-value-added works that need to be removed or minimized to improve the process. The seven wastes define those non-value-added works in terms of transportation, inventory, motion, waiting, over processing, and over productivity. The eighth waste is the underutilization of human capabilities, or untapped human potential.

Relationship between Wastes and Profitability

Frequently, the inexperienced estimators will perform a cost estimate assuming everything is perfect and the plant is working at full capacity. This approach is totally erroneous as it does not consider all operation wastes, such as downtimes, waiting between processes, inventory carrying for long periods, re-working for quality, and delay of orders delivery.

The relation between profitability and operation wastes can be seen through this simple formula:

Profit= Revenue – {(Fixed Cost + Variable Cost) + Wastes}

The fixed and the variable costs are the manufacturing operation costs required to make the product. Organizations that are working at or near the break-even point can find ways to be more profitable through the losses. Furthermore, if a company is running at 80% of its actual capability and can sell 100% of its capacity, there is an opportunity to produce the extra 20% through the losses. Those twenty percentages of losses are the sales losses that can be recovered through the removal of the operation wastes. The losses are the price of the unsold parts which recover the profit, labor salaries, maintenance costs, overheads, and indirect expenses.