Value Stream Mapping

Value Stream Mapping Definition

- Value Stream Mapping (VSM):
  - Special type of flow chart that uses symbols known as "the language of Lean" to depict and improve the flow of inventory and information.

Value Stream Mapping Purpose

- Provide optimum value to the customer through a complete value creation process with minimum waste in:
  - Design (concept to customer)
  - Build (order to delivery)
 - Sustain (in-use through life cycle to service)

Why ?

- Many organizations pursuing "lean" conversions have realized that improvement events alone are not enough

- Improvement events create localized improvements, value stream mapping & analysis strengthens the gains by providing vision and plans that connect all improvement activities

- Value stream mapping & analysis is a tool that allows you to see waste, and plan to eliminate it
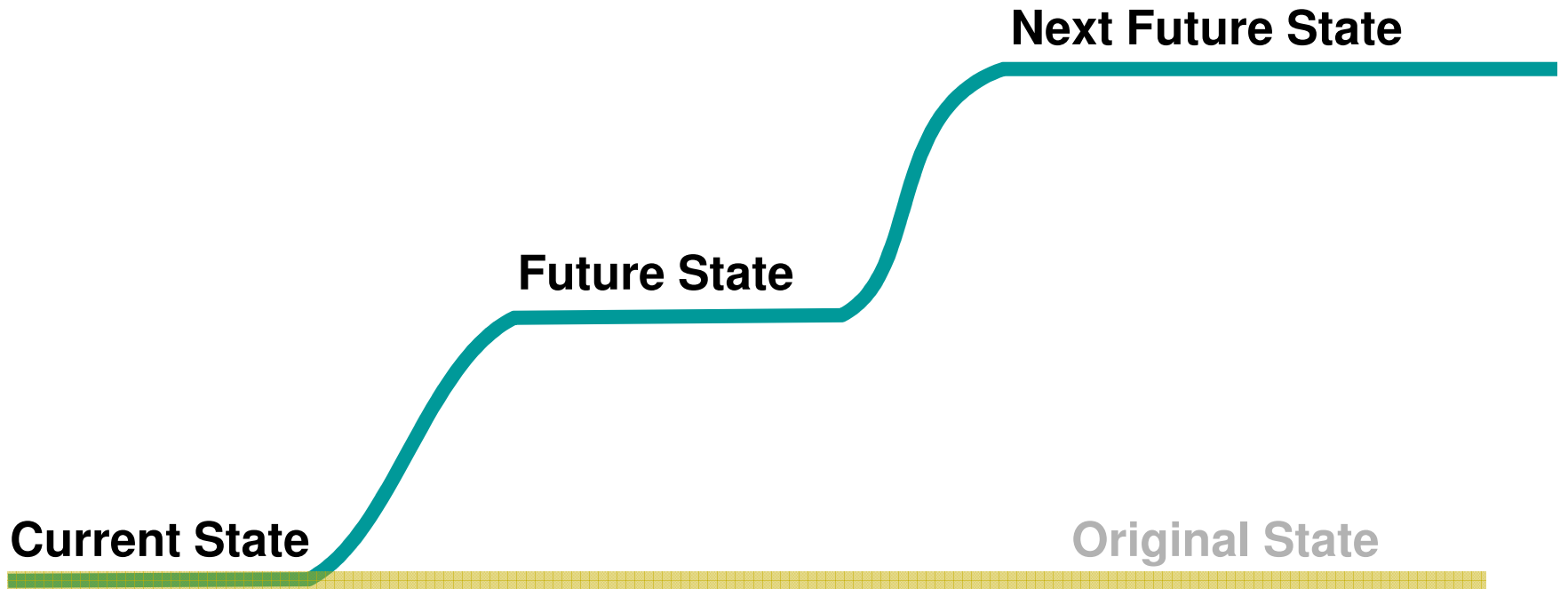
What Is Value?

- A capability provided to a customer
  - of the highest quality,
  - at the right time,
  - at an appropriate price,

  as defined by the customer.
- "Value" is what the customer is buying

What Is Value
Stream Analysis?

## Planning tool to optimize results of eliminating waste

current state VSM   future state VSM

+   +   Lean
Basics   =
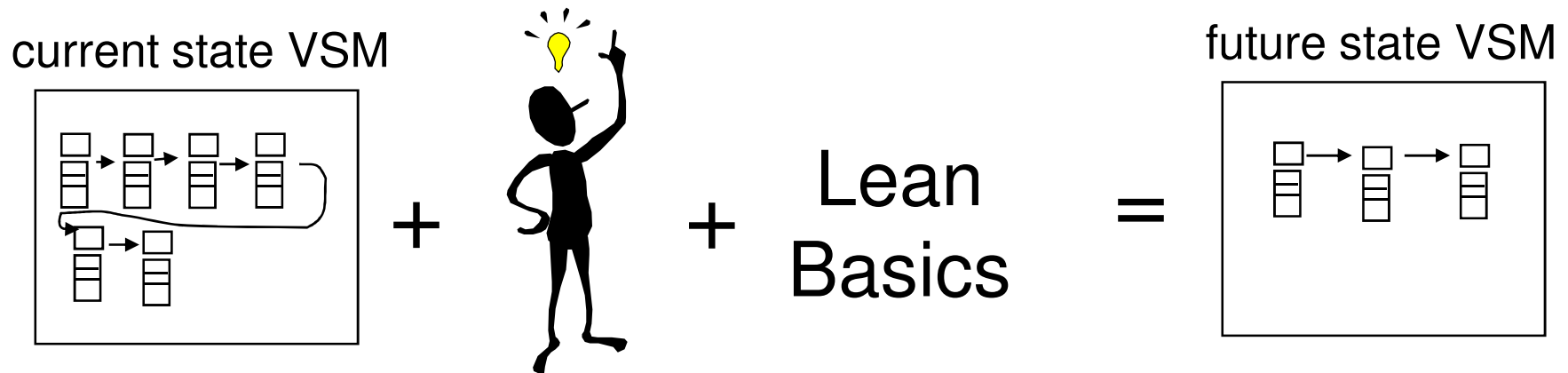
Value Steam Mapping Steps

Next Future State

Future State

Current State

Original State

Apply Five Simple Principles

- Specify value from the standpoint of end customer
- Identify the value stream for each product family
- Make the product flow
- So the customer can pull
- As you manage toward perfection

VALUE

VALUE STREAM

Perfection

PULL

FLOW

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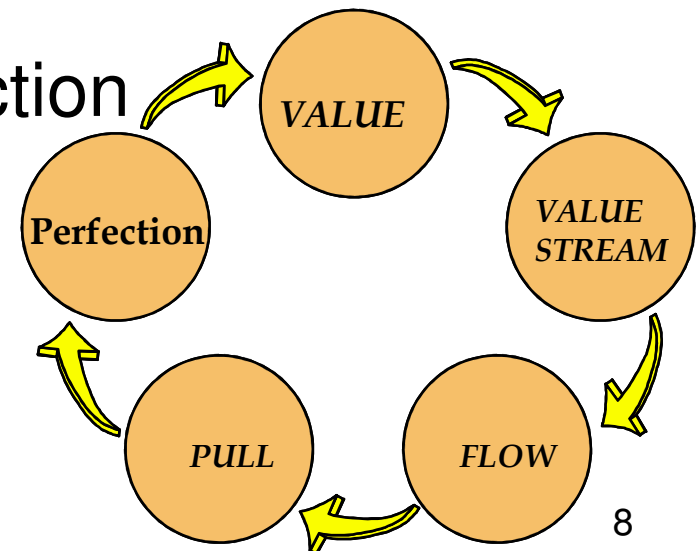
What is the Value that Flows?

Specify value from the standpoint of the end customer

Ask how your current products and processes disappoint your customer's value expectation:

- price?

- quality?

- reliable delivery?

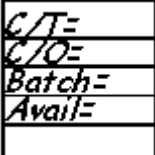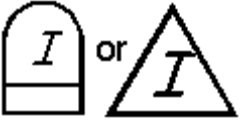- rapid response to changing needs?

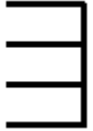- ???

What Flows?

"ITEMS" flow through a value stream
 – In manufacturing, *materials* are the items
 – In design & development, *designs* are the items
 – In service, external *customer needs* are the items
 – In admin., internal *customer needs* are the items

Analysis begins with part of a total value stream,
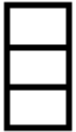That part of the value stream has customers too

Value Stream Mapping Process Symbols

	Customer/Supplier Icon: represents the Supplier when in the upper left, customer when in the upper right, the usual end point for material
	Dedicated Process flow Icon: a process, operation, machine or department, through which material flows. It represents one department with a continuous, internal fixed flow.
	Shared Process Icon: a process, operation, department or workcenter that other value stream families share.
	Data Box Icon: it goes under other icons that have significant information/data required for analyzing and observing the system.
	Workcell Icon: indicates that multiple processes are integrated in a manufacturing workcell.
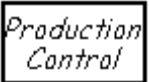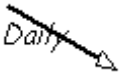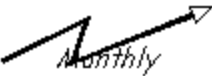
Value Stream Mapping Material Symbols

	Inventory Icons: show inventory between two processes
	Shipments Icon: represents movement of raw materials from suppliers to the Receiving dock/s of the factory. Or, the movement of finished goods from the Shipping dock/s of the factory to the customers
	Push Arrow Icon: represents the "pushing" of material from one process to the next process.
	Supermarket Icon: an inventory "supermarket" (kanban stockpoint).
	Material Pull Icon: supermarkets connect to downstream processes with this "Pull" icon that indicates physical removal.

Value Stream Mapping Material Symbols (Cont.)

MAX=XX □○▽	**FIFO Lane Icon: First-In-First-Out inventory. Use this icon when processes are connected with a FIFO system that limits input.**
	Safety Stock Icon: represents an inventory "hedge" (or safety stock) against problems such as downtime, to protect the system against sudden fluctuations in customer orders or system failures.
	External Shipment Icon: shipments from suppliers or to customers using external transport

Value Stream Mapping Information Symbols

Production Control	**Production Control Icon:** This box represents a central production scheduling or control department, person or operation.
Daily	**Manual Info Icon :** A straight, thin arrow shows general flow of information from memos, reports, or conversation. Frequency and other notes may be relevant.
Monthly	**Electronic Info Icon :** This wiggle arrow represents electronic flow such as electronic data interchange (EDI), the Internet, Intranets, LANs (local area network), WANs (wide area network). You may indicate the frequency of information/data interchange, the type of media used ex. fax, phone, etc. and the type of data exchanged.
P	**Production Kanban Icon :** This icon triggers production of a pre-defined number of parts. It signals a supplying process to provide parts to a downstream process.
W	**Withdrawal Kanban Icon :** This icon represents a card or device that instructs a material handler to transfer parts from a supermarket to the receiving process. The material handler (or operator) goes to the supermarket and withdraws the necessary items.

Value Stream Mapping Information Symbols (Cont.)

	Signal Kanban Icon : used whenever the on-hand inventory levels in the supermarket between two processes drops to a trigger or minimum point. It is also referred as "one-per-batch" kanban.
	Kanban Post Icon : a location where kanban signals reside for pickup. Often used with two-card systems to exchange withdrawal and production kanban.
	Sequenced Pull Icon: represents a pull system that gives instruction to subassembly processes to produce a predetermined type and quantity of product, typically one unit, without using a supermarket.
	Load Leveling Icon : a tool to batch kanbans in order to level the production volume and mix over a period of time.
	MRP/ERP Icon : scheduling using MRP/ERP or other centralized systems.
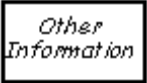
Value Stream Mapping Information Symbols (Cont.)

	Go See Icon : gathering of information through visual means.
	Verbal Information Icon: represents verbal or personal information flow.

Value Stream Mapping General Symbols

	Kaizen Burst Icon: used to highlight improvement needs and plan kaizen workshops at specific processes that are critical to achieving the Future State Map of the value stream.
	Operator Icon : represents an operator. It shows the number of operators required to process the VSM family at a particular workstation.
Other Information	**Other Icon : other useful or potentially useful information.**
VA VA NVA NVA NVA	**Timeline Icon : shows value added times (Cycle Times) and non-value added (wait) times. Use this to calculate Lead Time and Total Cycle Time.**

TAKT TIME

$$\text{Takt Time} = \frac{\text{Effective Working Time per Shift}}{\text{Customer Requirement per Shift}}$$

Synchronizes pace, evenly applying customer demand across the work day.

Takt Time is "Beat Time"? "Rate Time" or "Heart Beat" Lean Production uses Takt Time as the rate or time that a completed product is finished. If you have a Takt Time of two minutes that means every two minutes a complete product, assembly or machine is produced off the line. (http://www.isixsigma.com/dictionary/Takt_Time-455.htm)

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Current State - Manufacturing
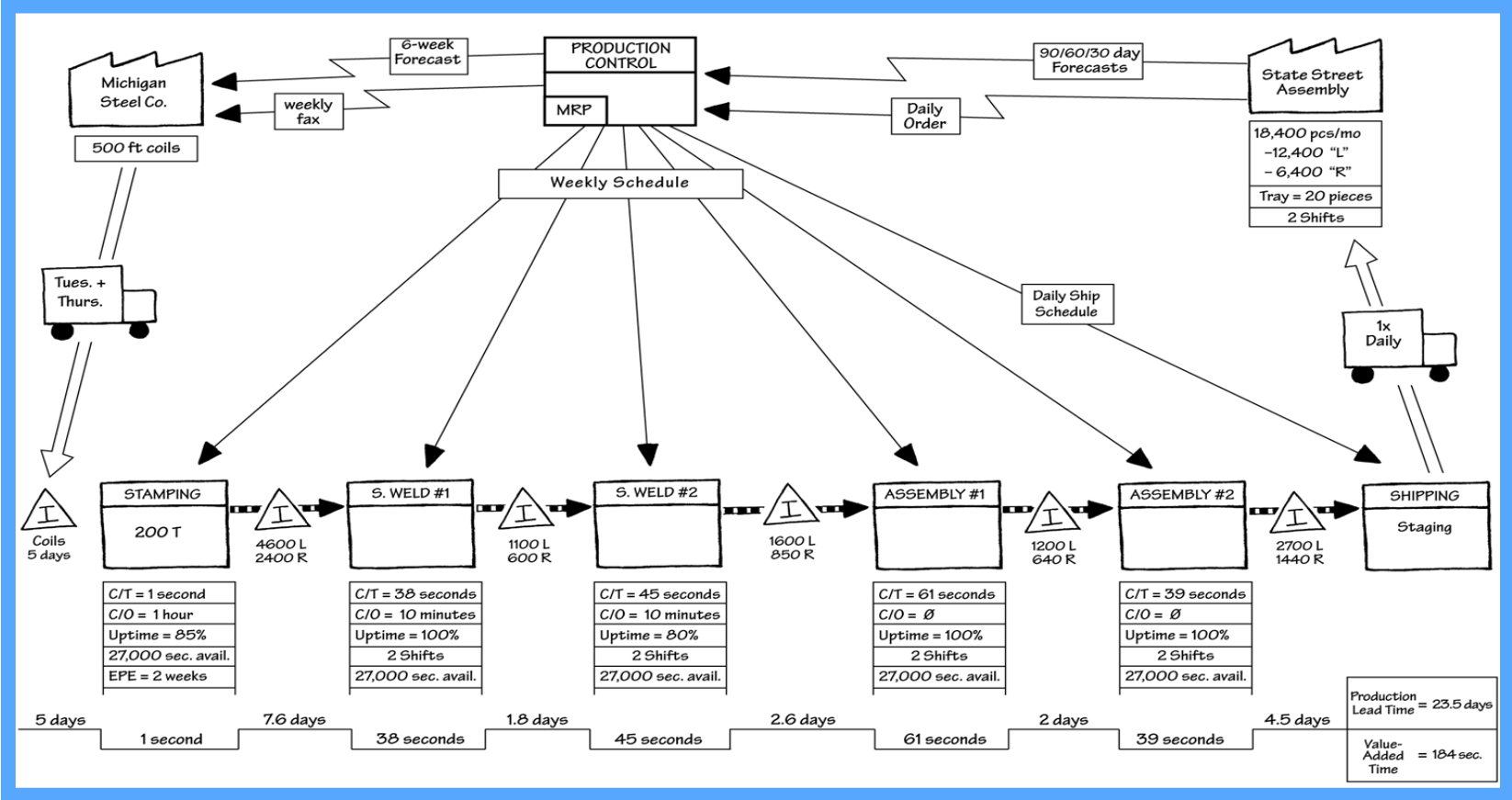
Ideal State - Manufacturing
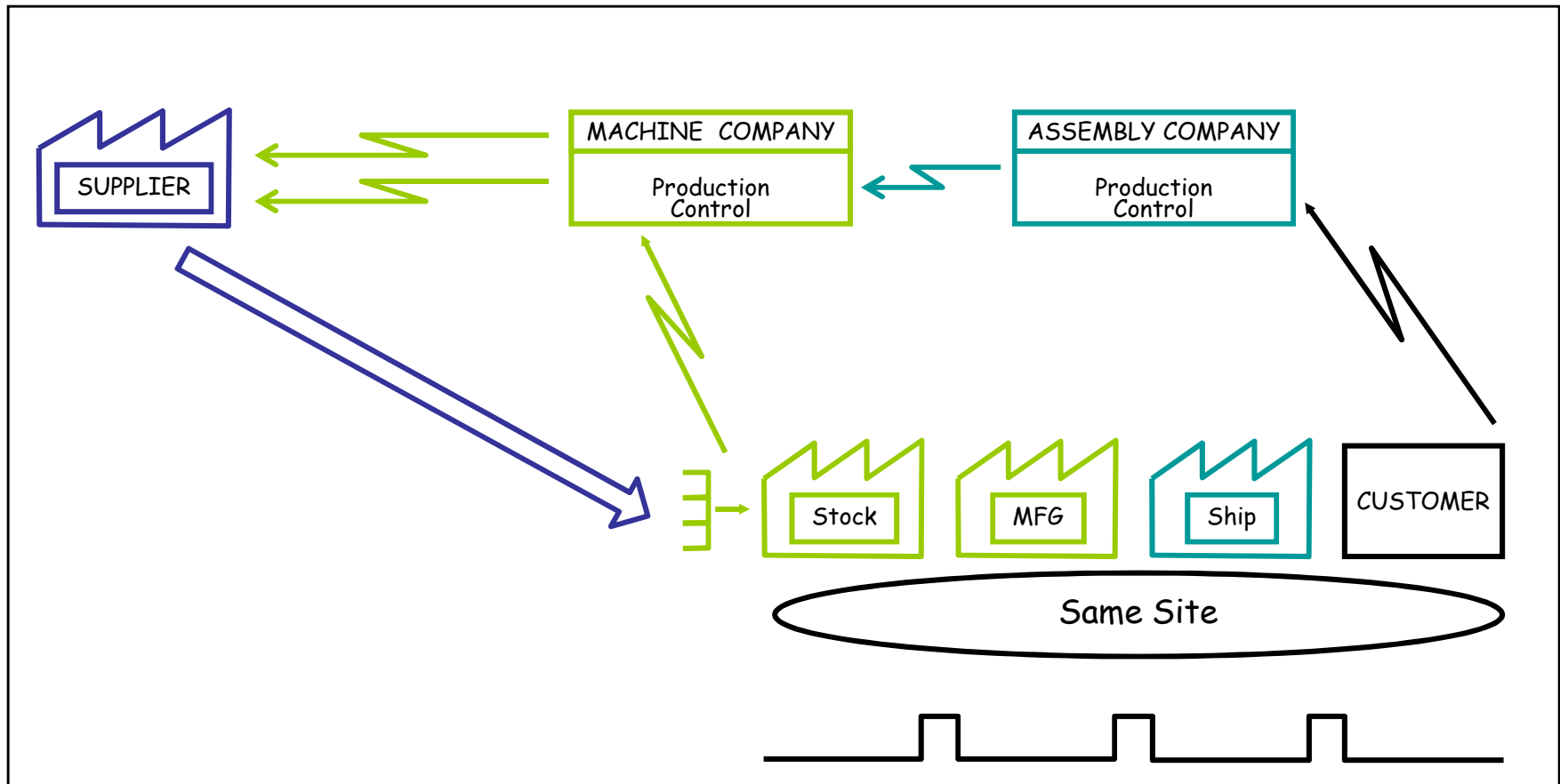
Future State - Manufacturing
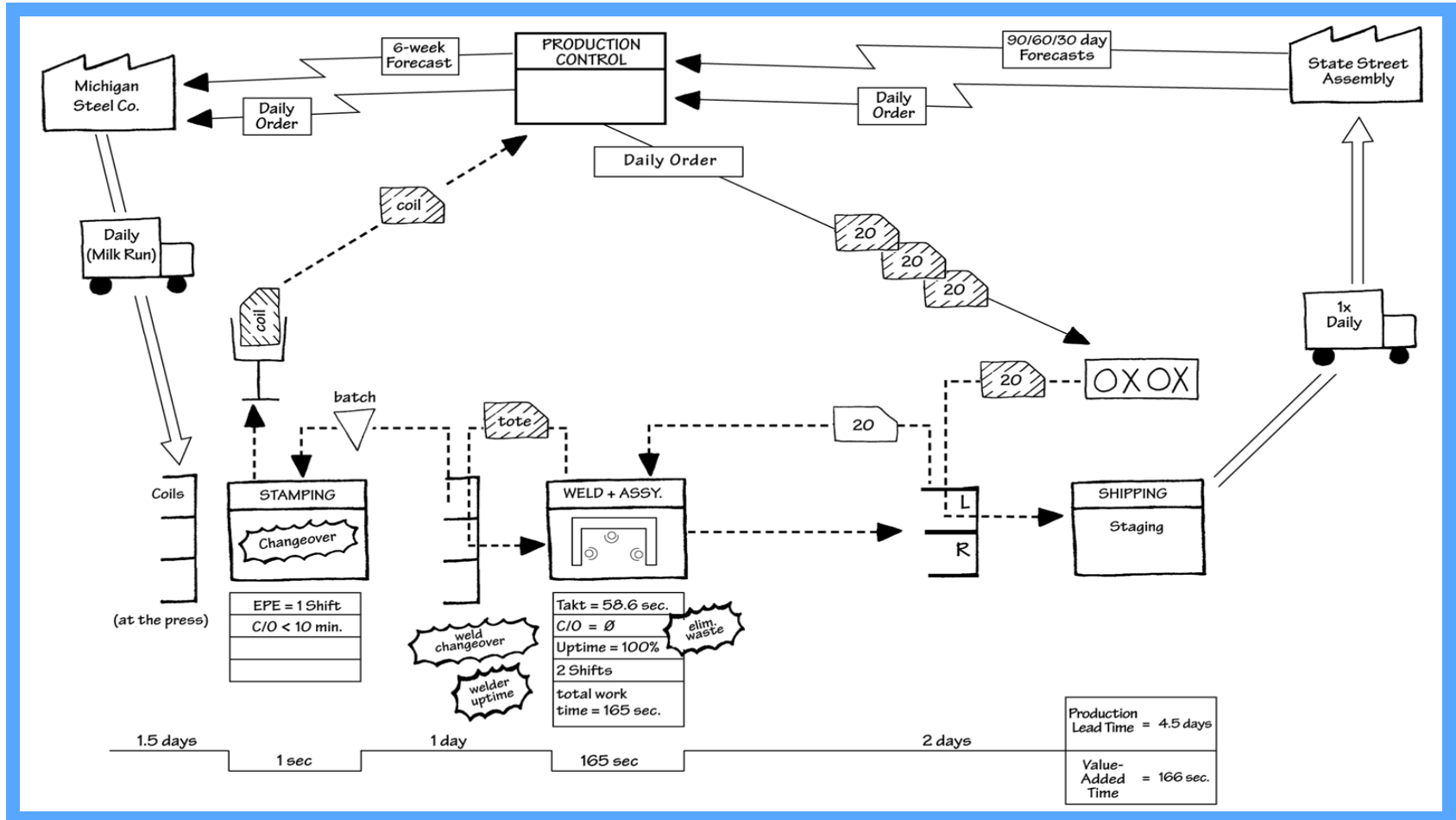
Ideal State - Non-Manufacturing
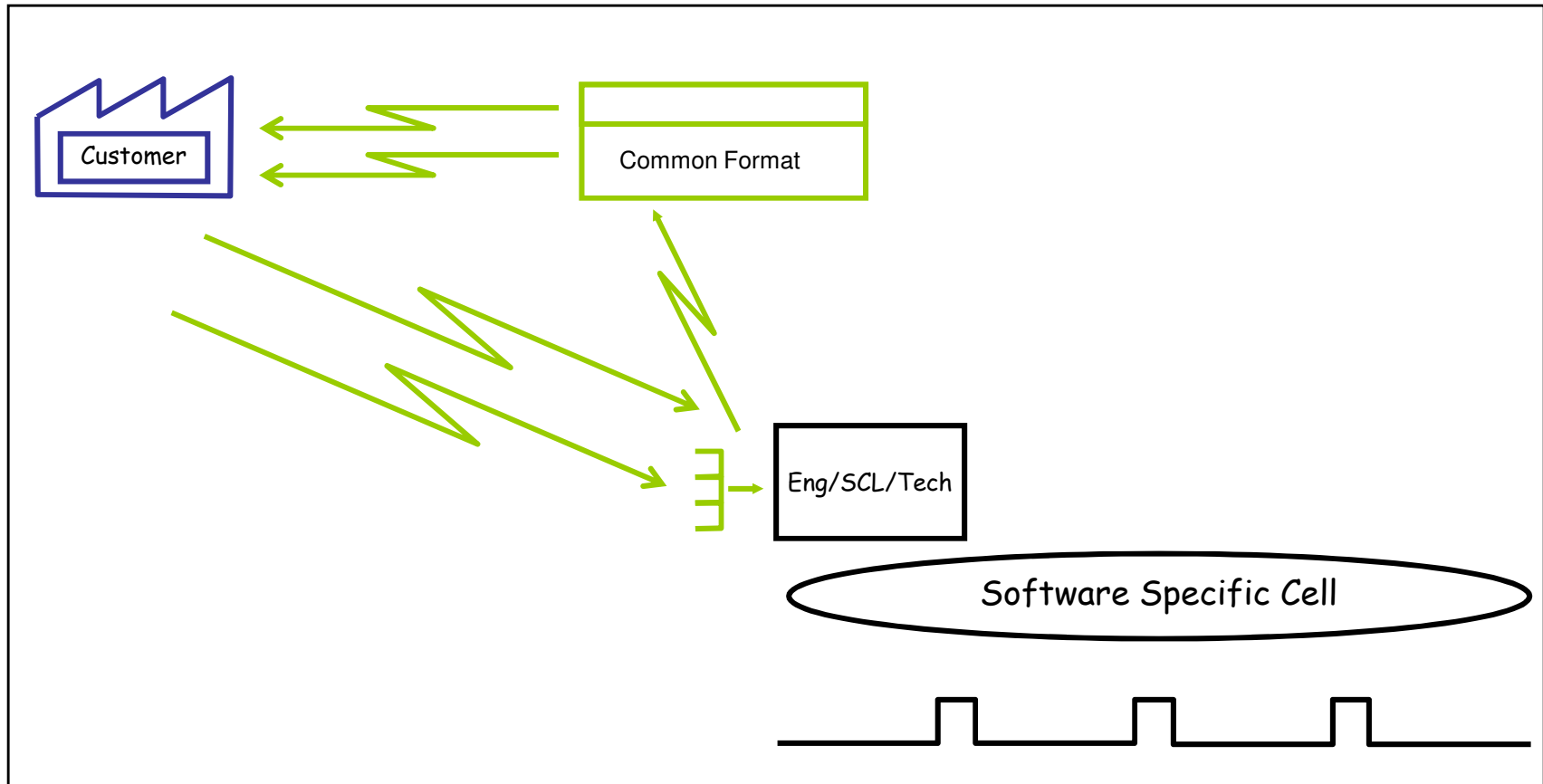
Future State - Non-Manufacturing

Customer

Common Format

Customer

Engineering	CFG MGT/SCL Cell	Tech Pubs
C/T = 45 sec.	C/T = 45 sec.	C/T = 45 sec.
C/O = 30 min.	C/O = 30 min.	C/O = 30 min.
3 Shifts	3 Shifts	3 Shifts
2% Scrap	2% Scrap	2% Scrap

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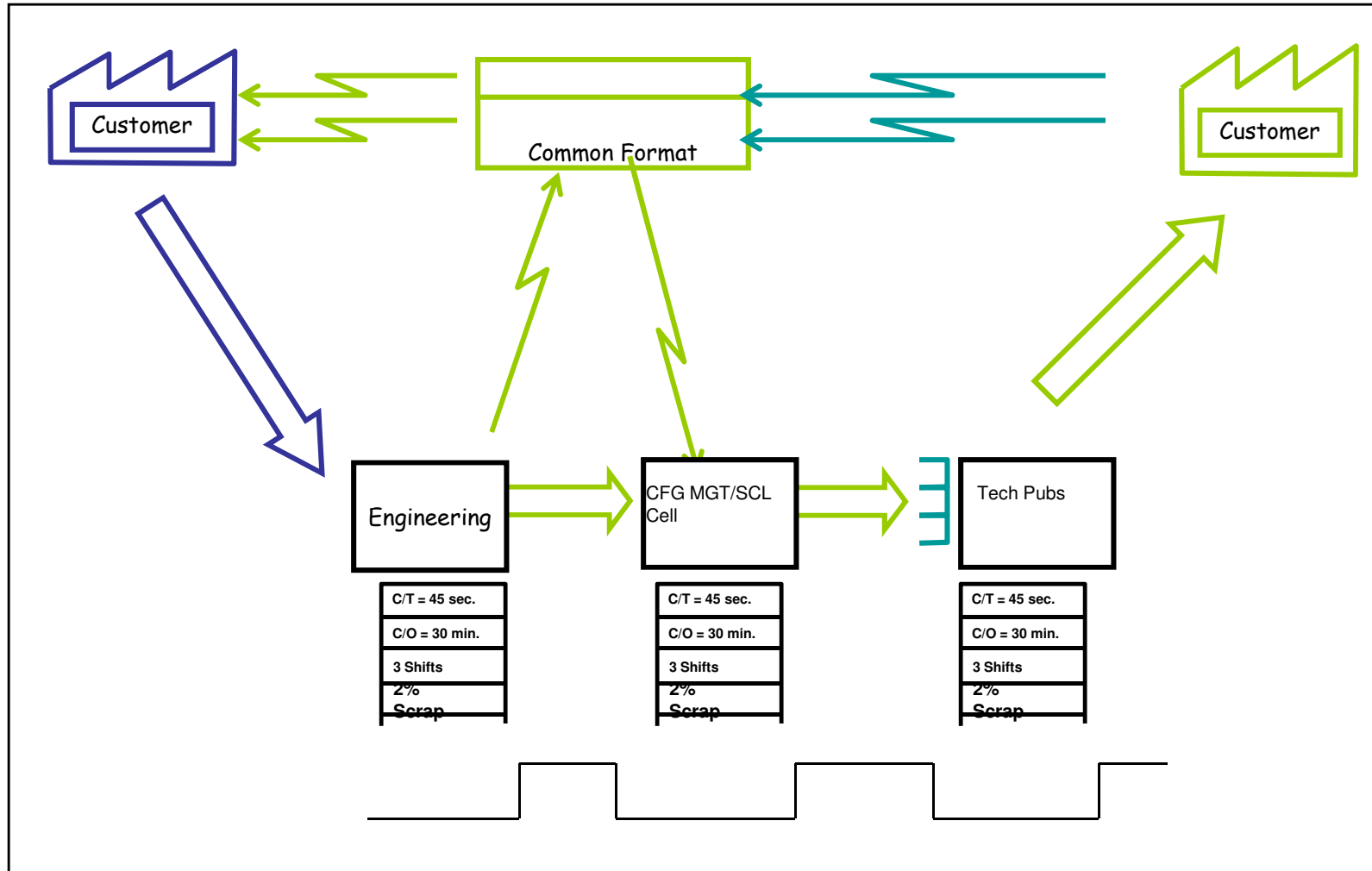
Step by Step Guide: An Example

- *John Smith works for ABC Company in charge of production. ABC company makes widgets and supply these through several retail outlets. Recently problems have emerged.*
  - *a shortage in supply to the retail outlets*
  - *Has high levels and value of inventory in the organization currently*
  - *a complaint letter to the company from a customer stating that as a frequent consumer of the products, he's dissatisfied at the quality of the product and that he often returns faulty widgets to the retail outlets*
- *John's unsure how to answer to these questions but he intends to get to the bottom of it and if possible improve the situation.*

Step by Step Guide: An Example

- Step 1 - Select your sponsor and set expectations
  - appoint someone who is responsible to make decisions, arbitrate solutions, and plan the project.
  - The sponsor usually selects the processes that will be mapped and will usually have a firm grasp of what achievement is being targeted.

Step by Step Guide: An Example

- Step 2 - Select your team
  - You should ensure that each area or stakeholder of the process is represented e.g. Sales, Purchasing, Warehouse etc.

Step by Step Guide: An Example

- Step 3 -Select process to be mapped
  - Value Stream Mapping is suitable for most businesses and can be used in Manufacturing, Logistics, Supply Chain and some Service orientated Organizations.

Step by Step Guide: An Example

- Step 4 - Collect data and produce current state map
  - process times, inventory or materials information, customer (or demand) requirements.
  - the future state maps will be developed using information captured here so it's imperative you have a correct understanding of the business.

Step by Step Guide: An Example

- Step 5 - Critique Current state
  - challenge the current thinking, encourage your team to make suggestions, look for areas of waste.

Step by Step Guide: An Example

- Step 6 - Map Future State
  - compile a future state map based on the current state map and the critiques

Step by Step Guide: An Example

- Step 7 - Create Action Plan and deploy
  - taking the Future State map consider an action plan that could be implemented to change the current process to the future state.

Step by Step Guide: An Example

- Step 8 - Measure benefits
  - check to ensure that the benefits expected have been obtained – review each change made and analyze benefits

Some Mapping Tips (1)

- Always collect current-state information while walking the actual pathways of material and information flows yourself

- Begin with a quick walk along the entire door-to-door value stream

- Begin at the shipping end and work upstream

Some Mapping Tips (2)

- Bring your stopwatch and do not rely on standard times or information that you do not personally obtain

- Map the whole value stream yourself

- Always draw by hand in pencil

From Rother and Shook (2009)

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References

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