Continuous Improvement Toolkit

Value Stream Mapping
Value Stream Mapping

A **high-level** visual representation of a business process
Value Stream Mapping

Involves the value-added and non-value-added work needed to create the **products and services** in response to customer needs.
Value Stream Mapping

Provides a graphical representation of the information and material flows
Value Stream Mapping

Considered an **improvement tool** rather than just a definition of how the process operates or should operate.
Considered as a tool for:

- Continuous Improvement
- Change Management
- Communication
A team may see an opportunity for maximizing the production rate to match the rate of customer demand.
Considered as a tool for:

- Continuous Improvement
- Change Management
- Communication

Useful for drawing a future state map or a blue-sky vision toward achieving the desired change.
Considered as a tool for:

- Continuous Improvement
- Change Management
- Communication

Effectively communicates where to focus the continuous improvement and change efforts
Value Stream Mapping

A dynamic tool as it is continually be updated as the process is improved.
Value Stream Mapping

Often considered as the first and last thing to do during a lean project.
Value Stream Mapping

Used to identify opportunities for reducing waste and improving quality and performance

By making the non-value-added activities easier to identify, and this is the heart of improving any business process
Often associated with **manufacturing**

Can also be applied in product development and **service-related industries** such as healthcare, hospitality and logistics.
Value Stream Mapping

Used when you want improve an end-to-end process in a single site

Start here

- Process Level
- Single Site
- Multiple Sites
- Supply Chain
Value Stream Mapping

Tends to display **more information** than a typical process map or flowchart

However, a value stream map does not track all possible paths that a process can take (does not include **decisions**)

Consider creating a process map before creating a value stream map as this will help better identify the value stream
Value Stream Mapping

Preferred over other process mapping techniques . . .

When you want to find out the **Lean opportunities** that exist in your core processes

When you want to know the various **inventories and delays** exist in your processes

When you want to know the various **business systems** used by your processes

When you want to improve productivity, utilization, and load distribution of staff

When you want to know the effectiveness of your **customer service approach**

When you want to present the **health** of your processes to the top management
Value Stream Mapping

Benefits

Helps to understand the flow of value as perceived by the **customer**.

Provides the opportunity to understand what is happening **today**.

It gives **everyone** a chance to see how their work fits into the big picture.

Provides the opportunity to discuss and plan the needed **improvements**.
## Value Stream Mapping

### Benefits

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Icons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helps making the process as close to <strong>lean</strong> as possible.</td>
<td>LEAN</td>
</tr>
<tr>
<td>Enables to see the big picture <strong>from</strong> beginning to end.</td>
<td>📍</td>
</tr>
<tr>
<td>Helps identify and eliminate <strong>waste</strong> within the value stream.</td>
<td>📊</td>
</tr>
<tr>
<td>Helps establishing a <strong>future state</strong> vision.</td>
<td>⏰</td>
</tr>
</tbody>
</table>
Value Stream Mapping

Benefits

Enables to see where problems lie within processes . . .

- Non-value-added activities
- Problems and inconsistencies
- Delays
- Bottlenecks
- Excessive inventory levels
- Other forms of waste
Value Stream Mapping

Other Benefits

- Provides important **descriptive information** for the operation
- Help understanding and improving **workplace organization**
- Enable to see how improvements in one area will impact on **other areas**
- Provides a **framework** for conversations and problem-solving
- Provides a common **visual language** to understand complex processes
- Demonstrates the **interaction** between material flow and information flow
- Provides **direction** for streamlining, transformation and change
Value Stream Mapping

Value Stream

The set of activities required to convert raw materials to finished products in the hands of the customer.

SUPPLIERS

CUSTOMERS

The product here may indicate any part, service or the combination of both.
The set of all the specific actions required to bring a specific product through the three critical business management tasks:

1- Problem solving
2- Information management
3- Physical transformation

*Womack and Jones*

“The steps required to create a product or complete a service”

Examining the value stream helps to **identify waste and non-value-added activities**
Value Stream Mapping

Value Stream

A value stream map is a **flow layout** of the material and information flows

- **Material flow**, where products flow through the stream
- Manual and electronic **information flow** along with the material flow
Value Stream Mapping

Material Flow

Includes processing, handling, transport and storage

Material flows involve **physical product flow** from suppliers to consumers, as well as the returns of products, rework, recycling and disposal
Inventory

It is also important to look at the amount of stored raw materials, work in process (WIP), and finished products.

- Raw Materials
- Work in Process
- Finished Goods
Information Flow

Important to the effective control of the material flow

Information is important to ensure that customers and suppliers will provide and receive information before any physical product or material is shipped or received.
Value Stream Mapping

Information Flow – Information Types

**Manual** – information that is passed on manually or verbally

**Electronic** – information that is passed on via telephone, fax, email, etc.
Value Stream Mapping

Information flow may include . . .

- Demand forecasts
- The transmission of orders
- Schedules, instructions, approvals and reports
- Financial related flows
- Verbal discussions and communication
Value Stream Mapping

VSM Manufacturing Example
Spans from order taking to product delivery
Non-Manufacturing Example – Equipment Installation

Value Stream Mapping

Supplier

Customer

Forecasting

Email request

Notification

Schedule installation

Customer service

Pick up parts

Install equipment

Functional test
Value Stream Mapping

Which Product to Select?

No need to map the flow of every product, but the production of a single product or single product family.

Consider a product which has a high business impact.

Consider long lead time and high-volume products or services.
Value Stream Mapping

A Product Family Matrix may help!

<table>
<thead>
<tr>
<th>Product</th>
<th>Press</th>
<th>Shape</th>
<th>Bend</th>
<th>Paint</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>B</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>C</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Generate a single flow diagram that is suitable for all product families
Value Stream Mapping

Value Stream Mapping Process

1. Select the Value Stream

2. Draw Current State Map

3. Draw Future State Map

4. Develop and Implement Improvements
Value Stream Mapping

Value Stream Mapping Process – Current State Map

Value stream mapping begins by defining the **current state** as it is today.

This allows to identify waste and areas where improvement can be made.

Also called **value stream analysis** (VSA)
Value Stream Mapping

Develops an understanding of how the value stream operates today

Helps identify the waste elements and improvement areas

Focus on understanding the existing flow of one product or service at once
Value Stream Mapping

Consider the eight types of waste:

- Overproducing
- Transport
- Inventory
- Waiting
- Defects
- Over Processing
- Motion
- Skills
Value Stream Mapping

Value Stream Mapping Process – Future State Map

Once the current state is mapped, and after studying the flow of materials and information and identifying the waste, it is time to create a future state map of how the process should be.

Also called value stream design or VSD
Value Stream Mapping

Value Stream Mapping Process – Future State Map

The ideal state or **blueprint** that you want to achieve toward implementing a lean system

Should be based on **lean principles** such as flow, pull and perfection to create a more streamlined production flow
It is important to define what is meant by ‘future’ before beginning to develop the future state.
Value Stream Mapping

Value Stream Mapping Process – Implementation Plan

From current to future state, there are many gaps and opportunities.

An implementation plan should be developed and implemented to get to the future state.

- Select the Value Stream
- Draw the Current State
- Draw the Future State
- Plan & Implement Improvements
Value Stream Mapping

Value Stream Mapping Process – Implementation Plan

Remember that this is a **project** that needs to be owned, tracked and monitored throughout its life cycle

April 28
When the future state becomes a **reality**, it becomes the new current state

The process will start all over again, and this is the essence of **continuous improvement**
Value Stream Mapping

Value Stream Mapping Process – Hints

A current state map without a future-state vision is waste

A future state map without an action plan to achieve it is waste

Avoid focusing on improvement opportunities with little impact

Information is better to be collected from the shop floor
Value Stream Mapping Symbols

Value stream mapping uses a set of symbols to denote the various details.

The type of symbols that are used usually depends on the industry and the type of work.
Value Stream Mapping

The list is by no means complete!

You may design your own symbols to express your details

New symbols should be easy to design

They should be understandable by everyone working or visiting the area
Value Stream Mapping

**Process box**

- **COATING**

Covers one area of continuous flow, where materials flow without being stored, queued or delayed.

Used when a part is intentionally changed in any of its characteristics, assembled or disassembled, or arranged for another operation, transportation, inspection, or storage.

Also used to represent a person (or department) doing work, or when information is given or received.
Value Stream Mapping

**COATING**
- **C/T = 2.3 seconds**
- **C/O = 52 minutes**
- **Uptime = 85%**
- **NAT = 25,200 seconds**
- **Scrap rate = 3.1%**

Optionally used to list key information related to processes.

Can be placed under other symbols (e.g. transportation, inventory or key customers or suppliers) to list key information.
Value Stream Mapping

For example, analyzing which workstation has the maximum number of operators or has the maximum change-over time.

Helps later when creating the timeline and the summary box, and when comparing between the different workstations or processes.
### Value Stream Mapping

<table>
<thead>
<tr>
<th>Information related to processes depend on the needs and may include:</th>
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<tbody>
<tr>
<td>Cycle times (C/T)</td>
</tr>
<tr>
<td>Defect or scrap rates</td>
</tr>
<tr>
<td>Processing times</td>
</tr>
<tr>
<td>Batch sizes</td>
</tr>
<tr>
<td>Rework rates</td>
</tr>
</tbody>
</table>

- **C/T:**
  - Cycle times
- **C/O:**
  - Changeover times
- **Uptime:**
  - Machine uptime rates
- **NAT:**
  - Net available working times

**Push**

**Withdrawal**

**Data box**

**Process box**
Value Stream Mapping

- **Process box**
- **Data box**
- **Information flow**
- **Material flow**
- **Push**
- **Withdrawal**

**C/T =**
**C/O =**
**Uptime =**
**NAT =**

**Manual information flow**
**Electronic information flow**

Generally used to represent flow of information.

Can be accompanied with text or other icons to indicate the type of information, the frequency of information interchange, and the type of media used (telephones, emails, Intranets, LANs, etc.).

Some lean practitioners simply use the straight arrow for all types of information flow.
Value Stream Mapping

Material flow

Material flow or shipping

- Represents the transfer or movement of materials from one process to the next.
- Also represents the movement of raw materials from suppliers to the receiving areas (accompanied with the shipping frequency).
- Also represents the movement of finished goods from the shipping areas to the customers (accompanied with the shipping frequency).

Push

Withdrawal
Value Stream Mapping

- **C/T =**
- **C/O =**
- **Uptime =**
- **NAT =**

**Data box**

**Process box**

**Information flow**

**Material flow**

**Push**

**Withdrawal**

---

**A push arrow**

Pushing the materials from one process to the next.

Represents a material flow that is not controlled by a pull system.
Value Stream Mapping

- **Material flow**
  - Material withdrawal or physical pull

- **Information flow**

- **Process box**
- **Data box**
- **Push**

- **Withdrawal**

**Used when the material is pulled from the supplying process to the supplied process.**
Value Stream Mapping

External body

Transport

Worker

Inventory

Safety stock

FIFO sequence

Represents an external body to the organization, and mainly indicates the key suppliers and customers along the value chain.

Firm name
(supplier or customer)

Often accompanied with a data box underneath which covers the characteristics of that supplier or customer.
Value Stream Mapping

External body
Transport
Worker
Inventory
Safety stock
FIFO

Information related to customers may include:
- number of customers,
- demand rate (items/day),
- packaging size requirement,
- actual and required lead times,
- error rates,
- customer shift pattern,
- product mix, etc.

Usually there is only one customer shown, but you may have more than one.

Customer Name
- 300 items/day
- 87 type A, 120 type B
- Pallet = 30 items
- 3 shifts, 24/7 operation
Information related to suppliers may include; number of suppliers, demand rate (items/day), packaging size requirement, actual and required lead times, error rates, supplier shift pattern, the different types of materials, etc.

Usually there is only one supplier shown, but you may have more than one.
Value Stream Mapping

- **External body**
- **Transport**
- **Worker**
- **Inventory**
- **Safety stock**
- **FIFO sequence**

**Transport or Shipment**

Represents how raw materials are brought in and how finished goods are sent out.

Also represents the transport of raw materials, WIP, or products within the facility by an operator.

**Date related to transportation may include;**
- distance traveled,
- transportation time,
- transportation frequency,
- number of product types, etc.
Value Stream Mapping

Transportation can be of three types:
1- External (e.g. trucking).
2- Internal (e.g. forklifts).
3- Conveying between processes.
Value Stream Mapping

- External body
- Transport
- Worker
- Inventory
- Safety stock
- FIFO sequence

3

Usually placed in a process box to represent the number of workers deployed at a particular workstation.
Represents the storage locations for raw materials, work-in-process (WIP), and finished products throughout the value stream.

Date related to inventory may include; inventory type, amount of inventory, queue or delay time, number of product types in the inventory, etc.
Value Stream Mapping

You can write a number below the triangle to indicate the approximate amount of inventory observed, or the maximum capacity.

You may indicate that the inventory is uncontrolled or has no fixed upper limit by leaving the triangle without a number.
Value Stream Mapping

- **External body**: Represents external bodies involved in the process.
- **Transport**: Represents transportation of materials or products.
- **Worker**: Represents worker activity in the process.
- **Inventory**: Represents inventory of materials or products.
- **Safety stock**: Represents safety stock for inventory.
- **FIFO sequence**: Represents First-In-First-Out sequence.

### Symbols Explained

- **Q (Quality inspection)**: Occurs when a product is examined against pre-defined quality standards to determine whether defective products are being produced.
- **D (Delay)**: Represents unplanned accumulation of materials or products without a prior plan. Also represents a delay in the process, such as waiting for approval.

These are not standard symbols and rarely used.

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Value Stream Mapping

Pieces

Represents a safety stock against problems such as unplanned breakdowns, to protect the production system against failure or sudden fluctuations in customer demands.
Value Stream Mapping

FIFO

First In First Out lane is used to show where parts are stored or transferred to the next process in a FIFO sequence (queue).

You may write either the maximum capacity or the current capacity above or below the FIFO lane.

External body
Transport
Worker
Inventory
Safety stock

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Value Stream Mapping

Document or report

Represents a document, form or report that is generated throughout the value stream. More than one report can be represented through the use of multiple symbols behind each other.
Value Stream Mapping

- **Business System**: Represents a centralized system (ERP or MRP).
- **Go see**: Note that value stream mapping considers not only the process, but also the management systems and information systems that support the process.
- **Kaizen burst**: Note that a production control or scheduling system can also be represented using a plain box.
Value Stream Mapping

Visually checking material and information flows to ensure they meet quality standards and quantity requirements.

For example, a supervisor may visually check the material flow to seek for discrepancies, visually inspect a sample product as part of his routine job, or visually check the amount of inventory to decides what to produce next.
Value Stream Mapping

Kaizen or lightening Burst

Used to indicate issues and problems throughout the value stream.

Kaizen bursts help launch appropriate kaizen events for continuous improvement.
Value Stream Mapping

Used to indicate a solution, suggestion, or improvement idea.

The team can highlight improvement opportunities that are critical to achieve the future state of the value stream.
Value Stream Mapping

**Signal Kanban**

Supermarket

Kanban post

Production Kanban

Withdrawal Kanban

Load leveling

**Improvement idea**

Used when the on-hand inventory levels in the supermarket between two processes drops to a minimum or the trigger point.
**Value Stream Mapping**

- **Signal Kanban**
- **Supermarket**
- **Kanban post**
- **Production Kanban**
- **Withdrawal Kanban**
- **Load leveling**

### Supermarket

Represents an inventory supermarket or the end point of a Kanban loop.

For a supermarket to be complete, an information flow should come out of it and bring a Kanban back to one of the preceding processes or transports.
Value Stream Mapping

**Kanban post**

A location where Kanban signals reside for pickup.

Often used with two-card systems to exchange withdrawal and production Kanban.
Value Stream Mapping

**Production Kanban**

Used to signal the supplying process to trigger production and provide a pre-defined number of parts to the next process.

Usually drawn on top of the information flow going back from a supermarket to a preceding process or transport.
Value Stream Mapping

A note card or device that instructs the material handler or operator to go to the supermarket and withdraw parts needed at the receiving process.
Value Stream Mapping

Signal Kanban  Supermarket  Kanban post  Production Kanban  Withdrawal Kanban  Load leveling

Part of the information flow in a Kanban loop. It is a tool to batch Kanbans in order to level the production volume and production mix over a period.

Load leveling
The value stream timeline is the sum of time spent at all stages represented in ‘hills’ and ‘valleys’

The hills represent the waiting non-value-added time whereas the valleys represent the processing value-added time.

The value stream timeline is used to facilitate the calculation of the value-added ratio (VAR) or the process cycle efficiency (PCE).

Remember that not all processing time is value-added.
The results are often summarized at the right of the timeline in a summary box.

Many organizations use the Value-Added Ratio (VAR) metric to measure the performance of their end-to-end process.

\[
VAR = \frac{\text{Total Value Add Time (Processing Time)}}{\text{Total Lead Time}}
\]

Other metrics can be added to the value stream summary as required.
Value Stream Mapping

Zone the Map

Title & date

Information flow
External customers & suppliers
Secondary processes

Material flow
Primary processes
Delays & inventory between processes

Timeline & value stream summary

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Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Establish the team and include people working in the process

Clearly explain the purpose for creating the value stream map
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Identify and agree on the **product family** and the value stream that needs to be mapped

Discuss with your team how are you going to map the process
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Physically **walk the flow** starting from the customer and working backwards

Capture all relevant data and performance information as you walk. Note down any issues or concerns
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Walk the information flow and collect examples of relevant records, instructions, checklists, etc.

Always record what you see not what you are told is normally there
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Use a flipchart or whiteboard to allow the team to draw the current state

Start with the title, date and state (current or future)

Consider zoning the map

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Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Map the material flow including processes, inventory, delays and transportation

Identify the main processes and complete the data boxes
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Map the information flow and the secondary processes

Add any other information you feel is relevant to the map (current schedule, amount of inventory, etc.)
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Add the value stream timeline and the value stream summary

Calculate value stream summary metrics such as processing time, lead time and value-added ratio
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Look for the non-value-added activities, delays and other form of waste

Record on the map the different types of waste, delays, observations, suggestions, ideas, etc.
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Gather the team again to visualize the ideal state and develop the future state map

Start only when the current state map is understood and agreed
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Look for . . .

- Steps that can be simplified or eliminated
- Build-ups of inventory
- Stock shortages
- Long travel distances
- Bottlenecks
- High scrap and rework rates
- Too few or too many staff in key areas
- Lengthy checking or approval periods
- 5S and safety issues
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Optimize and organize processes . . .

- Elimination
- Combination
- Change sequence
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Look for . . .

- Significant variations in cycle times or demand levels
- Long value stream cycle times
- Poor value stream ratios
- Different time basis compared with key customers
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Brainstorm ways to eliminate the waste, ask questions like?

- Are things done in the right sequence?
- Does information arrive on time?
- Can any paperwork be eliminated? Is automation possible?
- Are existing systems used in optimum way?
- Is information available, reliable and up-to-date?
- Is information really used in decision making?
- Are there any quick wins possible?
Value Stream Mapping

How to Conduct a Value Stream Mapping Exercise

Plan and implement actions to achieve the future state

Assign responsibilities and identify milestones and resources

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Value Stream Mapping

Guidelines for Developing the Future State Map

- Develop continuous flow wherever possible
- Use pull and Kanban systems where continuous flow is not possible
- Produce to Takt time
- Scheduling based on the pacemaker process
- Level the production load on the pacemaker process (Level the production volume)
- Distribute the production of different products evenly (level the production rate)
- Optimize the number of people
- Improve uptime
- Reduce inventory
Value Stream Mapping

Example – Start with customer requirements

Cans customer
- 3 shifts x 8 hrs
- 16 trailers / day
- Each 20 pallets
Value Stream Mapping

Example – Draw the material flow

<table>
<thead>
<tr>
<th>Process</th>
<th>Prod. Rate</th>
<th>P/T (sec)</th>
<th>C/O (min)</th>
<th>Uptime (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing</td>
<td>2450</td>
<td>30</td>
<td>N/A</td>
<td>98%</td>
</tr>
<tr>
<td>Wall ironing</td>
<td>2800</td>
<td>17</td>
<td>30</td>
<td>83%</td>
</tr>
<tr>
<td>Rinsing</td>
<td>2400</td>
<td>376</td>
<td>60</td>
<td>94%</td>
</tr>
<tr>
<td>Painting</td>
<td>2200</td>
<td>179</td>
<td>150</td>
<td>80%</td>
</tr>
<tr>
<td>Shaping</td>
<td>2400</td>
<td>45</td>
<td>200</td>
<td>42%</td>
</tr>
<tr>
<td>Packaging</td>
<td>2450</td>
<td>397</td>
<td>45</td>
<td>81%</td>
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FIFO

Cans customer
- 3 shifts x 8 hrs
- 16 trailers / day
- Each 20 pallets
Value Stream Mapping

Example – Add the suppliers

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Steel company
5 shipments/month
- Each 20 containers
- Each 2 coils

Coil supplier

Cans customer
3 shifts X 8 hrs
16 trailers / day
- Each 20 pallets

5 shipments/month
- Each 20 containers
- Each 2 coils
Value Stream Mapping

Example – Add the information flow

- Weekly schedule - daily communication (320 pallets needed every day)
- 3, 6 & 12 months demand forecast
- Weekly order 2240 pallets
- Daily ship schedule
- 3 shifts x 8 hrs
- 16 trailers / day - Each 20 pallets

**Coil supplier**
- 5 shipments/month - Each 20 containers - Each 2 coils

**Cans customer**
- 3 shifts x 8 hrs
- 16 trailers / day - Each 20 pallets

**Drawing**
- Prod. Rate = 2450
- P/T = 30 sec
- C/O = N/A
- Uptime = 98%

**Wall ironing**
- Prod. Rate = 2800
- P/T = 17 sec
- C/O = 30 min
- Uptime = 83%

**Rinsing**
- Prod. Rate = 2400
- P/T = 376 sec
- C/O = 60 min
- Uptime = 94%

**Painting**
- Prod. Rate = 2200
- P/T = 179 sec
- C/O = 150 min
- Uptime = 80%

**Shaping**
- Prod. Rate = 2400
- P/T = 45 sec
- C/O = 200 min
- Uptime = 42%

**Packaging**
- Prod. Rate = 2450
- P/T = 397 sec
- C/O = 45 min
- Uptime = 81%

**Steel company**
- 5 shipments/month
- Each 20 containers

**Coil supplier**
- 5 shipments/month - Each 20 containers - Each 2 coils

**FIFO**
Value Stream Mapping

Example – Add VSM timeline and VSM calculations

- Weekly schedule - daily communication (320 pallets needed every day)

- 3, 6 & 12 months demand forecast

- Weekly order 2240 pallets

- Monthly order 100 coils

- Quarterly forecast

- Production control

- Cans customer
  - 3 shifts X 8 hrs
  - 16 trailers / day - Each 20 pallets

- Coil supplier
  - 5 shipments/month - Each 20 containers - Each 2 coils

- Wall ironing
  - Prod. Rate = 2800
  - P/T = 17 sec
  - C/O = 30 min
  - Uptime = 83%

- Rinsing
  - Prod. Rate = 2400
  - P/T = 376 sec
  - C/O = 60 min
  - Uptime = 94%

- Painting
  - Prod. Rate = 2200
  - P/T = 179 sec
  - C/O = 150 min
  - Uptime = 80%

- Shaping
  - Prod. Rate = 2400
  - P/T = 45 sec
  - C/O = 200 min
  - Uptime = 42%

- Packaging
  - Prod. Rate = 2450
  - P/T = 397 sec
  - C/O = 45 min
  - Uptime = 81%

- Drawing
  - Prod. Rate = 2450
  - P/T = 30 sec
  - C/O = N/A
  - Uptime = 98%

- FIFO
  - 75 days
  - 30 sec
  - 0.1 days
  - 17 sec
  - 0.1 days
  - 376 sec
  - 0.4 days
  - 179 sec
  - 0.2 days
  - 45 sec
  - 0.1 days
  - 397 seconds
  - 12 days

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Value Stream Mapping

Example – Identify issues & opportunities for improvement

- **Drawing**
  - Prod. Rate: 2450
  - P/T: 30 sec
  - C/O: N/A
  - Uptime: 98%

- **Wall ironing**
  - Prod. Rate: 2800
  - P/T: 17 sec
  - C/O: 30 min
  - Uptime: 83%

- **Rinsing**
  - Prod. Rate: 2400
  - P/T: 376 sec
  - C/O: 60 min
  - Uptime: 94%

- **Painting**
  - Prod. Rate: 2200
  - P/T: 179 sec
  - C/O: 150 min
  - Uptime: 80%

- **Shaping**
  - Prod. Rate: 2400
  - P/T: 45 sec
  - C/O: 200 min
  - Uptime: 42%

- **Packaging**
  - Prod. Rate: 2450
  - P/T: 397 sec
  - C/O: 45 min
  - Uptime: 81%

- **Coil supplier**
  - 5 shipments/month
    - Each 20 containers
    - Each 2 coils

- **Cans customer**
  - 3 shifts X 8 hrs
  - 16 trailers / day
    - Each 20 pallets

- **Weekly schedule**
  - (320 pallets needed every day)

- **Quarterly forecast**

- **Monthly order**
  - 100 coils

- **Monthly order**
  - 2240 pallets

- **Daily ship schedule**

- **Cans customer**
  - 3, 6 & 12 months demand forecast

- **Daily communication**

- **SMED**

- **5S**

- **FIFO**

- **Spoilage**

- **Uptime**

- **Wall ironing**
  - Prod. Rate: 2800
  - P/T: 17 sec
  - C/O: 30 min
  - Uptime: 83%

- **Rinsing**
  - Prod. Rate: 2400
  - P/T: 376 sec
  - C/O: 60 min
  - Uptime: 94%

- **Painting**
  - Prod. Rate: 2200
  - P/T: 179 sec
  - C/O: 150 min
  - Uptime: 80%

- **Shaping**
  - Prod. Rate: 2400
  - P/T: 45 sec
  - C/O: 200 min
  - Uptime: 42%

- **Packaging**
  - Prod. Rate: 2450
  - P/T: 397 sec
  - C/O: 45 min
  - Uptime: 81%
Value Stream Mapping

Further Information

Like many other lean tools, developing a value stream map for the sake of doing the map will not help much. You should first have a problem that needs to be solved.
Value Stream Mapping

Further Information

Try to be specific and include only what you think is relevant for your situation

For example, if inventories are not part of the problem, it would be a waste to count them.
Value Stream Mapping

Further Information

Problems that are not related to the material or information flow are unlikely to benefit from value stream maps (e.g. administrative areas and indirect areas and support services)
Value Stream Mapping

Further Information

There are many **software applications** and **online services** that allow the creation of value stream maps.

For example, you can generate value stream maps in **Minitab Workspace**.