VSM INTRODUCTION

1

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WHAT MANY COMPANIES DO?

Chose tools of random form and apply them in isolated points of the value stream.

Then, what next?

2

2

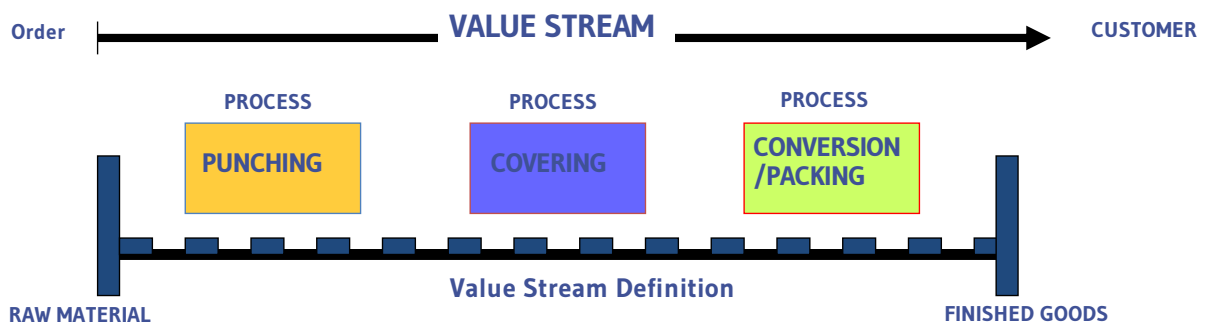1

THE VALUE STREAM

All the product value added or non-value added stages since the moment of order and raw material until it transform itself in finished goods and it is delivered to the customer.

Order — **VALUE STREAM** → CUSTOMER

PROCESS	PROCESS	PROCESS
PUNCHING	**COVERING**	**CONVERSION /PACKING**

Value Stream Definition

RAW MATERIAL — FINISHED GOODS

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WHAT IS A VALUE STREAM MAP?

A detailed PICTURE of your manufacturing process' actual flow. This PICTURE includes:

- Information flows
- Material flows
- Inventory points
- Processing and lead times

This PICTURE helps you SEE:

- Locations of significant waste
- Bottlenecks in the flow
- Potential improvements

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OBJECTIVES OF VALUE STREAM MAPPING

- Visualize material and information flow
- Facilitate the identification and elimination of waste
- Provide a lean vision for the process
- Support the prioritization of continuous improvement activities at the plant and value stream levels
- Support constraint analysis
- Provide a common language for evaluating processes

Step back and find the optimal route

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WHICH HORSE IS TALLER?

The background might cause you to think that the horses are not the same size.

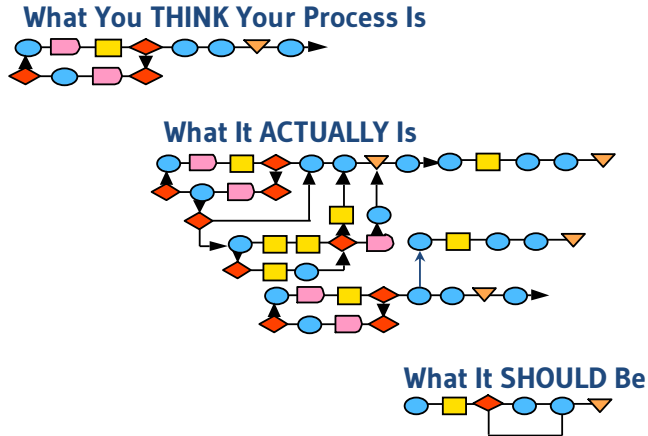Your assumptions might cause you to think they are the same size.

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VERSIONS OF A PROCESS

Most processes have at least three versions:

What You THINK Your Process Is

What It ACTUALLY Is

What It SHOULD Be

"Waste is often disguised as useful work."

-Hiroyuki Hirano

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CLASSIC VSM FLOW

Product Family

Current State Drawing

Future State Drawing

Work Plan & Implementation

"Learning to See"   Rother & Shook   Lean Enterprise Institute 1999
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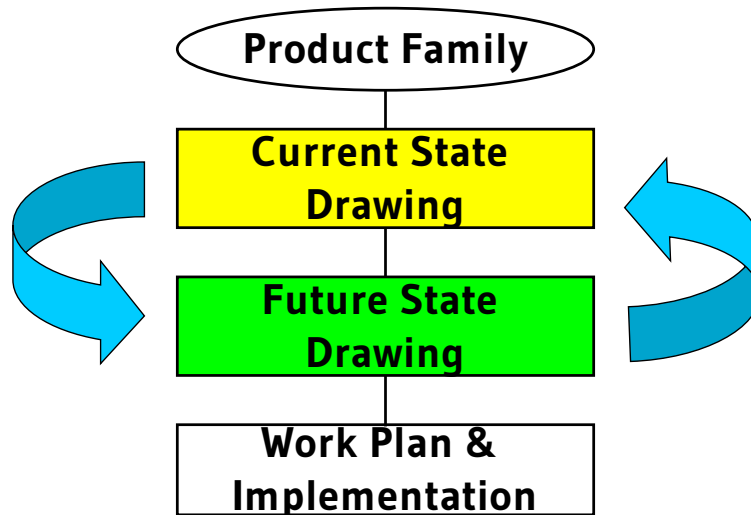
VSM HELP BUILD YOUR ROADMAP
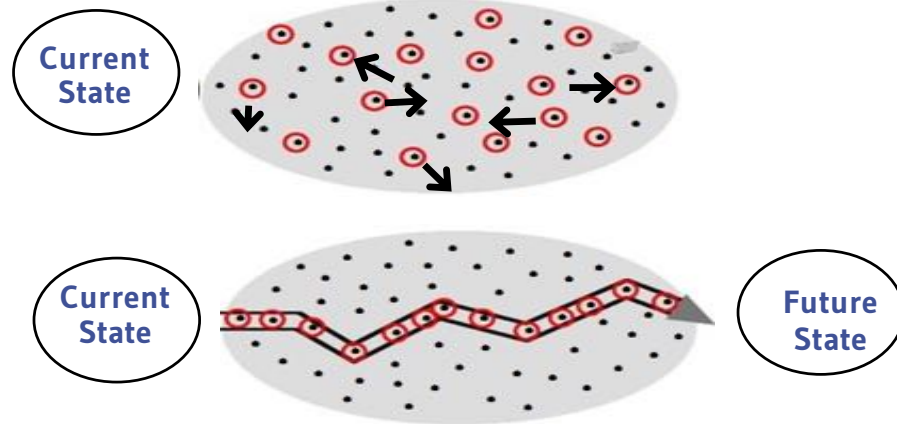
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TXM MAP MANUAL

1. Map product + information, or data + communication
2. Dock to dock or extended
3. Draw using post-its
4. Has time-lines + metrics for CSM + FSM
5. Seven steps process to FSM
6. Must do an action plan – organizing key improvements in to A3
7. Product families = similar or same routing
8. Target most important VS first
9. Cross functional team
10. Walk the flow – Actual Data

10

10

TXM MAP TIPS

- Data preparation
- Process = where process stops
- Customer = Complex the customised, use *Creating Mixed Model Value Streams* (by Kevin Duggan)
- Don't use VSM when ......
  - -Customer very unsophisticated or simple process. Spaghetti diagram, get baseline data
  - -One step process => TPM/OEE
  - -Quickie VSM

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CURRENT STATE MAP

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MAPPING THE CURRENT STATE

- Crucial first step in process improvement – deep understanding of the existing processes and dependencies
- Shows all the process and information flows for the product or service.
- Observe the process first hand.
- More questions than answers!
- Shows the waste
- Aim to measure how we are now
- Not trying to find solutions at current state map.

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8 STEPS FOR VSM CURRENT STATE

1. Select your value stream.
2. Define customer information.
3. Define each process.
4. Identify the information flows.
5. Collect data about each process.
6. Walk the process.
7. Calculate summary information.
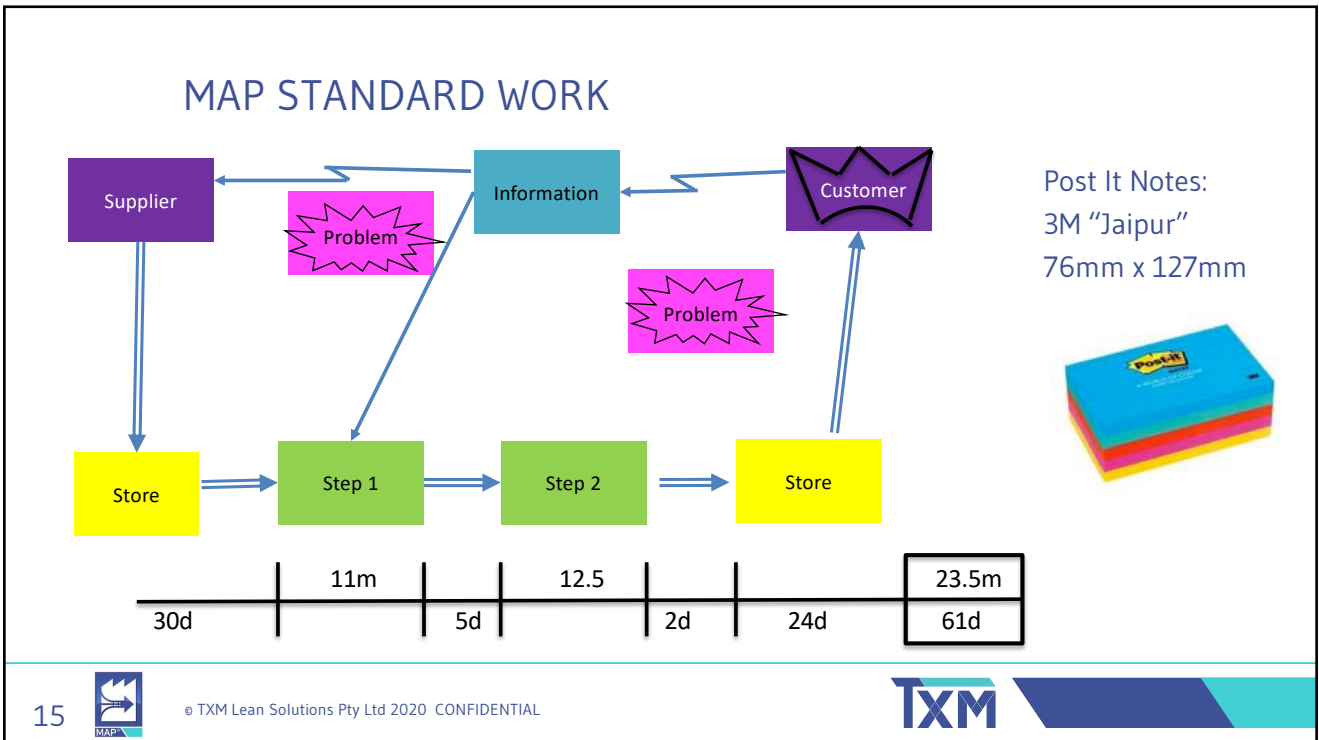8. Identify problem and wastes.

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MAP STANDARD WORK

Post It Notes:
3M "Jaipur"
76mm x 127mm

	11m		12.5			23.5m
30d		5d		2d	24d	61d

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1. CHOOSE PRODUCT FAMILY

- Product family is a group of products that passes through common processes or equipment and they have similar work content;
- Combine products that have similar processes in the same family product become the production line more flexible to approach the customer demand;

	Corrugate	Print	Auto Diecut	Rotary Diecut	Glue	Assemble	Pack
Family A	X	X			X		
Family B	X		X				X
Family C	X	X		X	X	X	X

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2. DEFINE CUSTOMER INFORMATION AND NEED

- Define the customer demand in a meaningful way:
  - Units per hour?
  - Other measures?
- Define customer service requirement
  - Quantities of orders per variant
  - Order size (minimum, maximum, average)
  - Packaging size
  - Shipment schedules
  - Customer lead time
  - Order adjustments

Saint Claire Assembly

18.400 pcs/month
12.000 "L"
6.400 "R"
2 shifts
Tray = 20 pcs
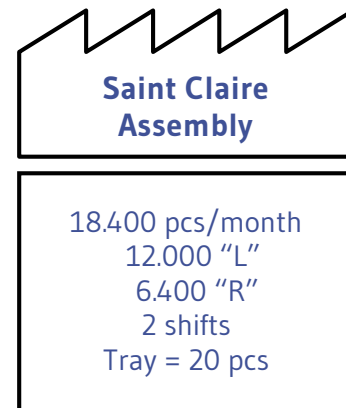
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3. DEFINE EACH PROCESS

- A process is an activity where material can stagnate on either side
- Only count points where flow stops
- A "process" may involve several steps
- Start at the customer
- Draw inventories, where they exist, between processes including inventory before and after production
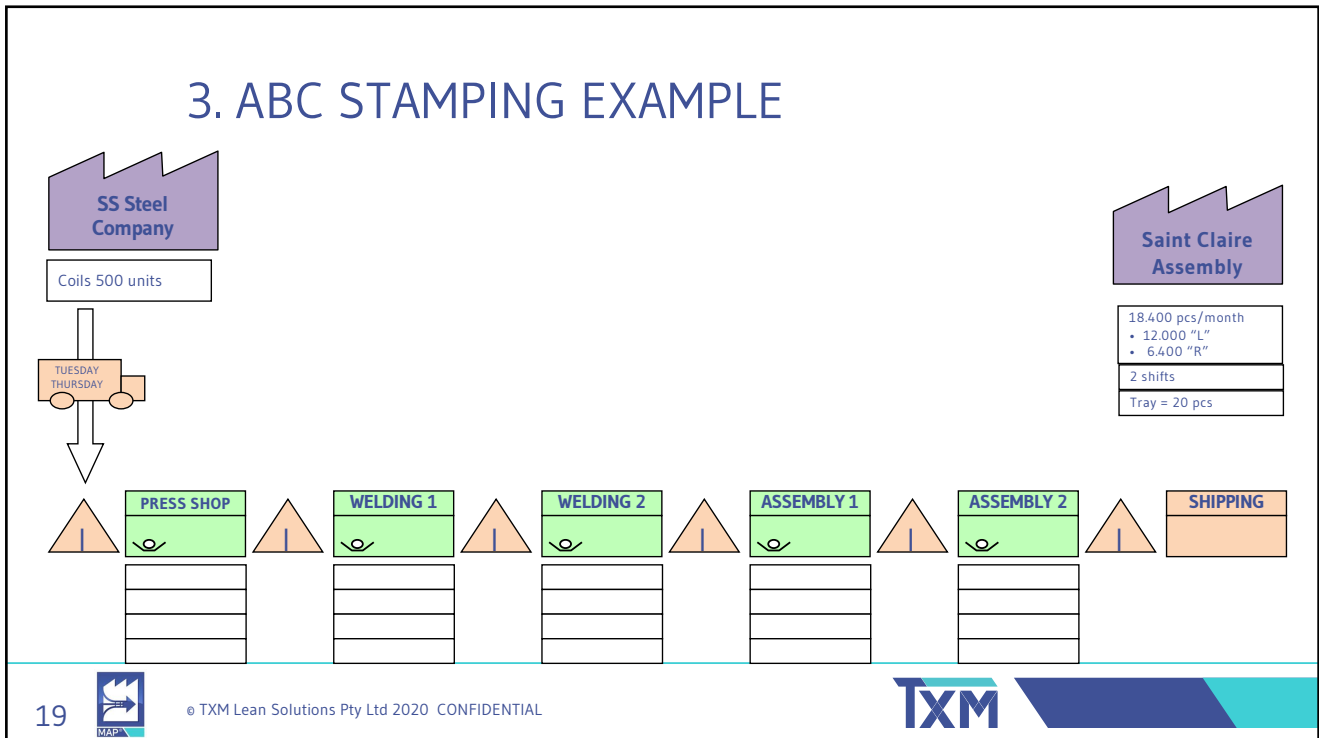
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3. ABC STAMPING EXAMPLE

SS Steel Company

Coils 500 units

TUESDAY THURSDAY

Saint Claire Assembly

18.400 pcs/month
• 12.000 "L"
• 6.400 "R"
2 shifts
Tray = 20 pcs

PRESS SHOP	WELDING 1	WELDING 2	ASSEMBLY 1	ASSEMBLY 2	SHIPPING

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4. DEFINE THE INFORMATION FLOWS

- What is the information that triggers product to move from one process to the next?
- Where does that information come from?
- What information is sent from the process to the next process or production control?
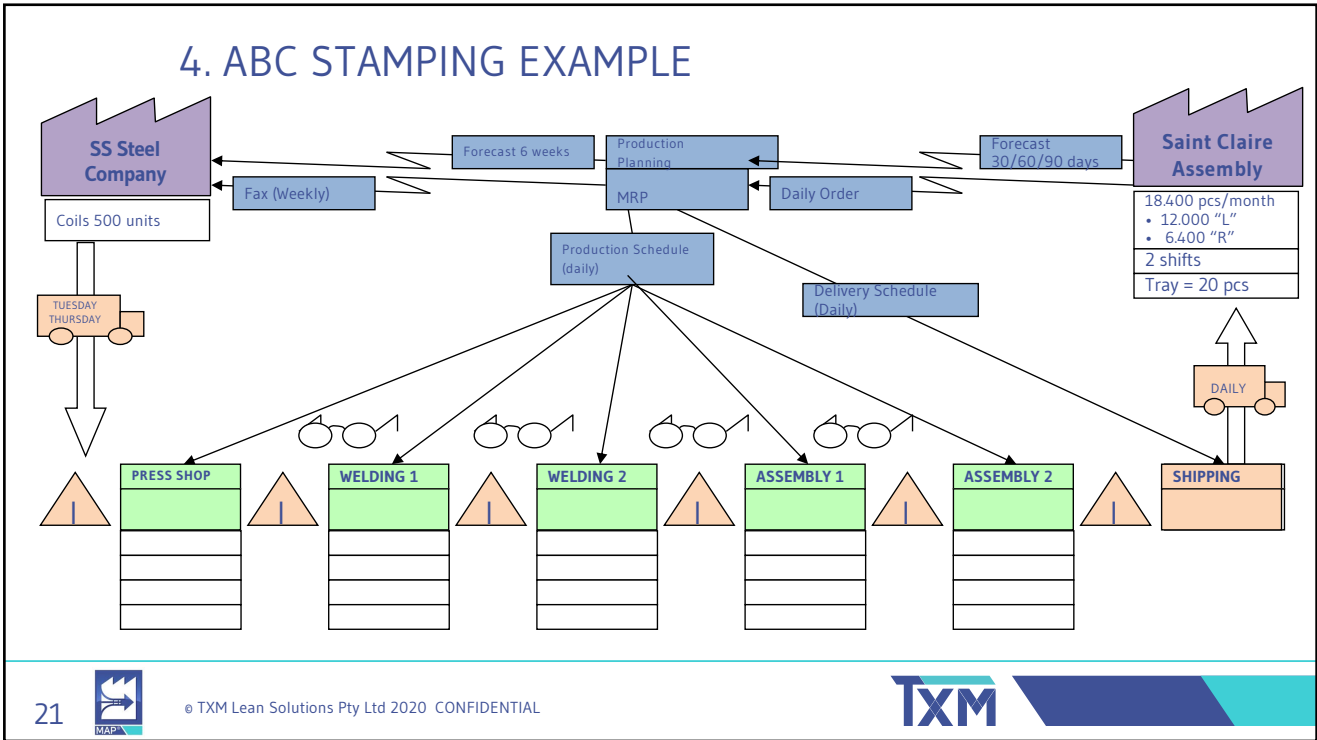- What informal information links exist and how do they work?

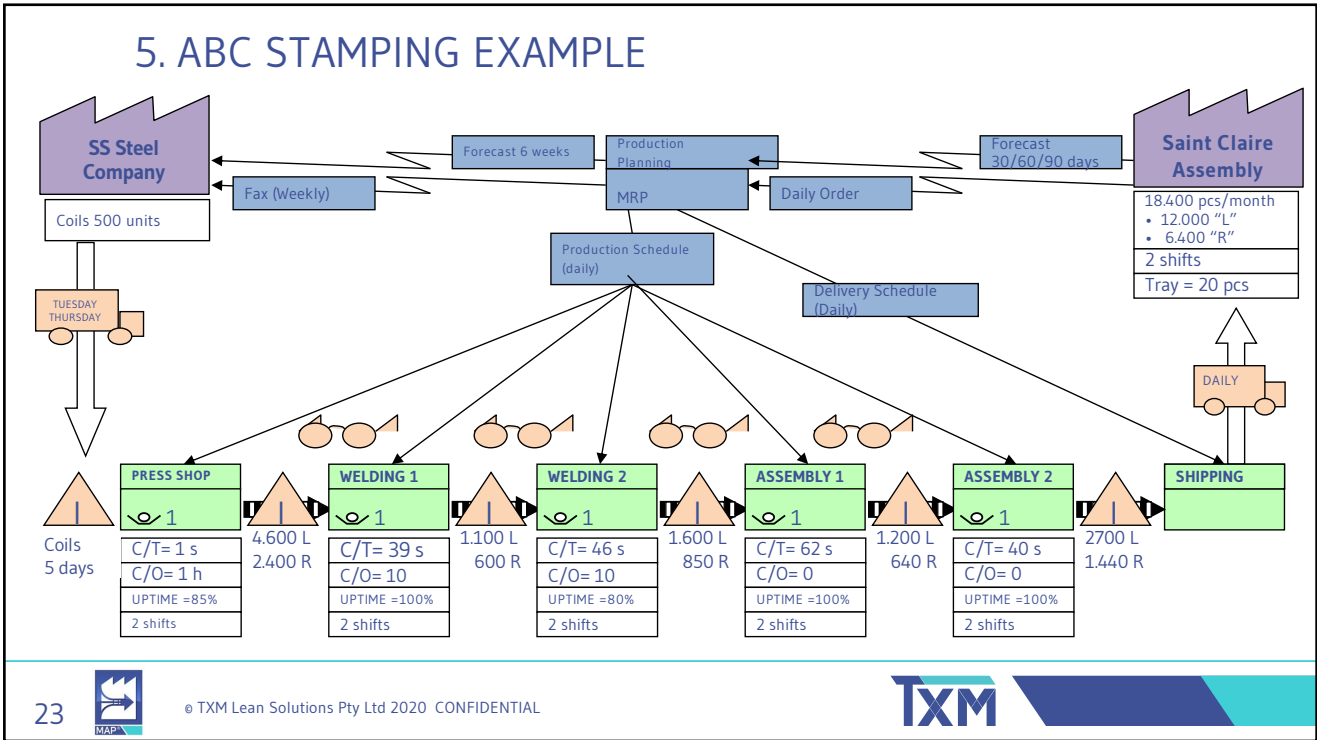20   © TXM Lean Solutions Pty Ltd 2020 CONFIDENTIAL   TXM

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4. ABC STAMPING EXAMPLE

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5. COLLECT DATA FOR EACH PROCESS

Basic Data	• Production Volume • Value-Added time • Shifts
Process Data	• Cycle Time • Changeover Time • Equipment Availability • Inventory • Employee allocation • Refuse / rework • Batches / Lot size

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5. ABC STAMPING EXAMPLE

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6. WALK THE PROCESS

- Go door to door
- Walk the flow
- Capture data yourself
- Actual data
- Ask questions
- Show respect
- Walk, understand, and validate

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7. CALCULATE MAP SUMMARY METRICS

- Calculate lead time.
- Determine value added and non value added time.
- Inventory lead time (days) = inventory / daily demand
- Other summary metrics – e.g. Quality

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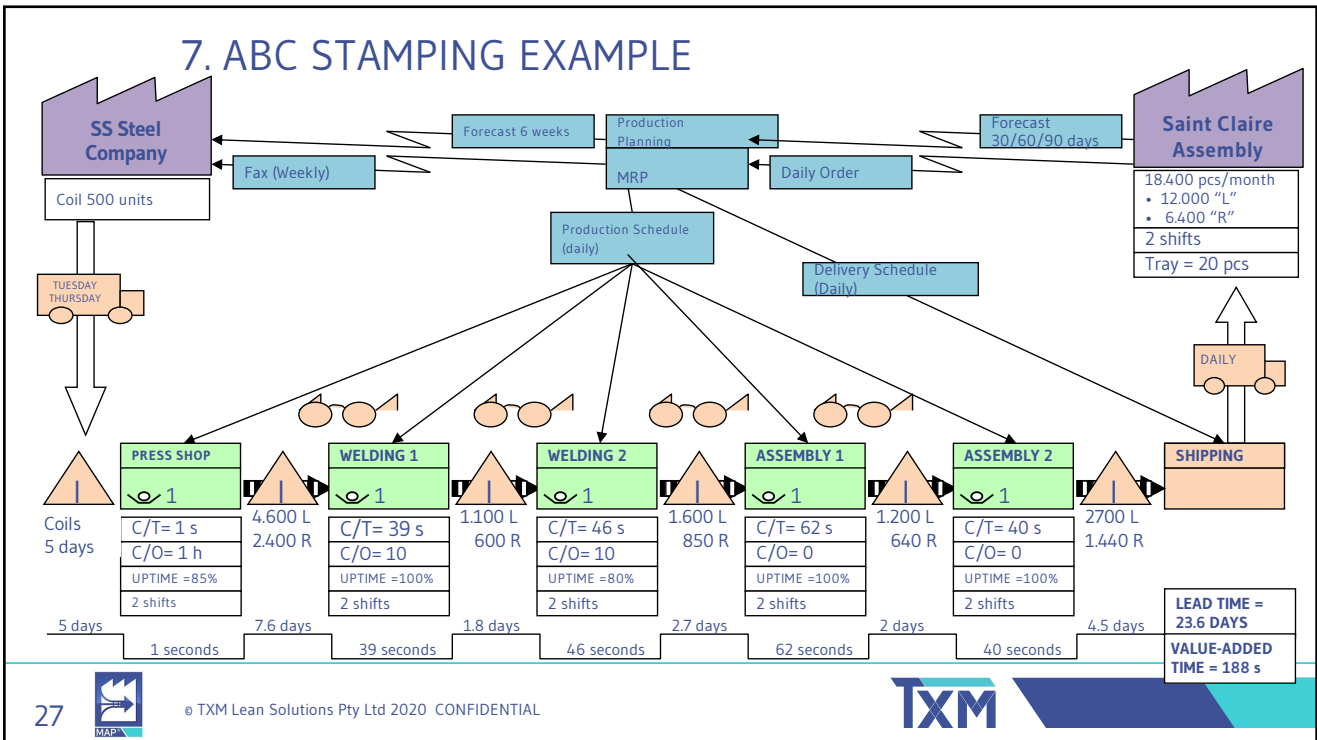
25

CURRENT STATE MAP EXAMPLE

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7. ABC STAMPING EXAMPLE

SS Steel Company

Coil 500 units

Forecast 6 weeks

Production Planning

MRP

Fax (Weekly)

Daily Order

Forecast 30/60/90 days

Saint Claire Assembly

18.400 pcs/month
- 12.000 "L"
- 6.400 "R"

2 shifts

Tray = 20 pcs

Production Schedule (daily)

Delivery Schedule (Daily)

TUESDAY THURSDAY

DAILY

PRESS SHOP	WELDING 1	WELDING 2	ASSEMBLY 1	ASSEMBLY 2	SHIPPING
👁 1	👁 1	👁 1	👁 1	👁 1	
C/T= 1 s	C/T= 39 s	C/T= 46 s	C/T= 62 s	C/T= 40 s	
C/O= 1 h	C/O= 10	C/O= 10	C/O= 0	C/O= 0	
UPTIME =85%	UPTIME =100%	UPTIME =80%	UPTIME =100%	UPTIME =100%	
2 shifts	2 shifts	2 shifts	2 shifts	2 shifts	

Coils 5 days

4.600 L 2.400 R

1.100 L 600 R

1.600 L 850 R

1.200 L 640 R

2700 L 1.440 R

5 days		7.6 days		1.8 days		2.7 days		2 days		4.5 days
	1 seconds		39 seconds		46 seconds		62 seconds		40 seconds	

LEAD TIME = 23.6 DAYS

VALUE-ADDED TIME = 188 s

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Value Stream Mapping Icons — Material Flow

Manufacturing Process	Boat Shipment	Operator
Manufacturing Process Shared	Airplane Shipment	Material Flow
Outside Sources — XYZ Corp.	Train Shipment	Push Arrow
Data Box	Expediting in Air Freight	Physical Pull
Inventory Box		Supermarket
Truck Shipment	External Warehouse	Buffer or Safety Stock
Move by Forklift	Cross-docking	First-In-First-Out = FIFO =

Value Stream Mapping Icons — Information Flow

|		
Manual Info Flow	Sequenced Pull Ball	
Electronic Info Flow	Quality Problem	
Go See Production Scheduling	Information Box attached to na information arrow — Weekly Schedule	
Kanban Post	Load Leveling — OXOX	
Withdrawal Kanban	Kaizen Lightening Burst	
Production Kanban	Follow Up	
Signal Kanban - Batch		

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8. IDENTIFY KEY PROBLEMS / WASTES

- Failing to satisfying the customer
- Flow is impeded
- Work is difficult or inaccurate
- Lack of visualization and continuous improvement
- People's time is used ineffectively
- Problems are not resolved in a structured way

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EXAMPLE: CURRENT STATE VALUE STREAM MAP
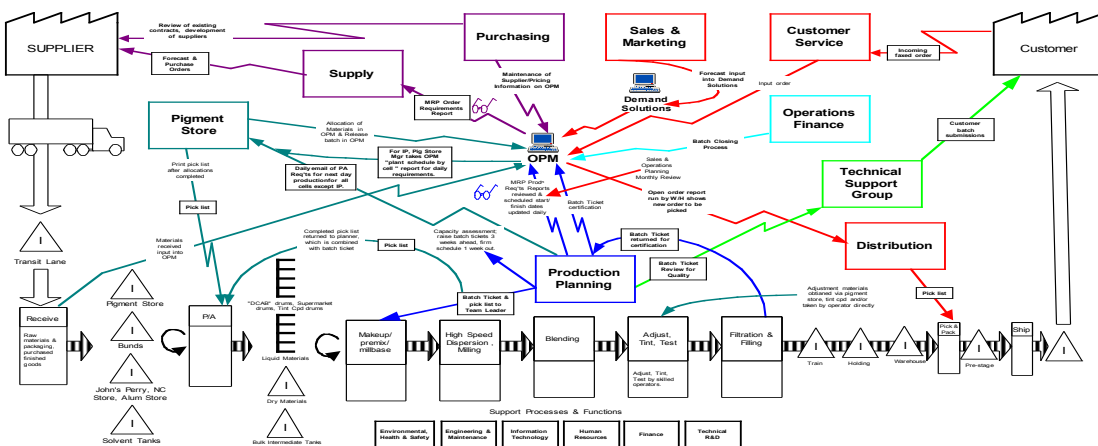
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FUTURE STATE MAP

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TXM SEVEN STEPS TO THE FUTURE STATE

1. What does the customer really need?
2. What is the finished goods strategy?
3. Where can process steps be eliminated or combined to achieve flow?
4. Where flow can not be achieved, how will work be controlled between interruptions?
5. Which process will be the pacemaker
6. How will workload or activities be levelled?
7. What process improvements will be necessary to achieve the future state?

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1 - TAKT TIME – WHAT DOES CUSTOMER REALLY NEED?

- Customer demand rate
- Synchronizes the pace of production to the pace of sales
- What does the customer value

$$\text{Takt Time} = \frac{\text{Effective working time per shift}}{\text{Customer demand per shift}}$$

$$= \frac{400 \text{ minutes}}{80 \text{ service jobs}} = 5 \text{ min}$$

33

33

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1 - WHAT IS THE TAKT TIME FOR OUR VALUE STREAM?

The Customer dictate the rhythm (TAKT) !

Order Entry **Planning** **Production**

Customer

Takt !   Takt !   Takt !   Takt !

Fluctuations occurred due to:
- Seasonality
- Variants
- Product Changes

Oscillation Leveling:
Collecting of the customer daily demand

Rhythmical Manufacture – Customer rhythm

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34
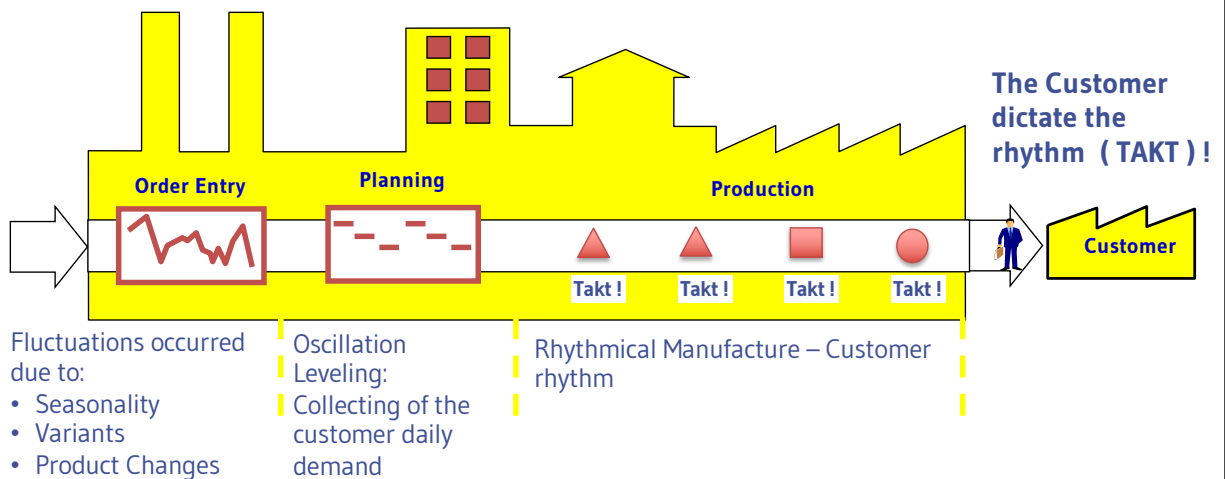
1 - HOW FAST SHOULD WE PRODUCE?

Systemic   vs   Individual
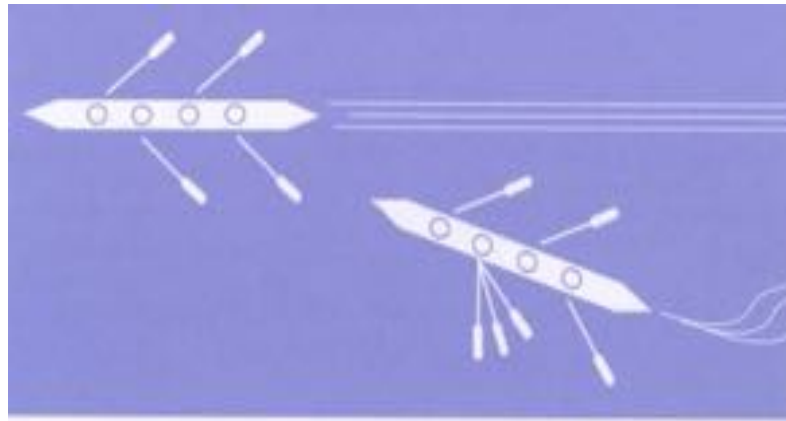
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2 - FINISHED GOODS STRATEGY

To Shipping   Customer

To Supermarket   Customer

Production   Shipping

Production   Shipping

Supermarket
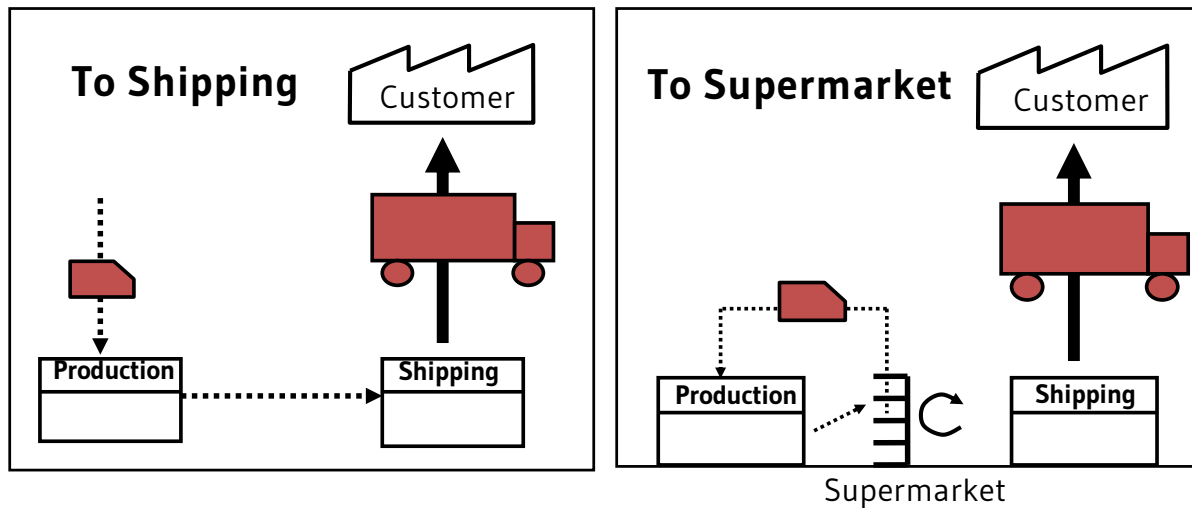
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3 - ECRS ANALYSIS

- **Eliminate:** Do we need to finish it? Why?

- **Combine:** Think about if we could combine processes together

- **Rearrange:** Rearrange the processes

- **Simplify**: Simplify the work content and steps, or movements.

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3 – COMBINE OR ELIMINATE STEPS?

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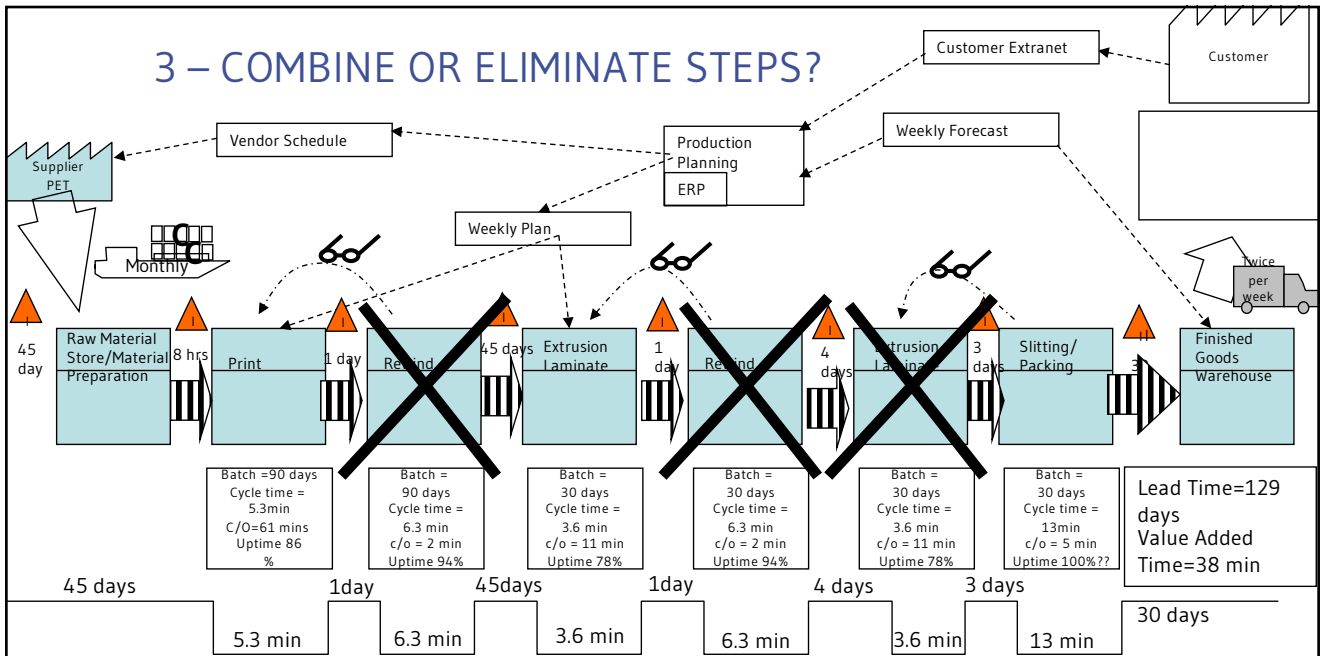
4 - CONNECTING PROCESS STEPS

- Continuous Flow
- Best method (least waste)
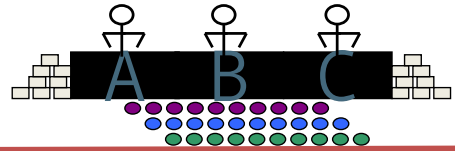
- FIFO (First In First Out) Lane
- Join decoupled processes
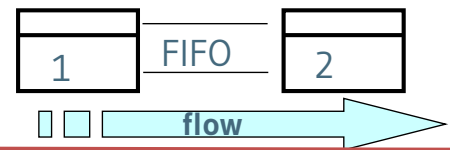
- Supermarket (Pull)
- When flow is not possible
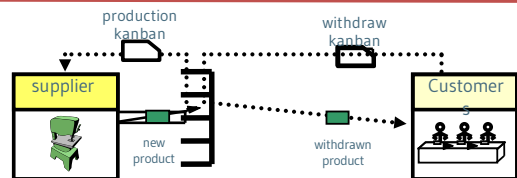
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4 - CONTINUOUS FLOW
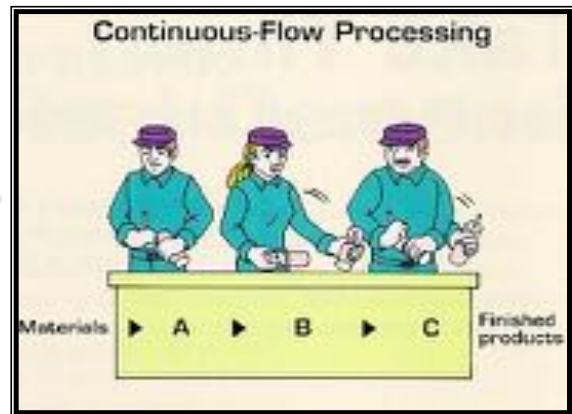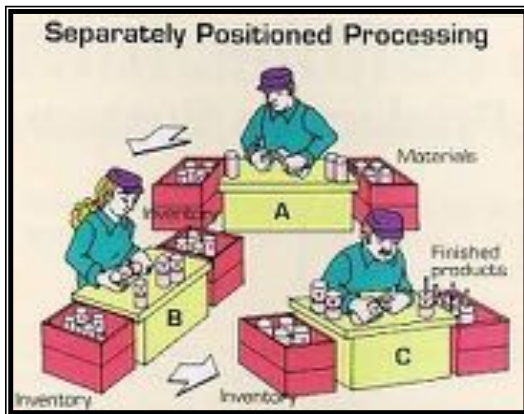
40 Source: The Toyota Production System, Toyota Motor Company
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4. BALANCE OPERATIONS
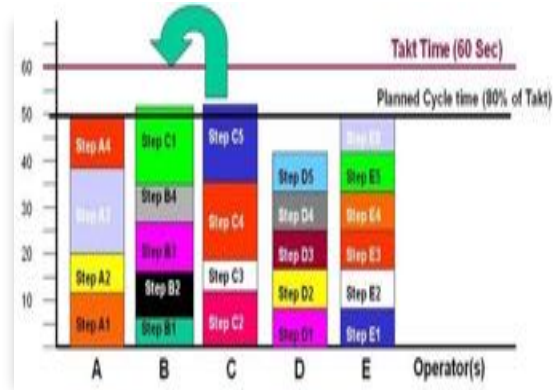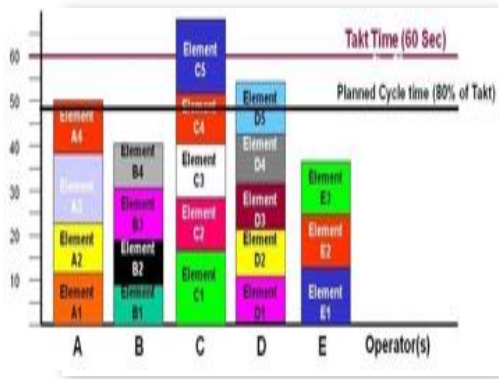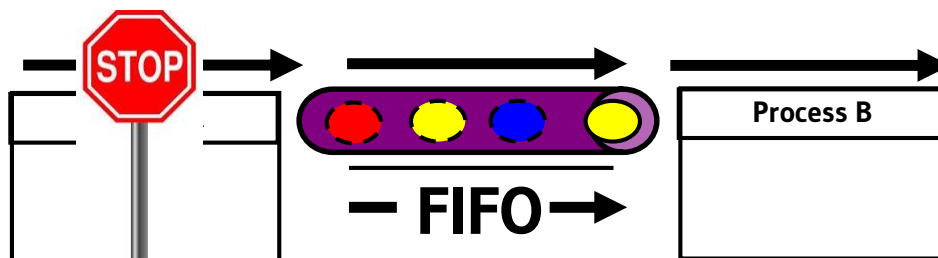
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4 - FIFO – FIRST IN FIRST OUT

FIFO

- Sets the sequence of production
- Controls the amount of inventory

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4 - FIFO – FIRST IN FIRST OUT

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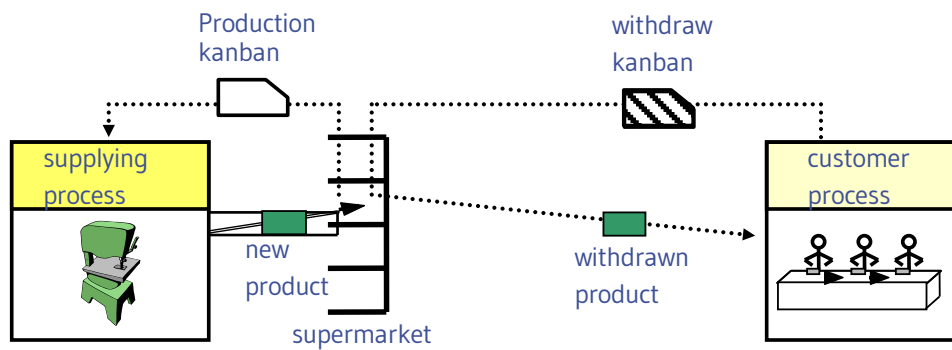
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4 - FIFO EXAMPLE – SCHEDULE SEQUENCE

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4 - SUPERMARKET PULL SYSTEM

Production kanban

withdraw kanban

supplying process

new product

supermarket

withdrawn product

customer process

Purpose: Control production between flows without scheduling

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5 - LEAN GUIDELINES

- Scheduling one point
- Where flow must end and pull begins

- EPEI (Every Part Every Interval)
  - Leveling the mix to intervals

- Pitch
  - Leveling the Volume and Management time frame

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5 - SCHEDULING ONLY ONE POINT – DEFINING THE PACEMAKER PROCESS
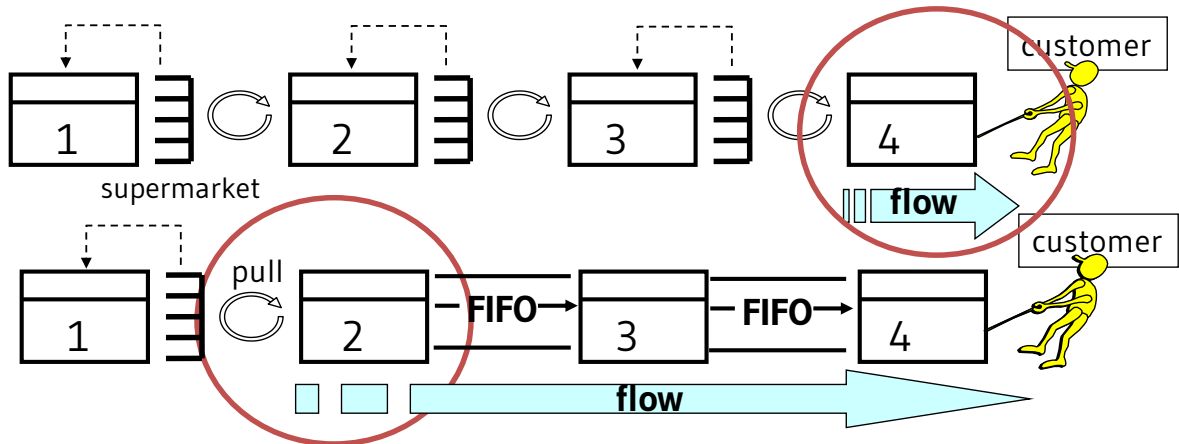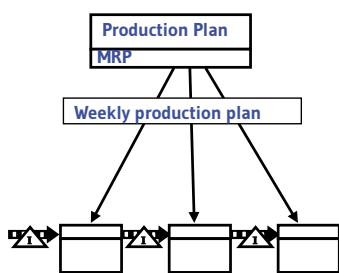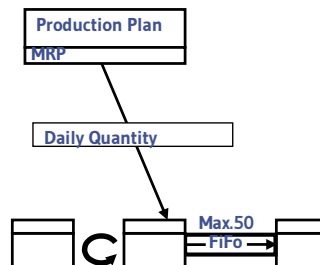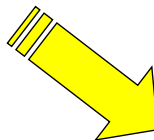
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5 - SELECTING THE PACEMAKER PROCESS

- The pacemaker process, determines the speed of all the previous processes!
- Must only have one pacemaker process !
- The process after the pacemaker must operate in accordance with the FIFO System, Inside The flow.
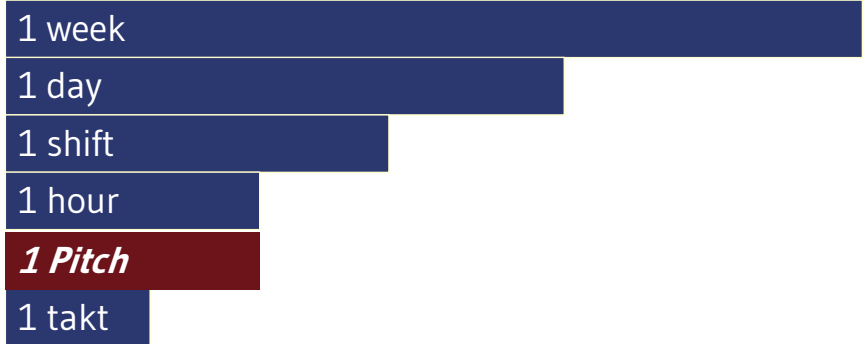
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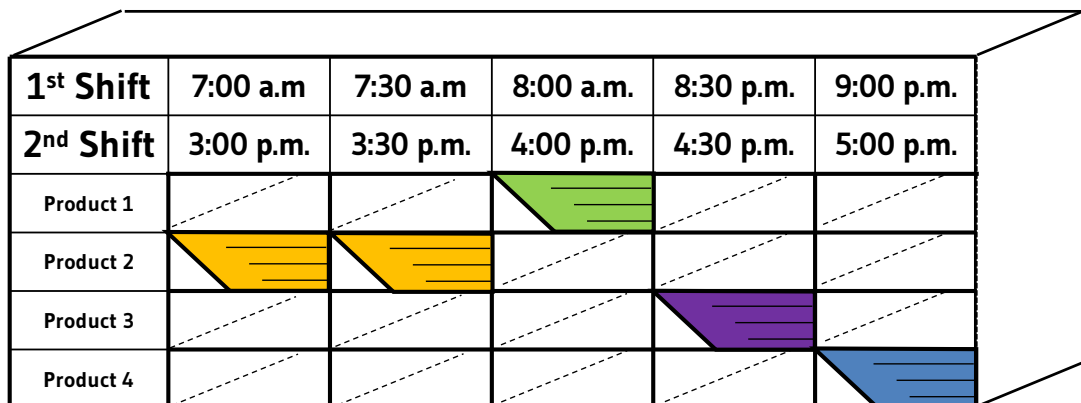
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6 – LEVEL THE RATE OF PRODUCTION

How much work do we schedule & take away at the pacemaker?

This amount is our management timeframe – how often we find out and can react to problems.

| 1 week |
| 1 day |
| 1 shift |
| 1 hour |
| *1 Pitch* |
| 1 takt |

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6 - LOAD LEVELING BOX

Use to level paperwork load and prevent batching

1st Shift	7:00 a.m	7:30 a.m	8:00 a.m.	8:30 p.m.	9:00 p.m.
2nd Shift	3:00 p.m.	3:30 p.m.	4:00 p.m.	4:30 p.m.	5:00 p.m.
Product 1					
Product 2					
Product 3					
Product 4					

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6 - LOAD LEVELING BOX EXAMPLE

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6 – ABC STAMPING EXAMPLE
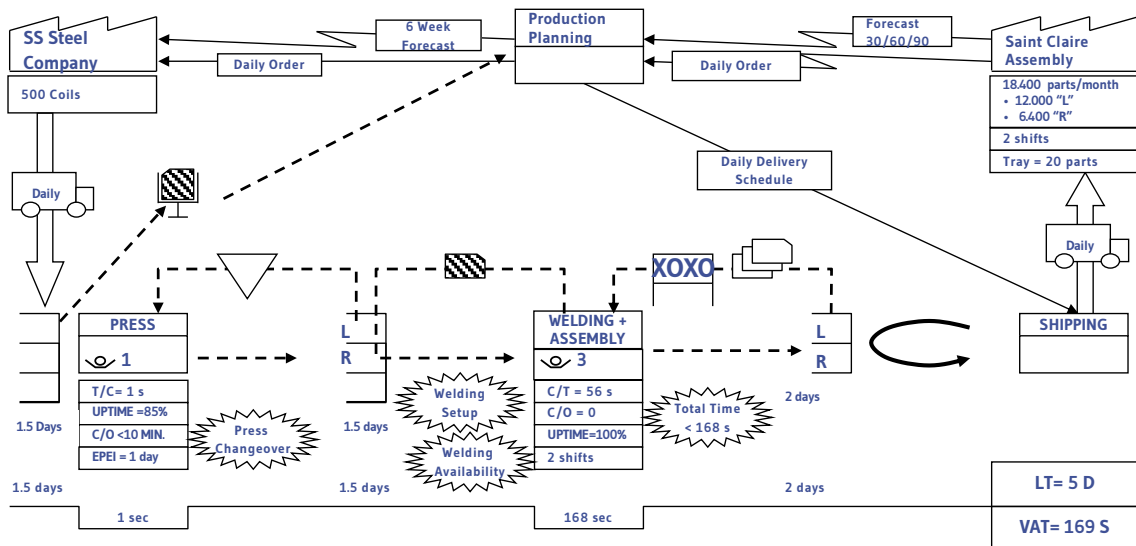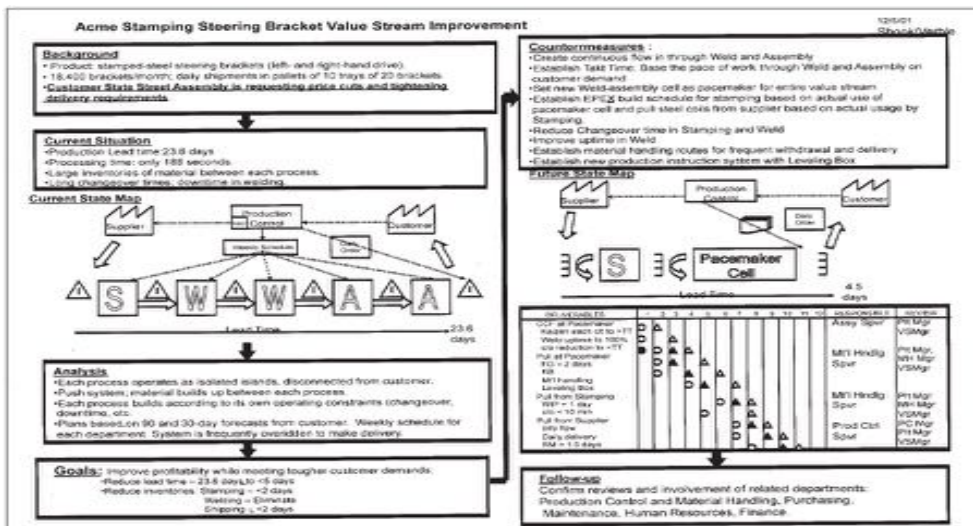
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7 - DEVELOP FUTURE STATE ACTION PLAN

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7 - A3 SAMPLE

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TXM SEVEN STEPS TO THE FUTURE STATE

1. What does the customer really need?
2. What is the finished goods strategy?
3. Where can process steps be eliminated or combined to achieve flow?
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5. Which process will be the pacemaker
6. How will workload or activities be levelled?
7. What process improvements will be necessary to achieve the future state?

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WHAT ARE OUR OBJECTIVES?

- A smooth efficient running business
- Better teamwork
- Plan for relocation of plants – layout and operations
- 100% Customer Satisfaction
- Better systems and procedures – standard work
- Improved paper flow – information flow
- Employee satisfaction through having an input and reducing firefighting
- Reduced waste.
- Better use of space

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