

LEAN FLOW MAPPING

- MODULE LFM101 -

VALUE STREAM MAPPING

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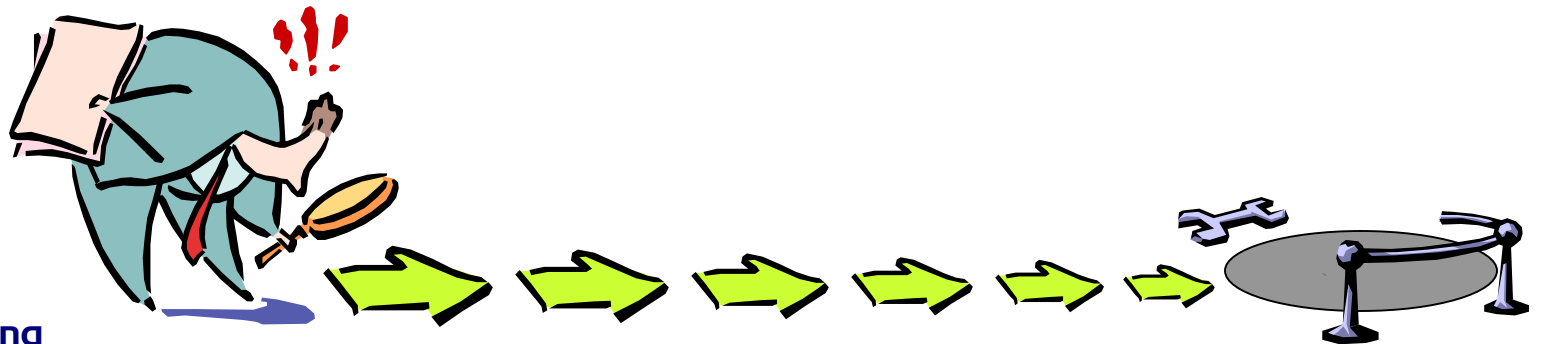
PURPOSE

- Value Stream.
- Process.
- Value Stream Map Icons :
 - Process,
 - Data Box,
 - Flow,
 - Inventory & Work-In-Process.
- Value Stream Manager.
- Value Stream Mapping – Current State :
 - ABC Stamping Company,
 - Case Study & Practical Exercises.

VALUE STREAM MAPPING DEFINITION

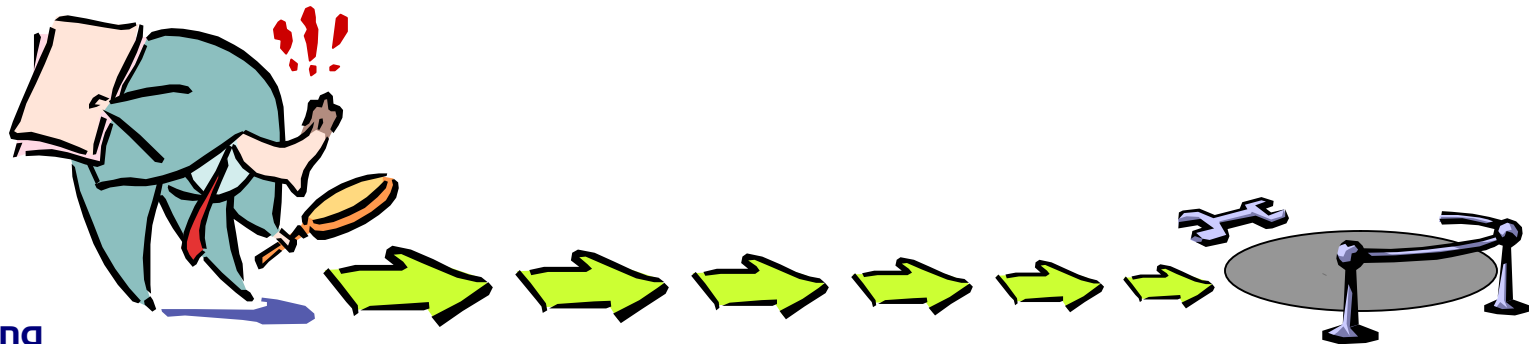
- Whenever there is a Product, or Service, for a Customer, there is a Value Stream...

... The Challenge lies in seeing it.



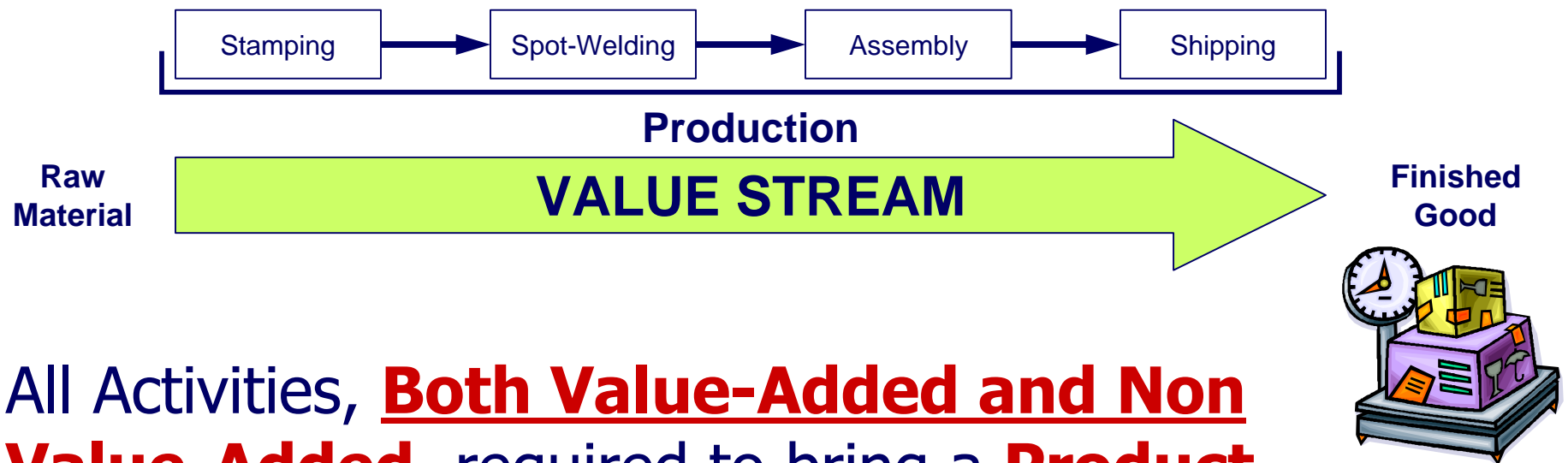
VALUE STREAM MAPPING OBJECTIVES

- Introduce **V**alue **S**tream **M**apping (**VSM**) in a Hands-On Manner.
- Develop your ability to "See the Flow" and Design Future State Value Stream by **Eliminating Wastes**.



VALUE STREAM MAPPING

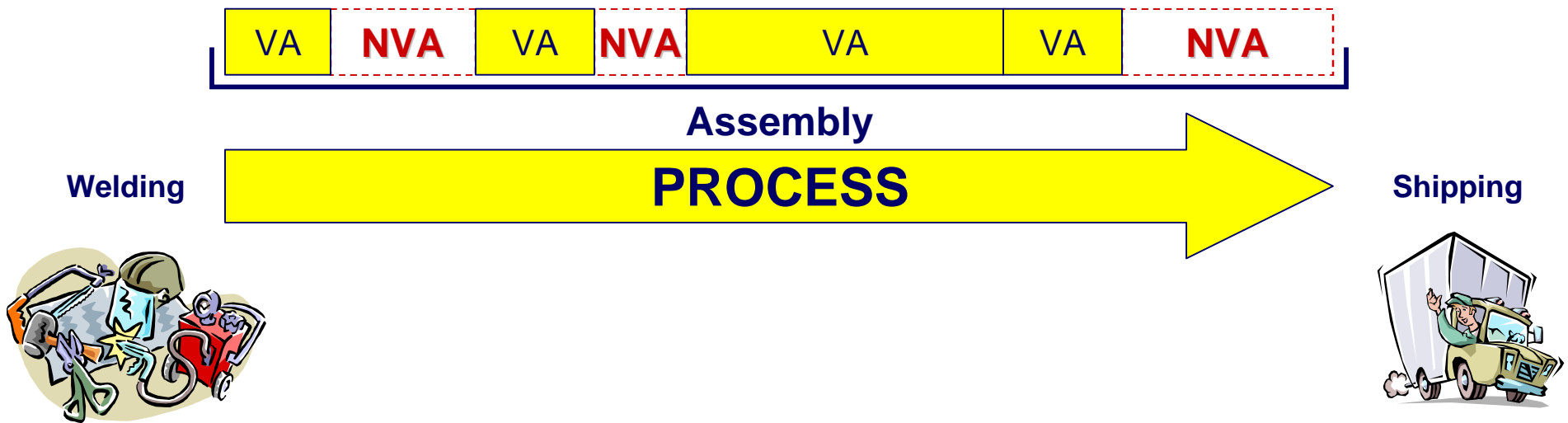
VALUE STREAM DEFINITION



- All Activities, **Both Value-Added and Non Value-Added**, required to bring a **Product**, or Service, from Raw Material into the hands of the Customer.



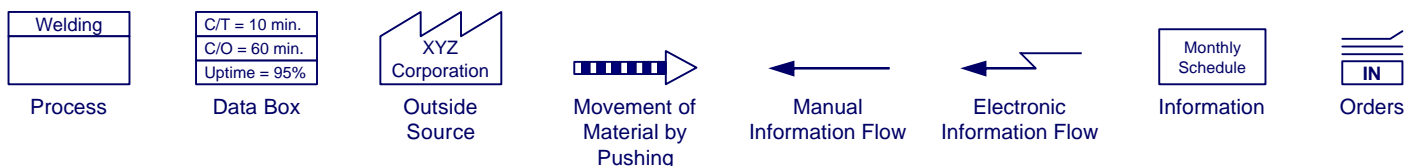
VALUE STREAM MAPPING PROCESS DEFINITION



- Sequence of **Value-Added and Non Value-Added** Tasks, which transform **Inputs brought by Suppliers** into **Outputs required by a Customer**.

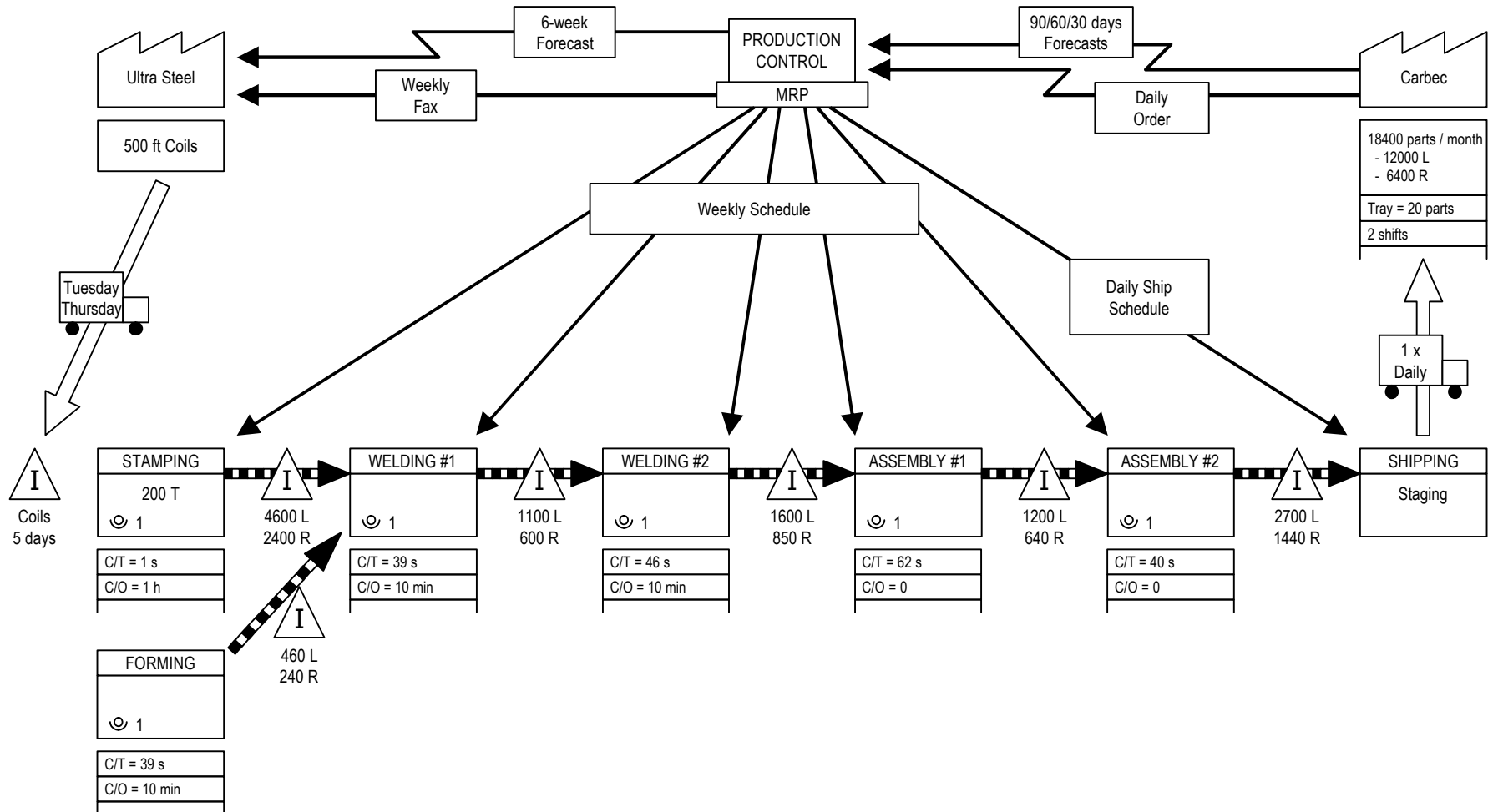
VALUE STREAM MAPPING OVERVIEW

- Follow "Step by Step" a Product from **Beginning to End** of every Process in the, from **Raw Material into the hands of the Customer.**
- Draw, using Icons, a Future State of Material and Information Flows.

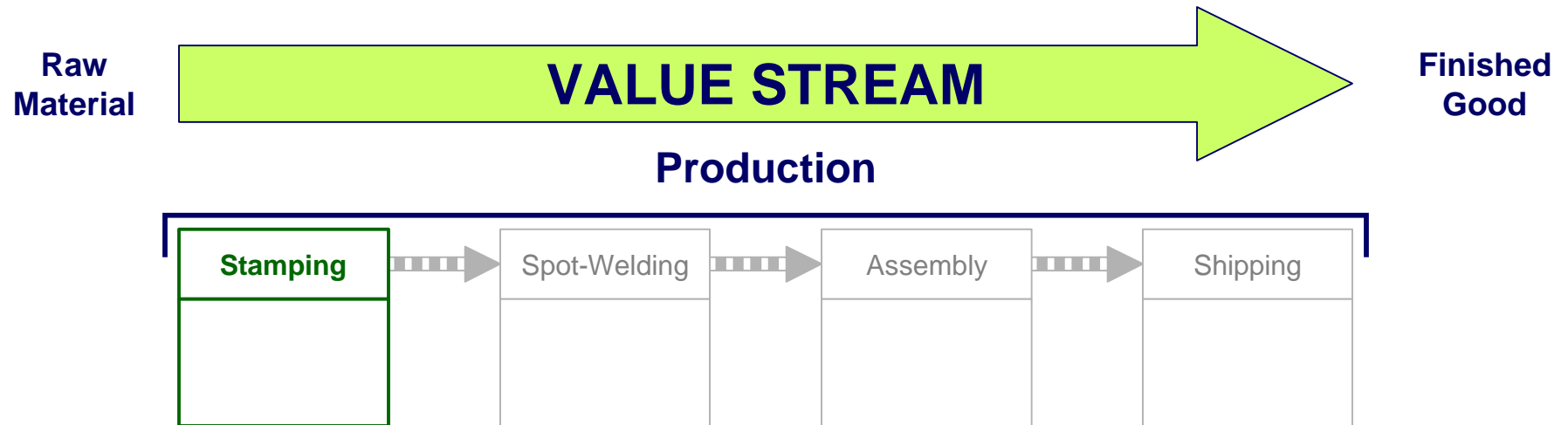


- **Create an Optimized Value Stream (Future State) focused on Value-Added Activities.**

VALUE STREAM MAPPING EXAMPLE



VALUE STREAM MAPPING ICON DEFINITION



- **Process (Dedicated or Shared) :**
 - A series of Steps or Individual Tasks that must occur in a specific sequence to produce a Product, **On Piece at a Time**, through a **Continuous Flow**.
 - Work is completed **Continuously between each Task** – **Inside the Process**.

VALUE STREAM MAPPING ICON DEFINITION

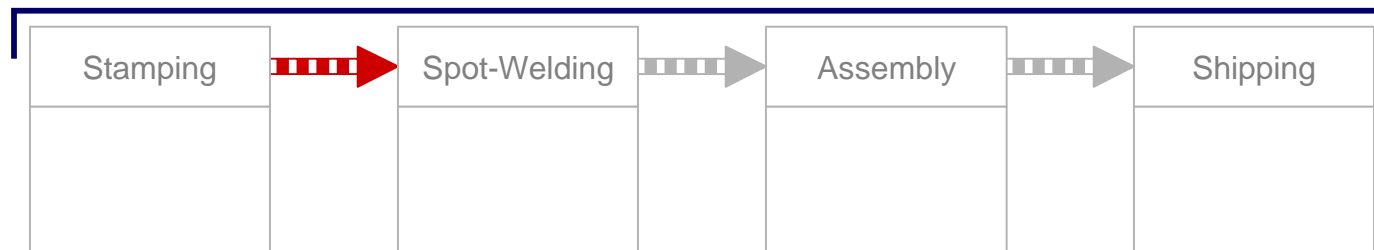


Takt =
C/T =
C/O =
Uptime =

■ Data Box :

- Takt-Time : **Takt**,
- (Operational) Cycle Time : **C/T** (At),
- Changeover Time : **C/O** (S/U),
- Uptime : **Uptime**,
- Effective Work Time per Shift, ...

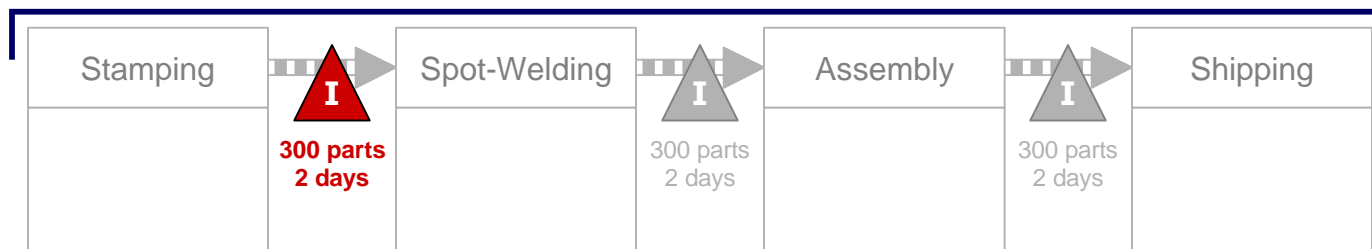
VALUE STREAM MAPPING ICON DEFINITION



Takt =
C/T =
C/O =
Uptime =

- **Flow :**
 - **"Push" :** Based on MRP II System,
 - Creates **Excess Inventory**.
 - **"Pull" : Based on Customer Demand.**
 - Nothing is produced until it is Needed Downstream.

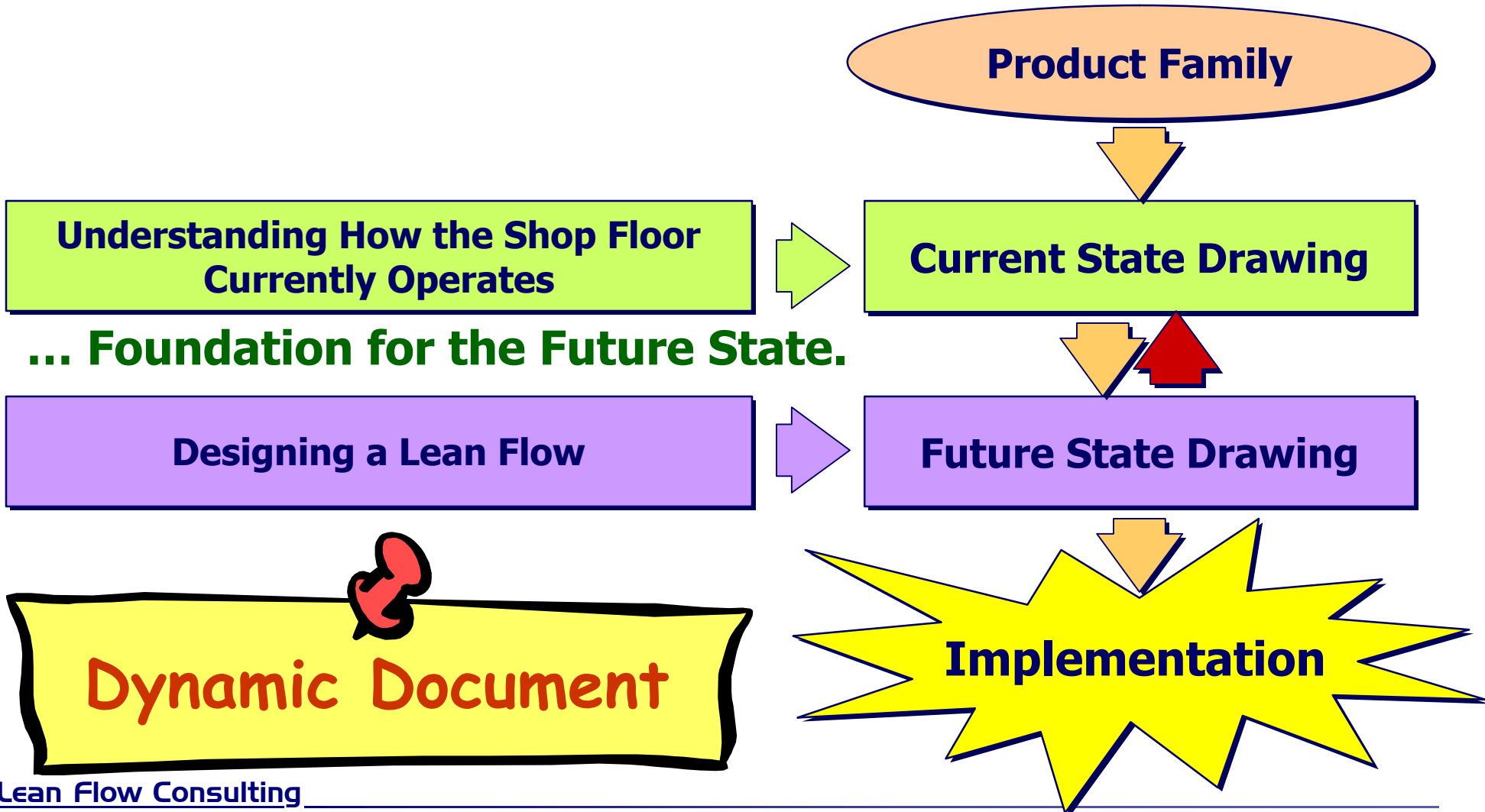
VALUE STREAM MAPPING ICON DEFINITION



Takt =
C/T =
C/O =
Uptime =

- **Inventory (Work-In-Process) :**
 - Indicates the Inventory **Count & Time**,
 - Observed Items (Parts, Pieces, Information) between Processing Steps (or Processes),
 - **Translated into Wait Time to clear Observed Quantity, according to the Customer Demand.**

VALUE STREAM MAPPING FUNDAMENTAL TOOL TO ...



VALUE STREAM MAPPING

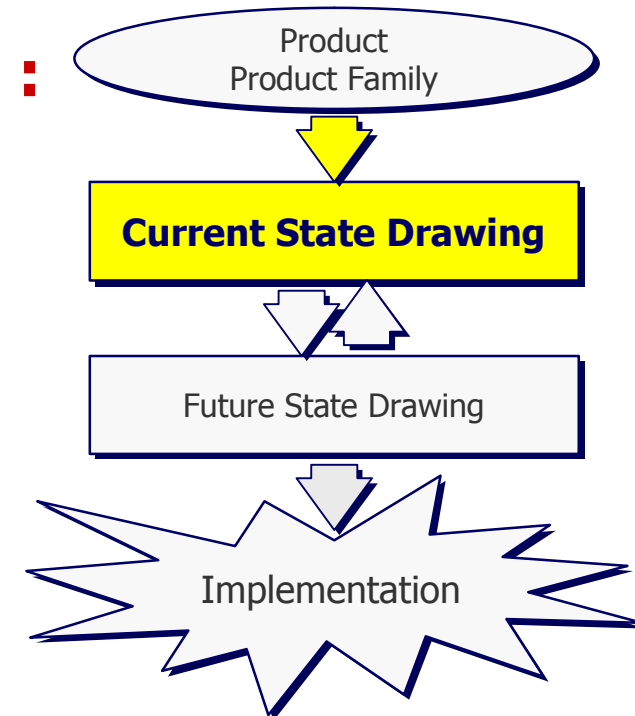
VALUE STREAM MANAGER

- **Each Value Stream needs a Value Stream Manager...**
- **... For Product Ownership, beyond functional Barriers.**
- **Responsibilities :**
 - Lead and Train Employees with the Objectives to :
 - Draw the Value Stream Current State Map,
 - Optimize Materials and Information Flows,
 - Draw and Implement the Value Stream Future State Map,
 - Define Action Plans necessary to obtain Results.
 - **Improve Continuously the Product Family Value Stream.**
 - Communicate Progress to the Top Management on Site.

VALUE STREAM MAPPING

VALUE STREAM MANAGER

- **Understanding How the Shop Floor Currently Operates :**
 - Material and Information Flows, from Raw Materials to Finished Goods :
 - Draw using Icons,
 - Follow all Flows Yourself,
 - **Gather Real Data, on the Shop Floor :**
 - No Standard Times.
 - Draw by Hand, with Pencil.
 - **Foundation for the Future State.**



VALUE STREAM MAPPING

ABC STRAMPING COMPANY (1/5)

- ABC Stamping Company (ABC) produces several components for vehicle assembly plants. This case concerns one product family : A steel instrument-panel bracket subassembly in two types : one each for left-hand and right-hand drive versions of the same vehicle model.
- These components are sent to the Carbec assembly plant, the Customer.
- **Customer Requirements :**
 - 18400 parts per month : 12000 of Type "L" (Left-Hand drive) and 6400 of Type "R" (Right-Hand drive).
 - Palletized returnable tray packaging with 20 brackets in a tray and up to 10 trays on a pallet. The Customer orders in multiples of trays.
 - One daily shipment to the assembly plant by truck.
- **Work Time :**
 - 20 days in a month in 2 shifts operation in all production departments.
 - 8 hours every shift, with overtime if necessary.
 - Two 10-minute breaks during each shift.
 - Manual processes stop during breaks.
 - Unpaid lunch.

VALUE STREAM MAPPING

ABC STRAMPING COMPANY (2/5)

▪ **Production Processes :**

- ABC's process for this product family involves Stamping a metal part followed by Welding and subsequent Assembly. The components are then Staged and Shipped to the Carbec vehicle assembly plant on a daily basis.
- Switching between Type "L" (Left-Hand drive) and Type "R" (Right-Hand drive) brackets requires 1 hour changeover in stamping and 10-minute fixture change in the welding processes.
- Steel coils are supplied by Ultra Steel Company. Deliveries are made to ABC Company on Tuesdays and Thursdays.

▪ **ABC Production Control Department :**

- Receives Carbec's 90/60/30-days forecasts and enters them to MRP.
- Issues ABC 6-week forecast to Ultra Steel Company via MRP.
- Secures coil steel by weekly Faxed order release to Ultra Steel Company.
- Receives daily firm order from Carbec.
- Generates MRP-based weekly departmental requirements based upon Customer order, WIP inventory levels, Finished Goods inventory levels, and anticipated scrap and downtime.
- Issues weekly build schedules to Stamping, Welding, and Assembly processes.
- Issues daily shipping schedule to Shipping Department.

VALUE STREAM MAPPING

ABC STRAMPING COMPANY (3/5)

- **Process Information :**

- **1) STAMPING** (The press makes parts for many ABC products).
 - Process with one operator.
 - Automated 200 ton press with coil (Automatic material feed).
 - Cycle Time : 1 second (60 parts / minute).
 - Changeover Time : 1 hour.
 - (Good piece to good piece).
 - Machine Reliability : 85%.
 - Observed WIP :
 - 5 days of coils before stamping.
 - 4600 stamped parts of Type "L".
 - 2400 stamped parts of Type "R".
- **2) SPOT-WELDING – W/S 1** (Dedicated to this product family).
 - Manual Process with 1 operator.
 - Cycle Time : 39 seconds.
 - Changeover Time : 10 minutes.
 - Reliability : 100%
 - Observed WIP :
 - 1100 parts on Type "L".
 - 600 parts on Type "R".

VALUE STREAM MAPPING

ABC STRAMPING COMPANY (4/5)

- **Process Information (Continued) :**
 - **3) SPOT-WELDING – W/S 2** (Dedicated to this product family).
 - Manual Process with 1 operator.
 - Cycle Time : 46 seconds.
 - Changeover Time : 10 minutes.
 - Reliability : 80%
 - Observed WIP :
 - 1600 parts on Type "L".
 - 850 parts on Type "R".
 - **4) ASSEMBLY – W/S 1** (Dedicated to this product family).
 - Manual Process with 1 operator.
 - Cycle Time : 62 seconds.
 - Changeover Time : None.
 - Reliability : 100%
 - Observed WIP :
 - 1200 parts on Type "L".
 - 640 parts on Type "R".

VALUE STREAM MAPPING

ABC STRAMPING COMPANY (5/5)

- **Process Information (Continued) :**

- **5) ASSEMBLY – W/S 2** (Dedicated to this product family).

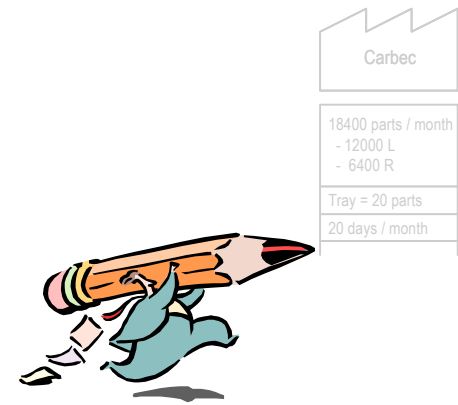
- Manual Process with 1 operator.
 - Cycle Time : 40 seconds.
 - Changeover Time : None.
 - Reliability : 100%
 - Observed WIP :
 - 2700 parts on Type "LH".
 - 1440 parts on Type "RH".

- **6) SHIPPING DEPARTMENT :**

- Removes parts from finished goods warehouse and stages them for truck shipment to Customer.

VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



Icons

Process	Production Control
Process	MRP
Process	Control Center
Shared Process	Manual Information Flow
Process Cell	Electronic Information Flow
XYZ Corporation Outside Source	Monthly Schedule Information
CT = 1s C/O = 10mn Up = 90%	OXOX
Data Box	Load Leveling
300 Pieces 2 Days Inventory	Withdrawal Kanban
12 Days Queue	Production Kanban
Truck Shipment	Signal Kanban
Movement of Material by Pushing	Kanban Card Post
Movement of Finished Goods	Sequenced Pull Ball
Max. 20 Pieces FIFO	"Go-See" Schedule
FIFO Transfer	Orders
Supermarket	E-MAIL
Manual Pull or Withdrawal	Phone
Safety Stock	Fax
	Operator
	CT=16mn Kaizen Lightning Burst
	Quality Problem

VALUE STREAM MAPPING

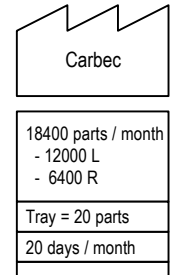
CURRENT STATE – QUESTIONS

- Where **Starts** and **Finishes** Value Stream ?
 - Which are the Input and Output Data ?
- Which are the Processes **Used to Produce** Product ?
 - "Each Break in Flow corresponds to a Change of (New) Process".
- Which are the **Retained Data** to gather Processes Materials & Information Flows ?
- Where are the **Parts before Processing** ?
 - ... Wait Time translation.
- What is the **Total Product Cycle Time** ?
- What is the **Total Flow Process Lead Time** ?



VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY

Carbec
18400 parts / month - 12000 L - 6400 R
Tray = 20 parts
20 days / month

STAMPING
200 T
☉ 1

WELDING #1
☉ 1

WELDING #2
☉ 1

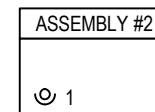
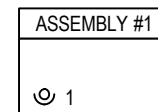
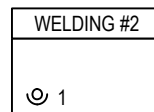
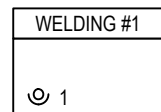
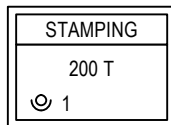
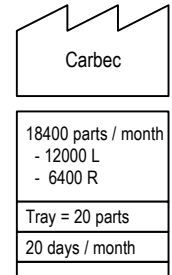
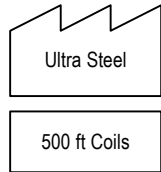
ASSEMBLY #1
☉ 1

ASSEMBLY #2
☉ 1

SHIPPING
Staging

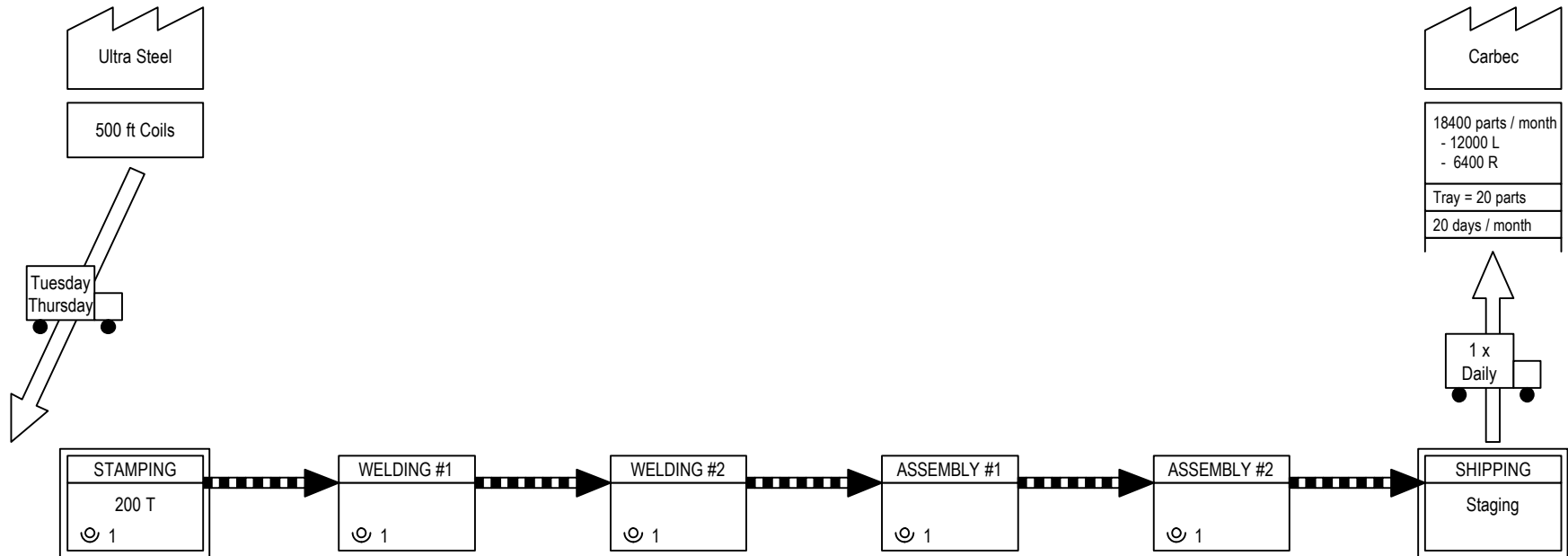
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



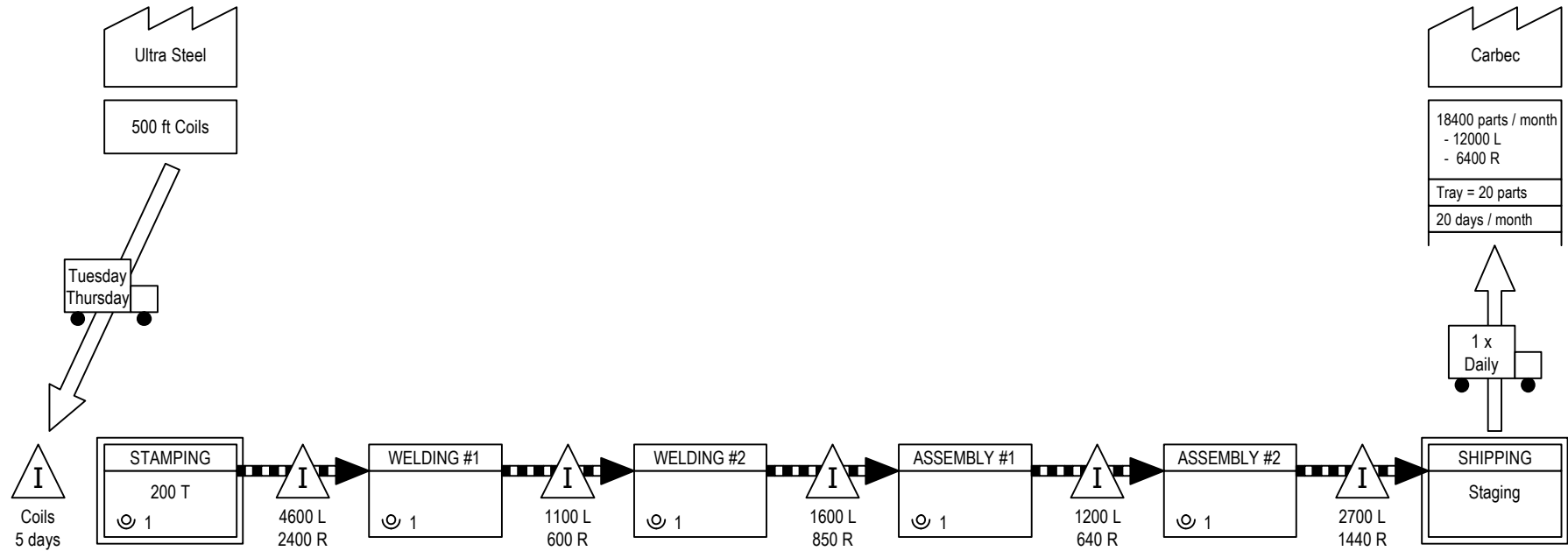
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



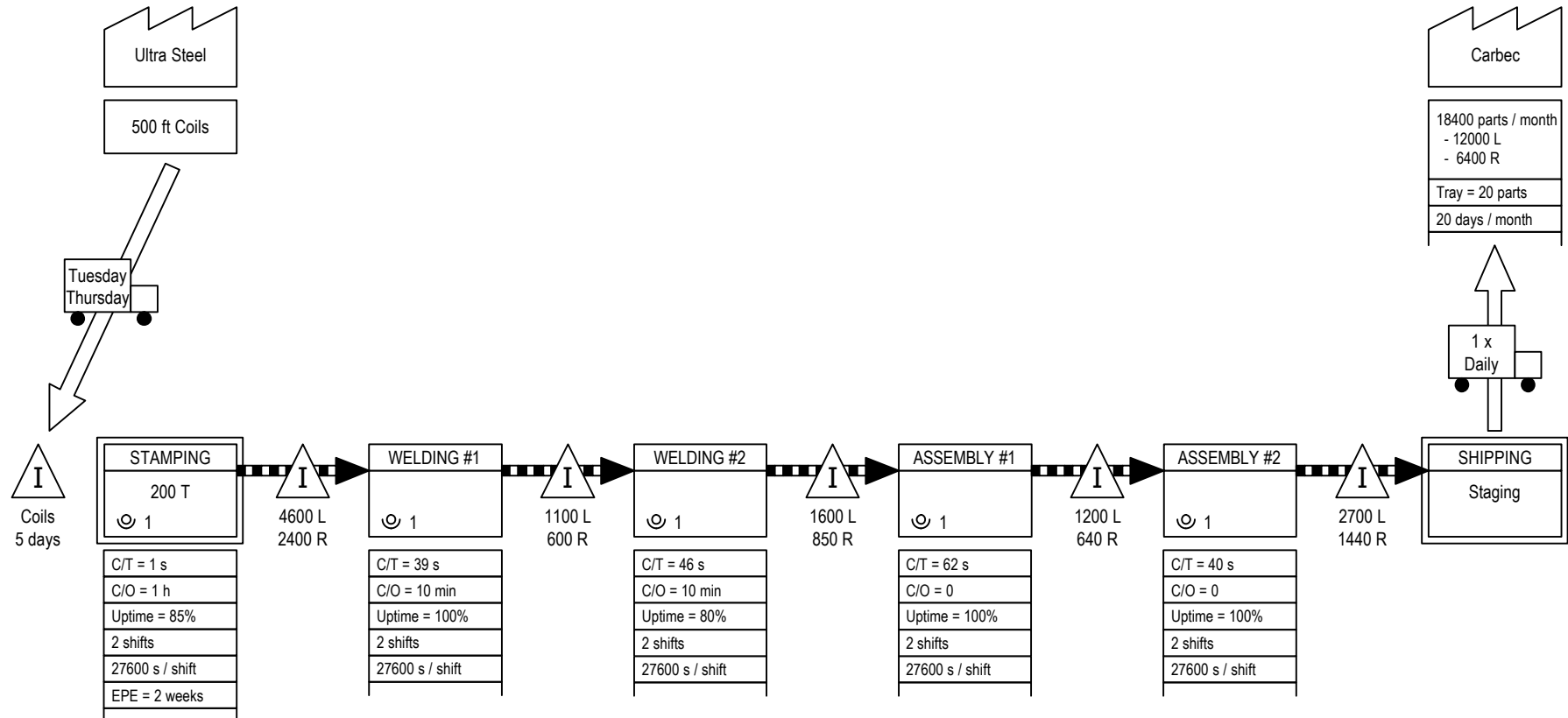
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



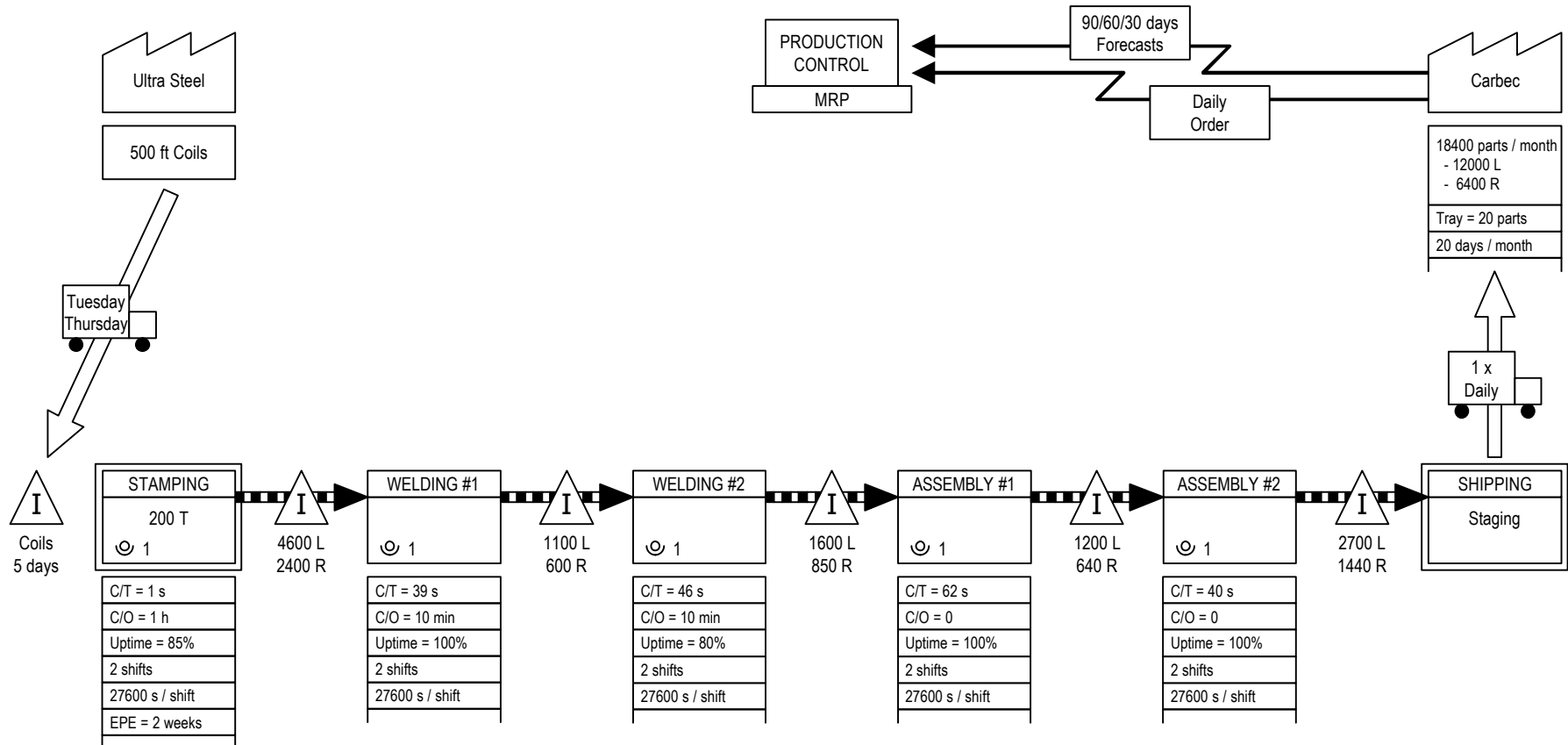
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



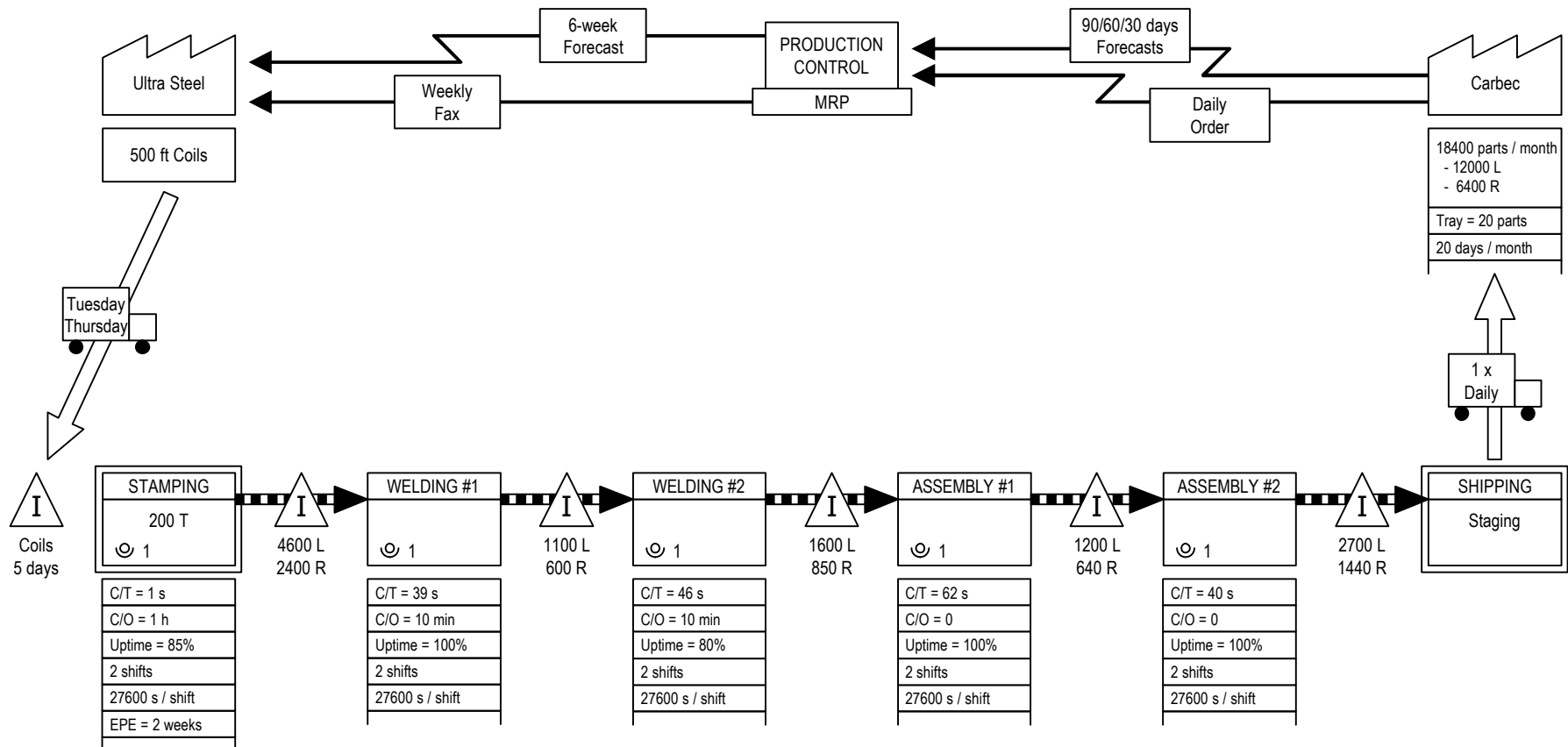
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



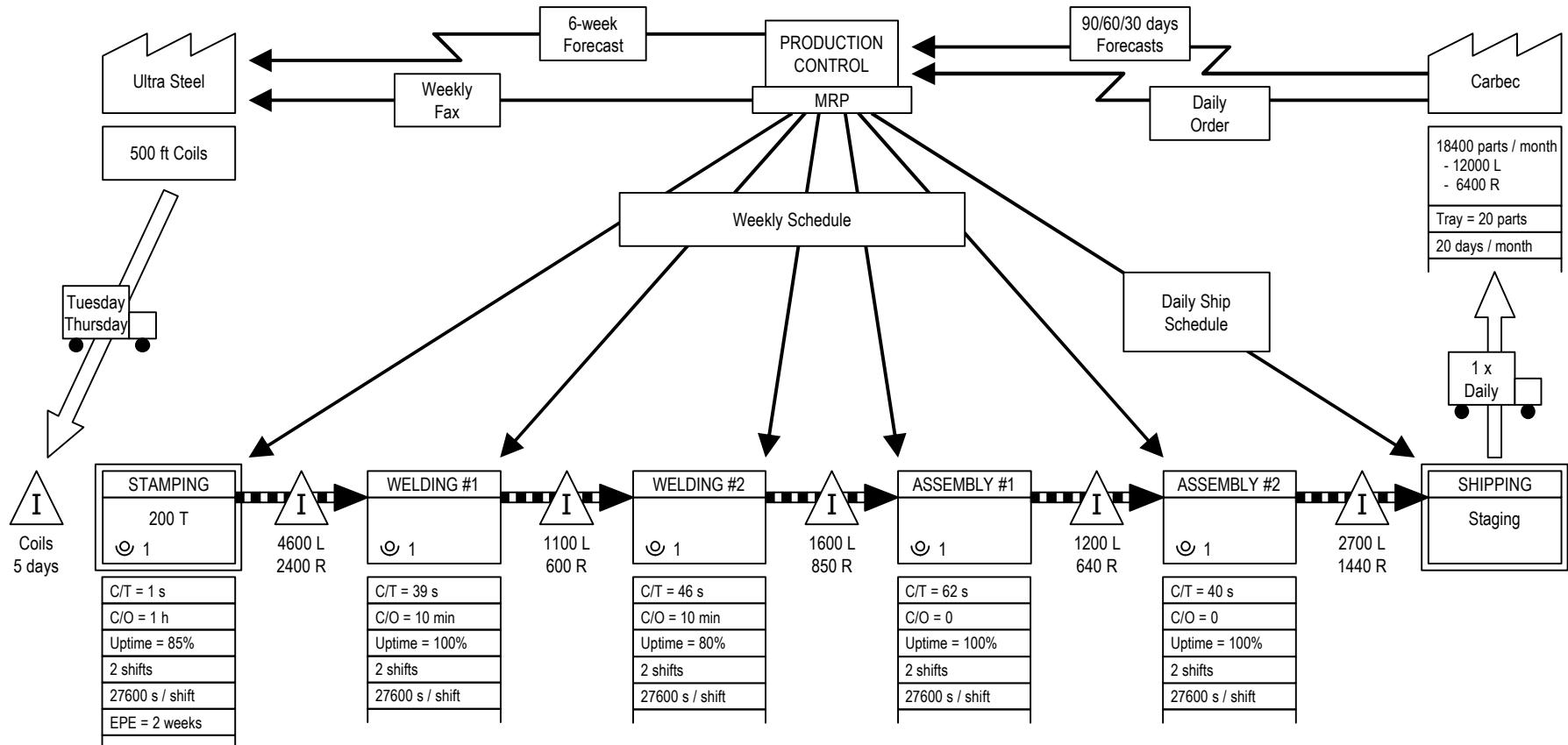
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



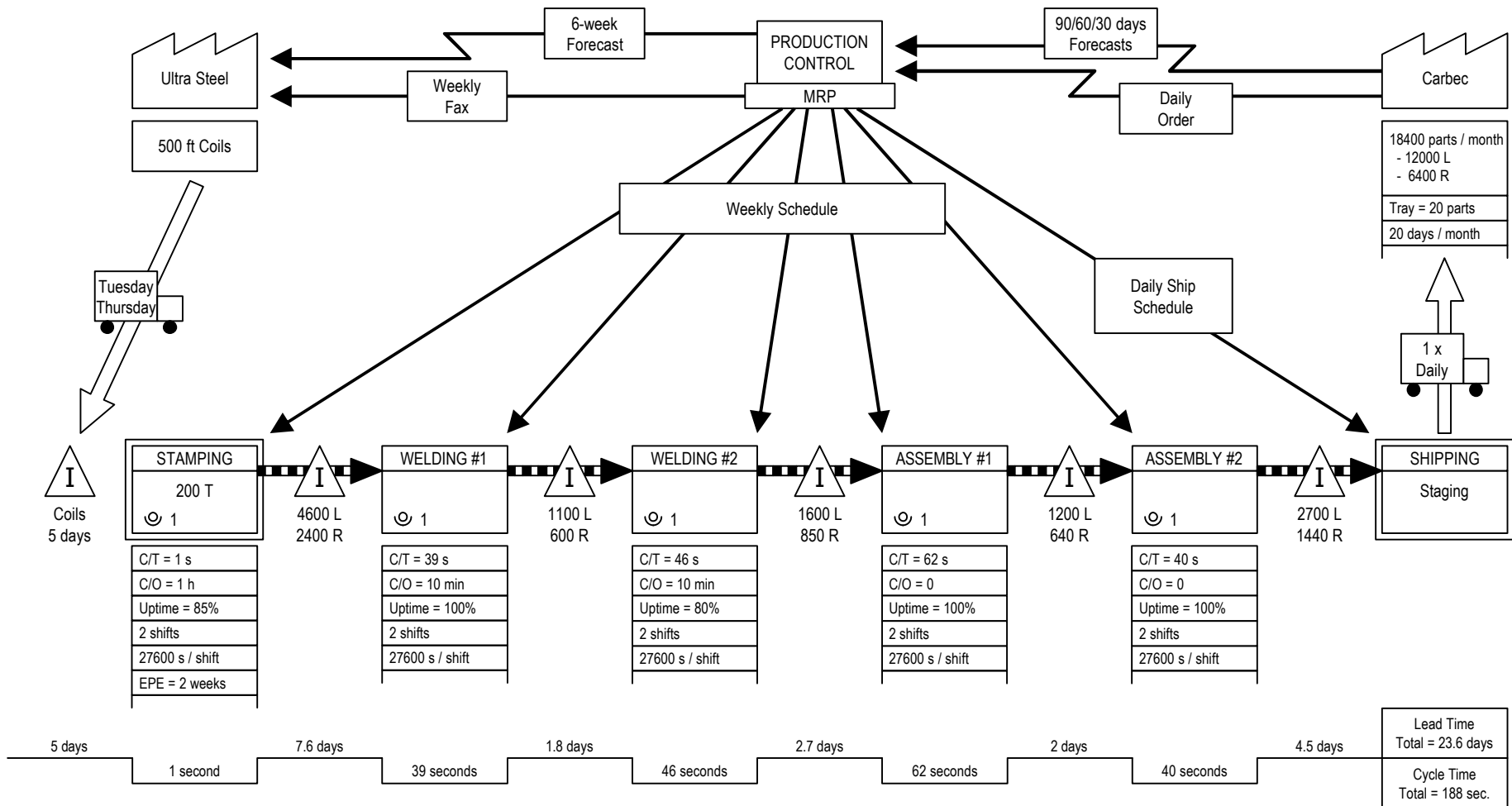
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



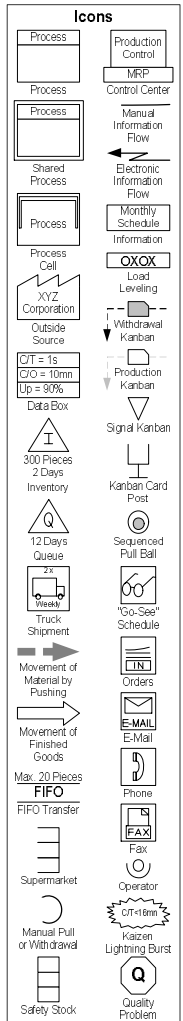
VALUE STREAM MAPPING

CURRENT STATE – ABC COMPANY



VALUE STREAM MAPPING CURRENT STATE – TEAM TIPS

- Mapping the **Current State** :
 - Review **all Processes Steps**.
 - Everyone draw while on the Shop Floor. Be sure to draw both the **Material & Information Flows**.
 - Always introduce yourself to operators and tell them what are you doing. Show them your drawings.
 - Draw only one final Current State Map from all your drawings.
 - Gather **Real Data**.
 - Calculate **Total Lead Time** vs. **Total Product Cycle Time**.
 - Make an overhead transparency of your Map.

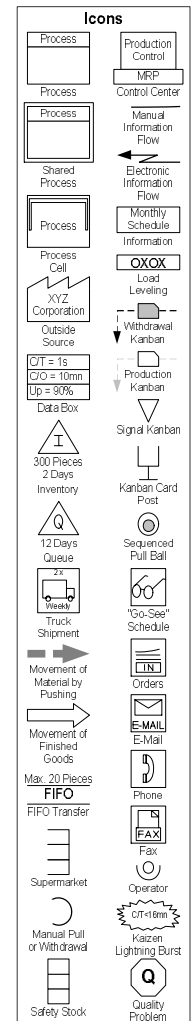


VALUE STREAM MAPPING

CURRENT STATE – TEAM TIPS

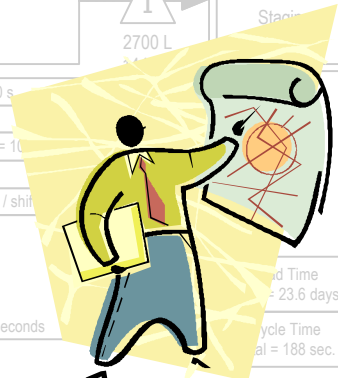
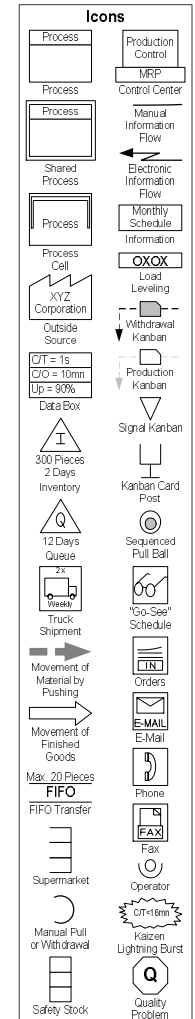
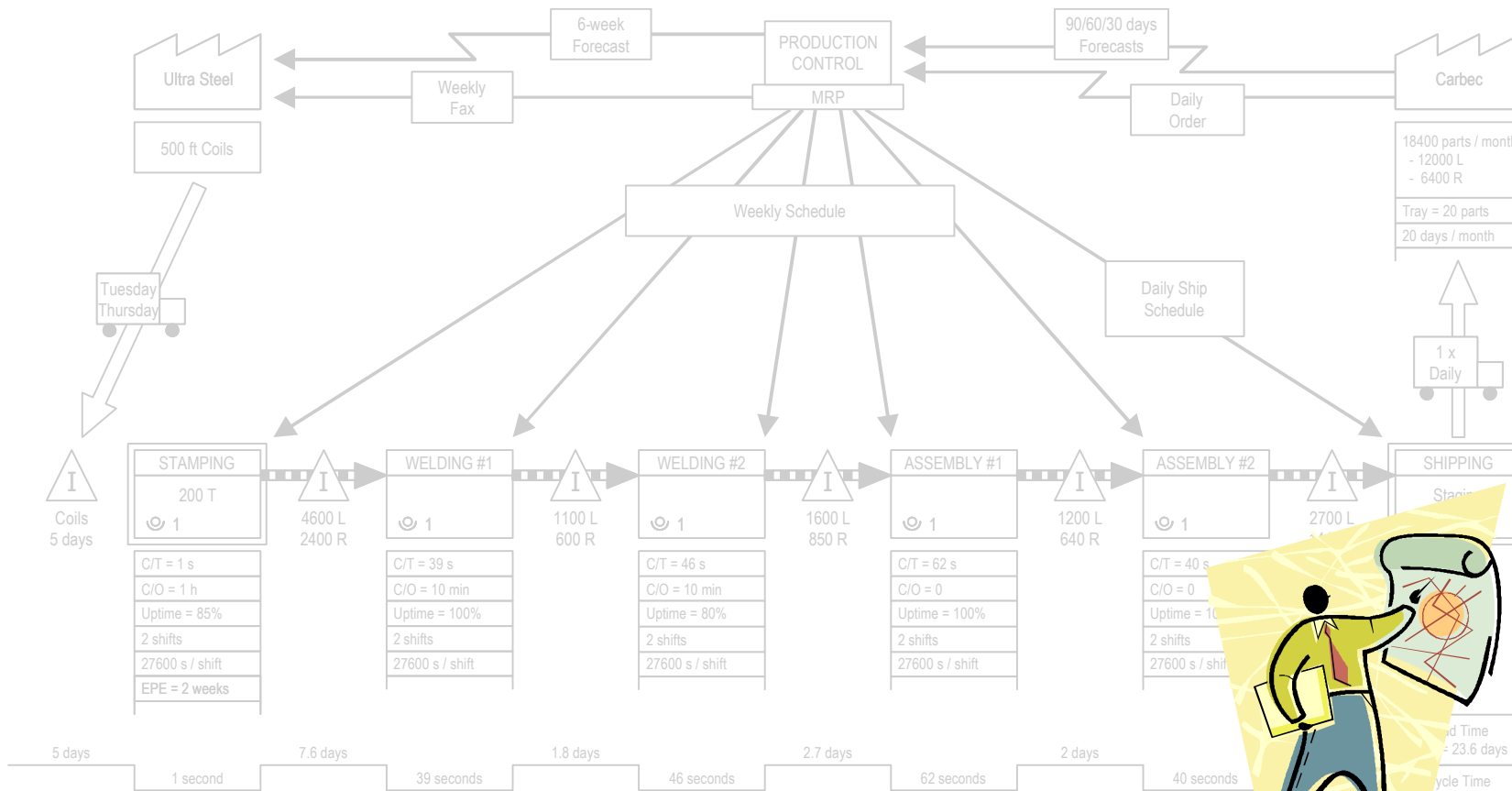
- Presenting your **Current State Map** :
 - **All Team Members** go up front with Presenter.
 - Explain your Product Family.
 - Present from your overhead transparency.
 - Start with the **Customer and Information Flow**.
 - State the **Total Lead Time** vs. **Total Product Cycle Time**.
 - What are the Problems you see ?
 - Where did you find "Push" Production ?
 - Where did you find Inventory & Work-In-Process ?

- **Share any Future State thoughts you have so far.**



VALUE STREAM MAPPING CURRENT STATE – EXERCISE

Team Presentation !



LEAN FLOW MAPPING VALUE STREAM MAPPING

SUMMARY

- Value Stream & Process Definition.
- Current State Map Icons.
- Value Stream Manager.
- Value Stream Mapping – Current State.

LEAN FLOW MAPPING QUESTIONS



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