



Profit Surge Consulting Value Stream Mapping Primer

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Overview



- The following presentation goes over the basics of Value Stream Mapping (VSM).
- This presentation uses an imaginary company called “Occamsrazor” to show how Lean principles and simple mathematics are used to create a VSM that will drive the correct project focus.

Occamsrazor Baseline



- Occamsrazor is a company that makes the Flimflam and is currently under considerable competitive pressure.
- Until recently they had 100% of their market share in their country (X Kingdom) but five months ago three foreign suppliers started importing and selling their version of the Flimflam into X Kingdom.
- The three foreign suppliers are selling their version of the Flimflam at a lower price and providing them at shorter lead-times than Occamsrazor.
- Occamsrazor has already lost almost 30% of their market share and losing more daily.

Baseline Metrics



- The owner of Occamsrazor reviewed the competition and determined these baseline metrics:

	FlimFlam	
	Price	Lead-Time (Days)
Occamsrazor	36	12
Competitor A	31	11
Competitor A	33	12
Competitor A	35	9

- To regain market share the owner of Occamsrazor set these company goals:
 - Reduce lead-time to 8 days
 - Reduce price to 30
 - Maintain profit margin
 - Be able to handle total market volume

VSM Data – Takt Time



- Occamsrazor hired a Lean consultant to help them review their company and put in place improvement plans.
- Current Flimflam volumes where at 30/day but because Occamsrazor hoped to regain most of their market share they set their goals at the total market of 42/day.
- Occamsrazor's employees work one shift of 8 hours with a lunch break of 1 hour so:
 - Total work time is $8 - 1 = 7$ hours or 420 minutes
- Takt time equals the rate at which Occamsrazor is currently creating Flimflams to meet their current customer demands:
 - $420\text{min}/30 \text{ flimflams} = 14 \text{ min/flimflam}$
- Takt time, the rate at which Flimflams would need to be created to meet the total market, would be:
 - $420\text{min}/42 \text{ flimflams} = 10 \text{ min/flimflam}$

Other Key Metrics



- Occamsrazor has 6 full time employees that make Flimflams.
- Labor cost per employee is 13/hour.
- Material cost per Flimflam is 13.
- The total order rework and scrap rate is 48% (ie Rolling Through-put Yield or RTY=48%).
- Total system WIP is equal to 320 Flimflams.

VSM Basics



- Before we get started lets take a look at some basics behind making a VSM.
- This project example is intended to show how Lean concepts can be applied in either manufacturing or the office.
- Although each VSM will be unique, as they focus around different company goals and process characteristics, they all have some similarities.

VSM Basics



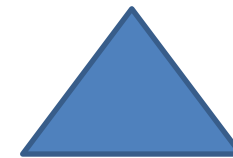
- A VSM has two key shapes:

Process step

Process Step Name		
Cycle Time	4.2	Mins
Resources	3	Qty
FPY	68	%

4.2	Mins
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Queue



Queue

100	Units
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25	Mins
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Process Step



- Process step:

Process Step Name		
Cycle Time	4.2	Mins
Resources	3	Qty
FPY	68	%

Process Steps are made up of a rectangular process step name and key parameters.



Under each process step is the Time-Line defining the Value Added time.

Key Formula:

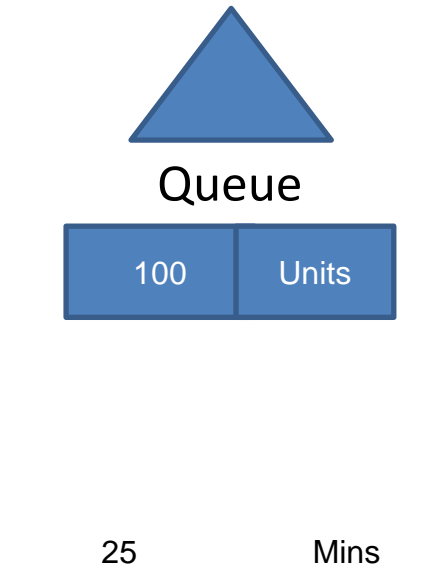
$$\text{Resources} = (\text{Cycle Time}) / (\text{Takt Time}) \times (2 - \text{FPY})$$

The Lean Champion needs to decide what is important for a particular VSM and based on this choose what key metrics to gather under each process step.

VSM Queue



- Queue:



The Queue is denoted by the triangle and specifies the number of units between process steps.

Under each Queue the Time-Line defines the Non-Value Added or wait time.

Key Formula:

➤ $\text{Queue Time} = (\text{Queue Units}) \times (\text{Takt Time})$

Current State VSM

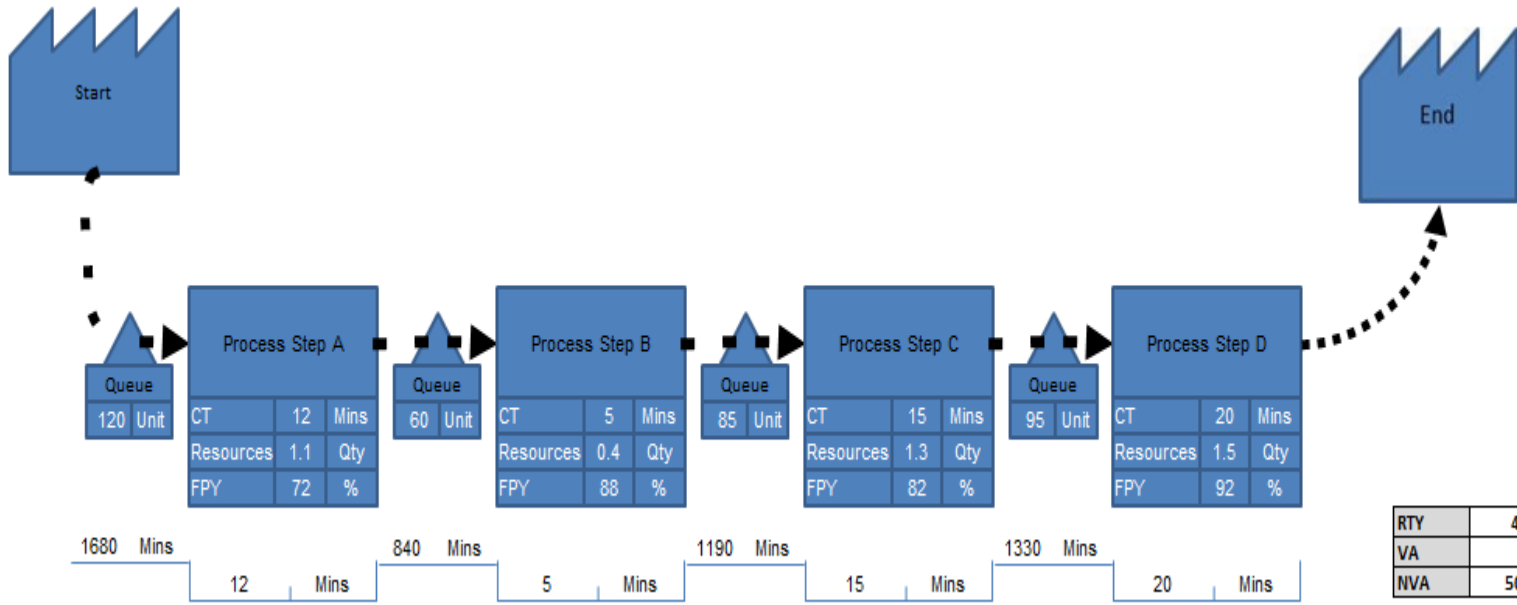


- Next we will see the Current State VSM for Occamsrazor.
- Take some time reviewing this map and note that resources, Work In Process (WIP) and Lead-Time match the current state metrics at Occamsrazor.
- When you make a Current State VSM it takes some skill and time to make sure it matches reality.
- A Current State VSM that does not match the actual current state is useless and must be corrected before proceeding.

Current State VSM



Minutes/Day	420
Current Daily Demand	30
Takt Time	14



RTY	48%
VA	52 Mins
NVA	5040 Mins
or	
NVA	12 Days

Where:

- CT=Cycle Time to make one part at each step.
- Shown resources are calculated. Actual Resources:
 - Step A = 1
 - Step B = 1
 - Step C = 2
 - Step D = 2
- $RTY = FPY A \times FPY B \times FPY C \times FPY D$

Key Observations



- Process Step **A** has less resources than needed to keep up with demand.
- Discussion with the people on the line show that many times the person from **B** is helping out at **A**.
- The person at **B** does not have the proper training to be working at **A** and is contributing to the low FPY at **A**.
- Process Steps **B**, **C** and **D** have more resources than needed.

Current Profit Margin



- Labor cost per employee is 13/hour
- With 7 hours per day and 6 resources at 30 Flimflams per day = $7 \times 6 / 30 = 1.4$ hours
- Labor cost per Flimflam = $1.4 \times 13 = 18.2$
- Material Cost per Flimflam = 13
- Total Cost per Flimflam = $18.2 + 13 = 31.2$
- This assumes no lost material for scrap or rework
- Profit Margin = $(36 - 31.2) / 31.2 = 15\%$

Current State-Takt of 10

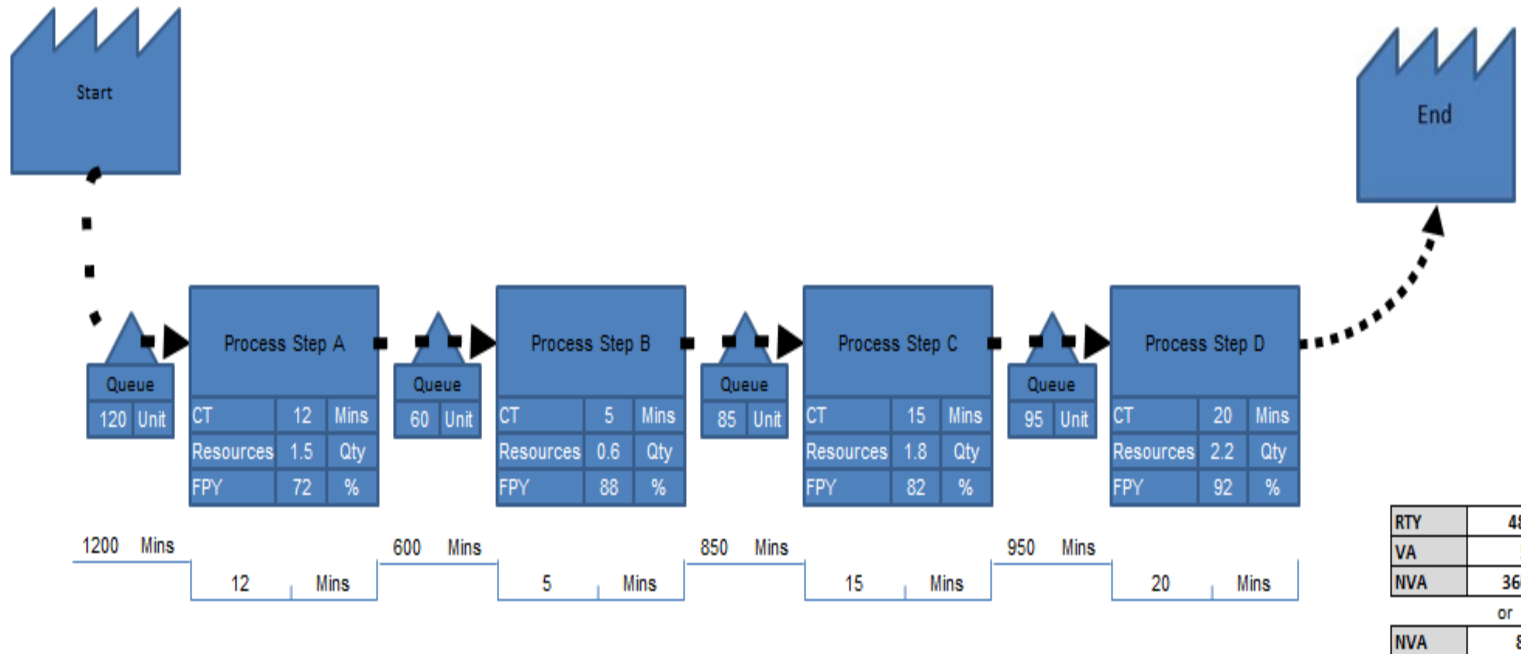


- Since the company goal is to regain the total market of 42 Flimflams per day the Future State needs to take into consideration these increased volumes
- 42 Flimflams per day make at Takt Time of 10 minutes per unit.
- Before going forward lets take a look at how the Current State VSM would look if we plugged in the Takt time of 10.

Current State-Takt of 10



Minutes/Day	420
Current Daily Demand	42
Takt Time	10



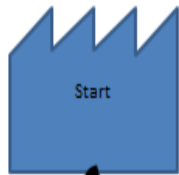
Notes:

- The good news is that the calculated total resources, to meet the total market demand, are 6.1 and so almost equal to the current resources.
- The bad news is that these resources are needed at different work stations than they currently exist.

Potential Projects



Minutes/Day	420
Current Daily Demand	42
Takt Time	10



Process Step A		
CT	12	Mins
Resources	1.5	Qty
FPY	72	%



Process Step B		
CT	5	Mins
Resources	0.6	Qty
FPY	88	%



Process Step C		
CT	15	Mins
Resources	1.8	Qty
FPY	82	%



Process Step D		
CT	20	Mins
Resources	2.2	Qty
FPY	92	%



1200 Mins

12 Mins

600 Mins

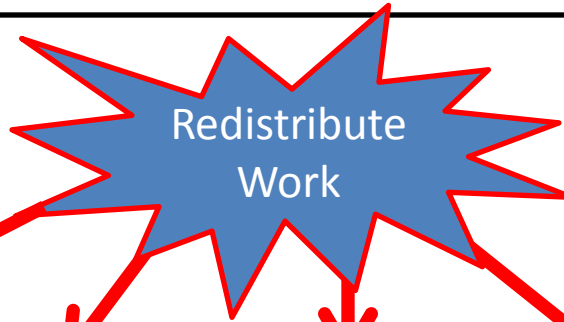
5 Mins

850 Mins

15 Mins

950 Mins

20 Mins



RTY	48%
VA	52 Mins
NVA	3600 Mins

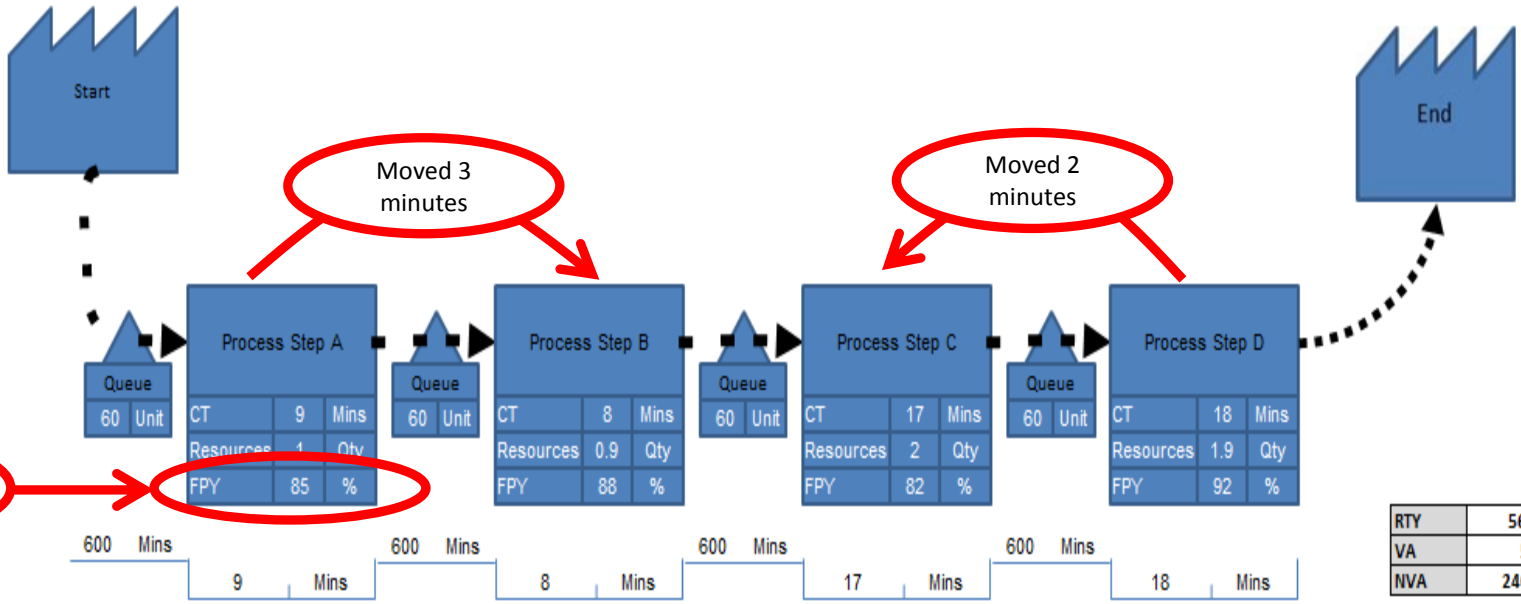
or

NVA	8.6 Days
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Potential Future State VSM



Minutes/Day	420
Current Daily Demand	42
Takt Time	10



RTY	56%
VA	52 Mins
NVA	2400 Mins
or	
NVA	5.7 Days

Notes:

- This potential Future State VSM now shows total labor requirement of 5.8 people and a lead-time of 5.7 day

Future Profit Margin



(please note **red** from goals set earlier)

- Labor cost per employee is 13/hour
- With 7 hours per day and 6 resources at **42**
Flimflams per day = $7 \times 6 / 42 = 1$ hour
- Labor cost per Flimflam = $1 \times 13 = 13$
- Material Cost per Flimflam = 13
- Total Cost per Flimflam = $13 + 13 = 26$
- This assumes no lost material for scrap or rework
- Profit Margin = $(\mathbf{30} - 26) / 26 = 15\%$

Comments



- This potential Future State will meet the goals of 42 Flimflams per day and an 8 day lead-time.
- It will also meet the product price reduction to 30 while maintaining the profit margin.
- The type of projects selected need to be realistic. An experienced operations and supply chain project manager needs to facilitate project selection so that the Future State is achievable.
- Before any projects are started their expected results need to be plugged into a Future State map to confirm that company goals will be met.

Closing



- Thank you for reviewing the Occamsrazor VSM project example.
- Did you find this presentation useful?
- Need more information or have suggestions?
- Please send your questions and feedback to:

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