PRESENTATION

Session: **Textile Processing**

Title: **Reduction of Production time via VSM**

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Conference Organization

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REDUCTION IN PRODUCTION TIME VIA VSM

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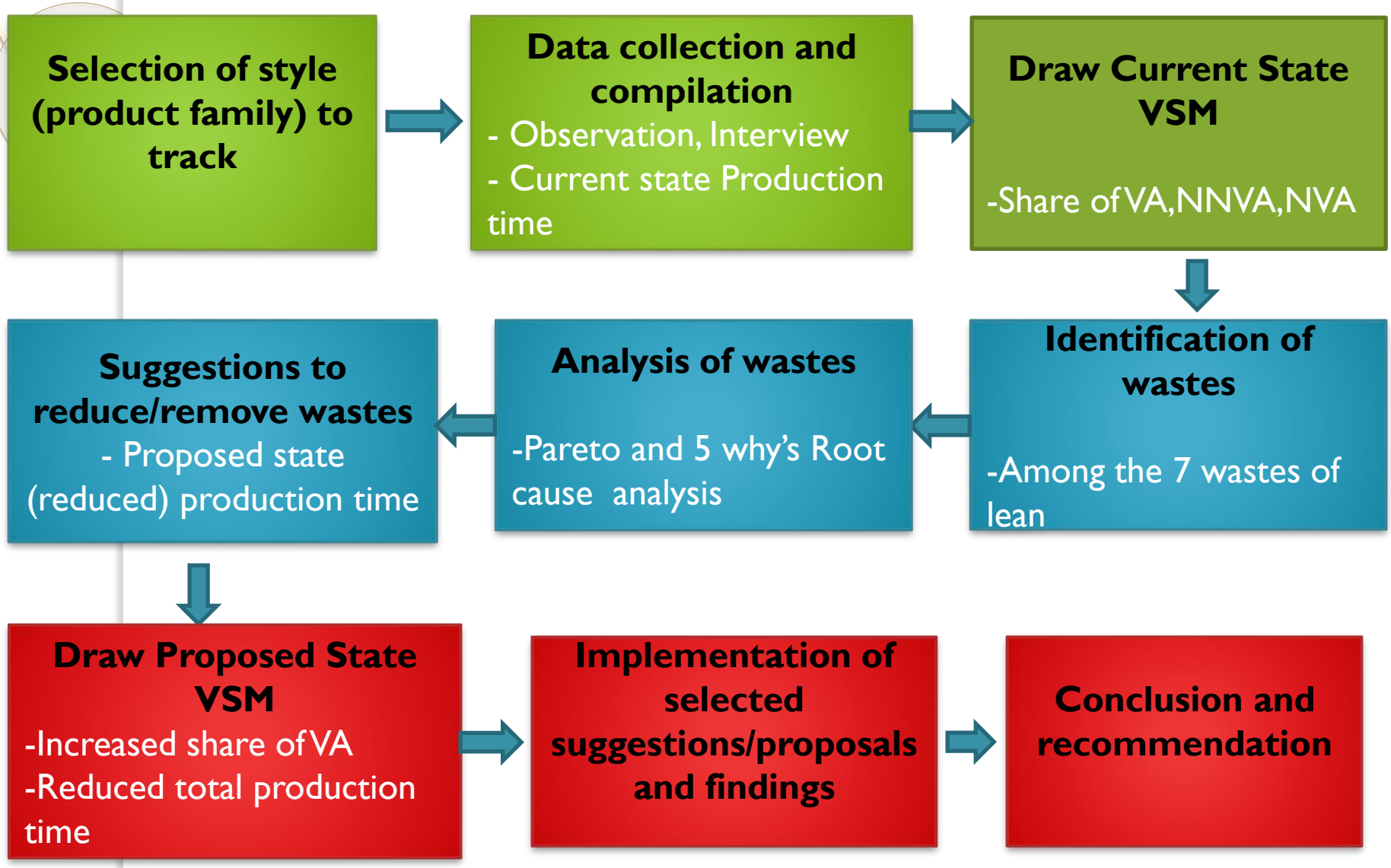
About VSM

- Value Stream Mapping (VSM) is a Lean manufacturing tool, which originated from the Toyota Production System (TPS), and is known as "material and information flow mapping."
- It is primarily used to identify, demonstrate and decrease waste, as well as creates flow in the manufacturing process.
- VSM can be created merely using paper and pencil. It helps to identify and eliminate/reduce non-value added activities.

1. Research Objectives

- To compare the existing scenario of a manufacturing unit with an improved scenario via VSM
- To identify and eliminate or reduce waste in the current state manufacturing
- To reduce production time of a style
- To increase the share of value add activities

2. Research Methodology



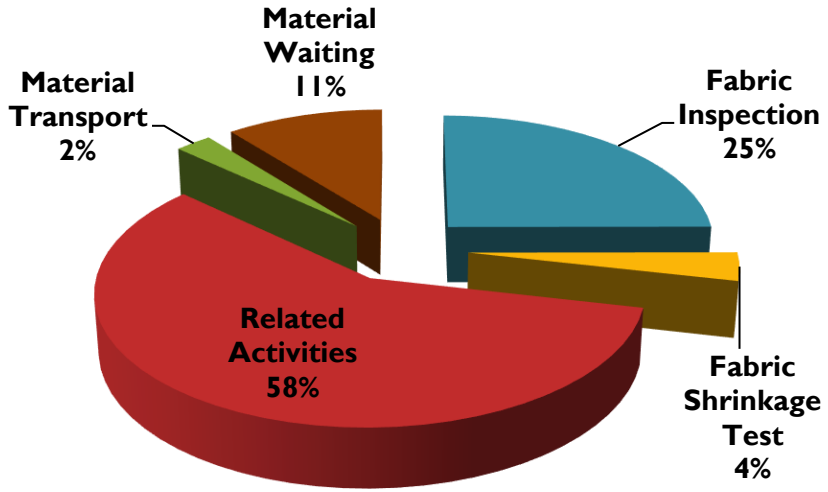
3.1 Style Selection

Style tracked#	Ladies dress, *(from fabric store to final finishing*
Fabric composition	100% rayon
Color	RFD
GSM	120
OQ	24,590 pieces
Total fabric quantity/quantity tracked	52109 meters/ 1236.98 meters
Qty of Ply tracked	(151 plies or 16 rolls) (604 pieces)
Size ratio	S:M:L:XL = 1:1:1:1

3.2 Production Time : Fabric Store

(Reduction in production time.excel.xlsx)

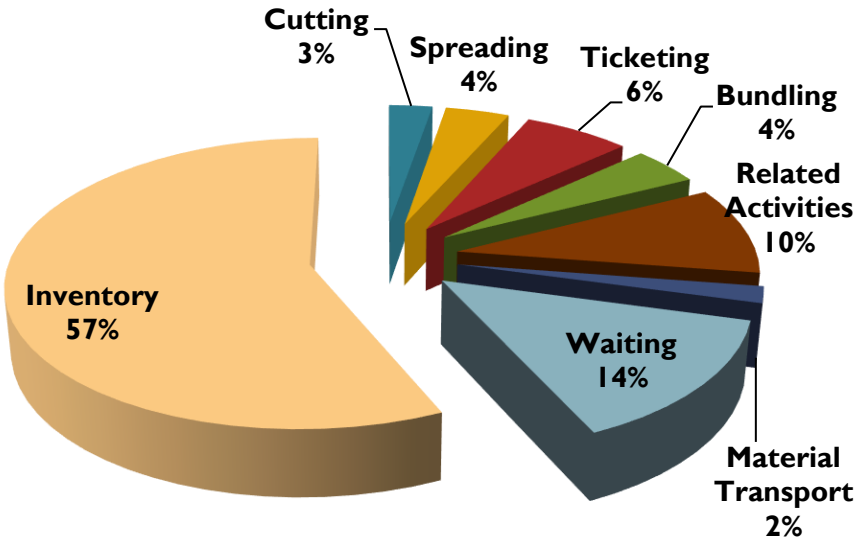
Activity	Quantity	Duration
Value Add	-	-
NNVA (unavoidable)	19	1413.47 min
NVA (avoidable)	3	175 min
Total	22	1588.47 min (3.309 days)



3.3 Production Time : Cutting

Reduction in production time.excel.xlsx

Activity	Quantity	Duration
Value Add	1	57 min
NNVA (unavoidable)	17	560.27 min
NVA (avoidable)	4	1495 min
Total	22	2112.27 min (4.4 days)



3.4 Production Time in Sewing

Work Sampling

- Sample size determination (WS1.docx)

  (Number of observations are required?)

- Determination of observation frequency (WS2.docx)

  (Interval between observations)

- Categorization of activities (WS3.docx

  (Given by the Standard)

- Data recording (WS4.docx)

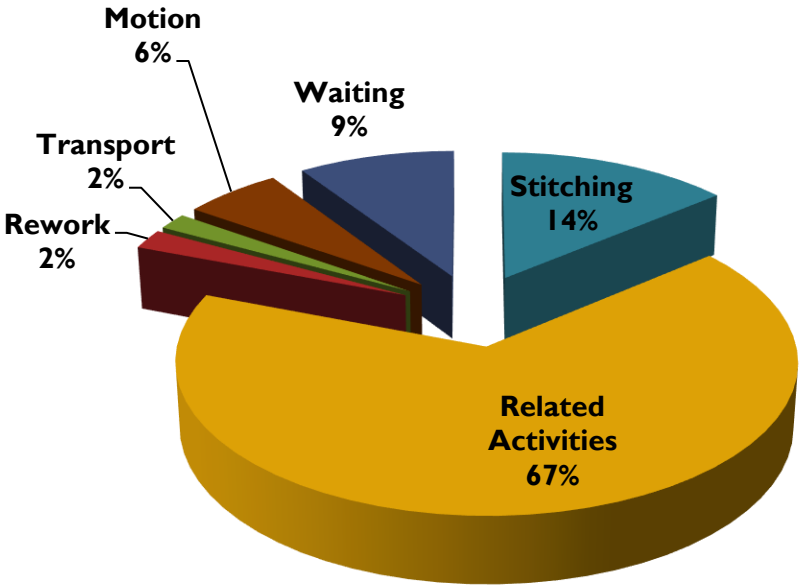
  (Determine the % share of activities)

Work Sampling
-To determine % share of various activities in sewing section

Cont…Production Time : Sewing

Reduction in production time.excel.xlsx

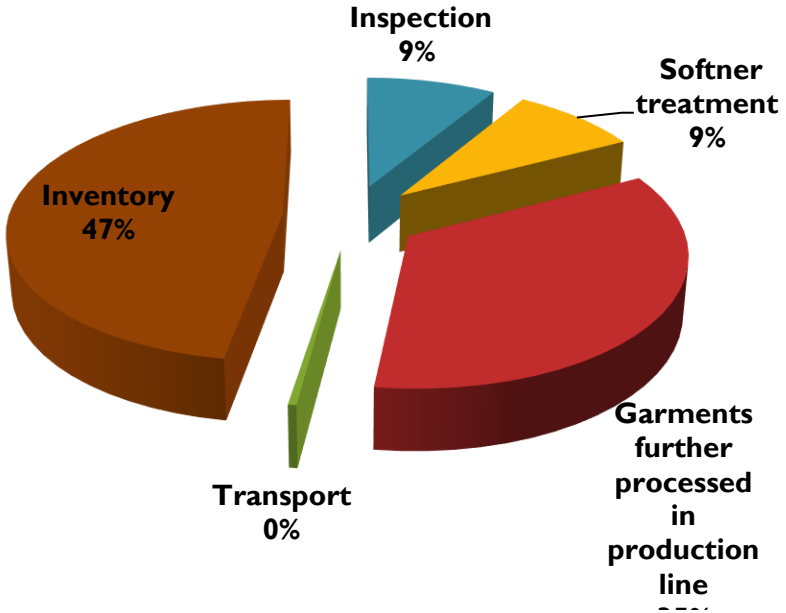
Activity	Quantity	Duration
Value add	1	144.74 min
NNVA (unavoidable)	13	737.12 min
NVA (avoidable)	5	151.54 min
Total	19	1033.4 min (2.15 days)



3.5 Production Time : Dispatch Area

Reduction in production time.excel.xlsx

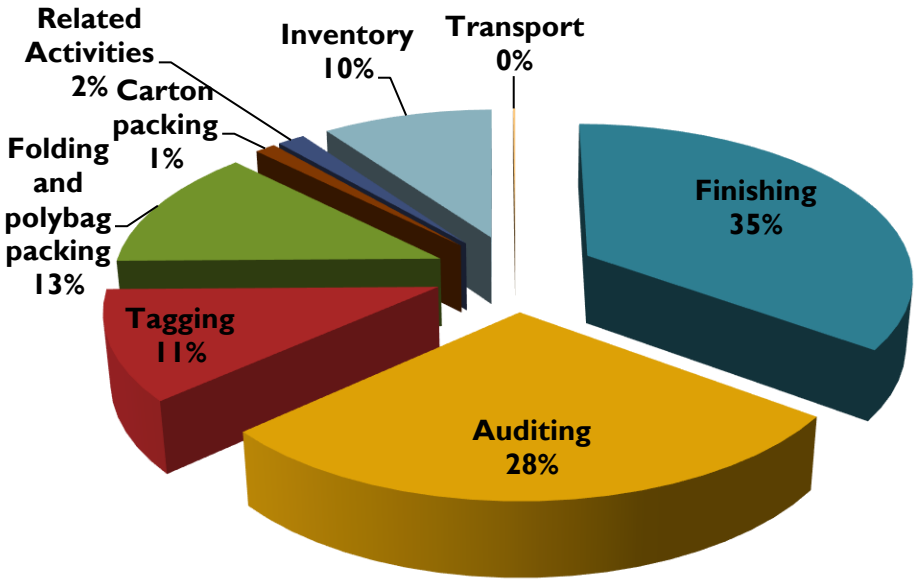
Activity	Quantity	Duration
Value Add	-	-
NNVA (unavoidable)	6	1446.3 min
NVA (avoidable)	2	1306 min
Total	8	2752.3 min (5.73 days)



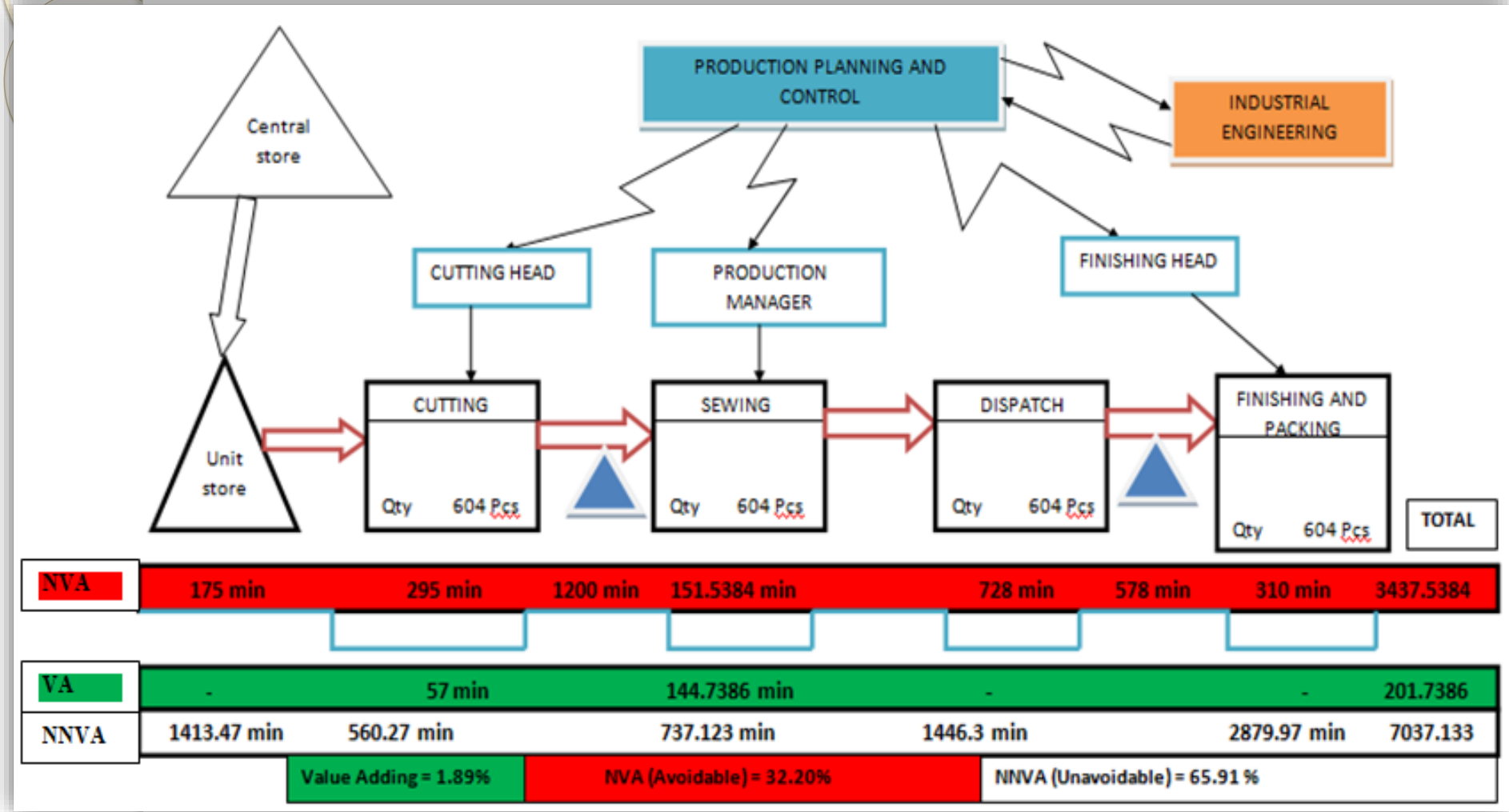
3.6 Production Time : Finishing and Packing

(Reduction in production time.excel.xlsx) (Finishing time.docx)

Activity	Quantity	Duration
Value Adding	-	-
NNVA (unavoidable)	28	2879.97 min
NVA (avoidable)	2	310 min
Total	30	3189.97 (6.646 days)



3.7 Current State VSM



4.1 Wastes Identified

Waste	Section	Duration
Waiting	Fabric Store	**170 min -** Waiting to get approval of lots
Transport	Fabric Store	**40 min -** Pressing of test samples and get approval of lots
Waiting	Cutting	**160 min -** To get signed shrinkage report from R&D
Waiting	Cutting	**15 min** - Lay waiting for cutting operators
Waiting	Cutting	**120 min** (Waiting for bundle tags)
Inventory	Cutting	**1200 min** – Cut pieces stored in cutting
Transport	Cutting	**39 min** – transporting rolls to cutting section and taking tied cut pieces to ticketing area
Motion	Sewing	**61.19 min-** Operators uncontrolled movement to wash rooms

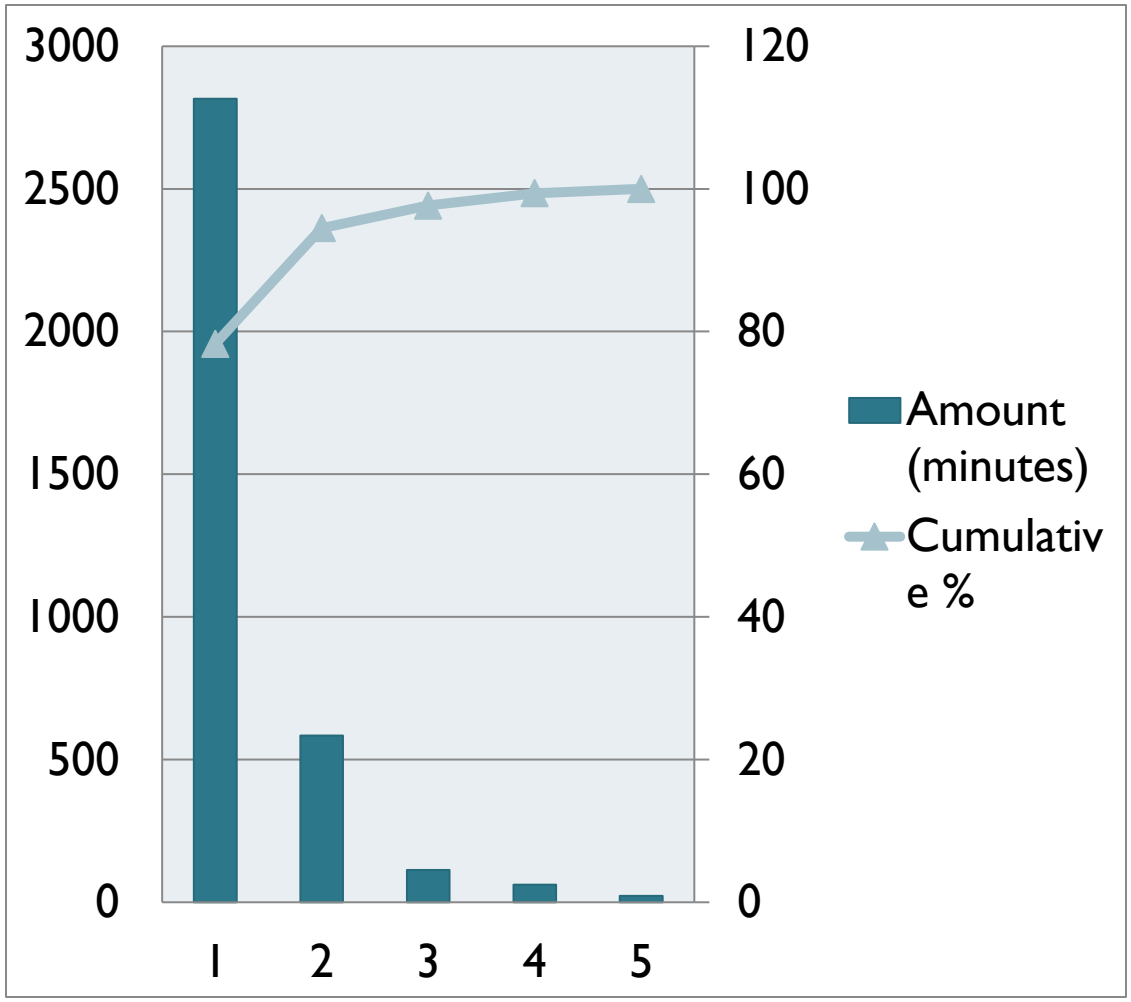
Wastes identified…cont

Waste	Section	Duration
Transport	Sewing	**18.63 min** – for taking cut pieces to sewing and transporting tools and material in the sewing floor
Waiting	Sewing	**119.48 min-** due to rethreading, waiting for work and negligence
Rework/Defect	Sewing	**22.34 min** – correcting of defective pieces
Transport	Dispatch	**12 min** – transported to washing and Kaj button
Inventory	Dispatch	**1306 min-** Before sending garments to production line and then to finishing and packing
Inventory	Finishing and packing	**310 min-** At audit point and after pieces are ploy bag packed
Transport	Finishing and Packing	**4 min-** taking pieces to final audit point

Total : 3598.43 min of Waste

4.2 Pareto Analysis of Wastes

No	Waste	Amt (min)	Cum.(min)	Cum (%)
1	Inventory	2816	2816	78.26
2	Waiting	584.48	3400.48	94.50
3	Transport	113.63	3514.11	97.66
4	Motion	61.98	3576.09	99.38
5	Defect	22.34	3598.43	100



4.3 5 Why's Analysis of Wastes

Inventory Waste – Cutting Section

Problem: Bundles ready to be issued to sewing are unnecessarily stored in cutting section

1200 min

WHY?

Because request for cut pieces did not come from sewing

WHY?

Because the sewing line has work in hand. Bundles are cut more than required by sewing section

WHY?

This is the company policy. Bundles are kept in hand at least 2 days in advance before issuing to sewing.

Root Cause

❑ Inventory waste – Dispatch area

Problem: Garments received from washing section are kept for long before sending them to production line for further processing

728 min

WHY?

Because, Production line is not set for further processing

WHY?

Because of delay by the dispatch area in informing the production section for line set up.

WHY?

Because keeping pieces in dispatch before issuing to production is a routine task and is inflexible to change

Root Cause

❑ Waiting Waste –Fabric Store

Problem: Approval for fabric lots from the merchants' team Was not in hand (unit's fabric store). As a result, issuing of rolls of fabric to cutting section gets delayed

170 min

WHY?

Because approval was not sent from the central store

WHY?

Because signing of the merchant for the approval of lots not obtained

WHY?

Because there is no merchant in the central store so the lots have to be taken to the main office to get signing

WHY?

Because merchants are only to physically attend in the main office .This is how the company works

Root Cause

❑ Waiting Waste- Cutting

Problem: Bundling of ticketed pieces does not start immediately after ticketing is completed

120 min

WHY?

Because bundling tags are not available by the time

WHY?

They are in the process of getting prepared because they are not prepared earlier

WHY?

Lack of proper systematic/timely communication b/n bundle tag personnel and ERP section

Root Cause

5.1 Suggestions on Inventory waste

Sect.	Proposed Suggestion	Time saved
Cutting (1200 min)	Company produces for variety of customers. It should reconsider its working policy and only the next day sewing requirement has to be cut.	720 min
Dispatch (728 min)	-The dispatch section informs the production section before/as soon as they start receiving pieces from dying. Since 8 m/cs are required to be set for further processing it will not take more than 2 hours to do so.	608

5.2 Suggestions on Waiting Waste

Section	Suggestion	Time saved
Fabric Store (170 min)	A representative from the merchants' team shall be placed in the central store so that the process between the central store and the main office which leads to waiting can be avoided.	170 min
Cutting (120 min)	The bundling tag head, instead of waiting for cut pieces to come, has to go and check the status of the cutting process. There is a process of tying up of cut pieces (on the same table where cutting is done) after cutting is over. It is better if the request for bundle tags is sent at this stage of the process.	120 min

6.1 Production Time: Current State Vs Proposed State

Reduction in production time.excel.xlsx

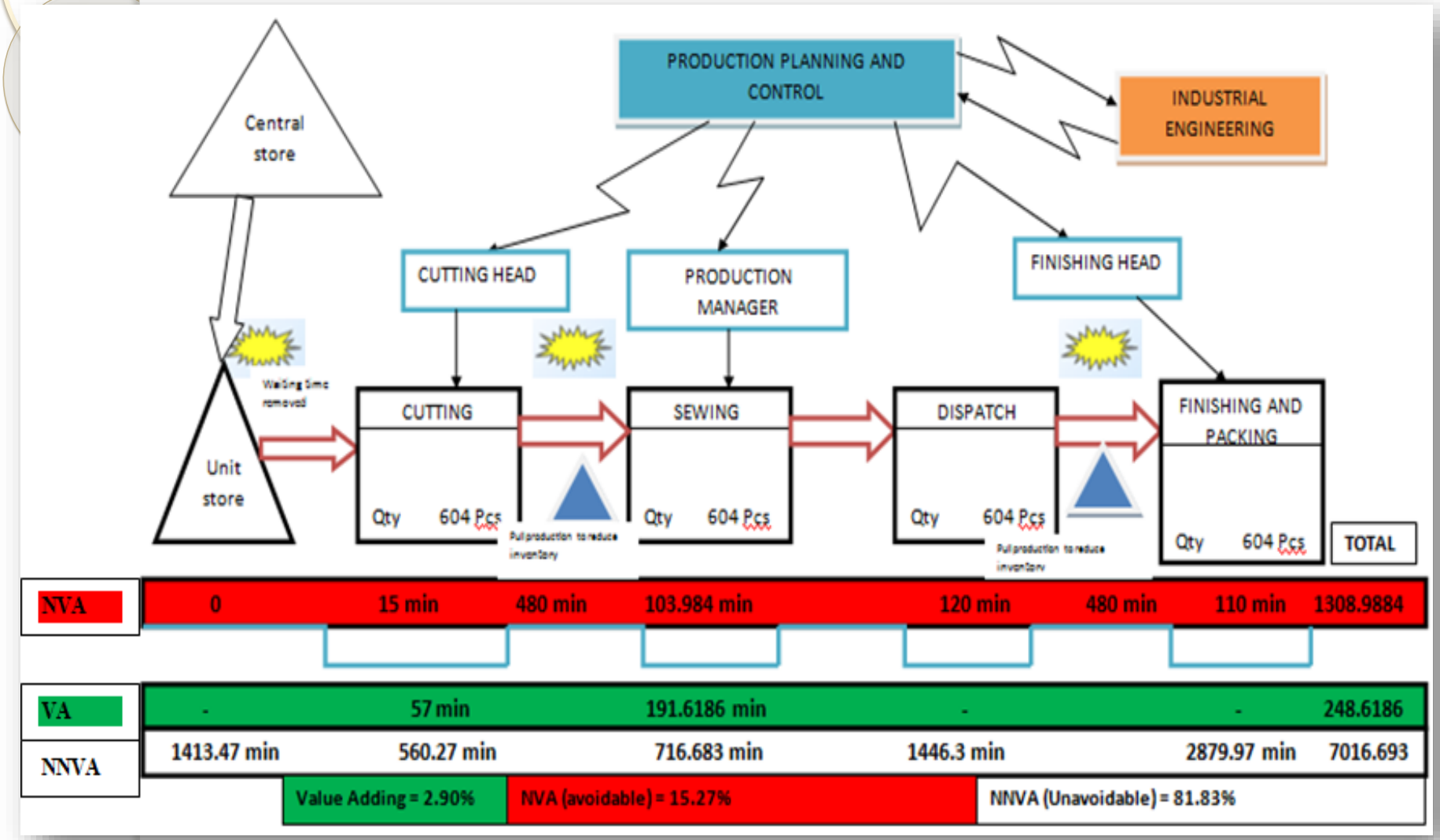
Section	Activity	Current State	Proposed State
Fabric Store	VA	-	-
	NNVA	1413.47 min	1413.47 min
	NVA*	175 min	-
Total		3.31 days	2.94 days
Cutting	VA	57 min	57 min
	NNVA	560.27 min	560.27 min
	NVA*	1495 min	495 min
Total		4.4 days	2.32 days
Sewing	VA*	144.74 min	191.62 min
	NNVA*	737.12 min	716.68 min
	NVA*	151.54 min	103.99 min
Total		2.15 days	2.11 days

Cont…

Reduction in production time.excel.xlsx

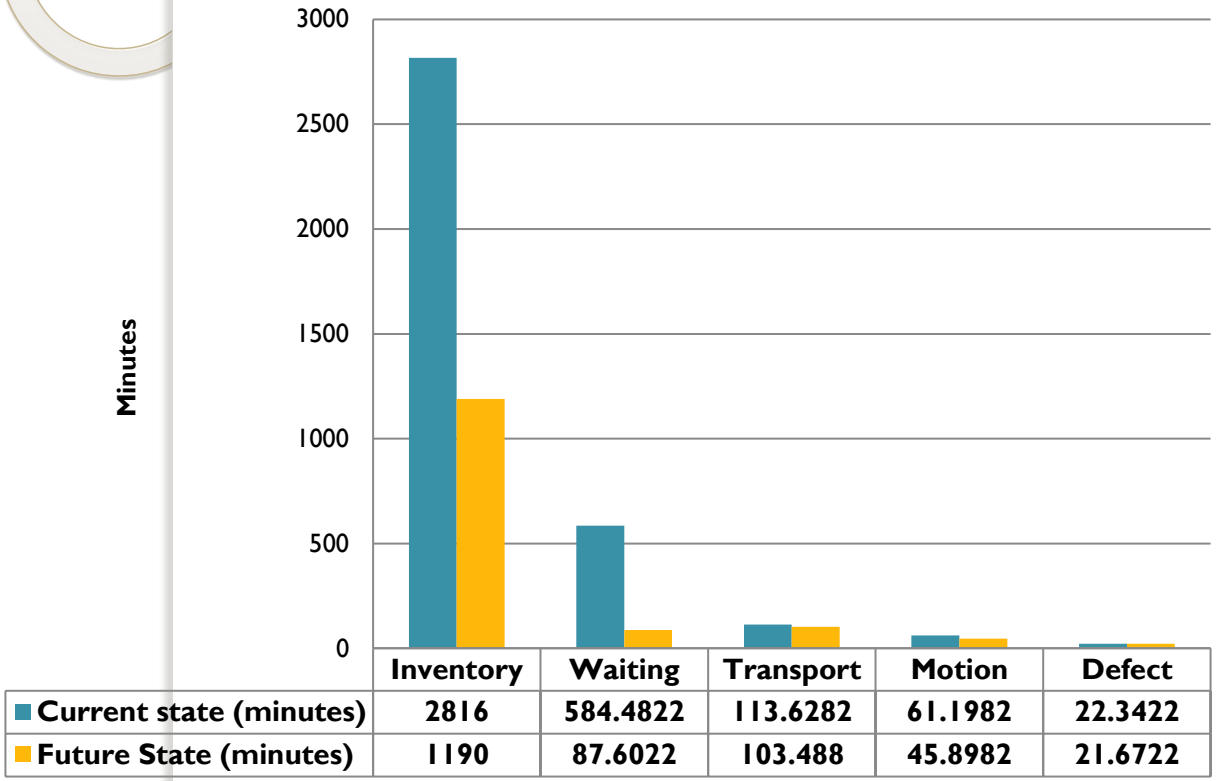
Section	Activity	Current State	Proposed State
Dispatch Area	VA	-	-
	NNVA	1446.3	1446.3 min
	NVA*	1306 min	600 min
Total		5.73 days	4.26 days
Finishing and Packing	VA	-	-
	NNVA	2897.97 min	2879.97 min.
	NVA*	310 min	110 min
Total		6.65 days	6.23 days
Grand Total		22.24 days	17.86 days
Reduction in production time		4.38 days or (19.69 %)	

6.2 Proposed State VSM



6.4 Wastes: Current State Vs Proposed State

Reduction in production time.excel.xlsx



	Inventory	Waiting	Transport	Motion	Defect
Current state (minutes)	2816	584.4822	113.6282	61.1982	22.3422
Future State (minutes)	1190	87.6022	103.488	45.8982	21.6722

Waste	% Reduction
Inventory	57.74
Waiting	85.01
Transport	8.92
Motion	25
Defect	2.99

59.73 % reduction in the total waste

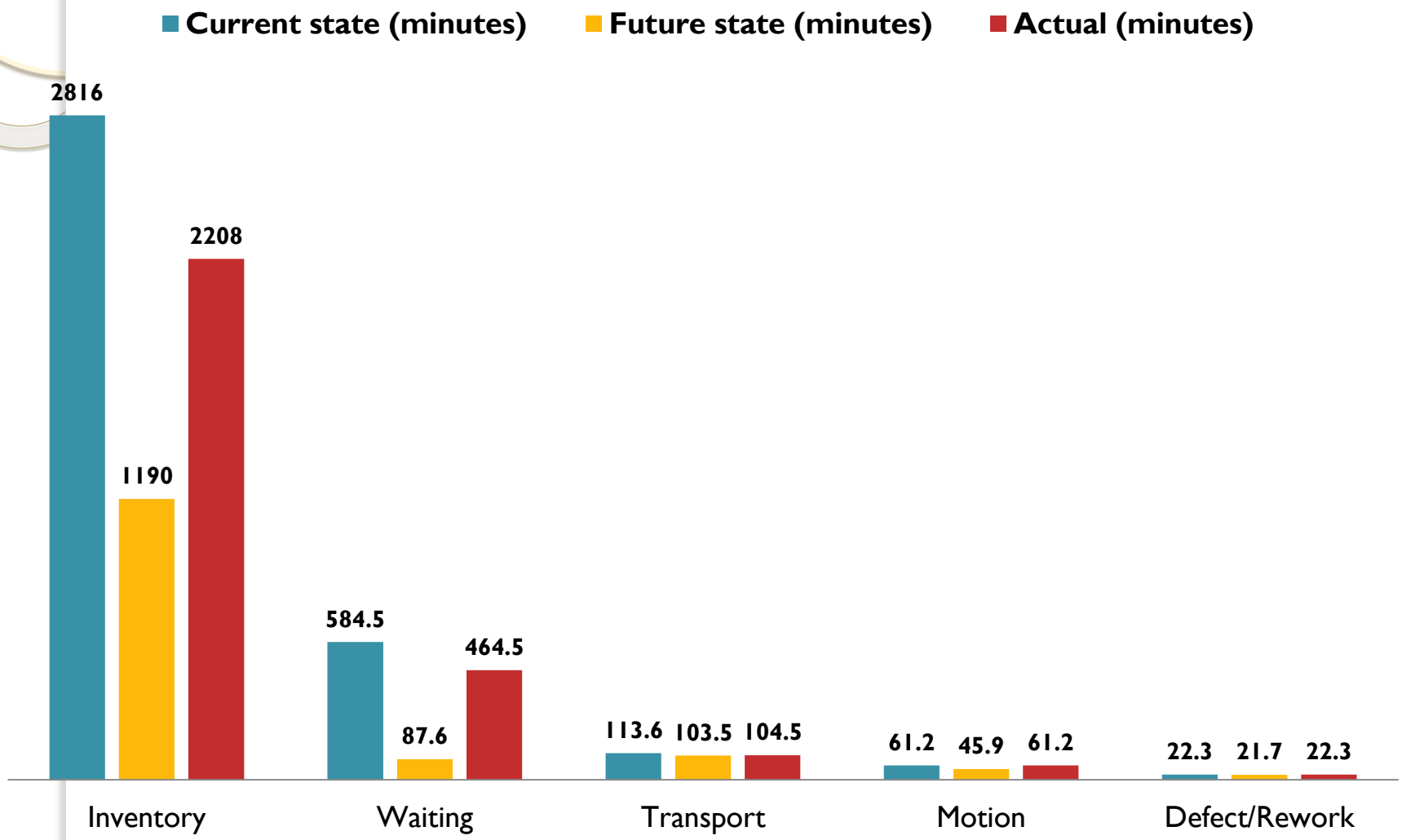
Implementation (Inventory –Dispatch area)

Before implementation	After implementation
- Incoming pieces are stored in dispatch area - Production section is informed about garment pieces by the time they are told to take the same for further processing.	-As soon as dispatch area starts receiving pieces from dyeing, information is passed on to production section
-Lay out of machines in the production area is done when/after pieces are received from dispatch area	- Lay out of machines is done before pieces are received from dispatch
-Pieces are kept in production area for a while before the start of further processing	- Further processing starts as soon as pieces are received by production

Implementation (Waiting – Cutting section)

Before implementation	After implementation
Bundle tag person sits idle for a long time	Bundle tag person observes the status of cutting by going to cutting area.
Request for bundle tags is placed at ticketing stage	Request for bundle tags is placed as soon as pieces start coming out of cutting
Bundle tags start getting prepared by the time ticketing is already in process	Bundle tags start getting prepared way before ticketing. They get prepared at the end of cutting and beginning of tying up of cut pieces.

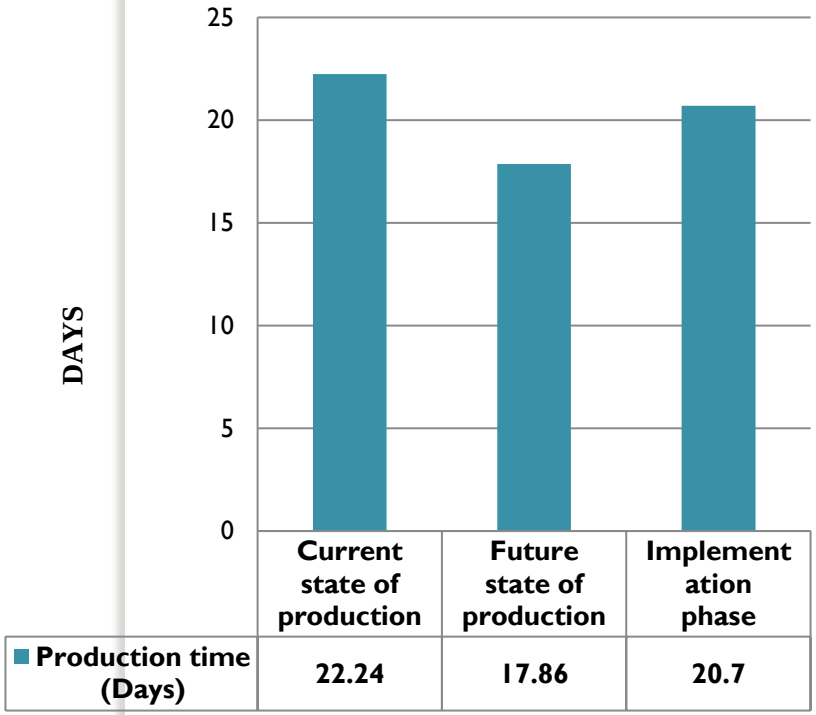
7.4 Summary of Findings: Waste Reduction



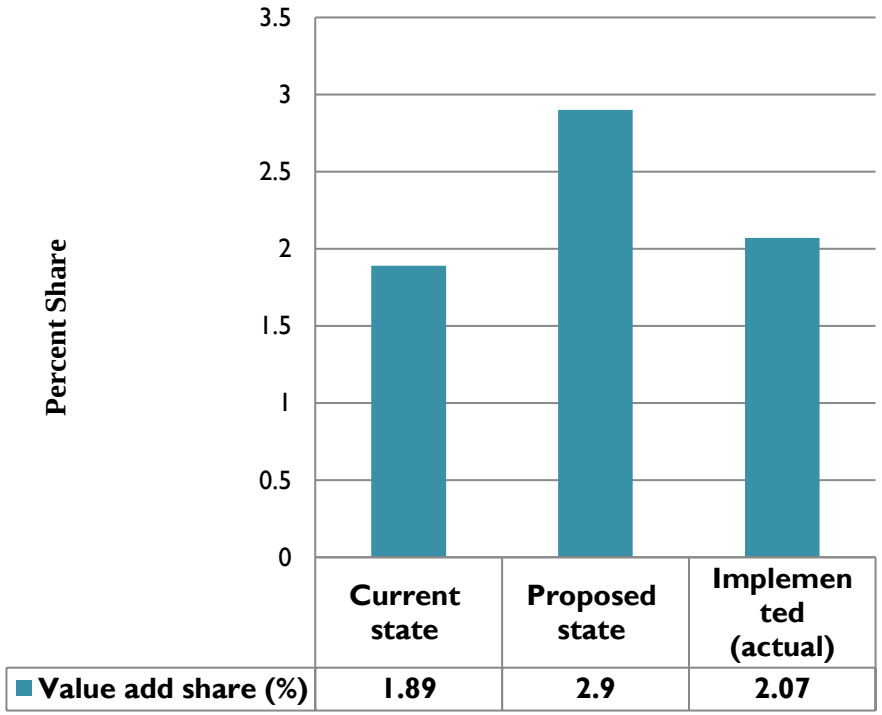
Reduction in production time via VSM

7.5 Summary of Findings :Production time and VA share

Production time (current vs future vs actual)



Value add share (current vs future vs actual)



7.6 Findings of Implementation

- More than 20% of the identified wastes have been removed from the process
- Value added time is increased from 1.89 % to 2.07 %
- It has been able to achieve a 6.9 % reduction in production time

8. Conclusion

Proposed state of Production showed that:

- Production time can be reduced from 22.24 days to 17.86 days which is about 19.6% (4.38 days)
- Share of VA activities can be reduced from 1.89 % to 2.9 %
- 59.73 % of the identified wastes can be removed from the process

The following are actually achieved

- Production time is reduced from 22.24 days to 20.7 days which is about 6.9 % (1.54 days)
- Share of VA activities is reduced from 1.89 % to 2.07 %
- 20.49 % of the identified wastes are removed from the process

THANK YOU