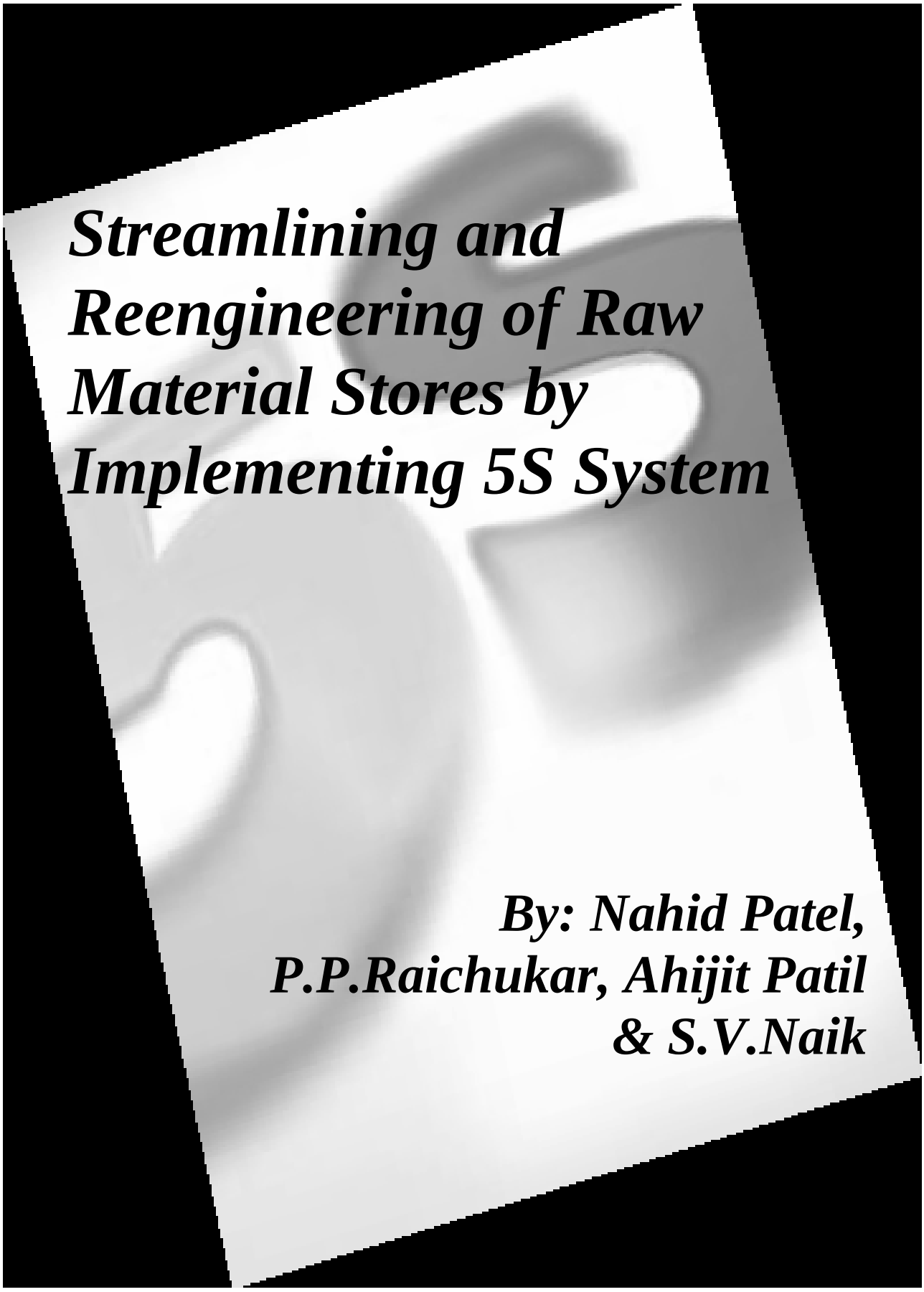

Streamlining and Reengineering of Raw Material Stores by Implementing 5S System

By: Nahid Patel, P.P.Raichukar, Ahijit Patil & S.V.Naik

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Introduction

After detailed study on the existing situation, the project work concerns troubleshooting the problem that directly and indirectly interrupts the production. The burning issue was tracked in the fabric stores department which forms the base of firm. Because in the fabric stores there was higher delay and waiting time during fabric issual either sampling or bulk fabric. This was due unorganized storage area, no summoning system and inefficient and insufficient manpower.

Thus implementation of 5'S system was must so as to acquire effective workplace organization and standardized work procedure. The 5'S simplifies the work environment reducing the wastages and non value adding activities.

The project title being 'Streamlining and Re-engineering of Raw material stores by Implementing 5'S System'. The objectives are to streamline the whole process flow and thus minimizing the unnecessary wastage of time and to implement the 5'S housekeeping system. The 5'S implementation was further divided into two stages as re-engineering of layout and bin card implementation. The layout was re-engineered by sorting the material buyer-wise and style-wise. Also the quantity of material per pallet was standardized. Bin card was implemented for the ease of identification of material.

The methods used for the analysis of the current situation are:

1. Cause and effect analysis
2. Failure mode effect analysis

After the development and approvals of the mitigation suggestions, the implementation part began. Maximum suggestions have been implemented, with some of them under partial implementation.

Project Methodology

This project work is to a greater extent based on the Lean Methodology of Toyota production system. And most of the tools adopted in the process come under Lean methodology of streamlining the whole process flow.

Basic pedagogy used for carrying out of the project

Observation

⇩

Materials and Methods
(Data collection and analysis)
Failure mode and effects analysis
Cause and effect analysis

⇩

Development of target areas

⇩

5's implementation
Streamlining of process flow
5's implementation
Re-engineering of layout.

⇩

Project gains

⇩

Conclusion and recommendations

Material and methods

Phase I – Observation

The following observations were made in the first few days:- The store room given the least preference from the rest of the company personnel and also from the people working inside it.

- No existing organization or system inside the store room as far as the storage of the raw materials is concerned.
- Issues regarding material issues between the store and the material receiving departments i.e. cutting, sewing, and finishing.
- The personnel and staff found to be negligent in following appropriate systems, present at that moment.
- Negligence in iodations to be made in the system. Transactions taking place orally.

Phase II – Material and Methods (Data Collection and Analysis)

The second phase in the project includes the interpretation of existing situation in the fabric stores and thus after analysis incorporated with the discussion with industry experts it ended with observed inferences.

In this phase 4 problem solving tools were being used to carry out the analysis, which are as follows:

1. Cause and effect analysis
2. Failure mode effect analysis

1) Cause and Effect Analysis

The fishbone diagram is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects.

Once all inputs are established on the fishbone, the 5 Whys technique is used to drill down to the root causes. A brainstorming session was conducted with all the concerned departments dealing directly with the raw material store for the inputs to their concerned departments. The agenda of the meeting being the problems faced by them while in interaction with the store. The meeting was conducted at two major levels:

- Worker level
- Managerial level

At the worker level, the discussion was conducted with the feeding helpers and it was oriented towards the day-to-day problems that they are facing. While, the later, was concerned mainly with the conceptual thought process, regarding setting up of the system, which should be independent of the individual. The analysis required 2 questions to be answered:

- Whether the problems discussed are genuine or not?
- If yes, what are the probable causes and consequences/effects if that problem occurs?

Following are the analysis and findings / interpretations of the study:

Problems of cutting room:

Process related problems:

- **Planning not clear**
- Material to be issued not ready in time
- Lot of time is wasted in searching of materials in stores
- Width of trims is not checked by stores
- Exact quantity of material availability is not clear

Manpower related problems:

- Plan ready, but no intimation to other depts.
- Issue people insufficient
- Issue people inefficient

Comments

- Training required

2) Failure Mode and Effects Analysis

An FMEA is a form of Brainstorming that generally follows a Cause and Effect Analysis or a Process mapping. It is a granular analysis of a process, a system or a product design for the purpose of identifying possible deficiencies.

Step 1: Identify the functions of your scope.

Step 2: For each function, identify all the ways failure could happen. These are potential failure modes.

Step 3: For each failure mode, identify all the consequences on the system, related systems, process, related processes, product, service, customer or regulations. These are potential effects of failure.

Step 4: Severity

Determine how serious each effect is. This is the severity rating, or S. Severity is usually rated on a scale from 1 to 10, where 1 is insignificant and 10 is catastrophic.

Step 5: Occurrence

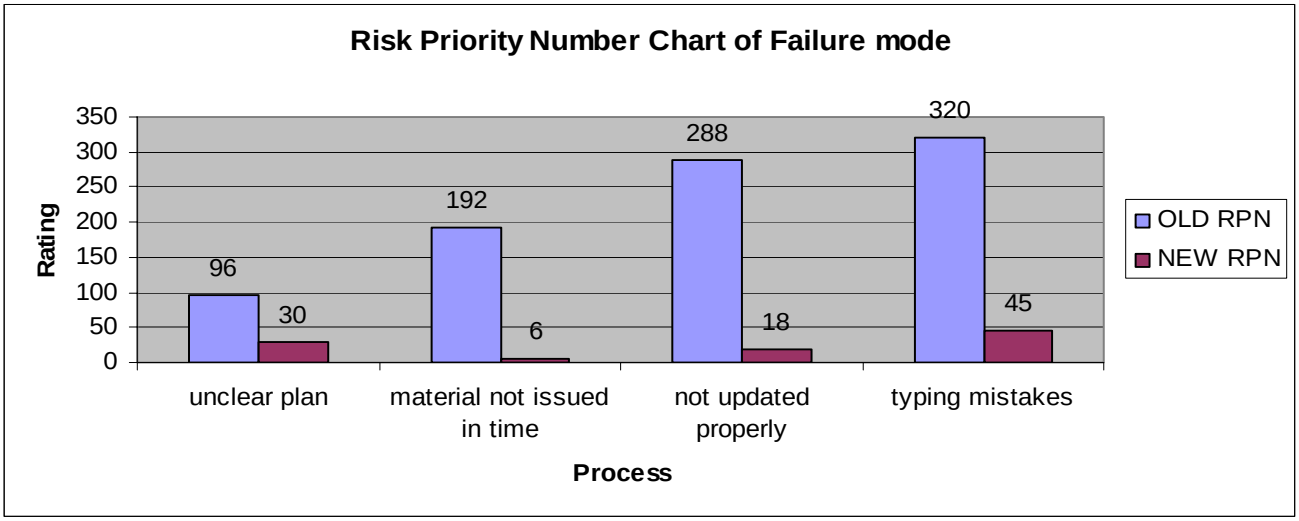
In this step it is necessary to analyze the cause of a failure. Occurrence should be rated as per how many times the failure mode comes into picture.

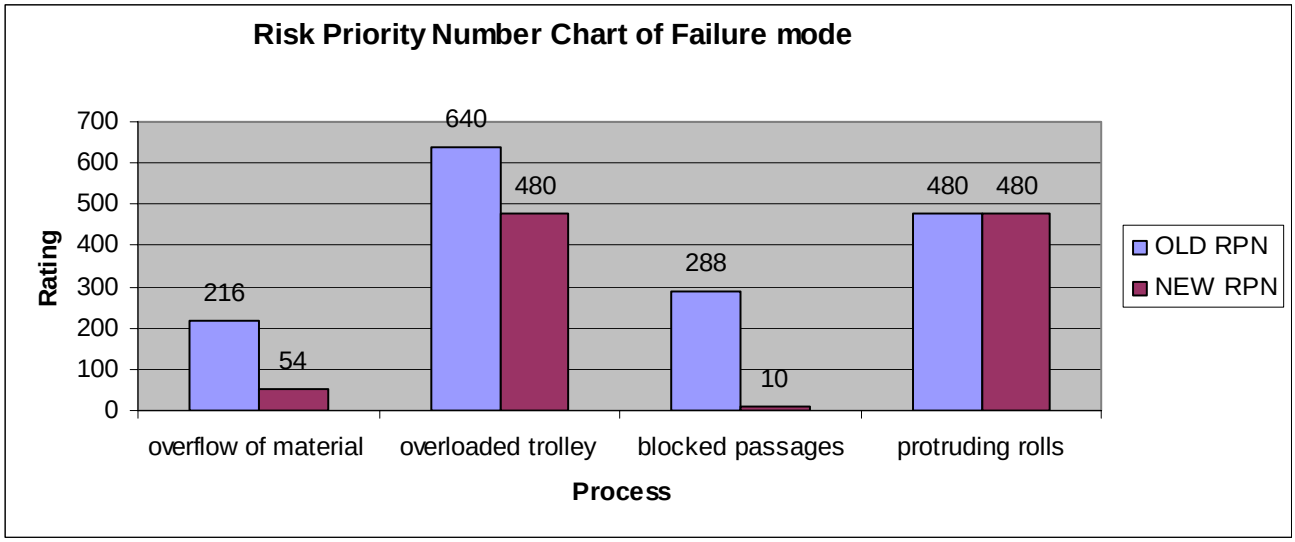
Step 6: Detection

For each cause, identify current process controls. For each control, determine the detection rating, or D. This number represents the ability of planned tests and inspections at removing defects or detecting failure modes.

Risk Priority Numbers

After ranking the severity, occurrence and detectability the RPN can be easily calculated by multiplying these 3 numbers: RPN = S x O x D





5'S Implementation

Development of target areas of 5s implementation

Target areas identified:

- Woven fabric stores organization
- Information flow between internal supply chain.

Mitigation suggestions

- Streamlining of process flow
- 5'S implementation.
- Re-engineering of layout.

Based on five Japanese words that begin with 'S', the 5S Philosophy focuses on effective work place organization and standardized work procedures. 5S simplifies your work environment, reduces waste and non-value activity while improving quality efficiency and safety.

Simply put, 5S is a method for organizing a workplace, especially a shared workplace (like a shop floor or an office space), and keeping it organized.

1S. SEIRI (整理): Sorting

"Sorting" means to sort through everything in each work area. Refers to the practice of going through all the tools, materials, etc., in the work area and keeping only essential items. Everything else is stored or discarded. This leads to fewer hazards and less clutter to interfere with productive work.

The sorting / segregation of bulk material was first done on value / buyer-wise basis. The Sorting/segregation of sampling material quality wise.

Re-engineering of layout:

Before implementation of 5'S

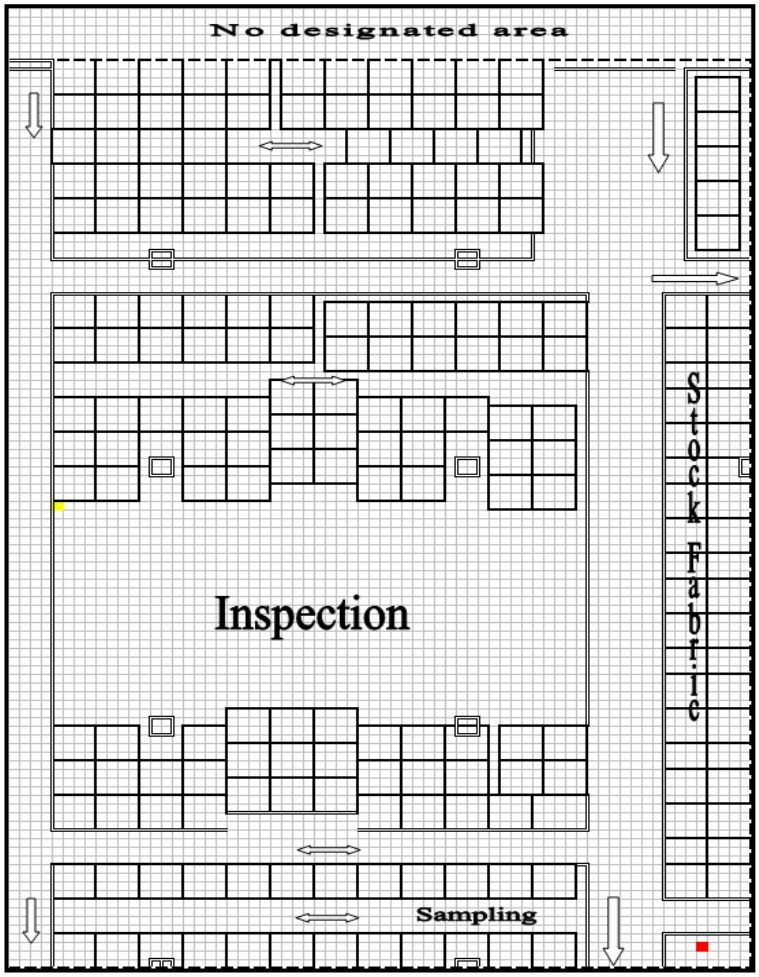
The sorting / segregation of material was first done on value / buyer-wise basis: Later, the material were segregated item wise e.g. Fusing, canvas, felt etc. Further item code wise segregation was done.

Demarcation of areas:

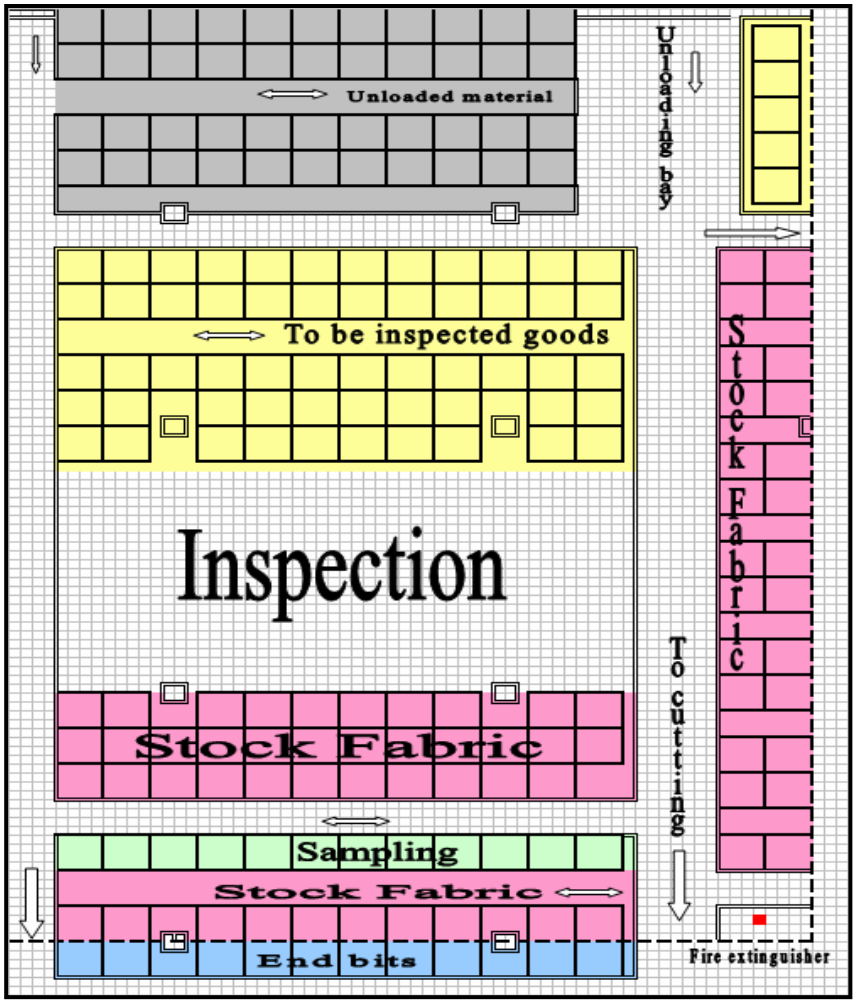
The material in the layout was sorted out with respect to their quality and similarly area was demarcated as given below. This demarcation aids in lower material handling time.

- "Office Area"
- "Incoming Goods Area"
- "Under-inspection Area"
- "Sampling Area"
- "Red tag area" for future stock of shell and non-moving or dead stock.

Before implementation of 5'S



After implementation of 5'S



2S. SEITON (整頓): Set in order

Step two is to organize, arrange and identify everything in a work area for the most efficient and effective retrieval and return to its proper place.

Figure showing systematic placement of rolls on the pallet.

Before

After



3S. SEISO (清掃): Systematic cleaning

Once you have everything, from each individual work area up to your entire facility, sorted (cleaned up) and organized, you need to keep it that way.

4S. SEIKETSU (清潔): Standardizing

To ensure that the first three steps in your Five S program continue to be effective, the fourth step is to simplify and standardize.

Bin card implementation

Format used for Bin Card:

Bin Card					
Buyer:			Style no.		
P.O. no.:					
Sr. No.	Stock qty.(kgs)	Date of issue	Issued qty.	Balanced qty.	Sign. Of incharge
1					
2					
3					
4					
5					
6					
7					
8					
9					

Standardisation of quantity of material per pallet:

At this stage of implementation the quantity of material per pallet is also standardised so as to achieve improved storage area and thus improved capacity of stores. The quantity is taken in terms of meters.

This standardization is achieved by maintaining constant figures of the amount of material placed in terms of volume (height and width is constant) on each pallet. Before implementation the average height observed was 4.5 feet per pallet with the rolls protruding outside the pallet. Thus, the height is maintained constant as 6 feet per pallet and rolls are properly aligned.

After trial and error and calculation considering the following points the quantity per pallet is standardized in terms of meterage; the parameters considered variable are as:

Fabric gsm
End/inch in the fabric
Width of the fabric
Count of the yarn
Fabric meterage per roll
The results are summarized in the chapter 6.3.

Calculation for standardizing metres of fabric per pallet
Formula used: Pallet capacity in kg.= [(ends/inch x warp crimp% x length in metres)] + (warp count x 1693) [(picks/inch x weft crimp % x length in metres)] (weft count x 1693)
Average values at the existing situation are considered .

5S. SHITSUKE (躾): Sustaining

The final step is to continue training and maintaining the standards.

- Updation of bin cards, board and Data entry must be maintained
- regularly as and when the material is moved.
- Store manager to check the appropriate follow-up of the store organization and systems i.e. SOP.
- On every Saturday of the week checking the stock levels & turnover and the store room organization by some internal auditor.
- On every last day of the month, a Reconciliation Report should also be maintained by the store manager regarding the stock status and should be kept ready by the last day of the month.
- The Returns (Desktop Material) from cutting of a particular P.O. should be noted down along with the stock balance and should be documented properly. The report should be sent to the merchant as soon the O.C.R (Order Confirmation Report) is generated.

Results and Summary of project gains

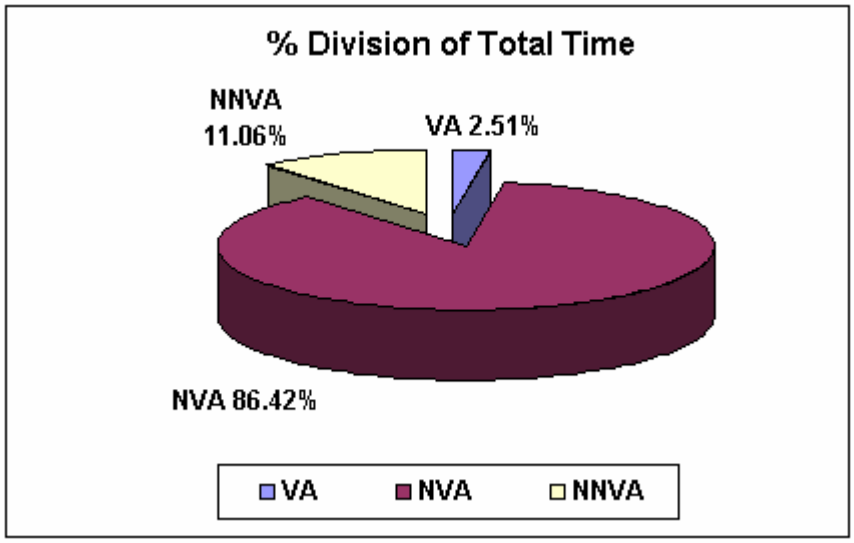
Input cost incurred in the store: Nil

Summary of Time Saved: The study is conducted before and after implementation for the same quantity of lot from unloading point till storage and from storage to cutting and sampling issue.

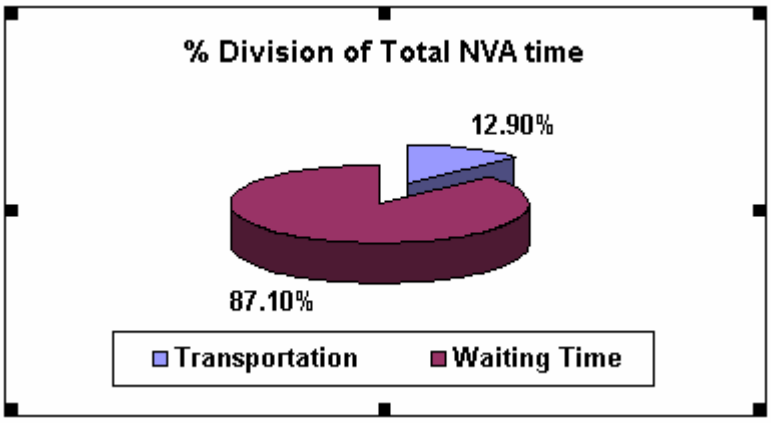
	VA	NVA	NNVA	Total
Tot. time (min.)	120	4125	528	4773
% division of total time	2.51	86.42	11.06	100

VA-Value added time; NVA-non value added time; NNVA- Necessary non value added time

Element	Transportation	Waiting Time	total time
Tot. time (min.)	532.1	3592.8	4125
% division of total NVA time	12.90	87.10	100



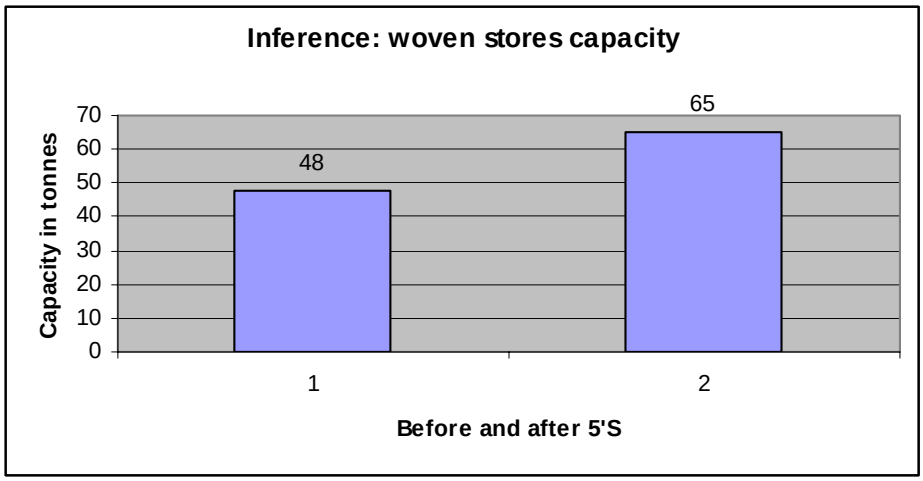
	Total (min.)	Specific activities.(min.)
NVA before	4125	305
NVA after	4064	235
difference	61	70
Percentage	1.2	23



Improved capacity of woven stores:

Capacity is improved as the quantity of material per pallet is standardised and the due to demarcation of material to designated places.

Capacity	Mts. Per Pallet (approximately)	Total mts. In woven stores	% improvement in capacity
Before	1430	290290	26%
After	1620	328860	(Total of 203 pallets)



Conclusion

The project has achieved its ultimate objective of streamlining the whole process flow of the raw material store. The entire work procedure is standardized and thus simplified work environment is established. Ultimately the secondary objective of 5'S i.e. safety and security is too established.

The whole project, conducted in Alok Ind. Ltd. (Made ups & garment Division, Sayli, Silvassa) has been a great learning experience, both in terms of knowledge and work culture. The department process flow was understood in greater depth, including the internal supply chain mechanism.

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The authors are associated with Centre for textile functions (CTF), NMIMS MPSTME Shirpur campus, shirpur Dist- Dhule, Maharashtra

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