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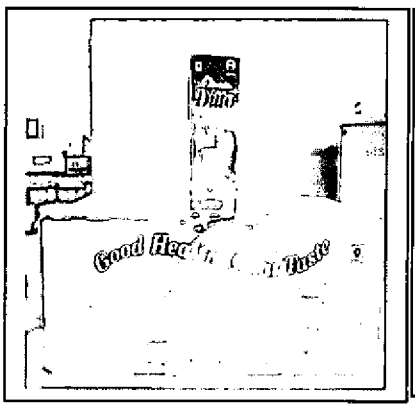
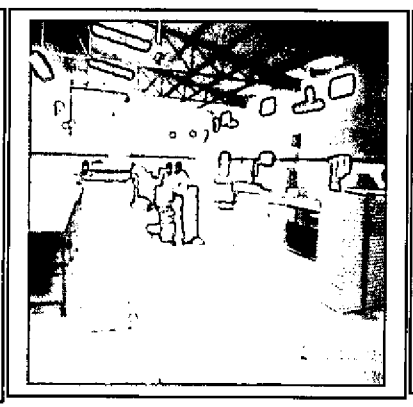
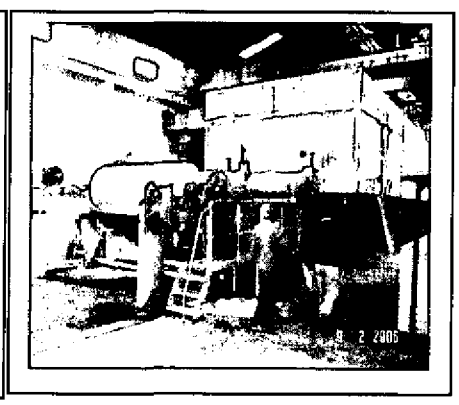
Project Report

Consulting Services and Training for

Strategic Cost Management Deployment

in Food Processing & Paper and Pulp Enterprises in India

UNIDO Contract Number: 2005/119
Project No.: XP/IND/05/B04

FICCI

Center for Global Competitiveness

FICCI , New Delhi, India

Center for Global Competitiveness
FICCI, New Delhi, INDIA

Contents

Executive Summary

UNIDO-Government of India -FICCI launched a joint business partnership program on 11th March 2005 to enhance global competitiveness of Indian SMEs belonging to Food Processing, and Paper sectors.

In the above program FICCI was assigned to establish a "Center for Global Competitiveness" to facilitate Indian industries improve their quality, productivity, and reduce cost through training and consulting intervention using Strategic Cost Management & Lean Manufacturing techniques.

A contract was awarded by UNIDO to FICCI Quality Forum, for providing training and consulting support to 3 SMEs (1 Food processing & 2 paper industries). Consulting and training assignment was completed as per schedule during the period of Dec.2005 to June 2006.

During the above period training and consultancy was provided to three SME units. The objective of consulting intervention was to train the managers of the participating units to improve their competitiveness using Lean Manufacturing tools, and handholding to apply these tools for cost reduction through an improvement project. Training and consulting project was executed by FICCI Quality Forum, in the under mentioned three units with positive results and building of problem solving capacity of the managers to make continuous improvements to enhance global competitiveness of their products.

Participating SME	*Project*	*Results*
1. HPMC Fruit Processing Plant, Parwanoo, Himachal Pradesh	Improvement in productivity of Tetrapack Unit	Productivity of tetrapack unit was improved from 812 Trays/Shift to 1531 trays/Shift Estimated financial saving: Rs 16.48 Lakhs/annum
2. Banwari Paper Mills Ltd. Kashipur, Uttaranchal	Reduction in Paper Finishing Loss	Finishing loss reduced from 6.70 % to 4.73% Estimated financial saving: Rs. 4.08 Lakhs/annum
3. Naini Tissues Ltd. Kashipur, Uttaranchal	Reduction in Paper Finishing Loss	Finishing loss reduced from 7.35 % to 6.30% Estimated financial saving: Rs. 3.0 Lakhs/annum

This report gives details of the activity and outcome of the projects which were taken up in the above three participating units. Based on the experiences of above three units "Center for Global Competitiveness" is developing standard training and consulting modules which can be used for improving the competitiveness of Indian SMEs as well as similar industries of other developing countries.

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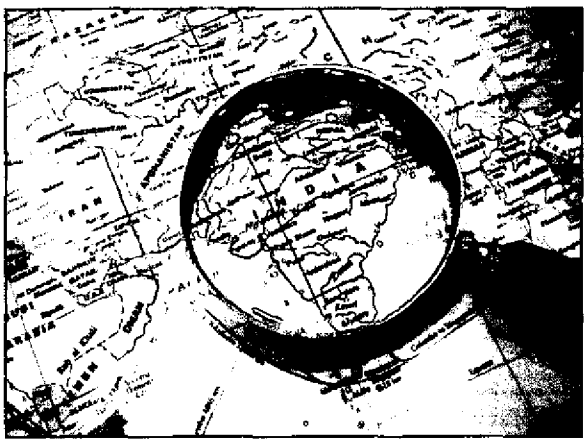
1. Introduction

India is a fast emerging economy with strong agricultural based products, but having negligible presence in global market due to low competitiveness. Government of India has taken special initiative to enhance export of food products produced by food-processing industries and other agricultural based products. Under the ongoing drive UNIDO has taken up a joint business partnership program in India in association with Government of India and Federation of Indian Chambers of Commerce & Industry (FICCI) to improve the competitiveness of SMEs belonging to Food Processing and Paper & Pulp sectors.



In order to make the improvements measurable in terms of financial gains by participating units, the knowledge and skills are to be transferred to participating industries through a **"Consulting & Training for Strategic Cost Management deployment in Food Processing and Paper & Pulp Enterprises in India."**

For improvement of process performance of selected pilot industries "Lean Manufacturing" has been identified as the management technique to reduce the cost and improve quality and delivery. To develop appropriate customized model of "Lean deployment" in SMEs, during the first phase of project 3 pilot units (one from Food Processing and two from Paper sectors) were selected by FICCI under this project.

Training and consulting activities were initiated in December 2005 through open house training program to clusters of selected industrial sectors, followed by unit level consulting and training intervention in following three unit

	Industry Sector	*Unit Name & Location*	*Products*
1	Food Processing	**HPMC-Fruit Processing Unit** Parwanoo, Himachal Pradesh, India	• Apple Juice, • Fruit Drinks
2	Pulp & Paper	**Banwari Paper Mills Ltd.** Kashipur, Uttaranchal, India	• Writing paper • Printing Paper
3	Pulp & Paper	**Naini Tissues Ltd.** Kashipur, Uttaranchal, India	• Writing paper • Printing Paper

Project Objectives

- Capacity building by in-house training to the managers and supervisory people on Cost reduction methodologies using Lean manufacturing tools and techniques
- Facilitation to project teams in deployment of Lean tools on an actual Cost Reduction Project.
- *Demonstration of methodology and effectiveness of Lean tools for enhancement of* global competitiveness

2. SCOPE OF WORK

To provide comprehensive training & consulting for deployment of Strategic Cost Management to 3 industrial units (Food Processing & Paper and pulp industry). Scope of work includes the following:

1. **Waste diagnosis** of 3 industries belonging to Food processing & Paper sectors (outcome waste diagnosis data)
2. **Capacity building**: Training of employees to develop competency for diagnosis and elimination of waste in their business processes (number of people trained)
3. **Deployment of Strategic Cost Management** through selected cost reduction projects (one in each company). Results of the SCM intervention should be measurable in terms of yield improvement/ quality improvement/ or financial savings from the project (certified by the industry)
4. **Documented report** for dissemination of knowledge to other industries.

In addition to consulting support provide adequate information inputs for developing a concept paper for knowledge transfer to other similar industries in India and other developing countries.

3. METHODOLOGY of SCM Training & Deployment

Following methodology was adopted for execution of the above consulting & training project:

- **Waste Diagnosis training workshop:** The ultimate goal of the intervention is to improve competitiveness by elimination of waste. Therefore the very first activity was to train the company personnel on concept of waste and how to detect them. A group-training program was conducted for the cluster of industries to understand the

types of waste and detection techniques. From the group of participants 1 Food processing industry and 2 paper units who volunteered to participate in the consulting programs were picked up and the wastes were identified to select the projects.

- **Waste Elimination Projects:** From the diagnostic data one project in each company was selected in consultation with industry's management and project teams were formed. Project teams were trained on problem solving and waste elimination techniques and applied those techniques through a project under guidance of consultant during January-June 2006. Consultant has periodically audited progress of each project and provided counseling to teams for effective and timely implementation of action plan. Dates of monthly review and consulting visits were scheduled as per the convenience of participating units. The projects were completed by June 2006, as per schedule.

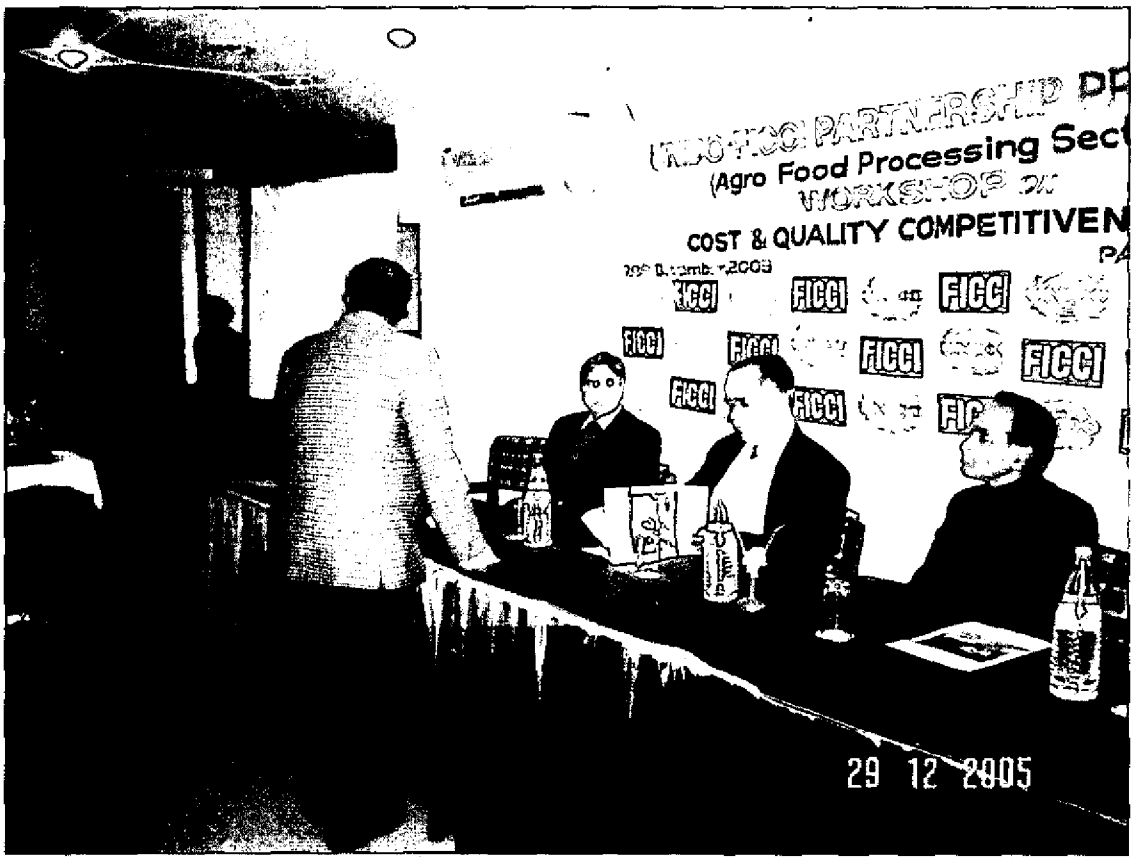
- **Documentation:** After completion of project all activities of the project are documented in form of this project report. The key concepts of methodology can be shred with other similar kind of industries. However all precautions are taken to protect confidential / proprietary information of the specific units.

4. Consulting & Training schedule

To attain the objectives of this project during the consulting period of 6 months following activities were performed:

	Activity Step	Unit-1 HPMC	Unit-2 BPL	Unit-3 NTL
1	Diagnostic Workshop; Training & Project selection	Dec.2005	Dec.2005	Dec.2005
2	Project initiation: training on data collection, analysis and improvement action plan development	Jan/Feb 2006	Jan/Feb 2006	Jan/Feb 2006
3	Project progress review, Counseling and training	March/April 2006	March/Apr 2006	March/April 2006
4	Project progress review, Counseling and training	April/May 2006	April/May 2006	April/May 2006
5	Project progress review, Counseling and training	May/Jun 2006	May/Jun 2006	May/Jun 2006
6	Performance evaluation & standardization	July 2006	July 2006	July 2006
7	Report preparation	Aug 2006	Aug 2006	Aug 2006

Training Workshops
for Paper and Food processing Industries

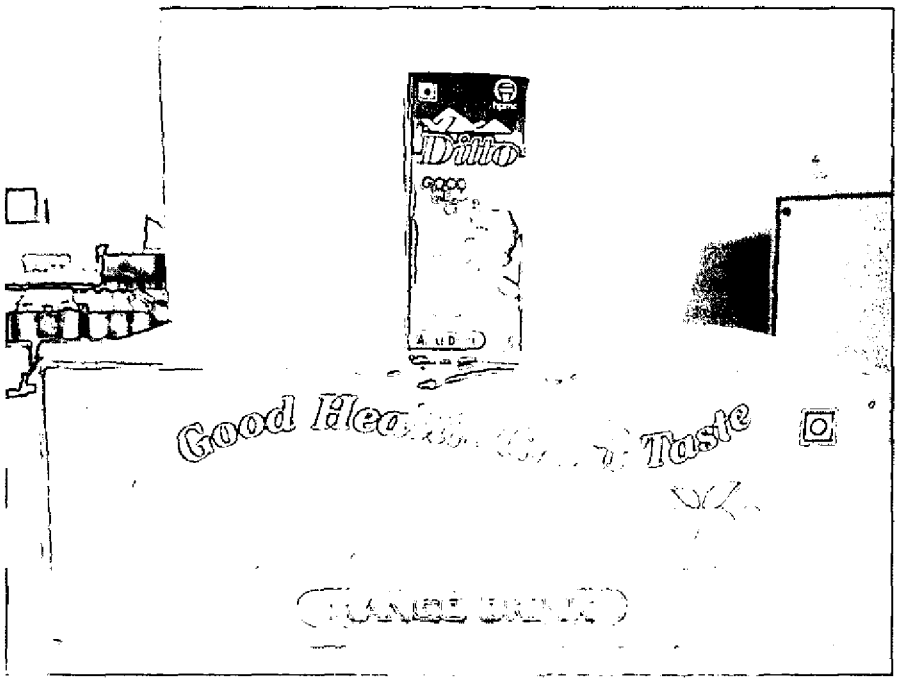


5.0 HPMC- Fruit Processing Plant

5.1 Company introduction:

Himachal Pradesh Marketing Corporation (HPMC) is a State Government owned public sector unit involved in production and marketing of various processed fruit products produced from the locally grown horticultural and fruit items. In India Himachal Pradesh is the largest grower of Apples. Due to local availability of apples HPMC has set up Fruit Processing Units to produce apple juice, concentrates, and fruit drinks from various fruits including Apple, Mango, Orange, Guava, Leechie, Strawberry, Kiwi etc.

HPMC has set up a most modern plant at Parwanoo to produce apple concentrate and fruit drinks. Apple concentrate is produced during harvesting season (August – November) and various kinds of fruit drinks are produced from variety of fruit concentrates (procured from other producers) and marketed throughout the country during all twelve months of the year.



Fruit drinks produced by HPMC

5.2 Products:

HPMC-Parwanoo plant is producing following kinds of drinks, which are supplied in 200 ml tetrapack packets for consumer usage:

- Apple Juice
- Apple Drink
- Mango Drink
- Orange Drink
- Kiwi Drink

- Leechie Drink
- Strawberry Drink

5.3 Consultant:

Akhilesh N Singh, Principal Consultant, FICCI Quality Forum, Specialist on Lean Manufacturing and Six Sigma Black Belt

5.4 Training & Consulting visits made at HPMC

#	Activity	Dates	Description
1	Training on Strategic Cost Management	28-29th Dec.2005	Training to industry managers on Lean manufacturing, cost management, waste diagnosis, project selection, Improvement project management methodology
2	Diagnostic Workshop Training	Jan31-Feb 1,2'2006	Value & Waste, Types of waste, How to Identify Waste, Quantification of waste, Economic evaluation of Waste, Project Selection, Team formation, Problem definition, Data Measurement plan
3	Project progress review, Training & counseling	Feb 22-23-24'2006	Data Analysis, Root causes determination, Development of Solutions, Making Improvement action plan, Implementation of plan
4	Project progress review, Training & Counseling	April 21-22'2006	Review of improvement progress, Counseling for accelerating the improvement action, training on improvement tools
5	Final review and Standardization	July 19-20'2006	Review of project outcome & standardization of operating practices

5.5 Problem Diagnosis

A Lean diagnostic workshop was conducted during 31st Jan -2nd Feb.2006 involving all process owners. Waste generated by all processes were identified, quantified, and it's impact on business and operational performance of the organization were evaluated based on last 12 months actual data of company, by all process owners (Heads of Departments). Highlights of the finding are presented as following:

There are four core business processes of the company:

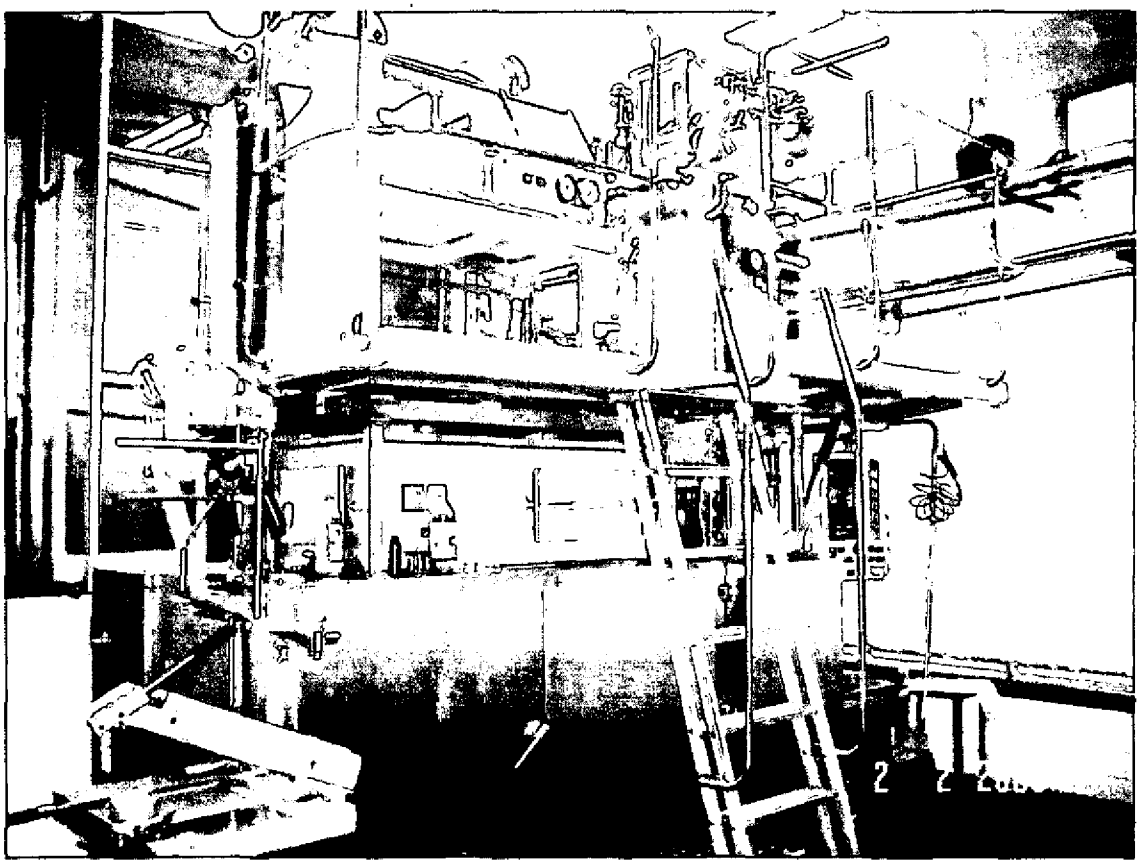
- **Apple collection process**: During the harvesting season of August –November fresh apples are collected/purchased from the farmers from the entire state and transported to Parwanoo for sorting, cleaning and pulping. There are various quality and logistic problems in this process resulting to quality, cost, and delivery
- **Apple concentrate making process**: Apples are cleaned and crushed in pulp form from which apple juice is extracted and concentrate is made, which is preserved for the entire year and used as main input for making apple drinks.
- Apple concentrate processing unit: operated at 35% of its capacity during last 12 months
- **Drink preparation and Tetrapack process**: finally the various kinds of drinks are made as per specifications and packaged in tetrapacks for consumer use. Inputs for drinks are apple concentrate made by company and other fruit concentrates purchased from other producers.
- Performance of tetrapack unit during last 12 months: 32% of capacity
- **Marketing process**: Marketing is one of the most important business processes, being managed by a centralized marketing organization at corporate office, which has inadequate interaction with the production unit resulting to less orders and underutilized capacity.

5.6 Project Selection

Based on the diagnostic data and current systems of the company it was found that tetrapack unit is the most crucial for maintaining flow in the value stream.

As per the last 12 months operating data it was observed that productivity of the tetrapack unit was only 32% of its capacity.

Since tetrapack process is the pacemaker unit in value adding chain, in consultation with Plant manger and operating people a project was selected to ***"Improve productivity of Tetrapack unit using lean manufacturing principles"***



Tetrapack Unit

5.7 Project Team

Role	Name	Designation
Sponsor	Mr C R B Lalit	Managing Director
Champion	Mr TS Chauhan	Plant Manager
Team member	Mr Vineet Kaushik	Technical Officer
	Mr B M Saini	Plant Engineer
	Mr. V K Gupta	Astt Manager (F &A)
	Mr. Balbir Singh	JE (Boiler)
	Mr. B L Dulta	Sr Assistant
Facilitator	*Mr Akhilesh N Singh*	*Consultant, FICCI*

5.8 Training

Team members were trained on the following topics

- Waste diagnosis
- *Lean manufacturing principles*
- Cost of poor quality measurement
- Problem solving tools
- Improvement project management

- Data collection methods
- Data analysis tools
- Solution development techniques
- Performance evaluation & standardization

5.9 Problem Definition

"Poor productivity of tetrapack unit is causing higher cost of products, resulting to lower competitiveness and negative contribution from its business operations."

5.10 Measurement of Baseline productivity

In order to find out the current level of productivity the performance data of past 12 months were collected and existing productivity levels were calculated

#	*Quarter 2005-2006*	*Total Production (Number of Trays)*
1	Jan - Mar' 2005	62590
2	April- June' 2005	156476
3	July- Sept.' 2005	55151
4	Oct – Dec' 2005	90585
5	Jan- March'2006	144872

Based on the following production data of previous quarters, baseline productivity of tetrapack unit was determined:

Total production during April 2005-2006: 447084 Trays

Number of operating days: 220 days

Average number of operating shifts: 2.5 Shifts/day (20 Hrs/day)

Baseline Productivity of Tetrapack unit: 812 Trays per shift

5.11 Baseline operating cost

	Cost elements	**Rs./Tray** (During the period April' 2005 -March 2006)
1	Fuel, Electricity & Water	Rs. 15.90
2	Direct Labor	Rs. 01.60
3	Stores & Spares	Rs. 03.38
4	Overheads	Rs. 01.34
5	Staff expenses	Rs. 10.07
6	**Total operating cost**	**Rs. 32.29**

5.12 Lean project objectives

- Train the people to improve process
- Increase the productivity of Tetrapack unit
- Reduce the operating cost
- Reduce the number of operating shifts for the same volume of production

5.13 Root-cause analysis

During a workshop consultant conducted brainstorming session of all managers and process-owners to identify the problems and root-cause of problem. The team identified following major problems:

Area	*Problems/ Cause of problem*
Equipment	1. Frequent Breakdown of Tetrapack unit
	2. Non-availability of spares
	3. Low steam pressure
	4. Power interruption
	5. Low air pressure
Personnel	1. Unskilled operators
	2. Inadequately trained maintenance technicians
	3. No electronics specialist
	4. Non availability of operators in shifts
Operating practices	1. Frequent change of product
	2. Change of product mix at short notice
	3. No adequate production planning
	4. Small order campaigns

5.14 Action Plan

Based on the outcome of root-cause analysis, project team developed following improvement action plan:

Area	*Problem*	*Person Responsible:*	*What need to be done?*	*Target Date*
Manpower	Inadequate skill of operators	Mr. B L Dulta	Development & execution of Training plan Manpower requirement plan	March 30th
Machines	Frequent Breakdowns	Mr. Saini	Breakdown analysis Preventive maintenance schedule Spare parts availability	30th April

Materials	No timely availability of some of the materials	Mr Kaushik	Quarterly plan for all raw materials and procurement as per plan	30th May
Measurements	Customer complaints	Mr Kaushik	Complaint settlement records Plant performance data analysis Visual management boards in each section	30th May
Environment	Hygiene Housekeeping Horticulturr	Mr Kaushik Mr Gupta Mr Dulta	Rectification of broken floors Removal of unwanted materials Cleaning & Plantation	30th May 2006

5.15 **Improvements made**

Actions were taken by the project team members for making improvement in machines, systems, methods and special training sessions were organized on Tetra pack machine operation and maintenance from the supplier specialists. These actions helped in improvement in operations.

5.16 **Design of Experiment for improving productivity**

In order to apply Lean techniques, an experiment was designed to operate the tetra pack unit continuously on 3-shift basis to produce ordered quantity (which may be for 10-15 days operation). After production of ordered quantity, it was planned to shutdown the plant and use that period for maintenance activities. After implementation of this plan, the new method of operation helped in reduction of fuel, water, steam, labor, & power cost. Plant was operated on continuous basis for required days during the month of April, May and June. Based on the actual production data significant reduction in cost was achieved and in addition it facilitated in identification of weaknesses of the machine, personnel, and operating methods, which were rectified in due course of time.

5.17 Outcome of the Productivity improvement project

By making improvement in operating practices, people's competence and machine condition, productivity went up and cost came down. As per the reported information from the project team, the productivity and cost of production before and after making improvements are as below:

	Cost elements	Cost **before** Start of Project Baseline: Rs./Tray	Cost **after** improvement Rs./Tray
	Productivity	812 Trays/Shift	1531 Trays/Shift
1	Fuel, Electricity & Water	Rs. 15.90	Rs.12.20
2	Direct Labor	Rs. 01.60	Rs. 01.58
3	Stores & Spares	Rs. 03.38	Rs. 03.38
4	Overheads	Rs. 01.34	Rs. 00.94
5	Staff expenses	Rs. 10.07	Rs. 10.07
6	**Total Operating cost**	**Rs. 32.29**	**Rs. 28.17**

5.18 Estimated financial gains from improvement

This improvement in productivity has reduced the cost of production of each tray by an amount of Rs.4.12/Tray (Rs. 32.29- 28.17).

Estimated annual production of plant: 400,000 trays /year

Estimated savings from the improvement: Rs. 4.12X 400,000 trays=

Rs.16.48 Lakhs/ Year (US$36620/Year)

5.19 Intangible gains

In addition to improvement in productivity and cost reduction the organization gained in following terms;

- Identified the weakest links of value creation chain
- Developed competence to detect waste and eliminate waste
- People were trained on cost reduction methodology
- Enhance morale of the employees for their capability to make improvement
- Initiated a change in the culture of organization

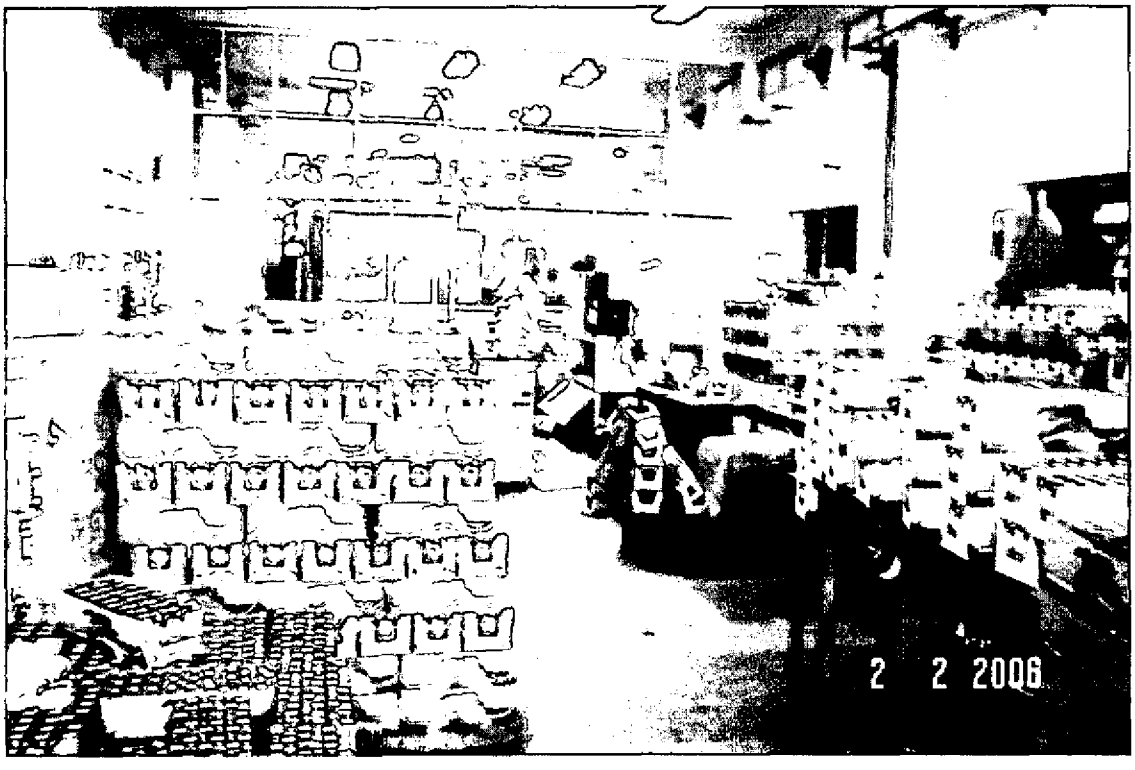
5.20 Conclusion

Consulting intervention has helped the organization to identify the hidden problems of the processes and acquired the knowledge and skills to solve such problems.

Company was advised to improve the two other critical processes:

- Apple processing and
- Marketing

Application of lean techniques will help the organizations to get real benefit of the new problem solving methodology.



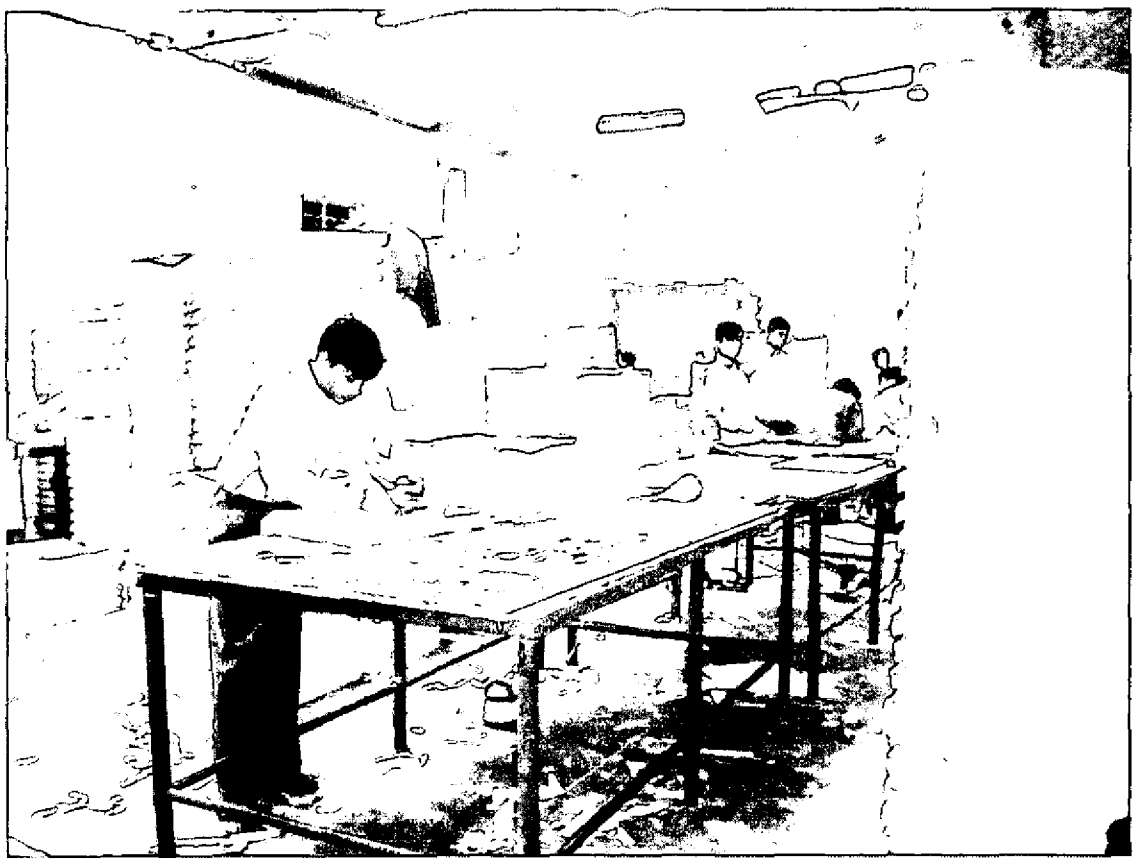
HPMC products waiting for shipment

6.0 Banwari Paper Mills Ltd., Kashipur

6.1 Company introduction:

Banwari Paper Mill was established in the year 1982 at Kashipur in state of Uttaranchal to produce writing and printing paper from agricultural wastes. Production and annual sales turnover of the company is as below:

Description	*Unit*	*2002-03*	*2003-04*	*2004-05*
1. Installed Capacity	MT/Yr	6000	6000	9000
2. Actual Production	Mt/Yr	5306	5942	7614
3. Annual sales turnover	Rs. Lakhs	1137.45	1370.41	1632.18



Paper inspection and packaging

6.2 Products:

- Writing paper
- Printing paper

Paper grades: Cream wove, map-litho, Copier paper and other grades as per customer requirements

6.3 **Consultant:**

Akhilesh N Singh, Principal Consultant, FICCI Quality Forum

6.4 Training & Consulting visits made at HPMC

#	Activity	Dates	Description
1	Training on Strategic Cost Management	23-24th Dec.2005	Cluster Training to industry managers on Lean manufacturing, cost management, waste diagnosis, project selection, Improvement project management methodology
2	Diagnostic Workshop & Training	Feb 7-8-9'2006	Value & Waste, Types of waste, How to Identify Waste, Quantification of waste, Economic evaluation of Waste, Project Selection, Team formation, Problem definition, Data Measurement plan
3	Project progress review, Training & counseling	March 29-30-31'2006	Data Analysis, Root causes determination, Development of Solutions, Making Improvement action plan, Implementation of plan
4	Project progress review, Training & Counseling	May 2-3' 2006	Review of improvement progress, Counseling for accelerating the improvement action,
5	Final Review & Standardization	July 12-14 2006	Performance review of the project and standardization of procedures to hold the gain

6.5 Production process

Inputs: Company uses agro-based raw materials such as:

- Hardwood pulp
- White paper cutting
- Sarkanda
- Wheat straw
- Baygoss

Production process

Paper production included following three main processes

- Pulping: Converting agro-based raw material into cellulose pulp
- Paper making: Converting pulp into paper rolls

- Paper finishing: Cutting and packaging of paper reels into sheets and printing paper reels as per customer requirements

6.6 Project Selection

Based on the diagnostic data and current systems of the company it was observed that company is generating expensive waste during the finishing of paper. To minimize the waste, a project titled a ***"Reduction in Paper Finishing Loss"*** *was* taken by the project team

6.7 Project Team

Role	Name	Designation
Sponsor	Mr Jasbir S Goraya	Managing Director
Champion	Mr Sumesh Verma	Plant Manager
Team member	Mr Ram Chander	Operation In charge
	Mr Rajbir Singh	Boiler In charge
	Mr. R P Mishra	Finishing In charge
	Mr. Kirpal Singh	Maintenance In charge
	Mr. Om prakash	Boiler In charge
Facilitator	Mr Akhilesh N Singh	Consultant, FICCI

6.8 Training

Team members were trained on the following topics

- Waste diagnosis
- Lean manufacturing principles
- Problem solving tools
- Improvement project management
- Data collection methods
- Data analysis tools
- Solution development techniques
- Performance evaluation & standardization

6.9 Break-up of Base line Finishing Loss

Breakup of Finishing Loss based on actual data of Jan.2005-Dec.2005

- Trim Loss: 3%
- Frequent size change loss: 0.7%
- Handling wastage loss: 0.5%
- Steam fluctuation loss: 1%

- Power fluctuation loss: 1%
- Excess sampling loss: 0.5%
- **Total finishing Loss: 6.7%**

Target: Reduce the Finishing Loss to the level of 3%

6.10 Root cause analysis and action plan

Project Team 1: **Team Leaders**: Mr Ram Chander and Mr R P Mishra

Objective: Reduce Trim Loss & Frequent change loss from 3.0% to 2.5%

Activity	Team members	Time frame
1. Deckel of roll at pope reel to be adjusted according to size received from customer 2. Minimize frequent size change through planning 3. Reduce the size cut to maximum two times in a loading on duplex cutter 4. Plan for each size quantity of at least 3 MT 5. Procure 2 more jumbo roll for effective scheduling	Harminder Singh LN Gupta Shift In-charge	May 06 June06

Project Team 2: **Team Leaders**: Mr R P Mishra

Objective: Reduce Handling/Loading loss from 0.5% to 0.25%

Activity	Team members	Time frame
1. Direct loading of paper packs on lorry from ferma and plan for full load lorry 2. Plan for large quantity similar size loading 3. Create more space in finishing bay by proper reorganization of storage space	Shift In-charge Supervisors Management	May 06

Project Team 3: **Team Leaders**: Mr Om Prakash

Objective: Reduce steam pressure fluctuation loss from 1% to 0.5%

Activity	Team members	Time frame
1. Boiler bed cleaning to be expedited to avoid drop in steam pressure 2. Commission and stabilize the operation of new Boiler	Shift In-charge Supervisors	May 06

Project Team 4: Team Leaders: Mr Kirpal Singh

Objective: Reduce voltage fluctuation loss from 1% to 0.5%

Activity	Team members	Time frame
1. Discuss with MD for procurement and installation of Voltage Stabilizer, On line tap changer transformer, Servo stabilizer	Managing Director	July 06

Project Team 5: Team Leaders: Mr Ram Chandar

Objective: Reduce excess sampling loss from 0.5% to 0.25%

Activity	Team members	Time frame
1. Reduce the samples taken to not more than 2 times for the same lot, except in case of breakage or any quality problem	Managing Director	May 06

6.11 Progress review

Respective teams took actions during project implementation and yield losses were measured on monthly basis. Actual performance during consulting intervention period:

Month	Finishing Yield	Yield Loss
January 2006	96.42%	3.58%
February 2006	98.63%	1.37%
March 2006	96.58%	3.42%
April 2006	95.86%	4.14%
May 2006	92.24%	7.76%
June 2006	91.87%	8.13%
Average (Jan-July 2006)	**95.27%**	**4.73%**

Average yield loss during 6 months: 4.73%

During the consulting intervention period of Dec 2005 to May 2006 average yield loss has dropped from 6.7% to 4.73%

Reduction in Finishing Loss due to application of Lean tools: 1.81%

6.12 Estimated financial saving due to Lean intervention

Increase in quantity of finished paper due to yield improvement during 6 months:

Total production during Jan-Jun'06: 5061.5 Metric Tons

Additional finished paper due to yield improvement: 5061.5 X1.8% = 91 MT

Increase in revenue by sale of additional paper: 91 MTX30,000= Rs. 27.30 Lakhs

Direct saving on account of power and steam:

Power cost saving: 91 Mt X500 units/Ton X Rs.2.60 per unit= Rs. 118300

Steam cost saving: saving in fuel consumption (paddy husk):

91 MtX 2 Mt T Steam = 182 MT steam

Cost of 182 MT Steam = 182/3.5 X Rs 1650 = Rs 85,800

Total saving during six month: Rs.118300 + 85800= Rs.2,04100

Estimated annualized saving: Rs. 4,08200 (US$ 9071)

6.13 Conclusion

Team took great interest in learning and implementing improvement actions. Enthusiastic effort of the members resulted in significant reduction of wastage. In order to have long term gains; it is essential that such initiatives should continue for longer period of at least one year.

Lean tools were presented in simpler way to make the supervisors understand it and implement in their own way.

The main factors, which contributed in reduction of wastage, are:

- Awareness of waste in the processes
- Diagnosis and quantification of realistic waste
- Learning and application of root-cause analysis
- Learning and application of solution development
- Commitment for reduction of waste

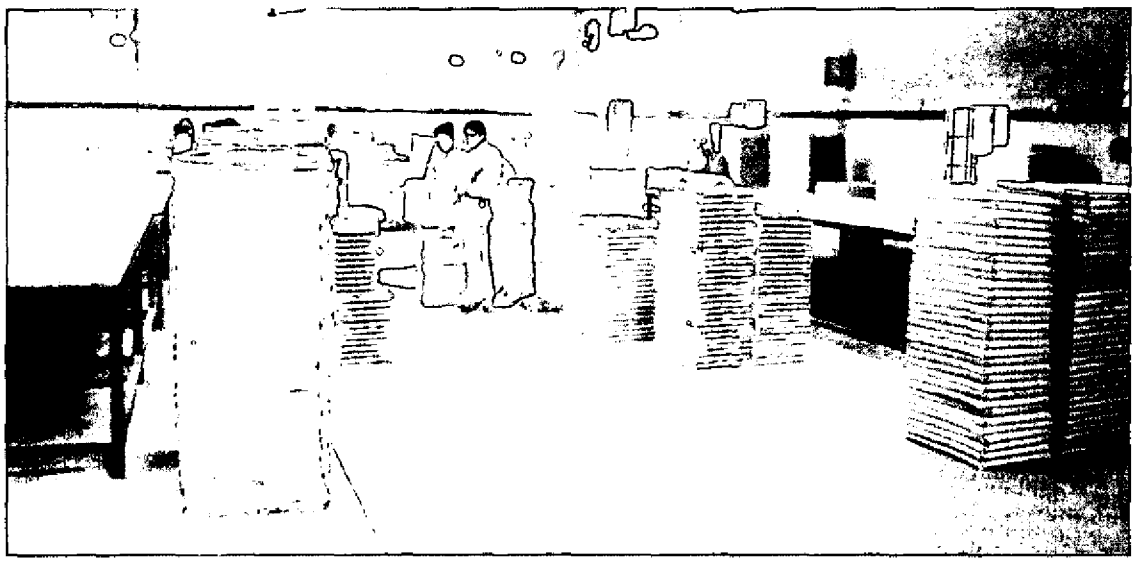
Paper production unit of Banwari Paper Mills (and Team Members)

7.0 Naini Tissues Ltd., Kashipur

7.1 Company introduction:

Naini Tissue Limited a new paper mill of 100Tons Per Day capacity was established during the year 2005 at Kashipur in state of Uttaranchal to produce wring and printing paper from agricultural wastes. It hastarted its production frm may 2005.

Description	*Unit*	*2005-2006*
Installed Capacity	MT per Day	100



Paper packaging & Dispatch section

7.2 Products:

- Writing paper
- Printing paper

Paper grades: Cream wove, map-litho, Copier paper and other grades as per customer requirements

7.3 Consultant:

Akhilesh N Singh, Principal Consultant, FICCI Quality Forum

7.4 Training & Consulting visits made at NTL

#	Activity	Dates	Description
1	Training on Strategic Cost Management	23-24th Dec.2005	Cluster Training to industry managers on Lean manufacturing, cost management, waste diagnosis, project selection, Improvement project management

			methodology
2	Diagnostic Workshop Training	Feb 7-8-9'2006	Lean Waste, Types of waste, How to Identify Waste, Quantification of waste, Economic evaluation of Waste, Project Selection, Team formation, Problem definition, Data Measurement plan
3	Project progress review, Training & counseling	March 29-30-31'2006	Data Analysis, Root causes determination, Development of Solutions, Making Improvement action plan, Implementation of plan
4	Project progress review, Training & Counseling	May 2-3' 2006	Review of improvement progress, Counseling for accelerating the improvement action,
5	Final review & Standardization	July 12-14 2006	Final review of project outcome and standardization of improved practices to hold the gain

7.5 Production process

Inputs: Company uses agro-based raw materials such as:

- Hardwood pulp
- White paper cutting
- Sarkanda
- Wheat straw
- Baygoss

Paper production includes following three main processes:

- **Pulping:** Converting agro-based raw material into cellulose pulp
- **Paper making:** Converting pulp into paper rolls
- **Paper finishing:** Cutting and packaging of paper reels into sheets and printing paper reels as per customer requirements

7.6 Project Selection

Based on the diagnostic data and current systems of the company it was observed that company is generation expensive waste during the finishing of paper. To minimize the waste a project titled as ***"Reduction in Paper Finishing Loss"*** *was* taken by the project team

7.7 Project Team

Role	Name	Designation
Sponsor	Mr Powar	Director (Technical)
Champion	Mr S.K Agrawal	Production Manager
Coordinator	Mr A K Upadhyay	Quality Head
Member	Mr L R Tiwari	Finishing In-charge
	Mr. Vikas Rastogi	Production Planning
	Mr. P N Sharma	R & D
Facilitator	Mr Akhilesh N Singh	Consultant, FICCI

7.8 Training

Team members were trained on the following topics

- Waste diagnosis
- Lean manufacturing principles
- Problem solving tools
- Improvement project management
- Data collection methods
- Data analysis tools
- Solution development techniques
- Performance evaluation & standardization

7.9 Baseline Finishing Loss

Paper produced in main mill is transferred to finishing section for making reels and sheets in following three units:

- Duplex cutter
- Simplex cutter
- Re-winder

Based on nature of operations there are different kind of losses in form of trimming loss, joint crease loss and rewinding loss

On the basis of actual finishing loss data of October 2005- December 2005, the project team fixed following base line loss:

Finishing Section	Trimming Loss	Joint & Crease Loss	Line Loss	Total Loss
Duplex Cutter Losses	3.5%	2.0%	2.0%	7.5%
Simplex Cutter Losses	3.0%	1.0%	1.0%	5.0%
Re-winder Losses	3.5%	2.5%	1.0%	7.0%
Average Loss				7.35%

Actual loss during Oct to Dec .2005

October 2005: 7.90%

November 2005: 9.50%

Dec.2005: 9.00%

Base line Finishing loss for the project: Oct-Dec: 7.35%

Target: Reduce the Finishing Loss from 7.35% to 6.35% during Jan. to July 2006 period using lean management tools

7.10 Root-cause analysis & development of action plan

To detect the root-cause of the various kinds of finishing losses, several brainstorming sessions were organized by project team. In these sessions team members identified all possible causes for the losses and finally selected the ultimate causes, which need to be eliminated to reduce the wastages. An action plan with time-bound schedule was prepared.

Project Team: Team Leaders: Mr. L. R Tiwari

Objective: Reduce finishing loss from 7.35% to 6.35% during Feb -July 2006

Problem	Action to be taken	Time frame
1.Sheet jamming in conveyor belts	Replacement of conveyor belt by single piece felt	April 06
2. Low deckle utilization	Deckle utilization up to 278 Cm by planning & marketing	April 06
3. Higher number of joints in parent roll	Periodical cleaning of chemical tanks and pipelines	Every month
4. Higher trimming loss on simplex cutter	Minimize utilization of simplex cutter	Regular
5. GSM moisture variation	Installation of online QCS system	July 2006

7.11 Improvement Actions

Team members taken actions for improvement as per plan, which was monitored and reviewed by consultant during monthly visits. Improvement actions reflected in reduction of waste, which encouraged teams for further action in other areas also.

7.12 Progress review

Actual performance during consulting intervention period:

Finishing Loss before start of Lean project

	Month	Yield Loss
Before the Lean Initiative	October' 05	7.90%
	November' 05	9.05%
	December' 05	7.30%
	Base Line Finishing Loss	7.35%

Finishing Loss after taking improvement action

	Month	Yield Loss
After Lean Intervention	Jan 2006	7.30%
	Feb 2006	7.30%
	March 2006	7.10%
	April 2006	7.09%
	May 2006	6.32%
	June 2006	6.30%
	Average (Jan-June)	6.90%

Average yield loss during 3 months: 7.23%

During the consulting intervention period of Jan 2006 to June 2006 average yield loss has dropped from 8.66% to 6.90%

7.13 Estimated financial saving due to Lean intervention

As per calculations made by project coordinator estimated annualized saving from reduction of finishing loss: Rs 300,000

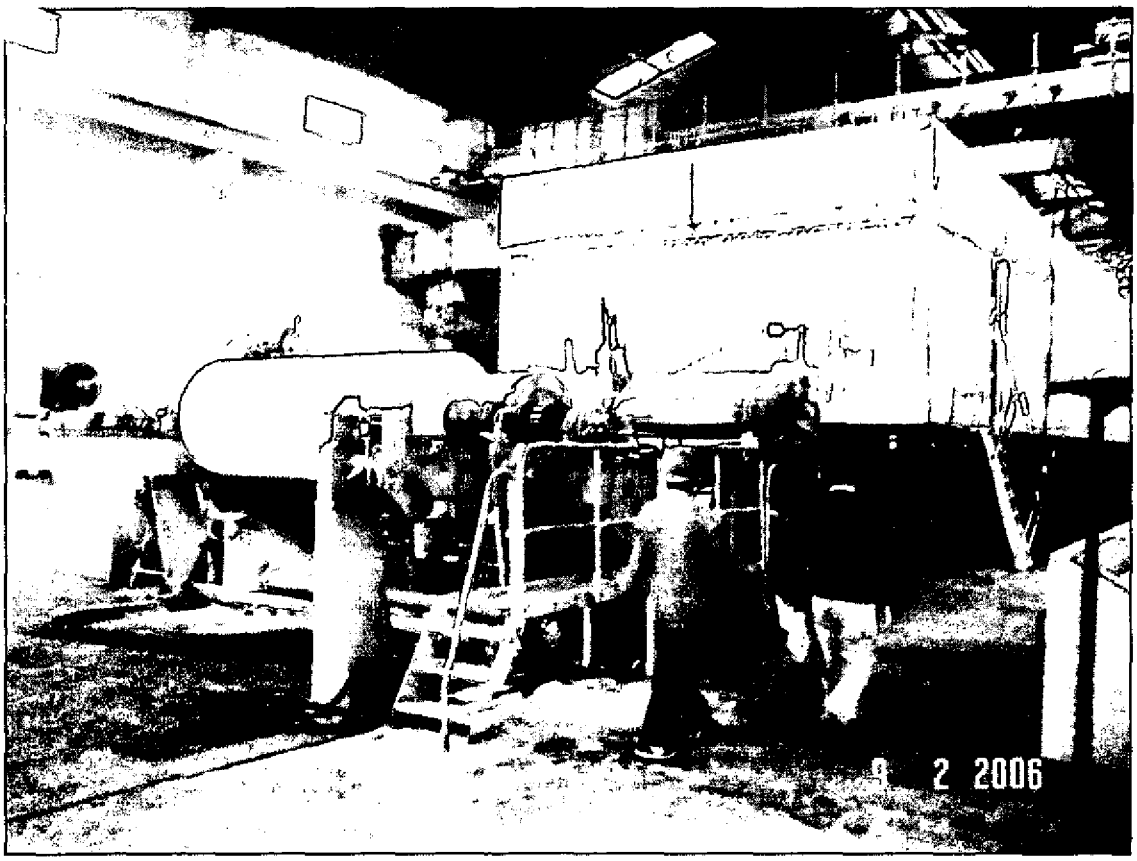
7.14 Conclusion

NTL Team took great interest in learning and implementing lean techniques for making improvements. Enthusiastic effort of the members resulted in significant reduction of wastage, In order to have long term gains; it is essential that such initiatives should continue for longer period of at least one year.

Lean tools were presented in simpler way to make the managers and frontline executives understand it and implement at their workplace in a customized way.

The main factors, which contributed in reduction of waste, are the following:

- Awareness of waste in the processes
- Diagnosis and quantification of real waste generated in the process
- Learning and application of root-cause analysis
- Learning and application of solution development
- Commitment for reduction of waste



Paper production unit of Naini Tissues Limited

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8. Consultants' Remarks

Consultant is highly grateful to UNIDO, Government of India and FICCI for providing the opportunity to develop a unique customized Lean methodology (based on Toyota Production System), which can be successfully implemented by SMEs also.

The organization culture of SMEs and psychology of SME entrepreneurs is not so receptive to learning and implementing new techniques. They lack a global vision and don't want to spend time, energy, and money on human resource development and learning of new techniques. It was a great challenge for the consultant to translate one of the most effective methodologies of Lean in simple implementable language of SMEs, train the people with practically little exposure of improvement techniques, and finally successfully deploy with positive tangible results.

This short intervention has definitely created awareness among the supervisors and managers about the "invisible waste" in their business processes and developed confidence in effectiveness of Lean tools. But to bring sustainable cultural transformation and institutionalization of continual improvement a long term intervention is necessary. The sponsors of this consulting support, specially FICCI and Government of India has to evolve appropriate mechanism to create a "pull" from the SMEs to go for human resource development to learn and apply modern management tools.

The experience gained during implementation of Lean tools in the above three units would be helpful in developing a well-structured methodology, which can be further improved by implementation in more SMEs. Undersigned is confident to come out with a simple, effective and practical methodology of training and deployment of Lean Manufacturing in SMEs of India and other developing nations.

14th August 2006
New Delhi, INDIA

Akhilesh N Singh
ansingh@ficci.com

Annexure-1

Project Completion Certificates

1. *HPMC Fruit Processing Plant Parwanoo*
2. *Banwari Paper Mills Ltd., Kashipur*
3. *Naini Tissues Ltd., Kashipur*

Himachal Pradesh Horticultural Produce Marketing & Processing Corporation Ltd.
(A Governmant Undertaking)

Ph. : (01792) 232351, 232773
Tele Fax No. : 01792-232773
हिमाचल प्रदेश उद्यायन उपज विपणन
एवम् विधायन निगम समिति
(एक सरकारी प्रतिष्ठान)

Processing Plant,
WANOO-173 220, Distt. Solan (H.P.)

No. .....

Dated .....
Dated:20th July,2006

The Director General,
Center for Global Competitiveness,
FICCI Quality Forum, Federation House,
Tansen Marg, New Delhi-110001

Sub: Consultancy & Training on Strategic Cost Management.

Dear Sir,

We are a public sector fruit processing plant involved in processing of fruits mainly apples) and preparation of fruit concentrate juices,drinks with annual production of 800 to 1000 MT of fruit juice concentrate and more than 9 lac trays of tetra-pak juices and drinks. Our plant is located in Himachal Pradesh, which is known as fruit bowl of india.

We are pleased to state that under the UNIDO SME capacity building program, strategic cost management training and consulting services were provided to us by Centre for Global Competitiveness during the period Dec'2005 to July'2006.In this consulting intervention our operating and maintenance personnel were trained on problem solving and cost reduction techniques based on lean manufacturing principles. To apply the learning a project titled " Improvement in Productivity of Tetra-pak Unit was taken up by our Managers under the guidance of FICCI consultant Mr. A.N.Singh.

During the consulting period our project team improved the availability of tetra-pak machine and modified the operating practices from two shift operation to three shift operation, which has helped in the improvement of tetrapak machine productivity from 812 trays per shift (average of April,'05 to March'06) to 1431 trays per shift during the month of June'06. The productivity improvement has contributed in significant reduction of production cost.

We express our sincer thanks to UNIDO for this consulting assistance to improve our process performance.

Thanking you,

Yours faithfully,

(T.R.Chauhan)
Plant Manager

. Office : Nigam Vihar, Shimla - 171 002
hone . 0177-2623832-34-36
0177 - 2623799
il hpmcshimla@hotmail.com / hpmc@nde.vsnl.net.in

C.S.T. No. SOL-CST-1552 DT. 22-10-81
G.S.T. No. SOL - III - 1555 DT. 22-10-81

HPMC, FRUIT PROCESSING PLANT, PARWANOO (H.P)

Project: Productivity Improvement of Tetrapak Unit.

Cost Elements	Baseline Cost (Before project)	Cost based on improved Performance
Productivity (Trays/Shift)	812 trays	1431 trays
Fuel, Elect., Water	Rs.15.90	Rs.12.20
Direct labour	Rs. 1.60	Rs. 1.58
Stores & Spares	Rs. 3.38	Rs. 3.38
Overheads	Rs. 1.34	Rs. 0.94
Staff Expenses	Rs.10.07	Rs.10.07
Total:	Rs.32.29	Rs.28.17

Reduction in cost of production: Rs.4.12/Tray
Annual estimated saving : Rs.16.48 Lacs

20/7/2006

(T.R. Chauhan)
Plant Manager

BANWARI PAPER MILLS LTD.

P. B. No. 18, Ramnagar Road, KASHIPUR - 244713 (Uttranchal)
Ph. : 274880, 275740 Fax : 05947-275840 Grams : PAPER MILL
e-mail : banwaripaper@sancharnet.in

Ref. No. ..... Date .....

BPML/2006-07/ 14/07/06

To,

The Director General,
Centre for Global Competitiveness
FICCI Quality Forum, Federation House,
Tansen Marg, New Delhi-110001

Dear Sir,

Sub: - **Training & Deployment of Strategic cost management in our plant.**

We are a 30 TPD paper unit operating in Uttranchal state of India. We are pleased to state that under the UNIDO SME capacity building scheme, training and consulting services were provided to us by center for global competitiveness during Jan 06-July 06.

During the consulting intervention our operating personnel were trained on problem solving tools based on Lean Manufacturing principles and a project titled "Reduction in finish loss by elimination of waste" was taken up by our project team under the leadership of Mr. Sumesh Verma, Plant Manager, Banwari Paper Mills Ltd., and assisted by FICCI consultant Mr. A.N.Singh.

By application of Lean Manufacturing techniques our project team could reduce the finishing loss from 6.54% (avg upto Dec'05) to 4.73 % (average Jan to June06).

Improvement in finishing yield is (1.8%).

We are thankful to UNIDO for this assistance and looking forward for future co-operation.

Thankful you,
Yours Sincerely,
For Banwari Paper Mills Limited

(Authorized Signatory)

Encl - Detail of conversion cost

BANWARI PAPER MILLS LTD.

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Ph. : 274880, 275740 Fax : 05947-275840 Grams : PAPER MILL
e-mail : banwaripaper@sanchamet.in

Ref. No. ..... Date .....

FINISH LOSS

Jan 05	10.60	Jan 06	3.58
Feb 05	4.89	Feb 06	1.37
Mar 05	7.50	Mar 06	3.42
Apr 05	6.28	Apr 06	4.14
May 05	5.40	May 06	7.76
June 05	4.00	June 06	8.13
July 05	5.80		
Aug 05	7.90	Avg	4.73 %
Sep 05	5.91		
Oct 05	10.07		
Nov 05	5.01		
Dec 05	5.14		
Avg	6.54 %	Diff	6.54
			4.73
			1.81 % less Finish loss

Total Finish Prod." From Jan 06 to June 06 = 5061.5 M T

5061.50 x 1.81 % = 91 M T
Conversion cost saving

a) Power 500 unit for one M T
b) Steam 2 M T for one M T (on M/c)

a) 91 x 500 = 45500 x 2.60 = Rs. 118300
b) 91 x 2 = 182 M T

3.5 T Steam generates from 1 M T Paddy Husk
Cost of Paddy Husk 1650/- per tonn.

182/3.5 = 52 M T 52 x 1650 = Rs. 85800/-

Total amount = 118300 + 85800
= 2,04,100/-

Naini tissues limited

Corporate Office : Station Road, Kashipur - 244 713 (UA) ☎ **275872, 275972** 🖷 : **(05947) 275872**

Works : 7th Km. Stone Moradabad Road, Kashipur - 244 713 ☎ **275913 - 15, 279360** 🖷 : **260831, 275914**

Regd. Office : 18, Nav Kranti Apartments, Plot No. 75 Patparganj, Delhi ☎ **22224593, 22224583 Extn. 218**

Director General
Center for Global Competitiveness
FICCI Quality Forum, Federation House
Tansen Marg, New Delhi-110001

Date: 12th July 2006

Dear Sir,

Subject: Training and deployment of Strategic Cost Management in our organization

We are a 100 TPD paper unit operating in Uttaranchal State of India. We are pleased to state that under the UNIDO SME capacity building scheme, SCM training and consulting services were provided to us by Centre for Global Competitiveness during Dec.2005 to June 2006

During the consulting intervention our operating personal were trained on problem solving tools based on Lean Manufacturing principles and a project titled "**Reduction in Finishing** Loss by Elimination of Waste" was taken up by our project team under the leadership of Mr. A.K .Upadhyay, DGM Research & Development, Naini Tissues Ltd. and project was executed through facilitation of FICCI's Consultant Mr Akhilesh N Singh.

By application of Lean manufacturing techniques our project team could reduce the finishing loss from 7.3% (average up to Dec.2005) to 6.9% (average Jan-Jun06) and finally attained 6.3% in the month of June 2006.

We are thankful to UNIDO for this assistance and looking forward for future cooperation.

Thanking You
Yours Sincerely

Authorized Signatory

Naini tissues limited

Corporate Office : Station Road, Kashipur - 244 713 (UA) ☎ 275872, 275972 📠 : (05947) 275872
Works : 7th Km. Stone Moradabad Road, Kashipur - 244 713 ☎ 275913 - 15, 279360 📠 : 260831, 275914
Regd. Office : 18, Nav Kranti Apartments, Plot No. 75 Patparganj, Delhi ☎ 22224593, 22224583 Extn. 218

RESULTS OBTAINED

Finishing Loss & Total Finished Paper Production *(Jan – June 2006)*

2006	Production MT	Finishing Loss %
January	2805	7.30
February	2458	7.30
March	3123	7.10
April	3107	7.09
May	3034	6.32
June	2721	6.30
Total/Average	17251	6.90

Reduction in actual Finishing Loss from Base line: 7.35-6.90 = 0.45%

Economic impact of Finishing Loss reduction During Jan-June 2006

Additional finished paper produced due to reduction in finishing loss: 77.6 Metric Tons
Estimated monthly saving potential by 1% reduction in finishing loss: Rs. 25000 /
Estimated annual saving potential by 1% reduction in finishing loss : Rs 3.0 Lacs

(A. K. Upadhyay)
DGM R&D

Project Documents

1. *HPMC Fruit Processing Plant, Parwanoo*
2. *Banwari Paper Mills Ltd., Kashipur*
3. *Naini Tissues Ltd., Kashipur*

Himachal Pradesh Horticultural Produce Marketing & Processing Corporation Ltd.
(A Government Undertaking)

Fruit Processing Plant,
PARWANOO-173 220, Distt. Solan (H.P.)

Ph. : (01792) 232351, 232773
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हिमाचल प्रदेश उद्यायन उपज विपणन
एवम् विधायन निगम समिति
(एक सरकारी प्रतिष्ठान)

Ref. No. No.hpmc(P)FPP-1- /2006- 348 Dated 10th February, 2006

THROUGH COURIER SERVICE

Mr. Akhilesh N. Singh,
Consultant,
FICCI Quality Forum
Federation of India, Chambers of Commerce & Industry,
Federation House, Tansen Marg,
NEW DELHI-110 001

Sub: **Wate Diagonistic Workshop – Proceeding thereof**

Dear Sir,

Kindly refer to the above workshop held at hpmc Ltd, Fruit Processing Plant, Parwanoo w.e.f 31st January to 02nd February, 2006, in this context, we are enclosing herewith a copy of proceeding of the same for your kind perusal and further necessary action at your end.

Thanking You,

Yours faithfully,

Plant Manager

Encl: a/a

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Telephone 0177-2623832-34-36
Fax 0177 - 2623799
E-mail hpmcshimla@hotmail com / hpmc@nde.vsnl net.in

C.S.T No. SOL-CST-1552 DT. 22-10-81
G.S.T No. SOL - III - 1555 DT. 22-10-81

A waste Diagonistic Work shop was conducted at hpmc Ltd, Fruit Processing Plant, Parwanoo on 31st Jan, 01st & 2nd February, 2006 by Mr. Akhilesh N. Singh Principal Consultant, FICCI Quality Forum, New Delhi in order to identify different kinds of business process waste generated in the Company, their quantum and source and costs involved in the same. Based on the observations a road map for elimination of wasts through Lean and Six Sigma deployment was made.

At the outset the following diagonistic teams were formed:

a) **Engineering Division comprising of :**
1. Sh. B. M. Saini, Plant Engineer
2. Sh. Balbir Singh, JE (Boiler)

b) **Production & Quality Control Division comprising of:**
1. Sh. Vineet KaushiK, Technical Officer
2. Sh. Mansha Ram, ATO (Processing)

c) **Accounts & Finance Division comprising of:**
1. Sh. V. K. Gupta, Asstt. Manager (F&A)
2. Sh. R. C. Sharma, Asstt. Manage (F&A)

d) **Storage & Shipping Division comprising of:**
1. Sh. Pardeep Sharma, JE
2. Sh. S. K. Jaret, ASK

e) **Marketing Division comprising of:**
1. Sh. B. L. Chauhan, Asstt. Manager (Marketing)

f) **Personnel Division comprising of:**
1. Sh. B. L. Dulta, Sr. Assistant.

On day one, the consultant gave presentation on Lean Diagnosis and explained the methods & techneques for diagnosis of waste in various Sections. Further, team activities such as process mapping, brain storming, waste identification, identification of source of data, development of data collection plan and development of formats & documents for data collection, compilation and analysis was done.

On day two the data collected from sources by various teams was reviewed with the consultant and on the final day the data was compiled by the teams and respective reports were prepared. The presentation of findings to the management was done and reviewed. Depending upon the findings, different projects for waste reduction were assigned to different teams and it was decided that the targets given to the teams shall be reviewed by the end of February, 2006.

The presentations on waste diagnosis by the various teams was as follows:

A: **Engineering Division**: Going through the records of the year 2005-06, it was found that the apple processing line operated at about 35% capacity utilization while TBA-9 machine in Tetrapak Division operated at about 32% capacity utilization. Since the TBA-10 machine is soon to be phased out, so it was not taken in to study. The main reasons for under utilization of apple processing line was non availability of sound and good quality apples for processing for longer durations and frequent break downs in apple handling line. The under utilization of TBA-9 machine was mainly due to the fact that this machine was under commissioning trials during the current year. As a special case, the Boiler segment was studied for diagnosis of waste and it was

Contd...2-

found that about 3% steam wastage was there due to week insulation of steam pipe lines in the Plant. Another 2% steam wastage was due to various leakages at different valves/joints etc,. A project was assigned to PE & JE(B) to bring down the steam wastage to less than 1% by end –Feb, 2006.

Another project was assigned to a Team comprising PE/TO/AM(F&A) to increase the capacity utilization of apple processing line as well as Tetrapak to 70% during the current year.

B: **Production /Quality Division:** As per the process map of quality control, it was revealed that a sum of about Rs.3.0 Lac per annum was involved in defective packages, re-work and for complaint settlement of Tetrapack production. A project was assigned to TO & ATO to increase the frequency of quality checks to avoid this expenditure.

As per the process map of Aseptic Filling of Juices/Pulps it was found that there was laminate loss of 3.8% which is quite high and accordingly a project was assigned to TO/PE/JE(Ref.) to bring down this loss to less than 2%. Similarly the trays wastage was @ 3% which is also quite high and is to be brought down to about 1%.

The process map of apple handling line reveals that about 50MT AJC costing about Rs.35.00 lacs was less produced due to rotten fruit and inadequate supply of apples during the onset of the apple season and during its fag end when the Plant could only be operated in either single or double shift. A project was assigned to TO & AM (Mkt.) to review the demand and supply of apples for processing of apples during the season, so that about 100 MT sound apples are available daily for processing. In order to increase the capacity utilization of the Plant, three shifts operation with 100MT per day handling of quality apples with minimum rottage is to be ensured contineously for 100 days, so that about 10000MT fruit is handled at the minimum during the season. It was also observed that the maximum breakdowns were observed in the apple handling conveyors/elevators so an alternate handling system or proper preventive maintenance of the system is required.

C: **Accounts & Finance Division:** There is no direct money related wastage in this division, however, efforts are required to reduce the losses in lieu of delayed processing of various bills and timely arrangement of funds for various operational requirements of the Plant. A project was assigned to Asstt. Manager (F&A) & T.O to review the costing of various products produced in the plant.

D **Storage & Shipping Division:** It was observed that there is shortage of space for storage of finished products as well as various raw materials in the Plant. Accordingly a project was assigned to PE/JE(M) and ASK/JE(Ref.) to review the level of raw material inventories including spares of various machines lying in our stores, so that minimum inventory is kept in stock to save space and money involved in the same. Similarly the storage of finished products is to be reviewed and efforts are required to produce and despatch materials as per requirements/ demand of various branches, so that un-necessary conjestion of space is avoided.

Contd....3-:

E: **Personnel Division :** It was observed that there was no schedule of training programmes to be imparted to the staff at various levels and the HRD activity was almost NIL. There was no training room available in the Plant. Accordingly the I/c Personnel was asked to workout various trainings that can be imparted to the staff and it was also decided that a good training room shall also be put in place. The Incharge Personnel shall also workout the details, so that the deployment of staff on over time is reduced to minimum, punctuality/late attendance of staff is accounted for is avoided, weekly-off's are fixed where are possible, misuse of telephone is avoided.

1		**Personnel**
2	1	Workout manpower requirement month wise for 12 months
3	2	Develop training programms for operating & maintenance staff
4	3	Organize taining program for motivating people for higher involvement
5		**Maintenance**
6	4	Breakdown trend analysis of tetrapack section for last 12 months
7	5	Reduce the breakdowns and downtime of machines
8	6	Planning and procurement of critical and essential spares for tetrapack section
9	7	Develop preventive maintenance schedule
10		**Process**
11	8	Quarterly plan for all raw materials and packing materials
12	9	Inventory requirement of raw material and packing material
13	10	Develop Standard practice instructions for all important operations
14	11	Standard practice instructions for emergency situations in case of failures of Power, Air, Steam, Chilled water
15	12	Standard practice instructions for cleaning of tetrapack system
16	13	Maximum and minimum inventory levels of finished product at storage and shipping sctions
17		**Planniong & Monitoring**
18	14	Monthly review of process and plant performance, recording of corrective actions
19	15	Visual management: Display of daily target and performance data at tetrapack section
20		**Environment**
21	16	Housekeeping : Removal of unwanted items from shop floor
22	17	Regular cleaning and proper maintenamce pf Toilets and canteen area
23	18	Cleaning and vegetation of Plant premises
24	19	Hygiene: Repair of broken shop floor and regular cleaning and maintenance

Area	Problem	Who ?	What to be done ?	By when	How to check it ?	Review meeting when
Manpower	Untrained Operator/ Operater competency	Mr. B. L. Dulta	To work the monthwise requirement current availability & appropriate solution identification of training need development of training programme	28th Feb, 2006		
	Attitude & Involvement	Mr. V. K. Gupta		28th Feb, 2006		
Machines	Breakdown analysis Preventive maintenance Spare Parts availability	Mr. B. M. Saini	Breakdown total analysis w.r.t mechanical, elect. or operational failures Maintenance schedule for entire Plant for implementation. Spare part requirement & procurement plan. List of actual stock & critical spares.	28th Feb, 2006		

	Who	What to be done	By When	How to Check it ? Review meeting when
Materials	Technical Officer/ Plant Engineer	Quarterly plan for all raw materials/input packing material based on production plan. Inventory level		
Process (Method)	Standard practices instructions manual -PE	List of standard practice instructions are to be develop/ instruct & instructions & training given to the staff.		
	Action plan during emergency -PE	Instructions during emergency situation i.e in case of power/chilling water/steam , mechanical failure.		
	Cleaning procedure -TO	Standard practice for the cleaning of machines/equipments. Proper documentation of log books & checking.		
	Inventory level	Standard position of inventory /planning for storage & despatch.		
Measurement	-TO -PE -PE	Complaint settlemtnt register Plant performance (all machines) , measurement production performance measurement. Visual management by displaying board indication daily / cummulative/ monthly tagets		
Environment	Hygiene -TO	Rectification of broken floors. Cleaning of floors		
	House keeping -AM(F)	Removal of unwanted items. Periodical check		
	Maintenance of premises/ Canteen/ Toilets -Sr.Asstt.	Clearing/ Plantation Maintenance/ cleaning & periodical inspection		

Month	Tagret (Nos. of Trays)	Actual	Shartfall	Surplus
January				
February	60000			
March	60000			
April	96000			
May	96000			
June	96000			

Target for the month:_____

BANWARI PAPER MILLS LTD.

P.B. No. 18, Ramnagar Road, KASHIPUR - 244713 (Uttranchal)
Ph. : 274880, 275740 Fax: 05947-275840 Grams: PAPER MILL

Ref. No.....

Date .....

COST REDUCTION PROGRAMME

Refer to the letter of FICCI regarding cost reduction programme in our unit. Mr. Akhilesh N.Singh visited our Plant on 07.02.06. We held a meeting & following executives were selected to participate & cooperate fully to achieve the target with in Limit.

1. Mr. Ram Chander
2. Mr. Rajbir Singh
3. Mr. R.P.Mishra
4. Mr. Anil Kumar
5. Mr. Tribhuvan Singh
6. Kripal Singh
7. Mr. Om Prakash

Pulp flow & paper making chart was made. Production record of 2005 including down time with substantial breakup & discussed the specific points, on which cost may reduce on priority basis.

A) Raw Material to pulp — For yield improvement
B) Pulp to Paper — For yield improvement
C) M/c Roll to finish product — For minimize loss.

Avg. Finish loss - 7 % considered by Mr. Singh

M/c Production 900 Mt/month (Considered)
900 x 7 % = 56.70 Mt
x 90 %
Which is recovered by reprocessing.

Conversion cost

Power 56.7 x 500 = 28350 unit @ 2.60 per unit

28350 x 2.60 = 73710/-

Steam 2 Mt per ton of Paper

56.7 x 2 = 113.40 Mt Steam
3.5 Mt steam generates by consuming 1 Mt Rice Husk
For 113.4 Mt Steam, 32.4 Mt Rice Husk is required.

32.4 x 1650 = 53460/-

Total Amount 73710+53460 = 127170/- per month.

BANWARI PAPER MILLS LTD.
P.B. No. 18, Ramnagar Road, KASHIPUR - 244713 (Uttranchal)
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Ref. No..... Date .....

To save this amount we made the provision of some interventions like effect, cause, remedial solution, Action plan etc. we made an internal improvement teams to monitor of individual effect.
Points noted how much % of loss can be minimized.

Effect

1. Trim loss 3 %
2. Frequent size change 1 %
3. Manual handling 0.5 %
4. Steam fluctuation 1 %
5. Power/voltage Fluctuation 1 %
6. No. of sample taken for GSM 0.5 %

- Trim losses can be reduced from 3 % to 2 % by maintaining deckle of the roll at pope reel according to size received by market.
- Frequent size variation loss cannot be controlled. We will hold a meeting with marketing executives so that losses can be reduced from 1 % to 0.5 %.
- Manual handling of the sheet from Pharma to lorry being done, which can be controlled by putting lorry directly under Pharma and full load lorry may be shifted to finisher's table, but at the time to put next lorry under Pharma, Duplex cutter has to shut for few minutes, by which loss can be reduced from 0.5 to 0.25 %.
- Steam fluctuation was observed at the time of bed cleaning due to which either quality of paper is defective or brakes our M/c. Almost care to be taken to reduce the time of bed cleaning in order to avoid steam fluctuation, so that loss can be minimized from 1 % to 0.5 %.
- Power fluctuation, if from Hydle cannot be controlled D.G. is available to generate power and supply to whole plant but it takes more time to reel the paper again.
  Providing following items can control voltage fluctuation.

  Stablizer
  Online tap change transformer
  Servo stabilizer
  Loss can be reduced, by putting required items, from 1 % to 0.5 %.
- Sample of Paper for checking substance-reduced number of times. Only two samples were allowed to check from one roll during running so that loss can be minimized from 0.5 % to 0.25 %.

Size variation 1 to 0.5 %
1 % to 0.5 %
discussed with market

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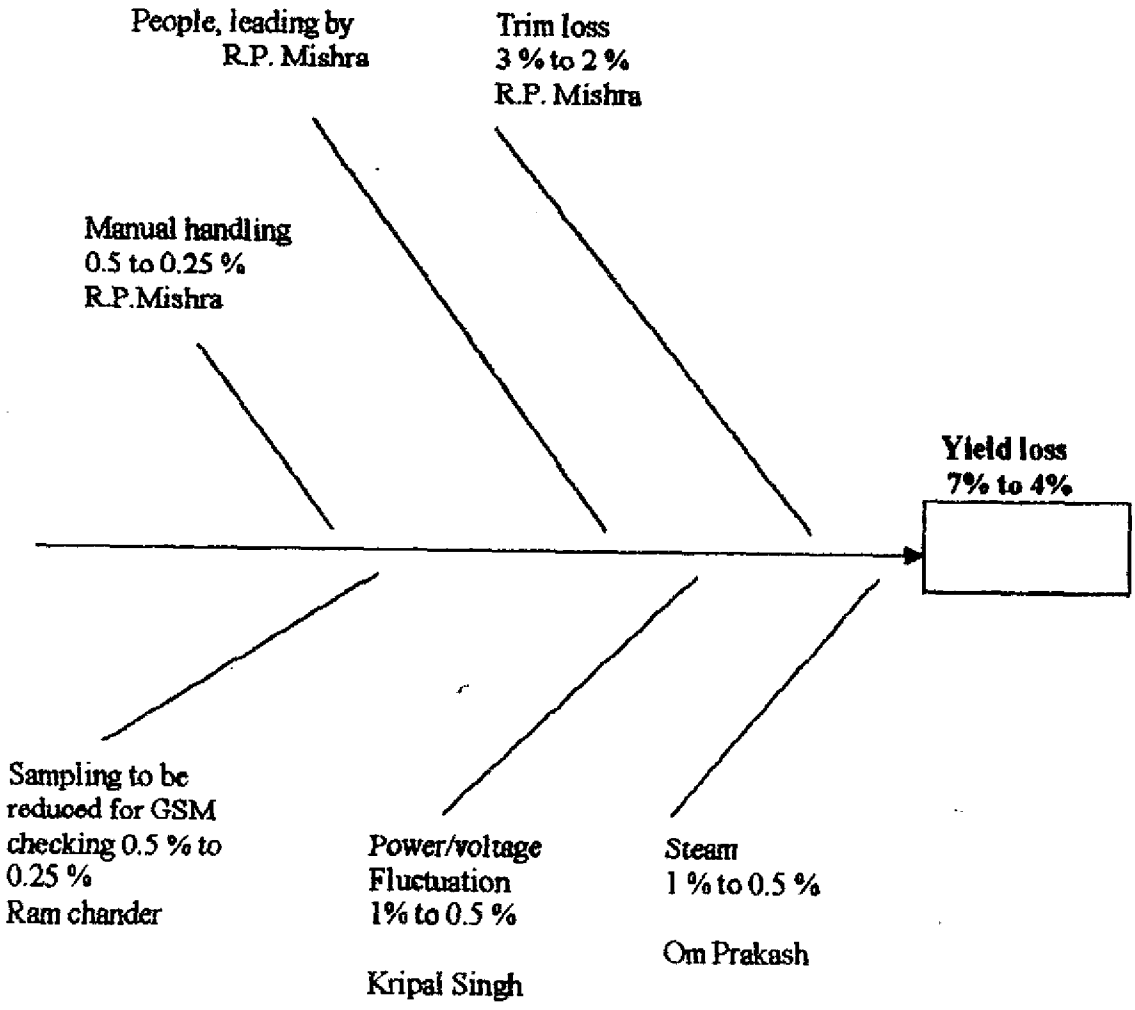
Date .....



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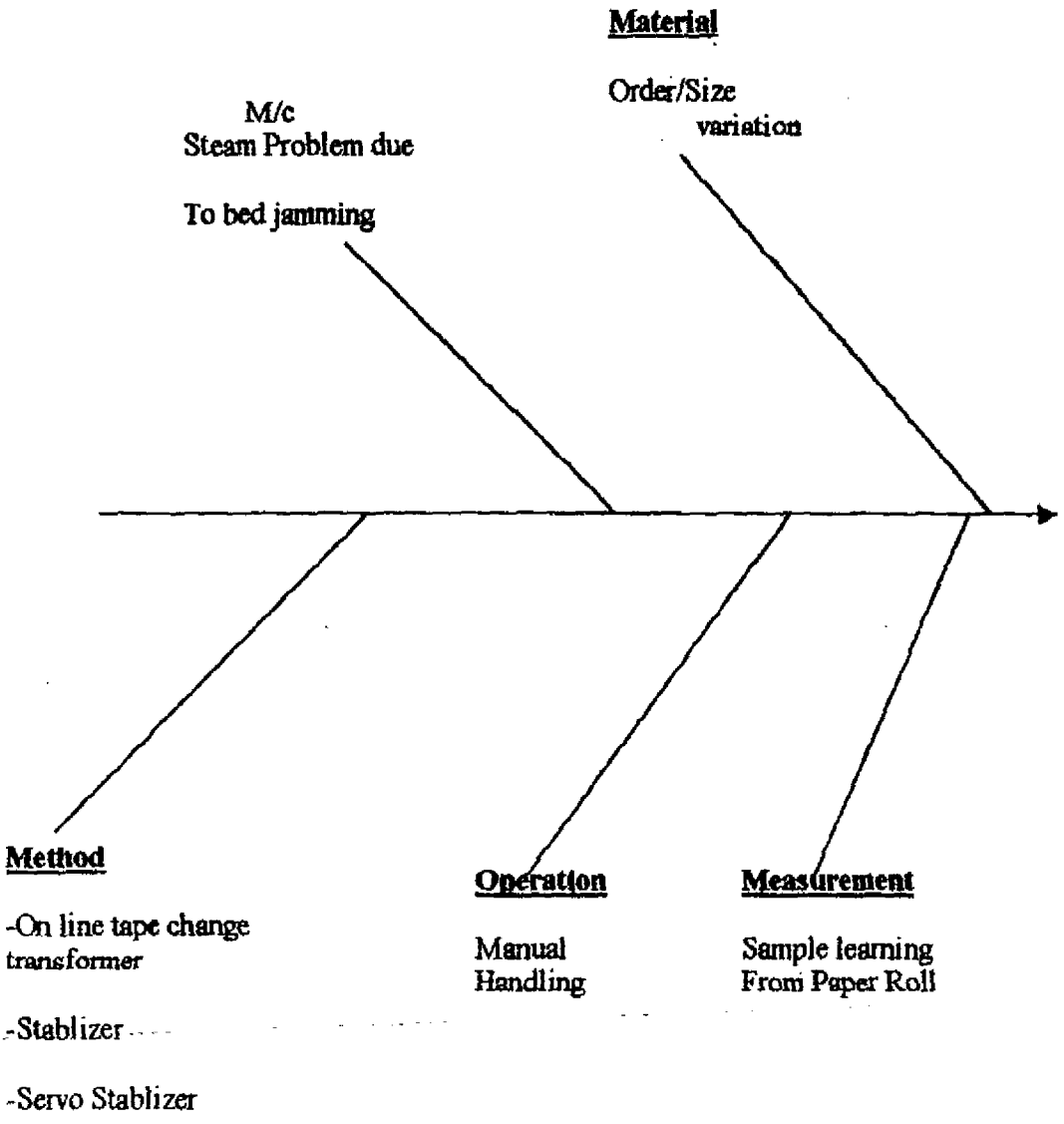

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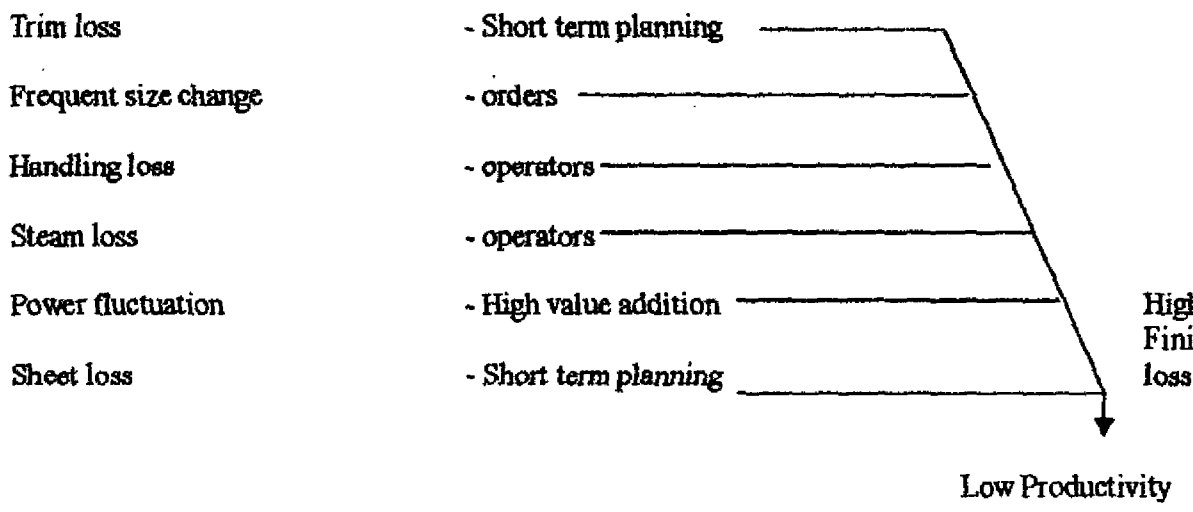
Effect / Cause / Solution



Action Plan What to do

Feb	Mar	April	Who
What & When	What & When		
Manual loading To lorry stopped From pharma Paper sample from Roll, reduced Number of times	To be discussed with market people to reduce frequent (size variation) order.	low steam pressure can be controlled after running IInd Boiler efficiently. Voltage fluctuation can be arrested by providing minimum Items.	all the concerned people with Be monitored.

Work is under progress process wise, awareness was raised among the Deptt. Heads but our basic needs is to maintain better quality on sustain basis without excessive investement with the existing system.

naini tissues limited

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Works : 7th Km. Stone Moradabad Road, Kashipur - 244 713 ☎ **275913 - 15, 279360** 🖷 : **260831, 275914**

Regd. Office : 18, Nav Kranti Apartments, Plot No. 75 Patparganj, Delhi ☎ **22224593, 22224583 Extn. 218**

PROJECT REPORT

Project Background

UNIDO (United Nations Industrial Development Organization), in association with Government of India and FICCI has initiated a SME Capacity building scheme for Paper & Pulp industry to enhance global competitiveness of Indian paper industry. Under this scheme Naini Tissues Ltd was selected to get consulting & training support from FICCI for deployment of Lean Manufacturing techniques in its production process. After a formal training on Lean Tools to our managers a project was taken up by a Improvement team of Naini Tissues Ltd during the period of January 2006-June 2006, project was faciliatated by a FICCI consultant Mr Akhilesh N Singh.

This project report gives brief description of activities undertaken by the project team and results obtained from the project.

NAINI TISSUES LIMITED:-

M/s Naini Tissues Limited, Kashipur is situated 7th Km mile stone of Kashipur Moradabad Road. It is an agro-based writing grade paper manufacturing mill having the capacity of 100 TPD. Plant was commissioned in the month of May 2005.

PRODUCTS:-

Writing & Printing Grade – Maplitho Paper
Conforming to IS: 1848

MAN POWER

Plant has total manpower of...200 which includes 25 managers and 175 staff workers.

PRODUCTION CAPACITY

100 Tons Per day

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PROCESS DESCRIPTION FOR PAPER MANUFACTURING

PULP MILL:-

A) BAGASSE/ WHEAT STRAW STREET

1. RAW MATERIAL:-

Bagasse and wheat straw are being used as raw material for paper manufacturing .The wheat straw is being de-dusted and bagasse is being de-pithed in depither. The bagasse and wheat straw are being washed before cooking in digester.

2. DIGESTER HOUSE:-

The washed raw material (Bagasse & wheat straw) is then cooked in Pandiya Type continuous digester in the presence of caustic and steam at a temperature of 160^0C for 15-20 minutes. The cooked pulp stored in separate blow tanks.

3. SCREENING, WASHING AND CENTRICLEANING:-

Cooked pulp from the blow tank is being sent for screening in 8mm hole dia.vibrating screen. The screened pulp is being used to three nos. of brown stock washers for separating of black liquor from pulp. All three washers are running on closed counter-current washing system. Black liquor is being sent to soda recovery plant and pulp is being sent to storage chest for further processing. Washed pulp is being refined is TDRs screened at slotted pressure screen and centricleaned.

For sheet making, the rolls are loaded on duplex cutter and the required sized sheets are cuts as per the market demand. The sheets are then sent for finishing and packing dispatched as per the schedule.

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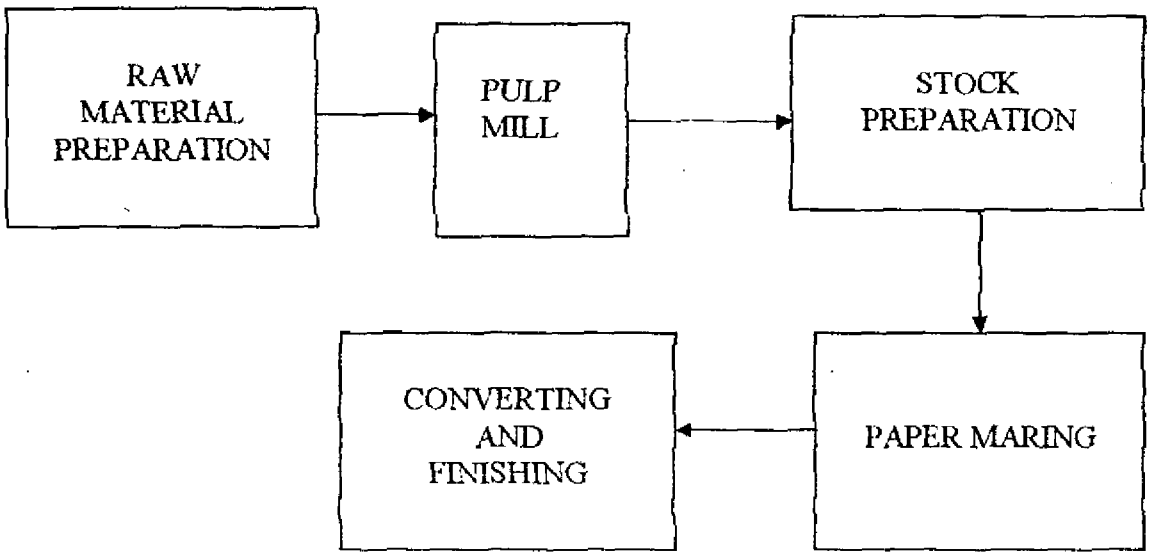
PROCESS FLOW DIAGRAM



Project description

Paper is manufactured on paper machine in the form of jumbo rolls weighing about 5 to 6 Metric Tons. Paper wound in Jumbo rolls is converted into smaller reels and sheet form for end users in simplex cutter, duplex cutter, and rewinder. During conversion there are loss of paper called finishing losses which is re pulped. In the finishing loss some of the losses are controllable by better operating practices and planning. In this project effort has been made to identify the controllable losses and evolve appropriate countermeasures to reduce such losses.

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PROJECT TAKEN:-
"Reduction in finishing losses;.

BASELINE VALUE:-
Based on last three months (Oct. to Dec.2005) actual finishing loss the baseline finishing loss taken for this project is 7.35% .

TARGET:-
A brain storming session was conducted in which all concerned department personnel were present and a target of reduction in finishing losses from 7.35 to 6.35 was fixed by consensus. The finishing line reduction target is to be achieved during next six months (Jan to June 2006) through application of Lean manufacturing Tools. FICCI consultant would provide essential training and guidance on learning and application of lean tools to attain the targeted reduction in finishing loss. For taking up this assignment following team was constituted by management.

NTL's PROJECT TEAM

1. Mr. S.K.Aggrawal DGM Production (chairman)
2 Mr. A.K.Upadhyay DGM R&D and Q.C .(Coordinator)
3. Mr.L.R.Tiwari, Sr. Manager Finishing and Converting (Member)
4. Mr. Vikash Rastogi, Manager Mktg (Members)
5. Mr. P.N. Sharma, Dy. Manager R&D (Members)
6. Mr. A.N. Singh, Principal Consultant, FICCI

METHODOLOGY
Team members were provided training on Measurement and analysis of data to establish the root cause and develop an action plan. Accordingly team worked and identified the root-causes resulting to various kinds of finishing losses. Through brain storming team developed countermeasures and action plan for reducing the controllable component of finishing losses. Appropriate actions were taken by team, which were periodically reviewed and evaluated jointly by consultant and team members. After taking planned actions finishing losses could be brought down as per target during the project period.

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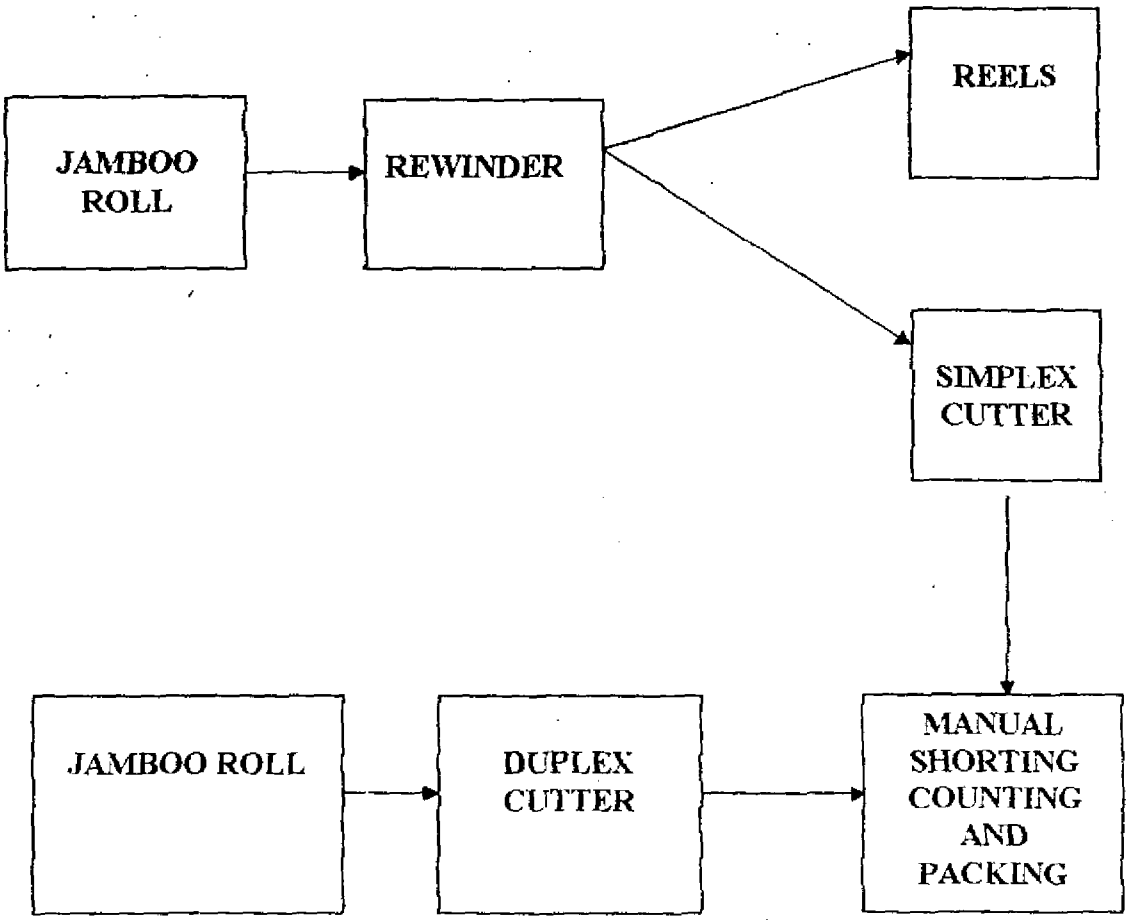
PROCESS MAP



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DETAILS OF BASE LINE FINISHING LOSSESS (OCT TO DEC) 2005

DUPLEX CUTTER LOSSES	TRIMMING LOSSES ETC (3.5%)	JOINTS AND CREASE ETC LOSSES (2.0%)	LINE LOSSES (2.0%)	TOTAL 7.5

SIMPLEX CUTTER LOSSES	TRIMMING LOSSES 3.0	JOINTS AND CREASE ETC LOSSES (1.0%)	LINE LOSSES (1.0%)	REWINDING LOSSES (5.0%)

REWINDER	TRIMMING LOSSES (3.5%)	JOINTS LOSSES (2.5%)	M/C DEFFECTS (1.0%)	TOTAL 7.0

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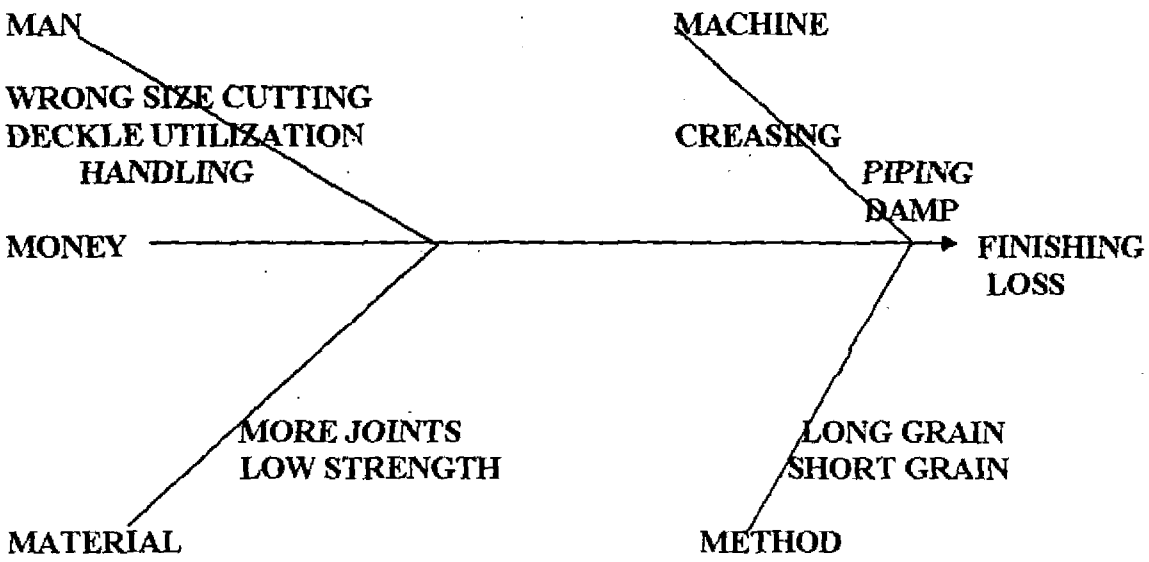
DATA ANALYSIS THROUGH CAUSE AND EFFECT DIAGRAM



CORRECTIVE ACTIONS TAKEN

S.No	PROBLEMS	JOB TO BE DONE	SCHEDULE DATEOF COMPLETION
1.	Sheet jamming problem in conveyor Belts	Replacement of conveyor belts by single piece felt.	10/03/06
2.	Low Deckle Utilization	Deckle Utilization up to 278 Cms	Done
3.	Higher No. of joints in Parent Roll	Periodical cleaning of chemical Tanks& pipelines etc	Continue
4.	Higher Trimming Losses on simplex cutter Material	Low Utilization of simplex cutter	Continue
5.	Gsm & Moisture Variation	Online QCS System to be Installed	With in 6 Months

Your Feedback
on Lean Consulting & Training

In order to develop effective and value-added training & consulting programs for Indian organizations, we would like to have your views and suggestions on Lean Management consulting & training activities provided to your organization We will be extremely grateful if you could spare few minutes of your valuable time to give your free & frank opinion on the following aspects based on our interaction with you during last six months.

Training on problem identification & problem solving

- In the beginning of project we provided formal training to project team. Kindly give your views about the content and methodology of training. Was it really helpful in problem identification and problem solving? Pleas give your comments:

It was quite helpful to identify the problems and then train solutions

Consulting support provided to improve the processes

- Was the consulting support enough? If not how to improve it. Please give your suggestions/

It was enough.

Overall comments about consulting & training

- Please give your views on this intervention. Did you find useful? Would you like to have further assistance? If yes, in which area?

It was useful and we require similar training for our other production lines.

Your Name T.R. CHAUHAN Designation PLANT MANAGER

Organization H.P.M.C.

Contact address HPMC, F.P.P. PARWANOO - H.P.

Signature T R Chauhan Date 20-7-06

E-mail hpmc.hpmc@yahoo.co.in Phones 232351, 232773

Your Feedback
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Training on cost reduction programme, 07 executives attended. Specific points were discussed. They are satisfied during discussion.

Consulting support provided to improve the processes

- Was the consulting support enough? If not how to improve it. Please give your suggestions/

consulting support was quite sufficient. This programme we observed just like it raise the awareness from any individual regarding the focus agenda. To increase the finish yield, control on perfect quality paper is basic need. It is better to point out the fault so that root cause can be arrested and eliminate inorder to improve the quality.

Overall comments about consulting & training

- Please give your views on this intervention. Did you find useful? Would you like to have further assistance? If yes, in which area?

A technical consultant is necessary to visit who knows about the specific rooms of the particulars on which we are discussing to give the remidieal Solution. Input cost will be reduced by manufacturing a gloss strength paper which satisfy to the customers.

Your Name Suneeth Verma Designation Prod. Manager

Organization Banwari Paper Mills Ltd.

Contact address Ram Nagar Road, Kashipur (U.S. Nagar)

Signature _____ Date 12/2/06.

E-mail _____ Phones 9837657484.

Your Feedback
on Lean Consulting & Training

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- In the beginning of project we provided formal training to project team. Kindly give your views about the content and methodology of training. Was it really helpful in problem identification and problem solving? Pleas give your comments:

  Lean tools are used to find the reasons. Resulting we able to reduce the losses.

Consulting support provided to improve the processes

- Was the consulting support enough? If not how to improve it. Please give your suggestions/

  Good consulting support was given to us.

Overall comments about consulting & training

- Please give your views on this intervention. Did you find useful? Would you like to have further assistance? If yes, in which area?

  Satisfactory. Further we would like to take assistance in future.

Your Name Arunkumar Upadhyay Designation DGM (R&D)

Organization Naini Tissues Ltd.

Contact address 7th KM Moradabad Road Kashipur (U.S

Signature _____ Date 13/07/06.

E-mail _____ Phones 9412843866

CREW

Cost Reduction thru' Elimination of Waste

Center for Global Competitiveness

Objectives

- Enhance global competitiveness of Business organizations
- Competency development
- Development of customized Consulting methodologies
- Support to other developing nations
- Developmt. of Consultants

FICCI

UNIDO

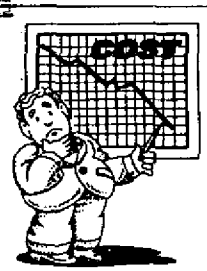
Knowledge Partners

- ASQ
- Kaizen Institute
- Dale Carnegie Training
- Naigel Baur UK
- Marsden International
- Eurepgap
- UNIDO
- Government of India

Products & Services

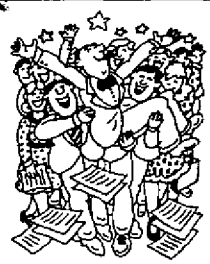
Consultancy ; Training ; Corporate Training CDs ; Case Studies

About the CREW



- CREW: a practical technique, which reduces cost by elimination of waste
- Developed based on hands-on experiences of specialist
- Already applied and validated by industrial organizations including UNIDO

Let's know each other



Please introduce yourself:

- *Name*
- *Designation/ Function*
- *Organization*
- *Products & services offered by your company*
- *Current improvement initiatives in your company?*
- *Your exposure of Lean?*
- *Your experiences of Lean?*
- *Your Expectations (from this Workshop?)*

My Lean Gurus

***Prof Dan Jones**, Chairman*
Lean Enterprise Academy UK

***Masaaki Imai**, Chairman*
Kaizen Institute Japan

Faculty: Akhilesh N Singh

ansingh@ficci.com
: 09811054753

Professional Skills

- Training in Lean: from Lean Enterprise Academy UK by Lean Guru Daniel Jones, Chairman LEA (2005)
- Gembakaizen & JIT : Kaizen Institute Japan by Kaizen Guru Masaaki Imai, Chairman KI (2003) & Toyota Japan
- TQM : Yokohama Kenshu Centre Japan by Prof. Yashika Tsuda (1993)
- Six Sigma Black Belt: American Society for Quality by Elizabeth Keim, Former President ASQ (2006)
- Certified NLP Practitioner, Formal study of Vedanta

Publications:

- Author of 8 Books (Quality Mgmt, Steel Technology, & Quality of Life)
- Developed 3 CD ROMs on Management Techniques *(Strategic Cost Mangmt., Change the Mindset, Value-added Quality Audit)*

Current activities:

- Management Consultant at FICCI
- UNIDO consultant on Lean
- ASQ faculty on Lean & Six Sigma

Education : B.Tech, Diploma in Industrial Management, Business Management, Gembakaizen
Experience: 34 years (28 Yrs. Industry + 6 Yrs Management Consulting)

Management Challenge

What's the ultimate goal of a Business organization?

The ultimate GOAL is to.....

- ***Make PROFIT***

By meeting the needs of its Customers & other Stakeholders

Quantum of profit?

PROFIT = Sales Volume X Contribution

The key to profit?

PROFIT = Sales Volume X Contribution

What is competitiveness?

Competitiveness is.....

Capability to win the global market race

Customer yardsticks to measure **Competitiveness** in Global market

- **Cost** : Minimum
- **Time**: Shortest *(order taking to delivery)*
- **Quality**: World class

QCD

The managerial challenge?

To make more profit the challenge is to:

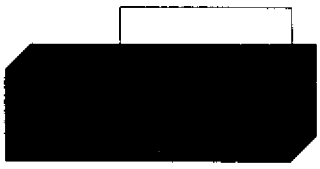
- *Reduce* **COST**
- *Reduce lead* **TIME**
- *Improve* **QUALITY**

Understanding the organization

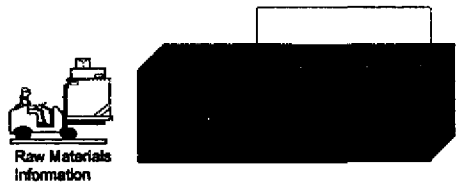
- Let us have a realistic view of our organizations

What is an organization?

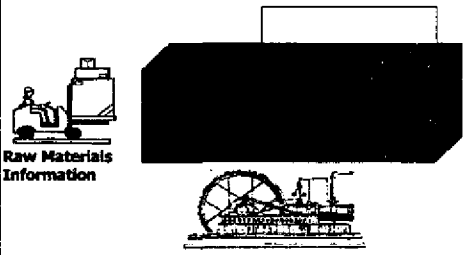
a Black Box



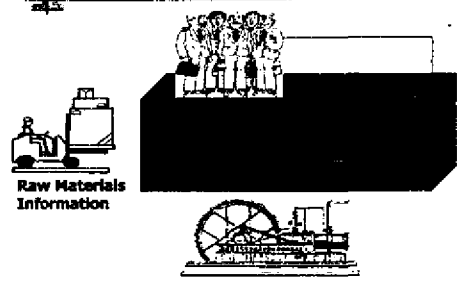
in which we put inputs...



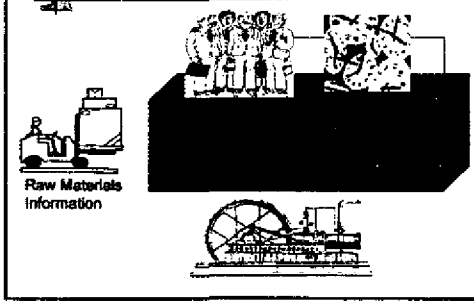
....use Machines, Facilities,



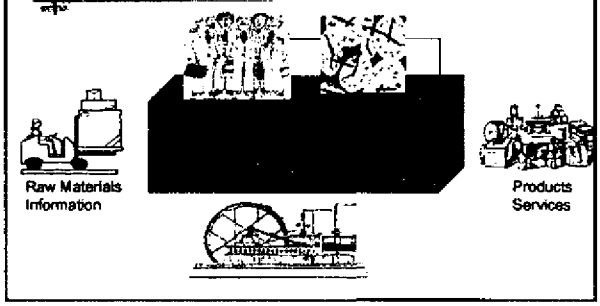
....People's Effort & ..



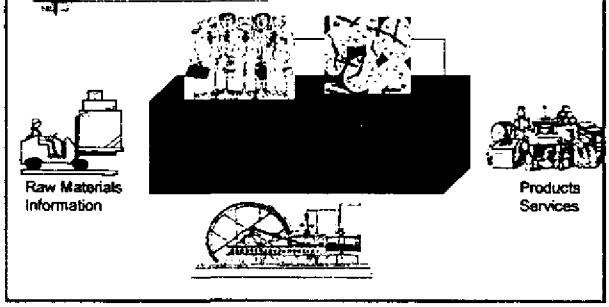
... Time to produce & deliver..



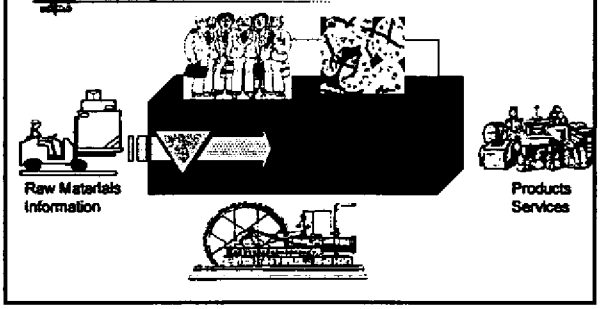
Products & Services



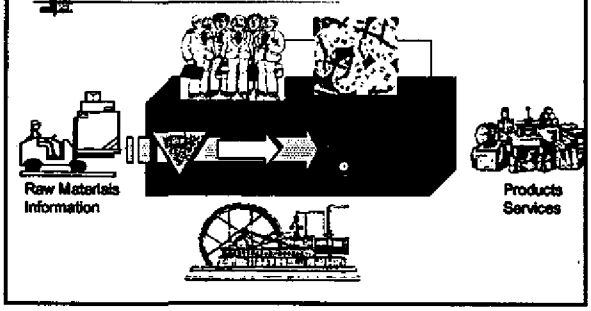
In the Black Box
4 types of operations are performed..



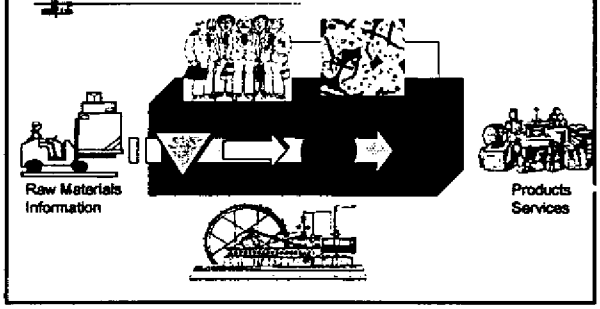
1. Retention



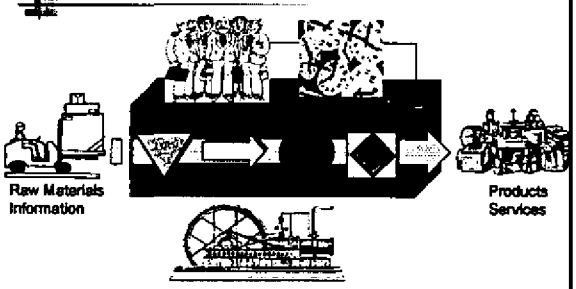
2. Transportation



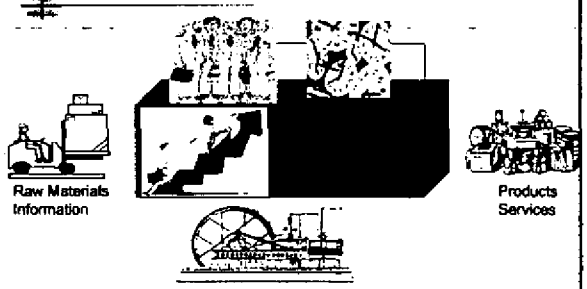
3. Processing



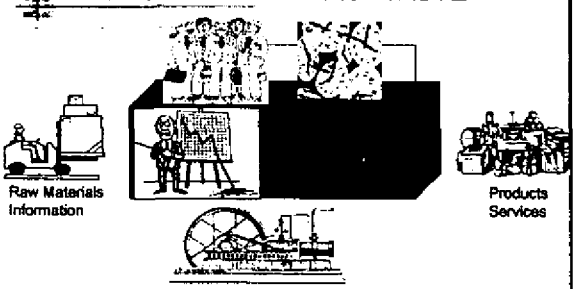
4. Inspection



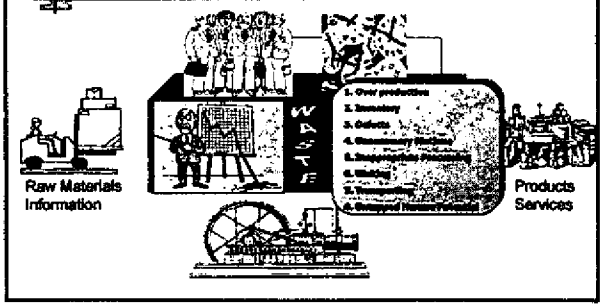
In the Black Box what we do?



Add value or Generate WASTE



Types of Waste

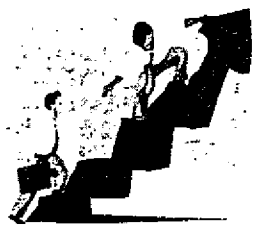


What reduces **Profit**?

PROFIT =
Revenue - Cost of (Product+ Waste)

Waste: any business activity that absorbs resources but **Adds No Value**

How to enhance ***Profit & Competitiveness?***



PROFIT =
Revenue - Cost of (Product+ Waste)

To enhance profit & competitiveness:

- *Detect* **Waste**
- *Eliminate* **Waste**
- *Prevent* **Waste**

Competitiveness = Value - Waste

How to enhance ***Competitiveness?***

How to eliminate ***Waste?***

- We require effective techniques to detect, eliminate, and prevent WASTE !

How?

- Let us learn from the **Global Leaders**

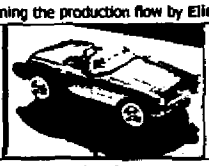
Learning from industry leaders

- **Toyota** - a textile company became the global leader in Automobiles
- Toyota is Toyota - *Indian Co is Indian Co*
- We can't copy them, but we can learn from them
- How can we operationalize the principles of Toyota Production System **(Lean)** in our companies?

Toyota Production System *(Lean)*

Best Quality * Lowest Cost * Shortest Lead Time
Through shortening the production flow by Eliminating Waste

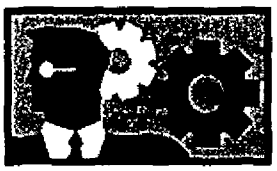
Just In Time
"The right part at the Right time in Right quantity"
- Continuous Flow
- Pull system
- Leveled Production



Jidoka
"Built-in Quality"
- Human touch to m/c
- Automatic m/c stop
- Visual management
- Labor-m/c Efficiency

Operational stability & Kaizen
Standardized Work
Total Productive Maintenance
Robust Processes
Supplier Involvement

Lean Principles



1. Specify **Value**
2. Identify the **Value Stream**
3. Make the value **Flow** by elimination of *Muda* (Waste)
4. Create **Pull** according to *Customer Demand*
5. Attain **Perfection** in every business activity

What do we do at our workplace?

- Adding **VALUE** through a Value-Added activity

or

- Generating **WASTE** or *MUDA* through a Non-Value-Added activity

What is **Value**?

- ***Value***: a capability provided to a customer at the right time at an appropriate price, as defined in each case by the customer.
- *Value is created by the producer. From customer's point of view, this is why producer exists.*

What is **Waste** *(Muda)*?

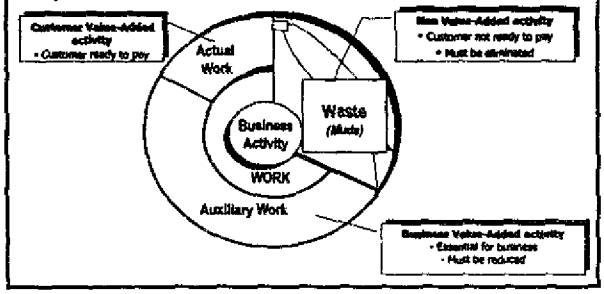
Waste is defined as any organizational activity that absorbs resources but **adds no value**

- Mistakes which require rectification
- Production of items no one wants so that inventories pile up
- Processing steps which are actually not needed
- Group of people in downstream activity waiting because an upstream activity has not delivered in time
- Goods and services which does not meet the needs of *customer*

Wastes appear in following forms:

- Defective materials
- Wasted materials
- Excess consumption
- Unwanted inventory
- Demurrage
- Downtime of machines
- *Unutilized capacity*
- Productivity Loss
- *Waiting time*
- Yield loss
- Re-work
- Defective products/scrap
- Downgraded products
- Un-recovered bye- products
- Returned Material
- Warranty Claims
- Complaints
- Cancelled orders
- Excess transportation cost
- Delayed delivery
- .....

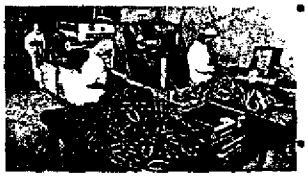
Business activities & waste



Types of Waste

1. Waste of **Over production**
2. Waste of **Inventory**
3. Waste of **Defects**
4. Waste of Unnecessary **Motions**
5. Waste of Inappropriate **Processing**
6. Waste of **Waiting**
7. Waste of **Transporting**
8. Waste of Untapped **Human Potential**

1. *Waste* of Overproduction



- Produced to compensate loss in production due to absenteeism, equipment break down, higher rejection rate, inconsistency in operation
- Instead of eliminating the root cause companies go for overproduction

2. *Waste* of Inventory

- More than the required stock of finished product, work-in process and raw materials do not add any value
- They add cost of operation by blocking more money, increased requirement of transportation, storage and handling
- In many situations extra inventory gets scrapped due to limited shelf life or becomes obsolete due to design changes

3. *Waste* of Defects

- Defects or rejects interrupt production and require expensive rework
- Rejects have to be scrapped
- Defective products may damage the tools and jigs installed on machines

4. *Waste* of Motion

- Any motion of a person's body not directly related to adding value is non productive
- Any action such as lifting or carrying a heavy object, should be avoided

5. *Waste* of Processing

- Sometimes inadequate technology or design leads to *muda* in processing
- Unproductive striking of the the press, de-burring of the product, machine idling cause *muda*

6. *Waste of* Waiting

- *Muda* of waiting occurs when the hands of the operator are idle
- Operator's work is put on hold because of line imbalances, lack of parts, or machine downtime or operator monitoring the machine when machine is adding value to the job

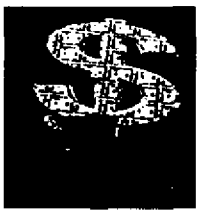
7. *Waste* of Transport

- Transport is an essential part of operations, but moving materials and products add no value
- Any process physically distant from main line adds *muda* of transport
- Use of conveyors, fork lifts, trucks and other transport system has to be minimized

8. *Waste of* Untapped Human Potential

- The purpose of efficient system is "to create thinking people"
- Human potential just does not need to set free. It requires clear communication as to what is needed (both from management and to management), it requires commitment and support, it requires a culture of trust and mutual respect.
- Example : *Not using creative brain power of employees, not listening, thinking that only managers have idea worth pursuing*

Economic Value of Waste



- Every business activity absorbs resources and every resource has a cost
- **Every waste has a cost** which is direct loss to the company
- Economic value of waste in a process industry are in the range of 05 - 40% of sales turnover

Cost of Waste

Sigma level & Competitiveness

Sigma Level	Defect Rate PPM	Cost of WASTE	Competitiveness
6	3.4	< 10%	World Class
5	233	10 - 15%	
4	6210	15 - 20%	Industry Average
3	66807	20 - 30%	
2	308537	30 - 40%	Non Competitive
1	690000	> 40%	

How to Detect

WASTE

Where does waste occur?

The waste occur in following major areas:

- Manufacturing
- Transportation
- Inspection
- Equipment
- Management
- Office processes
- Service processes

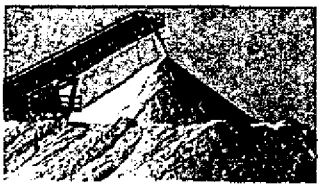
Areas where waste may occur?

In a product & service realization process waste may occur at:

5M+Q+S

- Material
- Machine
- Method
- Man
- Management
- Quality &
- Safety

*Waste related to **Materials**?*



- Storage
- Handling
- Excess Consumption
- Shortage
- Excessive Stock
- Poor quality
- Delayed delivery

*Waste related to **Machine**?*

- Underutilization
- Waiting
- Delays
- Non-availability
- Wasteful use
- Incapable
- Not required for task
- Conveyors
- Machine handling

*Waste related to **Method**?*

- Overproduction
- Inventory
- Incorrect processing
- Transportation
- Non standardization
- Mfrg. without order
- Over-processing

*Waste related to **Man**?*

- *Walking*
- Waiting
- Searching
- Unnecessary motion

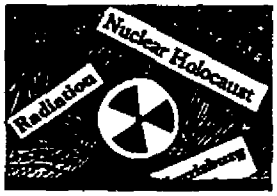
*Waste related to **Management**?*

- Excessive Meetings
- *Unnecessary paperwork*
- Many approvals
- Number of signatures
- Incomplete communication
- Delayed decisions
- Ambiguity of roles & responsibilities
- Undefined targets

*Waste related to **Quality?***

- Defectives
- Re work/Repair
- Downgrading
- Inspection
- Warranty claims
- Complaint settlement
- Delayed delivery

*Waste related to **Safety?***

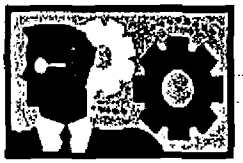


- Disaster
- Accident

How to Eliminate WASTE

Waste is eliminated project by project

Using scientific and proven problem solving methodology



Lean Project Management

Managing the project through

Problem Solving

- Waste elimination program is implemented project-by-project
- Every project should have a formal starting and a completion date.
- Waste Elimination project has to be completed in a period of 12-16 weeks *(exception may be in some special cases, but it should be avoided).*

What is a Problem?

- A problem is undesirable result of a process
- A problem is the cause of shortfall between a target (Desired state)and the current state

- Intensity of problem depends upon the variance of current situation form the targeted value
- A problem is an opportunity for improvement
- Eliminating the causes of the shortfall between target and actual is called as Problem Solving

DMAIC approach to project management

Improve *by implementing countermeasures*

Analyze *the situation to establish root cause*

Measure *the nonconformance/abnormality*

Define *the Problem in terms of what is wrong?*

Define phase

- The very first step in successful problem solving is defining it in a way that it can be easily solved.
- Following steps may be applied for effective problem definition:

1. *Understand the problem*
2. *Develop a problem statement*
3. *Set the project objective and goals*
4. *Define the milestones for project completion*
5. *Form a project team and describe the role of team members*

Develop a problem statement

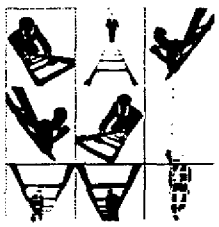
Develop a problem statement that accurately and clearly describes the current condition your project team wants to change. Consider the following questions:

- Is the problem stated objectively?
- Is the problem limited in scope?
- Does all concerned people of project team and improvement activities have a common understanding of the problem?

Goal statement

- Goal statement defines the improvement (result) project team is seeking to accomplish
- Starts with a verb (reduce, eliminate, control, increase, improve,etc.)
- Provides measurable targets with a completion date
- Statement is actionable and sets the focus, motivates team
- Does not include the presumed cause or prescribed solutions

Define milestones
for project completion



It is not enough to have goals and objectives only; you need checkpoints and activities to get your project to the goal and objectives. Otherwise how can you ensure that you are going in right direction?

- Periodic checkpoints help you to measure the project progress
- Milestones are the long term checkpoints. They are used to measure actual versus planned progress of the project
- *Develop a comprehensive project schedule* right from start to finish

Project Team

Success of project greatly depends upon the competency and synergy of team members. Team formation and assigning the roles and responsibilities of team members is one of the most important tasks of SCM initiative. Following factors must be clarified during team formation:

- Who is the **Project Leader**?
- Who are the **Team Members**?
- What are their **Time Commitments**?
- What are their expected **Deliverables**?
- What are their **Roles**?
- Who is the **Sponsor**?

(A senior member of the organization to guide and support the team)

Measure

Control *through prevention of recurrence*

Improve *by implementing countermeasures*

Analyze *the situation to establish root cause*

Measure *the nonconformance/abnormality*

Define *the Problem in terms of what is wrong?*

Measurement objectives

Measurement activity gathers data to establish "current state" what is actually going on in the work place with the process as it works today?

The objective of measurement is to collect all relevant data that describes the nature and extent of the problem. To set the measurement objective, you need to address the following:

- What is your **goal**, or expected outcome for collecting data?
- What **process** or **product** will you measure to collect data?
- What **data** do you need to collect to meet your objective?

Activities of Measure phase

The main activities of the measure phase are:

- Clarify measurement objective
- Develop process map
- Decide what data to be collected
- Collect & compile valid data

Analyze

Control *through prevention of recurrence*

Improve *by implementing countermeasures*

Analyze *the situation to establish root cause*

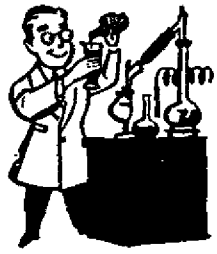
Measure *the nonconformance/abnormality*

Define *the Problem in terms of what is wrong?*

Analyze Objectives

- Wastes or deviations appearing in the processes are symptoms of presence of some hidden problems
- During the measure phase, data related to waste /deviations and causal parameters are collected
- The objective of analysis phase is to establish cause & effect relationship through collected data to reach to the ultimate root-cause of the problem.

Analyze phase



As explained earlier the objective of analysis is to reach the root-cause of problem. This step is divided in two parts:

1. **Set up hypotheses &**
2. **Test the hypotheses**

When we think about the causes (the hypotheses) the reasons are discussed and data are analyzed.

Testing of hypotheses requires data collection from planned experiments and surveys.

Set Hypothesis

- ***What is hypotheses ?***
- Hypothesis is a proposition made as a basis for reasoning. It is staring point for further investigation from known facts. It involves selection of major factors as causes.
- ***How to set up hypotheses?***

1. Prepare a Cause-&-Effect diagram so as to collect all knowledge concerning possible causes.
2. Use the information collected during Measure phase and delete any data which are not clearly relevant. Revise the C&E diagram
3. Select those elements in the latter diagram which seems to have high possibility of being main causes

Test Hypothesis

- ***Testing the hypotheses?***
- Building the hypotheses and testing the hypotheses are two different things, same data can not be used for both. Verification of hypotheses requires new data not used for building hypotheses. Testing involves deriving the main cause from selected major factors ***(identified during set up hypotheses).***
- ***How to test hypotheses?***

1. Tests of the hypotheses must be based on data obtained from experiments and surveys. The fresh data should be collected according to a carefully constructed plan.
2. Testing the hypotheses is investigating whether a relation actually exists between the possible causes and results and if does exists, how strong the relationship is? What effect the possible cause has?
3. Finally identify the true root cause (s) for improvement action

Improve

Control *through prevention of recurrence*

Improve *by implementing countermeasures*

Analyze *the situation to establish root cause*

Measure *the nonconformance/abnormality*

Define *the Problem in terms of what is wrong?*

Improvement objectives

- After the root cause (s) of the problem is identified, appropriate action is taken to eliminate the root cause and prevent the recurrence of problem by mistake prevention
- Improvement phase involves development of appropriate solution to eliminate the cause (s) of the problem and prevent it from recurrence

Improvement activities

Take following actions to make improvements:

4.1 Set improvement targets
4.2 Generate possible solutions
4.3 Select the best solution
4.4 Develop action plan
4.5 Implement the plan
4.6 Evaluate the performance

Two types of Action

There are two types of action;

- *Action taken for handling phenomena (results)*
- *Action taken to prevent the factor (cause)*

Implement the plan

1.Develop understanding and consensus
2.Make trial runs of new arrangement
3.Use data to validate effectiveness
4.Respond to unexpected problems

1. Develop Understanding & Consensus

- Most people even they understand the improvement *action plan intellectually, will* oppose changes in the status-quo. You must explain the intent and content of improvements to the people involved to win their confidence as well as active participation in improvement initiative.

Implement the plan

2. Make trial runs of new arrangements: begin the improvement action with trial run before going at large scale implementation.

3. Use data to validate effectiveness: Collect data related to performance of new action through proper monitoring system and confirm the desired state

4.Respond to unexpected problems: Due to changes in situations unknown and unexpected problems may arise, be prepared to take necessary actions to continue your journey toward your "improvement targets"

Evaluate the performance

Evaluate the results to find out

- *Has the "desired state" been accomplished?*
- *Are plans in place to ensure that problem will not recur?*

Evaluate the Performance

1. Collect the performance data compare the actual results with target
2. Compare the before-and-after situation and evaluate
3. Look for effects on prior as well as later processes
4. Look for negative effects on other control characteristics
5. Convert the effects in monetary terms and evaluate cost reduction
6. Evaluate the intangible effects

In case results are not satisfactory,repeat the *analyze* and *improvement* phases

Control

Control *through prevention of recurrence*

Improve *by implementing countermeasures*

Analyze *the situation to establish root cause*

Measure *the nonconformance/abnormality*

Define *the Problem in terms of what is wrong?*

Why Control?

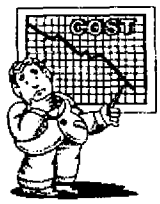
In this physical world "Law of Entropy" explains the gradual loss of order in a system.

The same law applies to business processes also.

- Entropy is the degree of disorder, which goes on increasing with time.
- As per the **law of entropy** unless we add energy thru a control mechanism,processes will tend to degenerate over time, & loose the effect of improvement

Control objectives?

- To make sure that system and processes stay in controlled condition after problem is solved
- To hold the gains of improvement
- To quickly detect the **"out of control"** state and take immediate corrective and preventive action



Institutionalization of Lean

FICCI

CREW - A.N.Singh

Institutionalization

Many companies start improvement program but very few have succeeded in institutionalizing to ensure that it becomes regular activity. This can be institutionalized by following actions:

- Create a Lean steering committee
- Make cost reduction/ improvement action part of job description
- Reward and recognition for good improvements
- Link employees growth with contribution made for improvement
- Establish periodical audit by senior management

Lean Promotion Organization

To institutionalize the continuous improvement activities in the organization, create a Lean Promotion organization under the chairmanship of very senior management personnel.

Roles & Responsibilities of Lean Steering Committee members

- Selection of Improvement Projects
- Provide resources to project teams
- Monitor & review the project progress
- Standardize the performance
- Reward & recognition to teams and individuals

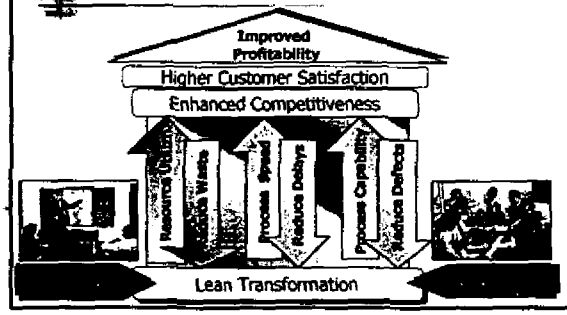
Reward & Recognition

- Employees should be motivated through appropriate rewards and recognition for good performance
- Improvement and cost reduction should be made responsibility of every employee by linking with reward & recognition system.
- Rewards are given for mandated performance
- Recognition is given for superior performance
- Contribution to profit may be one of the new parameters of annual performance appraisal of employees

Results of Waste Elimination

- Improved Quality
- Improved Productivity
- Faster Delivery
- Reduced Cost
- Increased Profit

IMPACT *of Lean Transformation*



Naini Tissues Ltd.

KASHIPUR

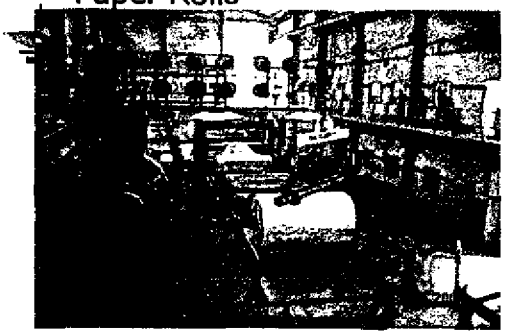
NTL: Plant Specification

- Products: Map litho, Writing & Copying paper
- Plant Capacity: 100 TPD
- Deckle size: 215 Cm
- Manpower: 280
- Plant started: May 2005

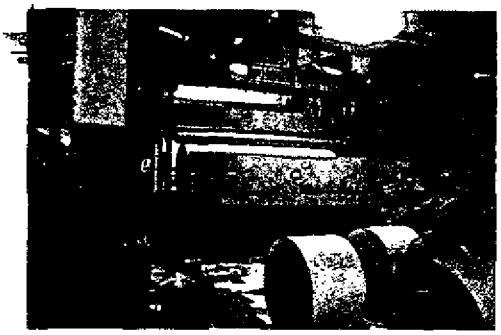
Final Product: Paper Sheets

Paper Production

Paper Rolls



Paper Slitting



Paper Finishing

Paper Waste

Sheet Shearing Line

Paper Finishing

Paper Finishing

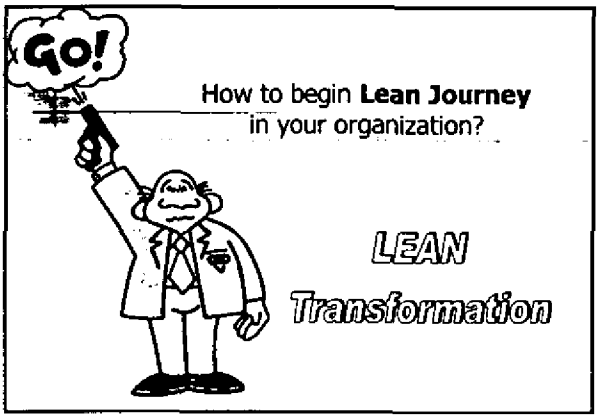
Paper Packaging

Paper Packaging

NTL: Finishing Loss

Total Finishing Loss :
7.35% (Before Project)

- Trimming Loss: 3.0%
- Quality Loss: 1.35%
- Converting Loss: 3.0%



How to begin **Lean Journey** in your organization?

LEAN Transformation

How to begin Lean Journey?

The founders of Lean Enterprise Institute; Womack & Jones' recommend a 5 step approach:

Find a **change agent** *(How about You ?)*
Find a **Sensei** *(a teacher)*
Seize or create a **crisis**
Map your **value stream**
Pick something and **get started**

1. Lean Awareness Workshops

- A series of training workshops to create awareness across all levels and all functions *(Manufacturing/Service and non manufacturing)*
- Workshop designed to introduce the Lean principles to drivers of lean transformation
- To trigger Lean thinking and lean implementation
- Create a Lean transformation infrastructure

2. Diagnostic Workshop

- To identify from where to start? - Seize the crisis!
- An interactive event of 3-4 days to detect waste in the value stream
- Evaluate the Cost of Wastes/Cost of Poor Quality
- Identify the areas of improvement based on quantified factual data
- Select the projects to be taken for improvement & form project teams
- Learning to see WASTE

3. Training : *Learning by Doing*

- Develop competency in people (project teams)
- Training contents include;
  - *Value stream Mapping*
  - *Lean tools*
  - *Six Sigma*
- Training period spread over 4 - 5 months (one week per month)
- Learning-by-doing: Team members learn the concept, practice it. One week training followed by 3 weeks implementation

4.Value Stream Mapping workshop

- Unique 4 days consulting workshop
- To draw current state map
- To develop future state map
- Develop Action Plan to reach to future state
- Identify the tools & technique to be used
- Develop a road map for Lean journey

5. Implementing the plan

- Making improvements through implementation of action plan by Project Teams
- Consultants conduct monthly project audit
- Counseling
- Performance review
- Standardization
- Institutionalization

Lean implemented in paper units

- Lean has been successfully implemented in 4 paper units of Vapi- Gujrat, under a FICCI-UNIDO consulting program. All companies have made significant saving from the projects
- Two units at Kashipur
  - Vaibhav paper Boards Pvt Ltd , Vapi
  - Ruby Macons ltd. Vapi
  - Shri Gajanan Paper Board Pvt Ltd. Vapi
  - Aryan Paper Mills Limited, Vapi
  - *Banwari Paper Mills Ltd, Kashipur*
  - *Naini Tissues Ltd, Kashipur*

FICCI -UNIDO can assist your company *for implementing Lean*

- Center for Global Competitiveness provides consultancy for implementation of Lean
- Consultancy project module is of 5 to 6 months duration during that period 5 Training & Consulting sessions will be conducted
- 1st Month: Begins with 3 days in-house Waste Diagnostic Workshop. Initiation of Cost management projects
- 2nd, 3rd and 4th Month: Training, Project audit and counseling
- 5th /6th month: Performance evaluation & standardization

What your company has to do?

- Commitment from top management
- Select improvement projects (Project duration: 6 months)
- Nominate 5-7 persons for managing the SCM project
- Project team members should spend at least 2 hours every day on the project in addition to their regular work
- Team members should devote full time during consultants presence in company (1-2 days every month)
- Has to pay a part of consultancy fee to Center for Global competitiveness (Partially subsidized by UNIDO, GoI & FICCI)
- Reimburse the expenses for consultants traveling & stay (of 5 visits)

For further information *Please contact*:

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