Impact of Integrated Quality Improvement Teams in Supply Chain Manufacturing (SCM)

The Case of Packages Ltd.

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Abstract

Impact of Integrated Quality Improvement Teams in Supply Chain Manufacturing (SCM) is a forgotten dimension. Key actors of Supply Chain manufacturing usually operate the Quality Improvement Teams in isolation. Working in isolation, they loose the insight of the problem and its long term impact is missed among the downstream and upstream departments of the Manufacturing Unit. Integrated Quality Improvement Teams working on the common theme not only can affect the operations of key actors of SCM but as well create a bottom line impact while improving the processes.

This paper depicts the application model of Integrated Quality Improvement Teams in Supply Chain manufacturing and its impact to enhance the productivity in the key actors of Supply Chain Manufacturing.

Quality Circles, Kaizen Groups, Quality Improvement Teams usually take the projects which are distinct in nature. Usually two circles or teams work as a disjoint sets working in their own domains. Integration of the Quality Improvement teams in different upstream and downstream departments of SCM is usually ignored in production environment and makes difficult to understand the underlying causes of the symptoms that create impact on the company profit.

This application model portrays the power of integration of Quality Improvement Teams in supply chain manufacturing. Consequently, finger pointing is totally eliminated while addressing the complex inter-related issues among the key actors of supply chain manufacturing. It is hoped that this model will not only highlight the importance of team dynamics but as well improve the decision making process for value chain sustainability.

Keywords: *Quality Improvement Teams, Supply Chain Manufacturing, Productivity, Quality, Decision Making Process*

Introduction

Today our nation faces serious economic problems because of the high cost of production and keen foreign competition. Rising prices threaten our standard of living, especially for those on fixed incomes. Productivity improvement in production systems cannot cure inflation alone; economic restraints are also needed, but productivity can dampen the surge. Productivity is the quality that indicates how well labor, capital, material and energy are utilized. Productivity improvement is sought everywhere because it supports a higher standard of living, help control inflation, and contributes to a stronger national economy. Quality Circles involve people in solving problems and tap their brainpower effectively. Japan has shown the rest of the world that productivity can be improved not only by using equipment or more people, but also by tapping human brainpower and working together in companies. **(Yusuf, 1997)**

Throughout the world, productivity is taken to be a measure of the efficiency, and therefore, the competitiveness, of the nation's industry. Losers in the competition face high inflation, persistent unemployment, weak national currency, worsening balance of trade, and a loss of markets to foreign competitors. **(Yusuf, 1997)** This is only possible if managers equip themselves with leadership skills. The expected best practice is for managers to feel strongly positive about their leadership practices. **(Murphy, et al. 2006)** Kahn mentioned that a manager and leader qualities must include confidence and strength, a desire to win and ability to form unlike and unrelated talents into a comprehensive whole**. (Kahn, 1993)**

As world communications systems become more efficient, countries can communicate with each other more conveniently. Therefore, the competition pressure for exporting products between countries has become more serious. Each country tries to find the most efficient and effective method

to improve the production line in its companies. **(Saeed & Parsong, 1991)**

To generate the productivity, companies use different means and methods, technology is one of the easiest way but requires financial muscles, measurement is another approach to address the declining productivity. Kazien Approach, Quality Improvement Teams, Small Group activities and Quality Circles are the participative management style to grab the people's creativity and encourage them to participate for cost cutting initiatives of the organization. Innovation at work is mainly driven by employee's ideas **(Leach, et al. 2006).** For a lean organization, the only route to productivity is to build an energized, involved, participative, turned-on workforce, where everyone plays a role, where every idea counts **(Heller, 2001).** About Quality Teams and Quality Circles Sud says, **"** It is not a "system", nor a "fad" or "program". It is a way of life, a change in the way one's mind is set. It will not change your management or organizational culture, but it will change the way you relate to people within the work environment (**Ingle, 1988).**

The key to an efficient system of process control are communication, commitment, visibility, speed, and simplicity. The more unsophisticated the system can remain, the more easily the steps may be monitored. **(Cottman, 1993)**

There are usually two processes within the workplace. One is the process that is stated in company policies and procedures and the management belief is in place. Then there is the process actually being practised. The two do not equate. A process developed by management personnel is conceived from past experience. A process that is developed by engineers who are doing the current work within the laboratory is a state-of-the-art process **(Cottman, 1993).**

Supply Chain Management talks about the activities which start from the point of origin to the point of consumption. If we limit the scope of supply chain with respect to factory dynamics and deal with only

supply chain manufacturing. Even then, the operational activities of the upstream departments and down stream departments are at the pull of customer or end user. The departments demand synergy and team efforts in an integrated way to achieve the company goals very much aligned with customer expectations. Quality Improvement Teams can do this job very well in different departments where the key actors of supply chain manufacturing not only have varied and apparently conflicting goals but in its true sense; these goals are very much aligned with company goals to create the impact on company bottom line while improving the productivity. This can be achieved either forming the team which works on the principle of quality circles.

QCC: A Winning Strategy

What is Quality Control Circle? International Association of Quality Circles defines, "It is a group of factory workers from the same area who usually meet for an hour each week to discuss their quality problems, investigate causes, recommend solutions, and take corrective actions when authority is in their purview" (**Ingle, 1988).**

QCC involves not only workers but management and the organization as a whole. A QCC includes:

(1) A group of employees with similar jobs.

(2) A QCC leader (usually the foreman).

(3) A facilitator who works with several QCC's and

(4) A management steering committee which examines all quality improvement suggestions made by the QCCs.

When QCCs are implemented by the company, members of each group set up its goals and objectives. It is essential to define objectives clearly and to relay them throughout the company (**Ingle, 1988)**

Prof. Dr. Khalid Saeed speaks, "In Japan, Quality Control Circles (Q.C.Circles) were developed in the early 1960s. This technique can improve the quality of products, reduce the number of defective items, reduce the cost of products, and

provide more profit. When QC Circles showed signs of great success, companies in other countries who did not have them quickly followed suit to imitate them, thus spreading this technique around the world.

In general, there are several approaches to study this problem. This study will determine the dynamics of implementing Q.C.C in a company by using a System Dynamics approach. This study will provide short term and long term information on implementing this technique. From this useful information, decision makers will know the degree of success and what should be planned before implementing technique. **(Saeed & Parsong, 1991)** Why the people to work using QCC approach because Circles allow people time to see how their ideas, feelings, and endeavours can fit into proposed initiatives. **(Luechauer & Locander, 2006)**

This small group meets at frequent and regular interval to identify, analyze and solve their own work related problems

This group carries out self-development and mutual development. (**Ali, 1996)**

Company Background

Packages Limited is the largest printing complex in Asia and Carton Line consists of Offset line and Roto Printing (Lemanic) is the backbone of Packages Ltd. Carton Line is oldest line out of the five lines like Paper Board Manufacturing, Carton Line, Corrugation, Flexo & Roto Printing, and Tissue Manufacturing. Pakistan Tobacco Corporation (PTC) is the loyal and committed customer to carton line of Packages Ltd. and 65% to 70% of carton Line business is from PTC in the form of Shells and Hinge Lid Flats. Around 50 million Shell Cigarettes and 40 million Hinge Lid Cigarettes along with Cigarettes inner depict the clear cut story that nation is based on heavy smokers that is why the business is growing by leaps and bounds. Ever lower costs ever better quality and ever be quicker are the customer expectations demanded in the form of price rebate. Carton Line accepted this challenge and

focused to start the Quality Improvement Teams from the Manufacturing of Paper Board Mill till to the Department of Folding Gluing See Process Flow Chart in Annexure 1 and 2 Improved board quality, less printing defects like smudging, blocking especially in Embassy Shell and HL Flats, curling in Gold Leaf HL flats, delayed offset printing plates (a major cause of machine down time) and Glue Missing in the Shells being glued in Folding Gluing department are the factors which require the focus of upstream and downstream departments of Supply Chain Manufacturing and exert the pressure on management to work for cost cutting initiatives. There is a need to form the Integrated Quality Improvement in every department and on every machine ideally. Mr Ather Ayub The Quality Assurance Manager of Packages Limited took the initiative and formed around 20 teams in the whole company. The saving generated of these teams are Rs 47,327694 (Note: 1 USD= Rs. 80) **(Ayub, 2005)** He believed, ‘‘abilities and potential in the first line workers should not be underestimated and they should be given full support to create positive changes in the organizations. After all growth of employees is the growth of the company in the long run”. **(Ayub, 2005).** Quality Improvement Teams having the common theme reduce the cost in the different key actors of supply chain manufacturing right from the Paper and Board Mill to Packing Departments. The common theme linking with company goals ultimately create the bottom line impact on company productivity. Integrated teams are formed in PBM, Coating Department, Reproduction Department, Offset Printing, Folding and Gluing and Packing the most departments of offset carton line and to pass on the benefits to customers in terms of improved quality, on time delivery and comparable price of product sold. These indicators enhance the customer satisfaction. Customer Relationship management is not technology driven but has to be based on changing the entire business mindset **(Zairi, 2005).** The

mission transcends the realm of short –run profitability to sustainable competitive advantage for the purpose of realizing the firm's reason for being to satisfy specific needs and wants of customers through the satisfaction of all stakeholders. This is , however, possible if the internal environment involves and empowers the employees to steer the organization in a mutually agreed upon direction as no one stakeholder group, be they the owner-managers can do it by themselves **(Fatima & Ahmed, 2005).** Entire business mindset should be people focused to tap the human creativity. That is why there was a pressure to form the integrated teams across the board. The quality team established a "quality first" mind set with the entire restoration team, one that showed itself again and again. This illustrates a second guideline for quality restoration –give the quality team authority and make it an integral part of the command structure. **(Krock, 2004).** Teams are basic elements in total quality organizations, and various types of teams are formed. These teams should have motivation, capacity (information and ability), and authority to improve their processes and results **(Ozdemirel & Koksal, 2005).**

Type of Teams

(1) Process Improvement Teams

(2) Self-Managed Teams

(3) Temporary / ad hoc Teams

(4) Work Groups

(5) Cellular Teams

(6) Special Project Teams

(7) Virtual Teams **(Westcott, 2006)**

But in industry there are many other types and names like Cross Functional Teams, Productivity Improvement Teams, Kaizen Groups, Small Group Activities and Task Teams. Seven steps strategy is the tool which works behind the team operation.

Methodology

Seven Steps Strategy (SSS)

Step 1: Select a theme in a SMARTWAY

Step 2: Collect and Analyze the Data

Step 3: Identify the root cause

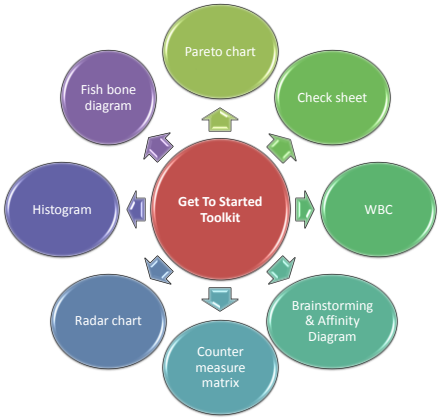
Step 4: Plan and Implement the solution

Step 5: Conform the Results

Step 6: Standardize the solution

Step 7: Reflect on process (**Yusuf, 2005)**

Seven steps strategies are powerful enough to generate the desired results. If we analyze the seven steps one by one, it gives the true understanding. First step is to select a theme in a SMARTWAY (Specific, Measureable, Achievable, Recordable, Time bound, Worthy to work on, Assigning responsibility to someone and ensure some yield). Without any theme no team can start the work. Brain storming and affinity group can be used for this step. Braining storming sessions lead to refinement of the parameters. Step two is to collect and analyze the data. We can design the check sheets & log books and apply other tools like radar chart, Graphs, Pareto Diagram, WBC (Why Because Card) Board etc, The third step is to identify the root cause. Fish bone diagram, Histogram, Scatter Diagram and 5W and 2H are the techniques to help to identify the root cause and fix the issue on permanent basis. Defect and error reduction and elimination of cause of dissatisfaction contribute to the customers' view of quality and are important part of customer-driven quality **(Besterfield, 1999).** Plan and Implement the solution is the step four. Deploying the implementing strategy is the part and parcels of fourth step. Counter Measure Matrix and Control Charts for attribute data and for variable data can be used in this step. Achieved results are the outcome of the implementing the solutions. In this step we are supposed to confirm the results whether they are as per our expectations or contrary to our assumptions. If they are okay then standardize the solution which is the step six. Standardize the solution means make it part of system procedures, work instructions, quality plans or quality records to get it implemented on permanent basis. Seventh step is to reflect on the process. If we can generalize the solution on the similar operations or equipment then step seventh is reflect on the process.



Get To Start Toolkit

The themes and corrective measures relate to other upstream and downstream departments can be communicated to all concerned for getting their blessing and support. Feedback and forming the cross-functional teams can contribute a lot more to find solution of a problem which is multi-fact in nature and asks for the input of many departments.

SSS starts with realizing the importance of formalizing the process parameters, the need to set up reporting systems and getting data, the process of evaluation of the data, the understanding of Pareto charts, Histograms, Fish Bone diagram, the cause effects etc. were all taught in this industry and we were eager students. **(Hyder, 1995)**

Glimpses of QIT activities aligned with company goals

Linkage with company goal-productivity and quality

Team Name: Tameer-e-Nou Team

Area: Paper Board Mill (PM2)

Theme: Reduction in Production Loss of White Board due to wrinkles and joints upto 50 %.

Saving per annum= Rs 7,95, 000/-

Problem Summary of Tameer-e-Nou: Wrinkles and joints are the major defects in the board which create huge wastage. Check sheet was developed and conditions of the wires and felts, consistency of pulps, malfunctioning of accuracy, uneven profile improper rewinding, improper cleaning of high pressure shower nozzles and blockage of the shower nozzles are key inputs after brainstorming session and root cause analysis. Look at the details of Pareto Chart, Fish Bone Diagram and Counter Measure matrix in Exhibit A and Annexure 3

Linkage with company goal-productivity and Quality

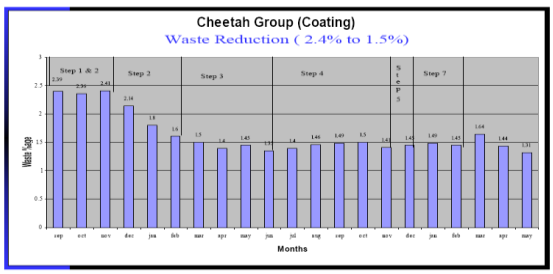
Team Name: Cheeta Group

Area: Coating Dept

Theme: To Reduce the waste of Coated Board from (2.4% to 1.5%)

Saving per annum= Rs 3,500, 000/-

Problem Summary of Cheeta Group: Coating is one the major department of Carton Line and there is only one coating machine to which the whole carton line depends. Wastage in coating departments are of two types one uncoated board has the damaged outer layers due to poor handling and transportation and second the wastages of coated board during the coating process. The seven steps strategy was formulated and implemented under the leadership of Khawja Muhammad Umer and got the excellent results as shown in below-mentioned graph.



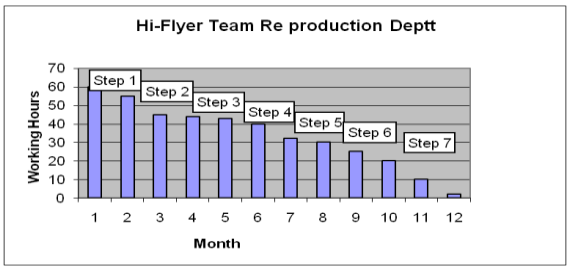
Linkage with company goal-productivity

Team Name: High Flyer Team

Area: Reproduction Deptt

Theme: To Reduce the Offset Printing Plate Waiting from 60 Hours to Zero Hour per month

Saving per annum= Rs 900, 000/-



Problem Summary of High Flyer Team Reproduction department is supposed to process the offset printing plates as per the daily production plan issued by the production planning department. It happens many times that offset printing plates have not been issued to offset department to run the machine so there was waiting for printing plates putting the machine on downtime.. There are per hour machine rates so there is a huge loss when the machine is down for even an hour or so. The team did a good job to reduce the waiting time from 60 hours per month to almost zero generating a lot more savings.

Linkage with company goal-productivity

Team Name: Al-Badar

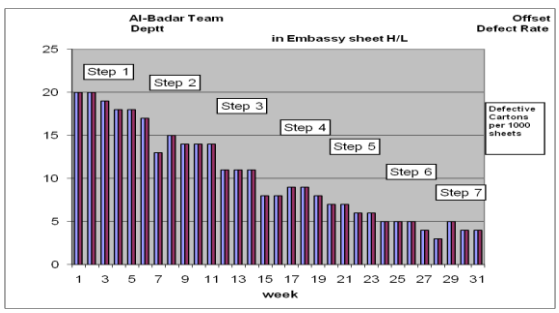
Area: Offset Printing Deptt

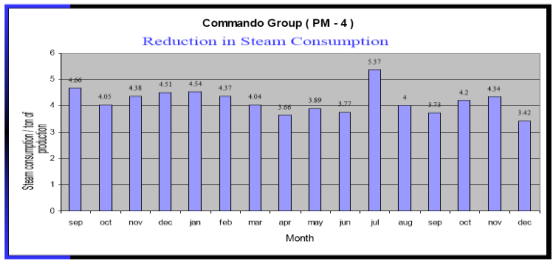
Theme: To reduce the printing defects from twenty defective cartons per thousand sheets to five defective cartons per thousand sheets of Embassy Shell & Hinge Lid cartons.

Saving per annum: Rs. 500,000

Problem Summary of Al-Badar

Smudging, blocking, pin holes, mis-print are the common offset printing defects which appear in most of embassy shell and HL sheets. The Al-Badar Team had taken theme during the current state they have determined that there are 20 defective cartons out of thousand sheets and team started working following seven steps strategy and reduced upto 5 defective cartons per thousand sheets.





Problem Summary of Commando Group

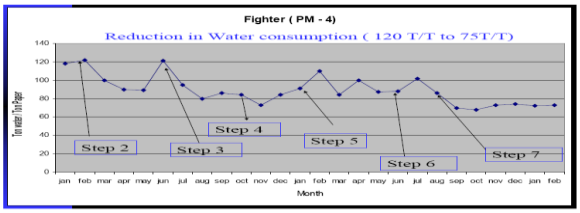
The steam consumption per ton of board produced was high just because of steam leakages and steam wastages in the line. Proper insulation was completed along with the regular energy audits to control the steam wastages as a result the target was achieved.

Linkage with company goal-environment and productivity

Team Name: Fighter Group

Area: Paper Board Mill (PM 4)

Theme: To Reduce the water Consumption (120 T/T to 75 T/T)



Problem Summary of Fighter Group

Water wastages was the another issue which

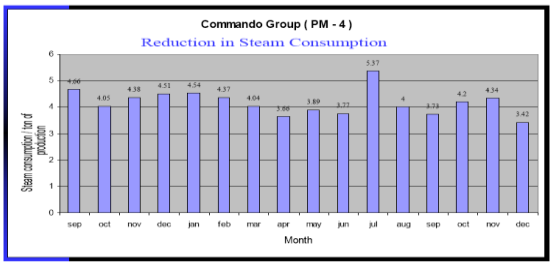
not only used the scarce natural resource but as well hit the bottom line productivity.

Team Name: Fiber Miser

Area: Waste Treatment Plant

Theme: To increase the Sludge Recovery from a level of 142 to 155 tons/day**.**

Saving per annum= Rs 4,000, 000



Problem Summary of Fiber Miser

To remove the maximum Suspended Solids from the effluent in order to:

- Meet the National Environmental Quality Standards for Suspended Solids (200 ppm)
- Maximize the Earnings from the Sale of Recovered Sludge

Following Factors were established and made part of operation

- Installation of saltec press to avoid by passing due to this we increased the sludge recovery.
- Used S.S material valve at Sed.Tanks to avoid damaging idle hours and bypass.
- Used imported Sed.Tanks Bridge wheels to avoid damaging which cause the more recovery.

After implementing these measures the increase in the average sludge recovery from 142 to 148 Tons/day. Saving of Rs 4.0 million verified by costing department.

Conclusion:

The efforts put among the different team members in Quality Improvement Teams were shared in this application model. The common theme was achieved by the integrated teams in supply chain manufacturing working in different domains. Productivity enhancement was the common goal which appeared in different form in different departments but at the end savings generated had created the impact n bottom line of the company. Enhanced customer satisfaction, better quality, on time delivery reduced waiting time and reduced customer complaints help the decision

support stream. Their actions develop the guiding principles that govern the use of technology for group processes and identified the lessons learned and insights gained from building, studying and evaluating various decision **(Nunamaker, Jr. 1991-92)** after implementing the seven steps strategy

Note: The numerical information is normalized to hide the proprietary information of the company survived. Thanks to Packages Management to allow me to share the facts to add the value to community as a Best Practices.

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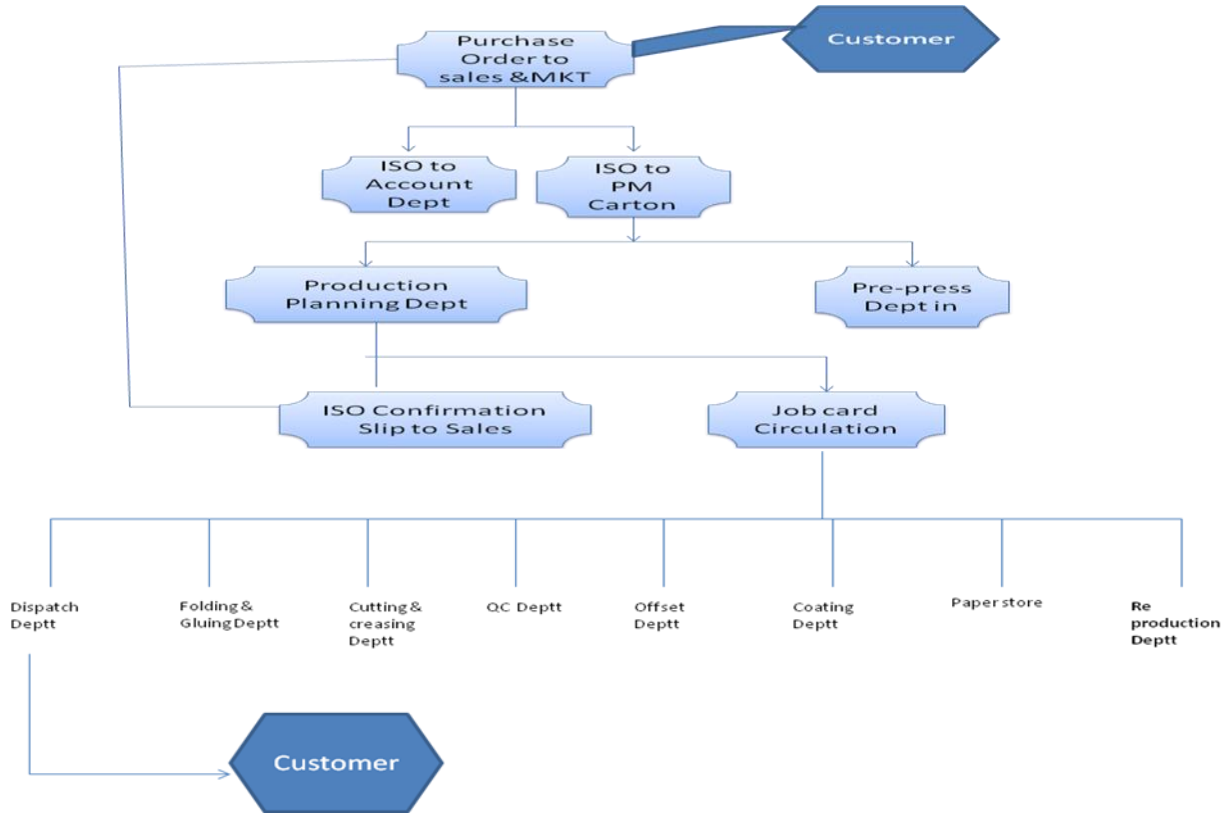
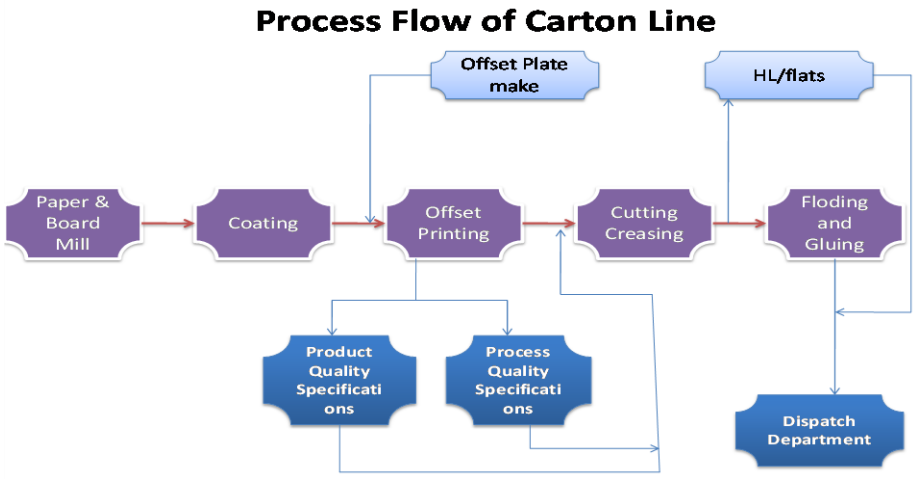
Annexure 1

Document Process Flow





Annex 2 Material Flow

Process

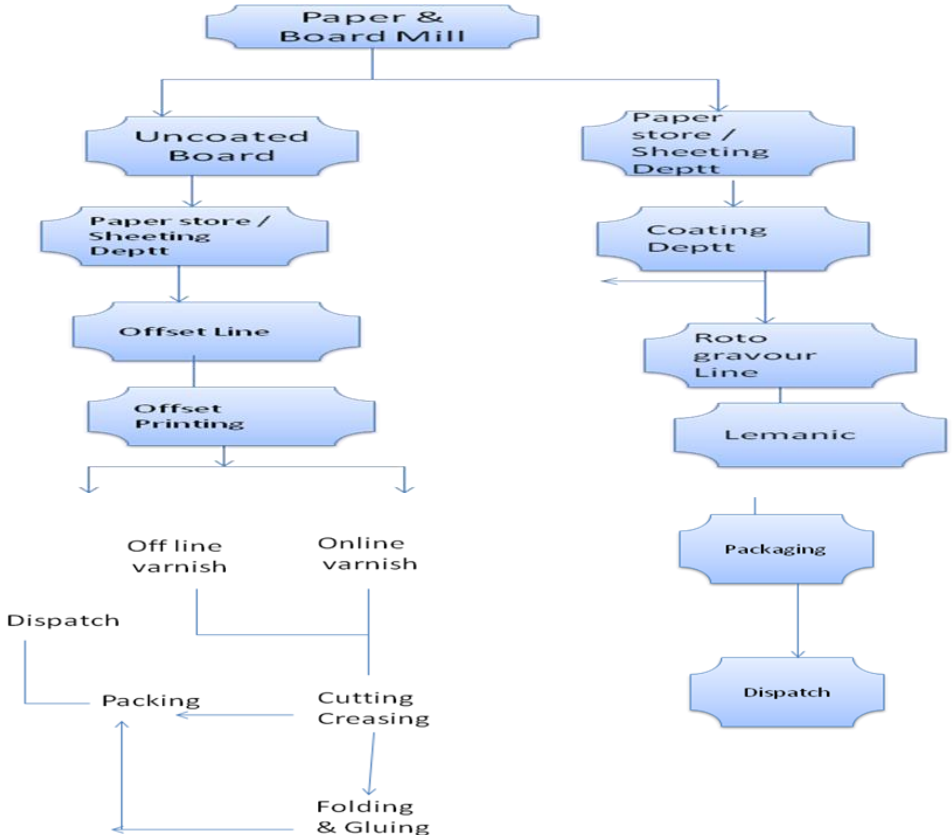
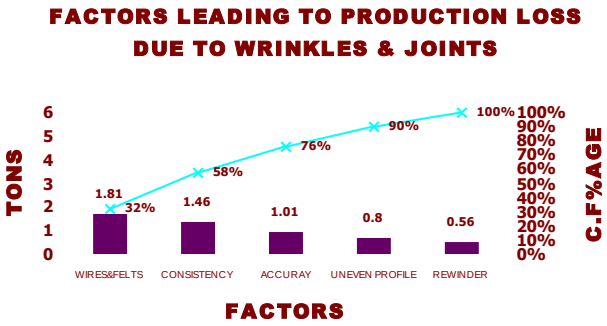
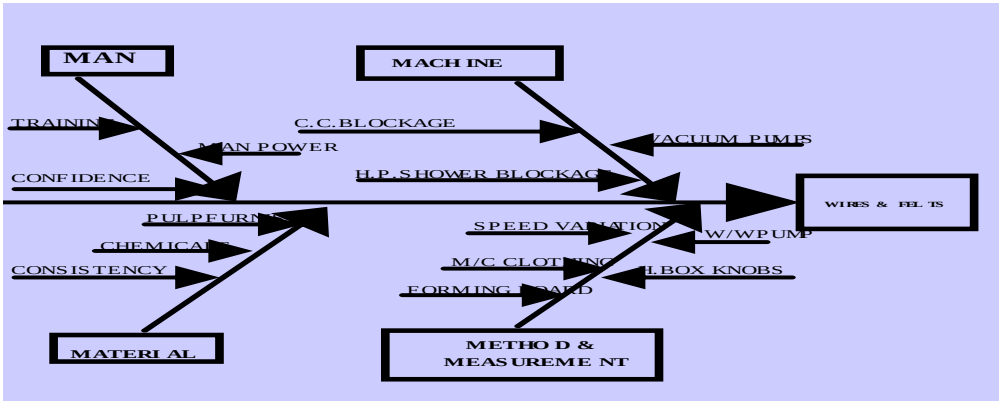
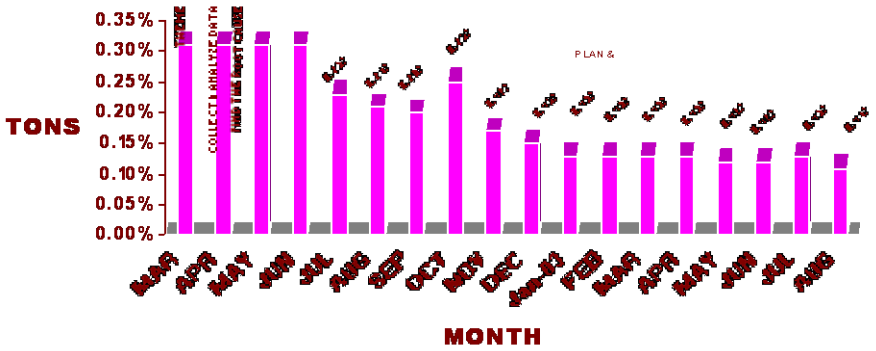


Exhibit A: **Pareto Chart and Fish Bone Diagram Prepared by Tameer-e-Nou Team**







Annex3
Sample Counter Measure Matrix

MAN	1	Untrained	Yes	Train the untrained person	Team	Implemented
MACHINE	1	Mech. Maintenence	No		Concerned deptt	Being implemented
		Pump problem	No	M/M deptt.	"	
		Gear box problem	No	M/M deptt.	"	
	2	Consistency transmitter	No	Instt. Deptt.	"	
		Pulp flow meter	No	Instt. Deptt.	"	
	3	Pipe leakages	No	Pipe maint.	"	
	4	Motor burning	No	Elect. Maint.	"	
MATERIAL	1	Kappa no.	No	NFL	NFL	Being implemented
	2	Pulp inlet consistency	Yes	Agitation & dilution	Team	
METHOD	1	Respoting of wire	Yes	Daily inspection & respoting	Team	Being implemented
	2	Improper filter cleaning	Yes	Cleaning of wire& spray nozzle	"	
	3	Steam shower pipe	Yes	Cleaning	"	
	4	Seaaling band	No	Weekly inspection	"	
MEASUREMENT	1	Hypo fig difference	Yes	Daily monitoring	Team	Implement
	2	Wrong indication of hypo	Yes	Physical verification	"	
	3	Checking of schudule for caliberation	Yes	Daily checking of critical instruments	"	
	4	Pulp fig. Difference	No	Daily checking & monitoring	"	