

# APO DIRECTORY OF DEMONSTRATION PROJECTS



ASIAN PRODUCTIVITY ORGANIZATION

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APO Directory of Demonstration Projects (12-IN-04-GE-DMP-C)  
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# FOREWORD

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The mission of an Asian Productivity Organization (APO) demonstration company is to convey success stories on the development and implementation of productivity improvement initiatives undertaken by all stakeholders. A demonstration company should epitomize an enterprise-wide productivity movement that achieves business expansion, increases profit and customer satisfaction, reduces waste, enables energy saving, and leads to fair, equitable, and mutually satisfying productivity gain-sharing for both management and workers.

Demonstration Projects are guided by the triple objectives of productivity enhancement of the company, capacity building of the national productivity organization (NPO), and multiplier effects, resulting in widespread benefits. Therefore, the main objective is to establish demonstration-cum-productivity model companies/organizations to showcase the processes and results of productivity, quality, and improvements in the environment, energy efficiency, and food safety in factories, farms, and enterprises in a tangible, practical manner. Simultaneously, it assists NPOs to build the capacity to provide consultancy and training services through their full involvement in such projects. The results achieved are widely disseminated by the APO through the publication of documents and audiovisual materials; discussing the case studies in related workshops, training courses, and seminars; and organizing field visits to the demonstration companies during the implementation of APO multicountry projects.

The APO implemented 13 Demonstration Projects in nine member countries (India, Indonesia, Malaysia, Mongolia, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam) from 2007–11. These projects produced several success stories in the industry and service sectors. Therefore, the APO decided to publish a compilation of the results in the form of a directory describing productivity-related problems, issues, and challenges faced by the demonstration companies; methodology for project implementation; and the achievements of the companies in terms of overall productivity gains, quality improvement, and higher profitability. This directory is designed to serve as a useful, handy, informative guide for productivity promotion in the Asia-Pacific region.

I hope that this directory will further help spread the concept of productivity throughout the Asia-Pacific region and help assist interested organizations to learn about various tools and techniques for productivity improvement.

Mari Amano  
Secretary-General  
Tokyo  
September 2014



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# INTRODUCTION

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## **About APO Demonstration Projects**

The Demonstration Projects undertaken by the APO are meant to illustrate practical applications of productivity tools and techniques in the industry, service, and agriculture sectors. Demonstration companies convey success stories on the development and implementation of productivity improvement initiatives undertaken by all stakeholders. By establishing demonstration/model organizations, companies, and communities to showcase the tangible results of productivity improvement programs, others are encouraged to undertake similar efforts.

Potential candidates for demonstration company projects are recommended by NPOs, and the final selection is made in consultation with experts and the APO Secretariat. The APO assigns experts to the selected organizations to perform diagnostic studies, recommend an action plan for productivity improvement, and help implement the plan. The results are documented for learning by others. Through this program, NPOs eventually develop the ability to manage their own demonstration/model projects.

## **Scope and Methodology**

### *Scope*

Establishment of demonstration companies/organizations for application of productivity and quality tools and techniques such as Green Productivity, lean production systems, Six Sigma, innovation management, knowledge management, quality management, energy efficiency, and food safety management systems to enhance productivity of private- and public-sector organizations.

### *Methodology*

This project involved a tripartite arrangement among a demonstration company or group of demonstration companies, the NPO, and the APO. The APO was mainly responsible for the assignment of technical experts to assist demonstration companies in the implementation of the project.

The international expert(s) designated by the APO was assigned several (three or four) times during the project period to assist in the implementation of the Demonstration Project in the selected member country based on need.

## **Execution of Demonstration Company Projects**

The implementation of the demonstration company project comprised five stages: selection, planning, implementation, evaluation and dissemination, and postproject assessment. The flow of the Demonstration Project is described below.

*Stage I: Selection (2 weeks)*

- The NPO nominated a company (or a few candidate companies) and submitted the proposal documents. The nomination of a company required careful consideration, as the demonstration company must be in a strong position to act as a model exhibiting leadership and influence on other organizations in the area with a high level of commitment from the management
- In the case of multiple candidate companies, the NPO and APO Secretariat with the expert conducted a preassessment exercise at the candidate companies
- Based on the selection criteria and assessments, the APO Secretariat approved a company/organization for a Demonstration Project
- After the selection was finalized and the Demonstration Project identified, the APO issued a Project Implementation Plan, which included a mutually agreed upon plan, budget, and other details, to the concerned NPO

*Stage II: Planning (2 weeks)*

- The expert(s) analyzed the level of productivity-related issues and problems through a diagnostic survey at the demonstration company
- The expert(s) proposed an improvement plan to the relevant parties and obtained a consensus on a mutually agreeable action plan for the scheduled duration of the project

*Stage III: Implementation (8–10 months)*

- The agreed-upon productivity improvement plan was implemented, which included training and capacity building of the parties involved in the Demonstration Project
- The expert(s), the NPO, and the APO communicated at various stages of implementation to review the diagnosis and progress and recommend ways to resolve any problems or administrative bottlenecks

*Stage IV: Evaluation and Dissemination (2–4 months)*

- The expert(s), the NPO, and the APO conducted an evaluation upon the completion of the Demonstration Project to determine whether the objectives have been achieved. The NPO took the lead in this stage and carried out dissemination activities to ensure multiplier effects in the region/area. (The NPO in consultation with the demonstration company submitted the plan for dissemination activities to the APO in advance before the completion of stage III.)
- In this stage, the results of the Demonstration Project were disseminated through locally organized activities. The final report, training manual, dissemination material, and/or a demonstration video in a local language (if possible, in English) were distributed for wider dissemination

*Stage V: Postproject Assessment (up to 1 week)*

- The APO assigned an external expert to carry out a post project review to assess the results and benefits derived by the company and overall impact of the project. The timing of the assignment was decided in consultation with the NPO concerned and the company.

# AADARSH PVT. LTD.

## INDIA



### ABOUT THE COMPANY

Aadarsh Pvt. Ltd. (formerly known as Aadarsh Printers and Publishers) was established in 1990 and is an ISO 9001:2008 certified organization. It operates through two plants in Bhopal. The total manpower of Aadarsh is 150 people. The current turnover of the company is around USD20 million. The plant consists of machineries that print, bind, and cut various types of products such as books, diaries, calendars, and danglers. The facilities available are prepress, press, and postpress. Aadarsh Pvt. Ltd. products include children's

publication under the brand name Purple Turtle, all kinds of stationery printing, newspaper, packaging printing, security printing, etc.

### PROJECT INVOLVEMENT

In India, the print market is growing steadily, especially in the packaging sector. Printers are attuned to value addition in print and offer exceptional results for their end buyers. Quality standards have improved dramatically and immense production capacities have been created with the advent of professionally run print houses. India's printing business is expanding its horizons toward exports owing to large-scale production capabilities. In order to compete in the globalized economy, print houses have to increase their productivity and attain international benchmarks. Inflation and competition have forced Indian companies to be on their toes. Since the margins are very low, companies are eager to adapt practices to reduce their internal costings. Toward this end, Aadarsh Pvt. Ltd. expressed keen interest to take up this Demonstration Project with the assistance of National Productivity Council of India and the APO to implement productivity improvement in their company.

### MAIN ISSUES

The company was operating using a conventional approach; problem-solving practices were unorganized without proper formulation of strategies. The unused raw material was kept too long in stores and consumed late for production or were rendered unusable. With systematic procedures, the company can save a lot of money.

The broad observations on housekeeping practices before the start of the project were:

- No defined statements on vision, mission, and core values
- No designated place for tools, spare parts, papers, finished products, etc
- Spare parts and tools were not identified
- No identification of papers in storage area
- Jumbling of papers and spare parts in storage area
- Time-consuming retrieval of spare parts and papers
- Heavy dead-stock inventory, etc

## IMPLEMENTATION OF PRODUCTIVITY MEASURES

- Implementation of 5S activity in all departments
- Revise the vision, mission, and core values of the company
- Hold weekly production meetings
- Review ISO procedures and implement the standard across the organization
- Re institute surveillance audit
- Recompute the added value by including wages paid to contract workers
- Measure inventory of all store items and establish a proper in and out system
- Redefine job roles to avoid duplicity
- Hiring of human resource manager
- Implement the revised functional organization chart
- Provide suitable work stations for production manager and maintenance supervisor
- Dedicate an employee communications board at a strategic location to display messages, posters, and current news
- Issue a circular to all employees announcing the Journey of Excellence
- Designate a fixed place as a learning hub; room to be fixed with flip charts, white board, projector and screen
- Provide production monitoring instruments to ensure consistency in quality outputs
- Formalize the business plan using the template provided
- Establish a formal system to give recognition and reward for project team members for going the extra mile in this Journey of Excellence
- 15-minute preshift meeting at production line
- Implement security procedures for the engagement of contract
- Track downtime for Mitsubishi printing machine and analyze the results
- Trace downtime due to power fluctuation
- Designate an area for finished goods with proper controls
- Establish QA procedures for all production, receiving, and outgoing processes
- Conduct Safety and Environment Awareness for production staff
- Develop a structured on-the-job training for all operators, including contract workers

## BENEFITS FROM IMPLEMENTATION OF PRODUCTIVITY MEASURES

Aadarsh Pvt. Ltd. implemented this project very effectively and it obtained major benefits by developing business strategy based on stated vision, mission, and core values statement, streamlining its inventory (store), tools (production area), and paper management (paper storage area).

Major benefits achieved at the end of the project are summarized below:

- Formation of vision, mission, and core values (Figure 1)
- Successful implementation of 5S in the entire unit
- Production improved by 26.75% (Table 1 and Figure 2)
- Wastage reduced by 20–25%
- Space generation up to 65% (Photo 1)
- Quality awareness inculcated in the grassroots-level workers
- Better workflow and material handling (Photo 2)
- Value realization by clearance of dead stock of INR2 million (Figure 3)
- Achieved focus on innovation and new technologies
- High motivation and a drastic change in attitude was observed in the team



Figure 1. Vision, Mission, and Core Values

Table1. Production Improvement

<b>Machine</b>	<b>Before</b>	<b>After</b>	<b>Change (%)</b>
Machine 1	35,010	38,814	11
Machine 2	39,442	44,225	12
Machine 3	43,981	49,980	14
Machine 4	47,533	52,366	10
Machine 5	49,112	56,874	16
Machine 6	50,132	59,421	19
Machine 7	62,359	87,429	40
Machine 8	215,641	299,416	39
<b>Total</b>	<b>543,210</b>	<b>688,525</b>	<b>26.75</b>

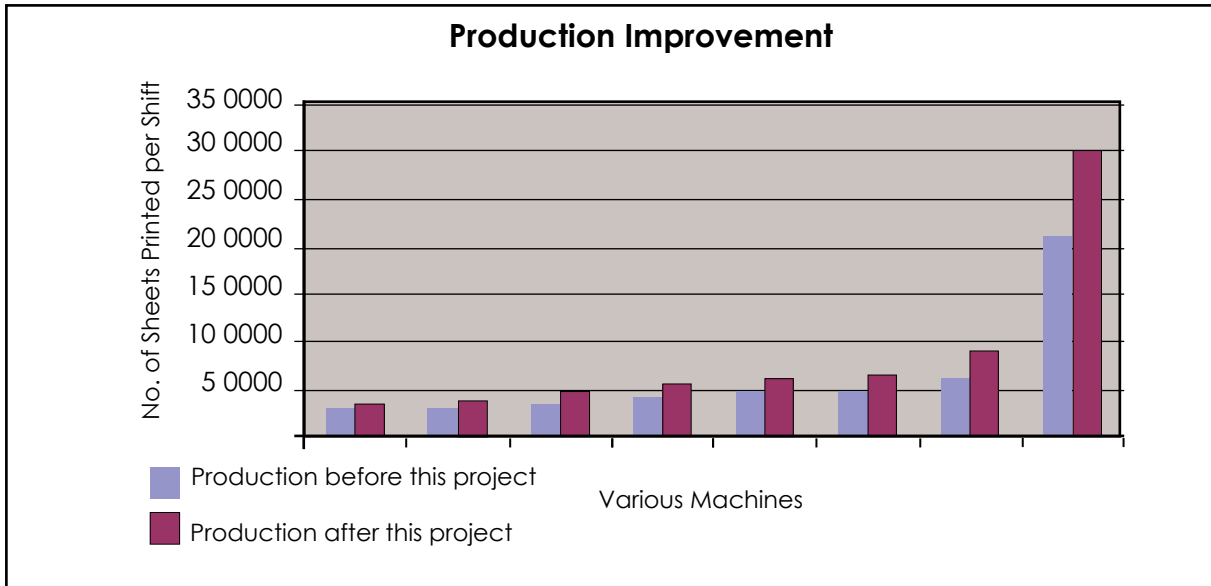


Figure 2. Production Improvement in Different Machines

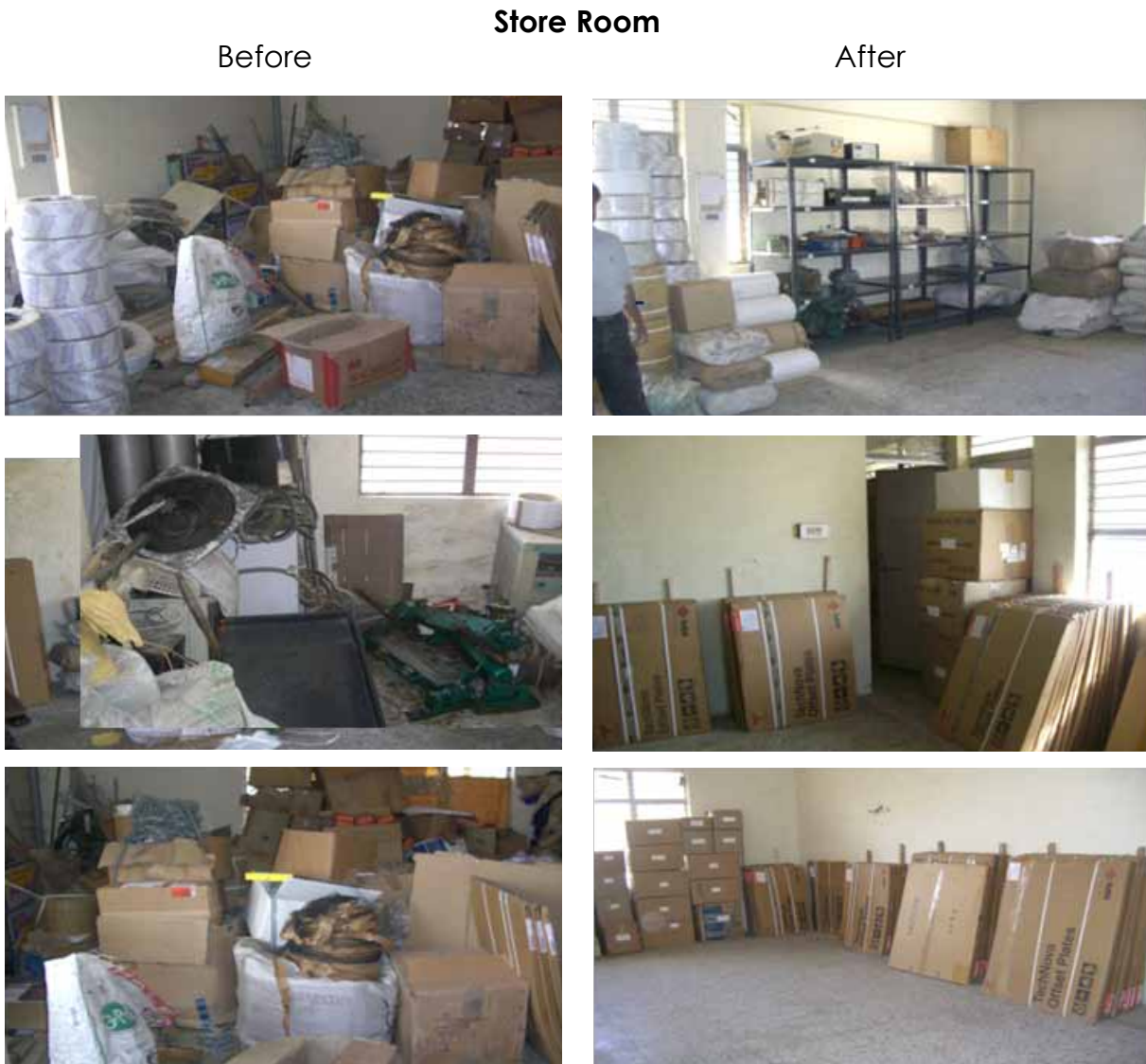


Photo 1. Space Generated by Adopting 1S and 2S





Photo 2. Better Material Handling Adopted on the Shop Floor

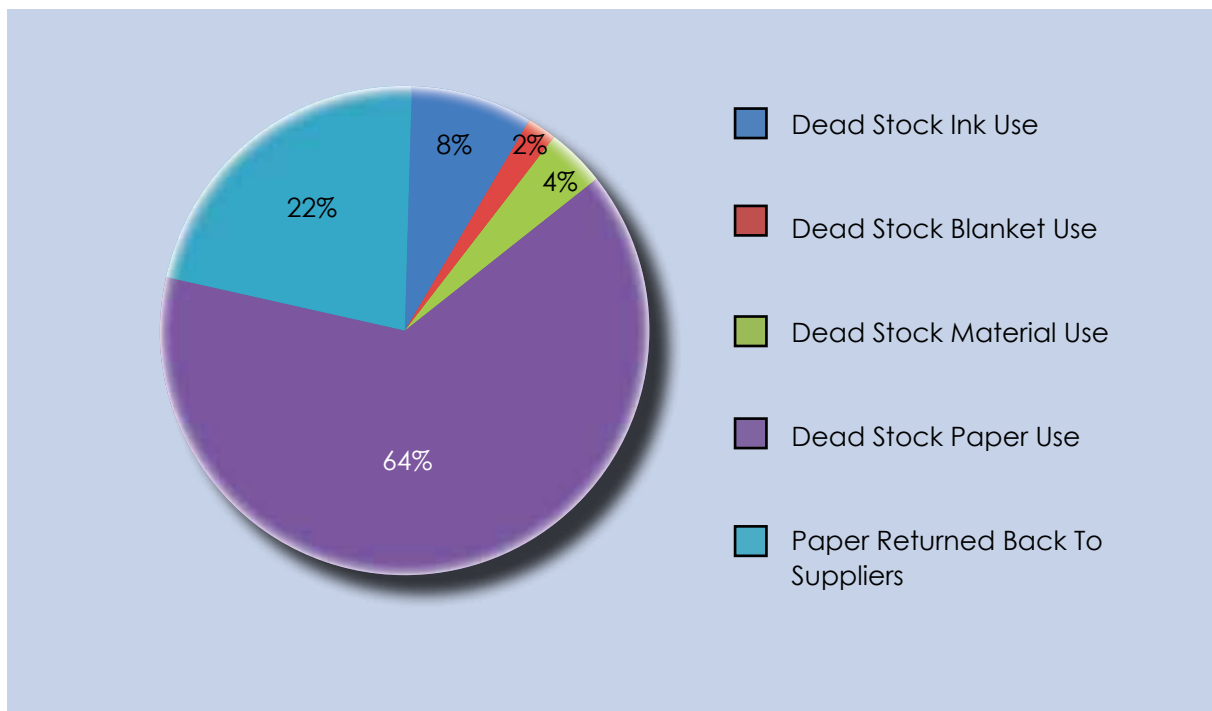


Figure 3. Break Down of Different Dead Stocks and Value Realized



## CONCLUSION

One of the easiest ways to determine a company's attitude toward improvement is simply to walk around its premises and observe the housekeeping practices. The reason is that good housekeeping is the first and essential step to continuous quality and productivity improvement. Once this link is reorganized, the need for good housekeeping can be appreciated. A company with good housekeeping practices will have a good foundation for higher productivity, higher quality, reduced costs, greater safety, higher employee morale, etc. In contrast, poor housekeeping practices can lead to disastrous outcomes such as industrial accidents (especially in engineering/processing industries), high labor turnover, high defect level, and eventual loss of clients.

As a result of this dissemination project, many entrepreneurs who took part in dissemination workshops were inspired and started implementing 5S in their units and were seeing benefits.

*"We have achieved tremendous improvements in reducing the cost of inventory and store management. Our efficiency in delivering products has also improved. We will continue to upgrade ourselves with innovative ideas and thrive to become a great organization ."*

Manish Rajoria  
Director, Aadarsh Pvt. Ltd.

Video available for this case study from:

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# BHARAT ELECTRONICS LTD. INDIA



## ABOUT THE COMPANY

Bharat Electronics Limited (BEL) is a public-sector organization, under the Ministry of Defence, India. It is a premier professional electronics company, engaged in the design, development, and manufacture of a variety of communication equipment, radar equipment, systems and electronic components for the Indian defense requirements as well as exports. The firm has nine units at different locations spread over different states of India. The Ghaziabad unit was chosen for the Demonstration Project on Knowledge Management (KM) Implementation. The unit is primarily engaged in design, development, manufacture of radars and allied products, Network Centric Systems (NCS) and execution of turnkey projects for defense as well as nondefense sectors. The two major manufacturing sections of the company are radar and NCS. The manpower strength in the organization is about 2500, from which around 1200 are in the executive cadre.

## PROJECT INVOLVEMENT

The company was one of the best performing organizations in the high-technology sector with many certifications such as ISO 9000 and ISO 14000 to its credit, and it was also classified as a *Miniratna* public-sector company. Being in the forefront of high-technology manufacturing sector, the company recognized that the intellectual capital of "knowledge" embedded in their people was a major asset for the company. It was felt that the traditional command-and-control nature of working typical of a "defense" setup, and the "government" and "public-sector" mentality were hindering the free flow of such "knowledge" for the common benefit of the company.

KM was a proven technique in many well-known organizations in India. Among them are winners of the “Most Admired Knowledge Enterprises (MAKE) Award, in both the private sector and the services segment, especially IT and IT-enabled services. It was felt that the efficacy of KM had to be proven to be beneficial for the manufacturing sector as well, especially in the government/public sector. The company also felt that the existing culture of management improvement can be further harnessed to introduce KM systems, and it would provide a fillip to transfer the practice to the other units of the organization, based on the success of the project. In alignment with the thrust areas of the Asian Productivity Organization (APO), NPC has been at the forefront of development of upcoming subjects, KM being among them.

The above factors and the company's desire to transform into a knowledge-sharing organization led to the selection of the Demonstration Project on KM at BEL during the period of 2008–10.

## **MAIN ISSUES**

BEL has been a high-technology manufacturing organization catering to electronic systems and products required for the defense sector, and accordingly have a sophisticated plant and equipment in its manufacturing setup supported by highly qualified technical personnel. However, some of the issues faced by the company in harnessing its knowledge capital for the benefits of the company were as follows:

- Managers and the shop-floor personnel were working in isolated silos in their respective departments with nonsharing culture
- Relatively older vintage of the plant and equipment and the need for keeping their performance defect free
- The managers and executives were technically and professionally qualified, but the shop-floor supervisors and workers were relatively lesser qualified and educated, thus the existence of a knowledge-divide in the company
- Being a defense establishment, the general culture of being secretive and the need to keep sensitive information confidential
- Lack of technology tools like LAN connections at the shop floor and access to Internet
- Nonexistence of any individual- or team-based incentive system that can motivate the personnel to contribute more than the minimum

## **KM IMPLEMENTATION**

NPC had previously cooperated with the APO in developing the KM framework and implementation methodology that can be applied in various industry segments and sectors. The decision was made to use the broad contours of the APO KM framework in the KM implementation at BEL. To assist NPC and BEL, the services of Dr. Ronald Young, a well-known KM expert from Knowledge Associates International, UK, was utilized, made possible by the APO. The expert made regular visits to the company at periodic intervals during implementation to provide guidance as well as to monitor the progress.

To begin with, an awareness campaign was undertaken to educate senior management and departmental heads on the facets of KM implementation (Photo 1). During the inaugural seminar, the CEO of the organization communicated his overwhelming support to the project, which proved to be a major booster for further progress. His quote — “Count me as one of the KM practitioners of the project” — provided the proof of top-management commitment to the project.

The implementation strategy followed at BEL spread out from middle level toward the top and the bottom (middle out strategy), similar to the well-known successful model of the Infosys company. A KM core team consisting of middle-level managers from different departments was formed to steer the KM implementation progress. The team was headed by the departmental head of human resources, who had substantial experience in both the manufacturing operations as well as HR functions. The team members had multifarious skills derived from their working in various functions, ranging from operations technology, communication and presentation skills, systems management, quality management, people management, storytelling, software programming, etc., which provided an ideal base for synergizing various KM efforts.

The KM core team, after extensive deliberations with the APO expert and the NPC coordinators, developed the KM Vision and Objectives statement for the company, which are displayed in Figure 1. The team also carried out an initial KM assessment survey among sample respondents to arrive at the KM maturity level in the initial stages of the project (Photo 2). The survey assessed the present levels of company goals, leadership, people's competency, technology support, processes, knowledge sharing, and measurement of outcomes. The team concluded from the survey that the company had been placed almost in the middle of KM maturity levels required for a well-established KM company.

#### Vision

**“To become the Most Admired Knowledge Enterprise in the field of Radar Systems allied products and services.”**

#### Strategy

**“Improving the Knowledge Creation, Retention and Reuse process through better management of knowledge assets by using the key principles, methods and tools of KM, and measure the benefits, that can then be applied across the BEL plant.”**

Figure 1. BEL KM Vision and Strategy

An analytical exercise was carried out to identify a suitable section of the plant where the KM practice could be implemented as a pilot. Based on the factors of scope for results, learning opportunities, availability of KM champion, and possibility for further expansion, the NCS-PCB Testing section was selected for the pilot project. Under the leadership of the engineer from the section, a field KM team comprising the PCB testing technicians was formed. The team comprised heterogeneous members in terms of education, age, experience, and skill level. The KM core team was made the supervisory and mentoring group for the KM field pilot team so that the entire KM demonstration process could be synergized. The organizational structure for the KM implementation is depicted in Figure 2.

Not to burden the team with additional efforts to have separate times for the KM work, it was initially decided to utilize the Quality Circle meetings, which were already in practice, to devote part of the meeting duration to KM. The team discussed the knowledge gaps that existed in the section that were leading to defects in the testing process of the PCBs. The skilled technicians

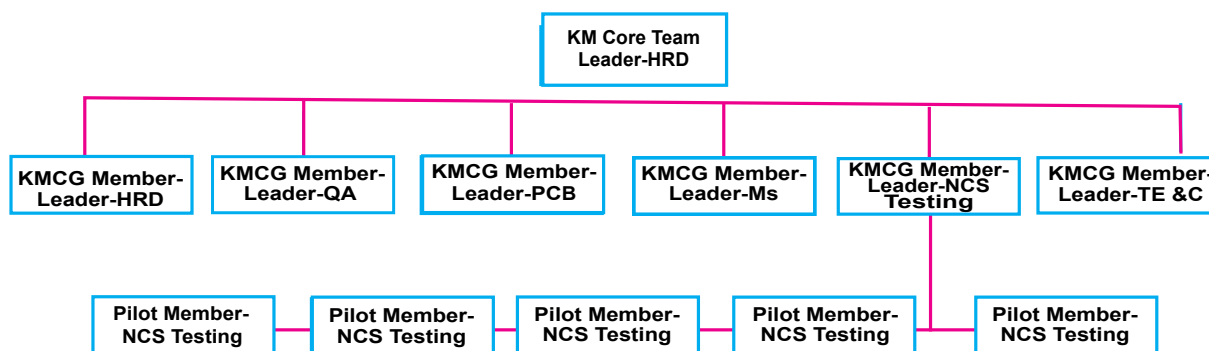


Figure 2. BEL KM Organisation Structure

were motivated to express their tacit knowledge of analyzing the faults in expressible forms so that those ideas and lessons can be captured. The leader of the team would document such lessons learned and carry them over to the KM steering team for further analysis and capturing in the knowledge database. Gradually, the pilot team became aware of the knowledge flow resulting from the exercise, and the KM circle meetings were converted into more frequent after-action reviews for creation of lessons learned and ideas generated.

The KM core team was initially handicapped by the absence of a web-based platform for operationalizing the KM tools and techniques. One of the team members quickly went on to create a KM portal within their LAN setup using Open Source Drupal platform. The most notable point was that the member who developed the portal had no prior IT programming knowledge; sheer enthusiasm of contributing to the KM efforts enabled him to learn a totally new discipline. The portal comprised various sections for sharing lessons learned, discussion forums, expert finders, and display of KM articles and case studies. The knowledge database on lessons learnt from the PCB testing shop floor, KM exercises and the core team's KM learning sessions were gradually uploaded in the KM portal. The search from this knowledge base for solutions to the day-to-day problems gained much popularity over a period of time among the plant personnel.

Gradually, the enthusiasm picked up through the meetings of the KM pilot team and the activities carried out by the KM core team, which achieved noticeable improvements. Newer KM tools such as Peer Assist were utilized in the process of designing new projects in the radar manufacturing section. Toward the final phases of the project, other departments showed keen interest in replicating similar KM activities in their sections as well.



Photo 1. KM Awareness Campaign



Photo 2. KM Assessment Survey

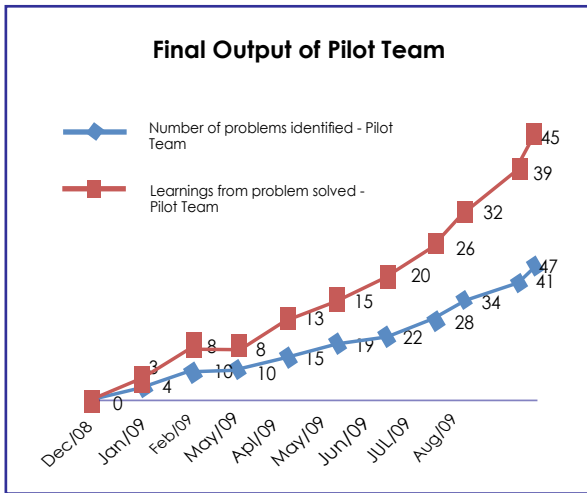


Figure 3. KM Pilot Team “Lessons Learned and Ideas Generated”

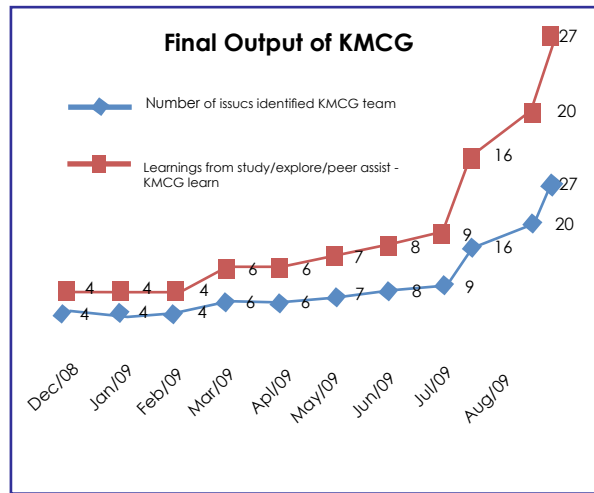


Figure 4. KM Core Group “Lessons Learned and Ideas Generated”

**BENEFITS FROM KM**

The greatest success of the KM project was the creation of the knowledge-sharing culture among the management and technical working classes of the company. The APO expert provided a methodology by which the various KM steps could be measured systematically through weightage indicators for various KM implementation stages, from the beginning of the project to the end. Appreciable improvement of the KM indices was achieved as measured by the expert from time to time.

The problems/issues identified and the lessons learned by the pilot team by the end of the project was 47 and 45, as given in Figure 3. The KM core team identified 27 issues and learned 27 lessons from the study/exploration and peer assistance during the project, as given in Figure 4. The final measurable outcome of the project depicted 74 total problems/issues identified, 72 lessons learnt, 54 records added to the database, 59 comments received in the KM blog and two portals, and 16 comments received in K-bases, as shown in Figure 5.

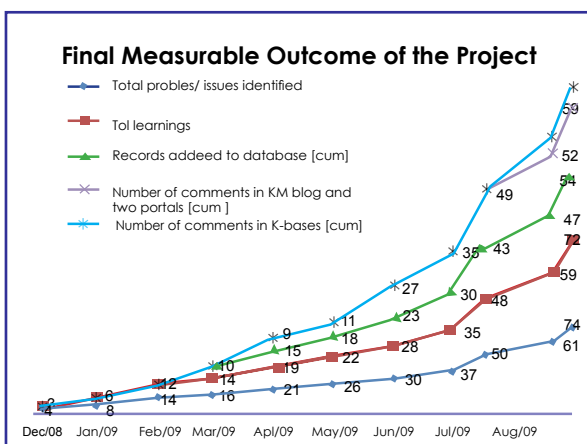


Figure 5. Overall KM Project Results Summary

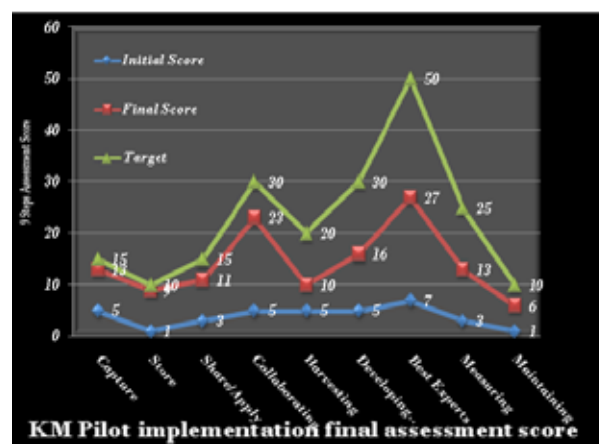


Figure 6. KM Assessment Improvement in KM Elements

Thus, the lessons learnt and ideas generated by the KM pilot team and the KM core team recorded appreciable increase apart from usage of knowledge base in the KM portal. The overall indicators of the KM assessment score rose to 128 from the beginning level of 35, as shown in Figure 6. The company, however, could appreciate that it would be difficult to directly correlate the KM indices to the company's business performance results, as the project was implemented for a shorter period.

## **CONCLUSION**

The KM Demonstration Project provided a great opportunity to a government-based public-sector manufacturing company to put into action and understand the advantages of KM implementation using simple tools and techniques. It also enabled NPC India to strengthen its capabilities for provision of consultancy and training services in the subject of KM.



# SIKKIM COOPERATIVE MILK PRODUCERS' UNION LTD. INDIA



## ABOUT THE COMPANY

The Sikkim Cooperative Milk Producers' Union Limited was established in 1980 after being registered under the State Cooperative Act 1978. It is the apex milk cooperative in the state of Sikkim, India, functioning on a two-tier cooperative setup with Primary Milk Cooperative Societies at village level and was handling 13,500 liters of liquid milk per day before launching the Demonstration Project.

The milk union has dairy plants located at Gangtok and Jorethang in Sikkim with registered capacities of 10,000 and 5,000 liters per day, respectively. Its product range includes liquid milk, butter, *paneer* (cottage cheese), *churpi* (local delicacy made of curdled milk), cream, curd (yogurt), *lassi*, and ice-cream. It is headed by a managing director and assisted by functional managers in the areas of procurement, processing, marketing, quality control, and general administration. The milk basically caters to the needs of Sikkim, a province located in the northeastern part of India and meets the requirements of some agencies like the Indian Army. Milk is mainly sourced from Sikkim and supplemented from supplies from the neighboring provinces. Being a small dairy plant, it follows a few standard and simple milk handling processes, as given in Figure 1.

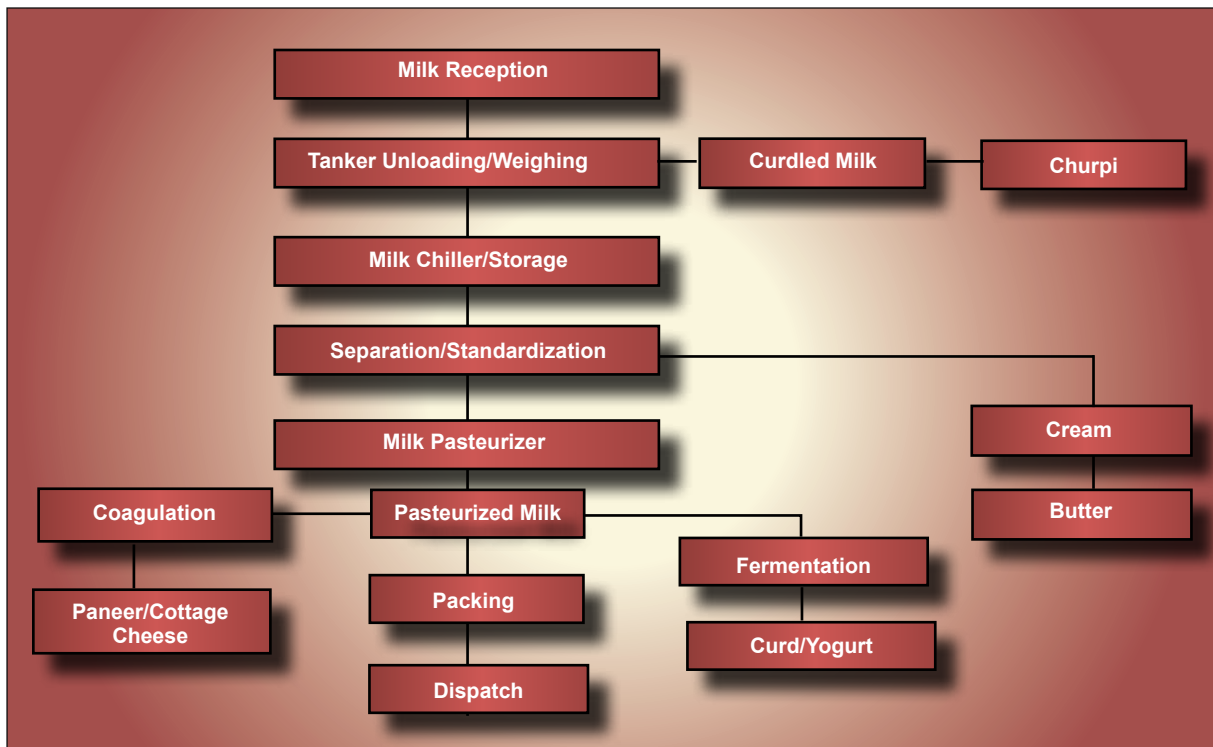


Figure 1. Key Basic Milk Handling Operations/Processes



## PROJECT INVOLVEMENT

The need for the project arose due to the fact that food safety had been identified as one of the priority areas of the Asian Productivity Organization (APO) as well as the National Productivity Council (NPC) of India.

Due to Operation Flood project launched in the 1960s and its subsequent White Revolution, and the opening of markets in the 1990s, the dairy sector in India witnessed a rapid expansion. This has made the country the largest milk producer in the world.

While milk production registered a phenomenal upward trend, unfortunately, same cannot be said about the productivity, hygiene and food safety standards. Lucrative export markets could not be tapped due to quality and safety problems. Since the majority of the milk in India is managed by the cooperative sector, it is imperative that productivity, food safety, and hygiene issues should be addressed first, targeting especially the units working on small and medium scales.

NPC India has been designated as one of the agencies to conduct mandatory annual food quality and safety audits in the dairy units across the country since 2006. During one of these audits, a team of NPC consultants met with the senior management of the Sikkim Milk Union who expressed keen interest in implementing the Demonstration Project. Further events followed a logical sequence, resulting in the launch of a Demonstration Project on Productivity and Food Safety Enhancement at the Gangtok dairy unit of the Sikkim Milk Union.

## MAIN ISSUES

Sikkim Milk Union was in expansion mode and looking forward to making its operations and products more efficient, effective, and safe, which is a significant challenge. This could be explained in the context of its small-scale operations and the limited exposure to modern productivity management and food safety enhancement practices. In a broader context, major issues could be clubbed under the following categories:

- i) Energy consumption
- ii) Water consumption
- iii) Effluent levels
- iv) Milk bacterial counts/levels
- v) Process adequacy and efficiency
- vi) Housekeeping
- vii) Systems and procedures

After these items were analyzed and summarized, the following challenges emerged prior to the Demonstration Project:

- i) Assessing the utilization pattern of critical inputs to chalk out appropriate conservation strategies
- ii) Assessing the efficiency and efficacy of various processes involved in liquid milk handling and the making of other dairy products
- iii) Putting in place an organized and reliable mechanism to monitor and ensure high levels of productivity, quality, and food safety
- iv) Enabling the dairy to rise to a higher level to implement a modern Food Safety Man-

agement System

- v) Introducing green concepts in the form of process optimization, waste minimization, recycling, and effective effluent treatment
- vi) Educating dairy farmers on the importance of clean milk production and its impact on final product quality and safety

## PRODUCTIVITY TOOLS IMPLEMENTATION

While several productivity tools and techniques were available, a conscious effort was made to select simple yet effective tools, keeping in view the small size of the plant and the limited exposure the workforce had to modern productivity and food safety management. The major tools used were:

- i) Brainstorming
- ii) Heuristics
- iii) Ishikawa cause-and-effect analogy
- iv) Water audit
- v) Energy audit
- vi) Hazard Analysis and Critical Control Points
- vii) 5S
- viii) Problem-solving teams
- ix) Gantt charts

Specific improvement measures carried out included:

- i) Introduction of new culture Thermophilic Yoflex (YF-L812) for curd production
- ii) Introduction of a digital pH meter
- iii) Commission of a new incubator
- iv) Daily phosphatase checks for each batch of milk
- v) Replace all damaged floor tiles
- vi) Safe storage practice of chemicals like NaOH and HNO<sub>3</sub>
- vii) Installation of a new flow pasteurizer
- viii) Installation of a new green generator
- ix) Installation of a new chilling plant
- x) Installation of a new watertube boiler
- xi) Effective recovery of condensate
- xii) Reduction of compressor air pressure levels from 7 kg/cm<sup>2</sup> (load) and 6.5 kg/cm<sup>2</sup> (unload) to 6.5 kg/cm<sup>2</sup> (load) and 6 kg/cm<sup>2</sup> (unload)
- xiii) Insulation of steam and chilled water lines
- xiv) Hygienic separation of production units
- xv) Introduction of standard microbiological tests
- xvi) Documentation of processes and SOPs
- xvii) Replacement of all damaged milk cans
- xviii) Enforce dress code for plant personnel
- xix) Introduction and maintenance of proper records

Other possible interventions identified for implementation and expected to be put in place in due course included:

- i) Introduction of T5 lamps

- ii) Introduction of compact fluorescent lamps
- iii) Installation of a wood-fired boiler
- iv) Power factor improvement
- v) Colony power segregation
- vi) Solar water system

### BENEFITS FROM PRODUCTIVITY IMPROVEMENT

Implementation of the above measures resulted in the following tangible and intangible benefits:

- i) Production of high quality curd (yogurt) with the desired characteristics such as high texture, high gel firmness, mild cream flavor and acidity (pH 4.60–4.65), and a favorable market response. The quality parameters achieved are provided in Figure 2

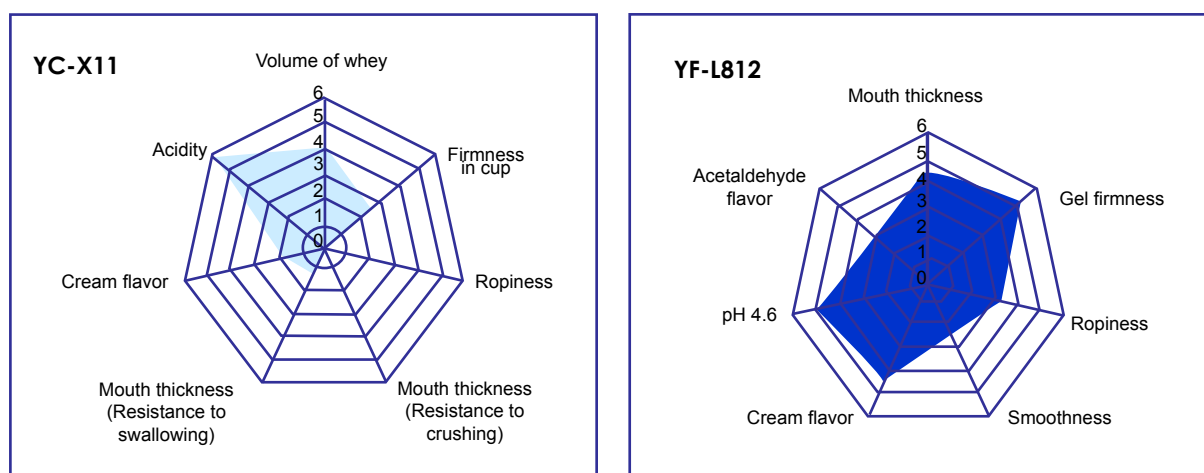


Figure 2. Improved Quality Parameters Achieved by Using New Culture YF-L812

- ii) Increase in milk pasteurizer regeneration efficiency from 87% to 93% and reduction in specific carbon emission from a level of 3.8 kgCO<sub>2</sub>/m<sup>3</sup> to 2.5 kgCO<sub>2</sub>/m<sup>3</sup>, as provided in Figure 3

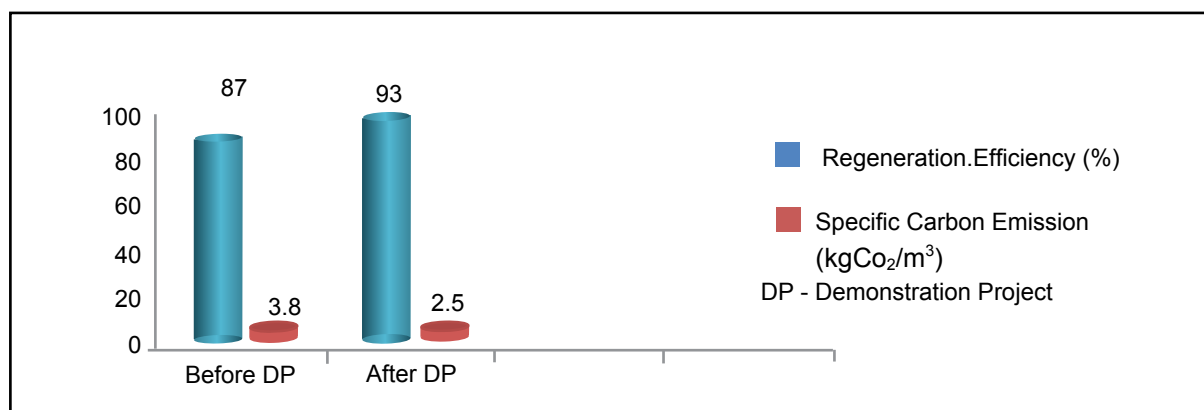


Figure 3. Pasteurizer Regeneration Efficiency and Specific Carbon Emission

- iii) Reduction in high-speed diesel (HSD) consumption from 20 lit/hr to 18 lit/hr in generator operation, as provided in Figure 4

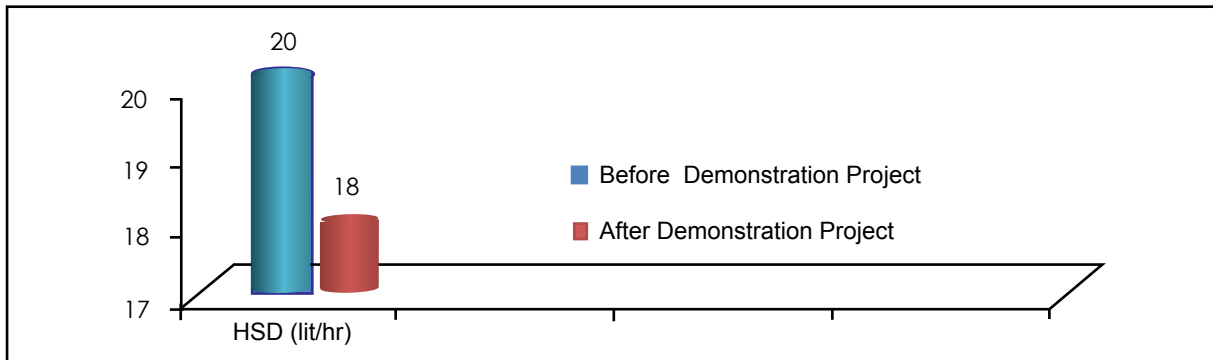


Figure 4. Diesel Consumption in Generator Operations

- iv) Reduction in heat loss from a level of 2.83 MJ/m/h to 0.138 MJ/m/h levels, as shown in Figure 5

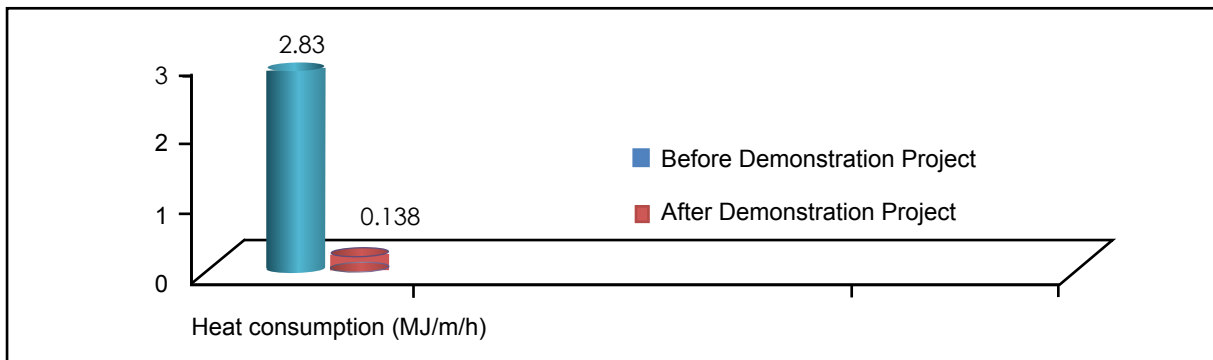


Figure 5. Reduction in Heat Loss

- v) Reduction in HSD consumption from 45 lit/hr to 25 lit/hr in boiler operation, as shown in Figure 6

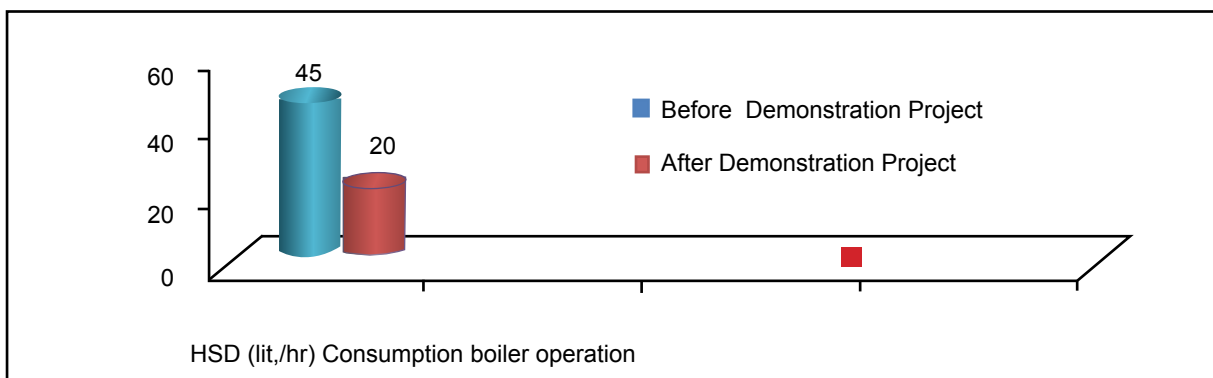


Figure 6. Diesel Consumption in Boiler Operation

- vi) Successful recovery of condensate from the flow pasteurizers and using it for washing of cans  
vii) Effective collection of water from stainless steel curd vat to supplement the supply and clean crates

- viii) Annual savings of electricity to the tune of 657 KWH valued at INR2,000 in compressor operations (Figure 7)
- ix) Annual savings of 6,594 KWH electricity valued at INR17,000 due to proposed improved lighting appliances (Figure 7)
- x) Annual savings of INR18,000 due to proposed colony power segregation (Figure 7)
- xi) Annual savings of HSD to the tune of 13,640 liters valued at INR58,000 with the proposed new solar water heating system (Figure 7)
- xiii) Reduction in microbiological count and increase in Methyl Blue Dye Reduction Time of processed milk due to new flow pasteurizers
- xiv) Control over raw milk quality due to introduction of Standard Plate Count and Methyl Blue Dye Reduction Time tests

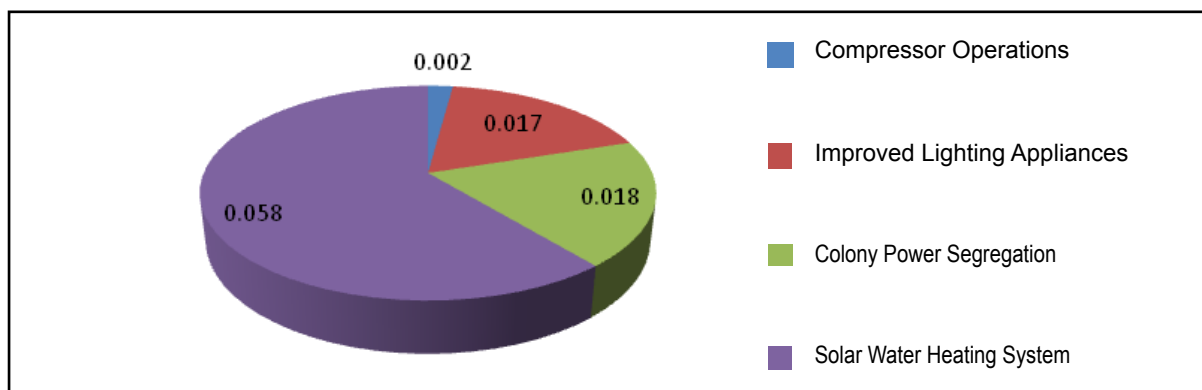


Figure 7. Savings Due to Reduction in Energy Consumption (INR'Million)

## CONCLUSION

The Demonstration Project has proved that it is possible to implement productivity measures in small enterprises in a public/cooperative-sector setting and located in remote areas amid formidable challenges such as logistics, resource constraints, limited productivity exposure, and slow decision making. They have the potential to act as sparks as well as catalysts to ignite productivity consciousness among the similar enterprises in the region and make it a mass movement. Size, exposure, and location are thus not deterrants for Demonstration Projects.

Since overseas experts are the vital links in the scheme of things, selecting the most suitable one is of critical importance as any mismatch might result in undesirable consequences. Local experts with international exposure deserve consideration for a role in implementing the Demonstration Projects.

*"We will carry forward so that our plant achieves the status of a Demonstration Project in Toto.*

*If you know where we are and where we should be, then we know the ways and means to go forward. The experts will provide you the ways and means to reach your goal."*

Managing Director  
Sikkim Cooperative Milk Producers' Union Ltd.

Whole-hearted involvement and support of the top management of the company will decide the pace and extent of implementation and the ultimate benefits.

# PT. SARANDI KARYA NUGRAHA INDONESIA



## ABOUT THE COMPANY

PT. Sarandi Karya Nugraha (PTSKN) was established as a corporation on 12 November 1997 and is situated at Sukabumi, Jawa Barat, Indonesia. The company has 180 employees and manufactures hospital equipment such as hospital beds, operating tables, gynecological chairs, folding stretchers for ambulances, etc. To date, the capital investment in the factory is about USD221,053. It is ISO 9001:2000 and ISO 13485 certified. It has also obtained Astra Green Company certificate for environment,

health, and safety. The sales turnover, gross profit, net profit, and labor cost of the company is USD2.1 million, USD900,000, USD200,000, and USD330,000, respectively. The vision of the company is to become a leading manufacturer of excellent, innovative, and reliable medical products.

## PROJECT INVOLVEMENT

In pursuit of this vision, the company wanted to implement proper production management and quality control system to follow the principles of good manufacturing practices. In order to improve its competitiveness in the global market, PTSKN wanted to increase production, save material cost and inventory, streamline the production shop floor, increase labor productivity, bring down cost of energy, and reduce rejects and high rate of rework. To achieve its vision and the goals, the company expressed keen interest to take up the Demonstration Project with the assistance of the Asian Productivity Organization (APO) and the National Productivity Organization (NPO) Indonesia.

## MAIN ISSUES

The preliminary diagnosis in PTSKN has revealed a highly mismanaged shop floor and housekeeping, improper plant layout, excessive transportation time due to back-and-forth movement of components, considerable amounts of work in progress, large quantities of rejects and reworks, heavy manual operations in the painting shop, insufficient illumination in the work place, noisy operation of machines, excessive amounts of water accumulation at the chemical treatment section, suboptimal use of manpower due to two shifts in operation having dual timing, etc.

## PRODUCTIVITY AND QUALITY TOOLS IMPLEMENTATION

While several productivity and quality tools were available, a conscious effort was made to select simple yet effective tools keeping in view the small size of the factory and the limited exposure the workforce had to modern productivity and quality management concepts. The major tools used were:

i) Company diagnosis

The minutes of the company's Annual General Meeting were carefully studied. The CEO and other key persons were interviewed using structured questionnaire. Subsequently, site visits were made to observe housekeeping practices, production management practices, quality control tools used, layout of plant and machinery, movement of material, and work in progress at the shop floor.

ii) Problem-solving techniques

Problem-solving methodology was suggested by questioning and selecting the most crucial issues and summarizing those issues into 5W+1H method. After which, problem-solving tools were used such as data collection and root cause analysis for finding solutions in tackling the root causes.

iii) Brainstorming

This was carried out at the managerial level to enhance productivity with 12 participants divided into two groups. The ideas that were suggested were listed into three categories: a) Important and feasible, b) Possible, and c) Less important. Each participant was asked to examine these lists and choose two ideas that have the potential to make the greatest contribution. The two ideas with the highest scores were chosen and each group was asked to prepare a written action plan to implement the ideas. After six weeks, the group met again to discuss how well the implementation plans were progressing. Subsequently, a revised action plan was developed.

iv) 5S training

All workers of the company were given training on the 5S concept and implementation methodology.

v) Total Quality Management (TQM)/Total Quality Control (TQC) training

All employees of the company were given training on quality improvement and implementation of TQC in order to reduce rework, repair, and quality defect using QC 7 tools.

vi) Kaizen training

All employees were given training on Kaizen.

## **BENEFITS FROM IMPLEMENTATION OF PRODUCTIVITY AND QUALITY TOOLS**

### **Main Factory**

Before the project implementation, the main factory (floor area of 5,000 m<sup>2</sup>) looked like a metal junk warehouse rather than a manufacturing plant. A lot of active and/or inactive machinery were mixed up, taking up large floor space. In addition, the shop floor was crowded with lots of unnecessary items such as excess inventory of raw materials, parts and components, many work in process piled up for the next process, inferior goods waiting for rework, etc., making the working floor space narrower and obstructing the production efficiency.

Five months later, the manufacturing plant became a model factory after clearing up and securing a large floor space using two of the 5S method, namely Seiri and Seiton. It now features an extra 500 m<sup>2</sup> of floor space. The images of the welding and drilling sections before and after implementation are shown in Photos 1 and 2, respectively.



**BEFORE****AFTER**

Photo 1. 5S Implementation in the Welding Area

**BEFORE****AFTER**

Photo 2. 5S Implementation in the Drilling Area

### Sharp Drop in Rework Rate

A very high rework rate of over 50% was observed due to the inferior quality of raw materials and the operations in painting and its related sections. Utilizing the extra space, carrying out remodeling in the related facilities, and having taken the following necessary preventive measures, the rework reduced sharply to one-digit level.

- i) Inspection of whole quantities of raw materials procured from new distributors recommended by original equipment manufacturer or OEM
- ii) The previous poor spray-painting facilities were replaced by newly remodeled facilities with anti-contamination devices
- iii) Installation of the automatic feeding system to the drying tunnel after wet-painting instead of traditional manual transportation into dry chamber, as shown in Photo 3
- iv) Introduction of preventive inspection of work in progress before feeding to the next process
- v) Day-to-day practice of 3S (Seiri/Seiton/Seiso) at all sections

### Cost Reduction

Before the project implementation, dual time to start work had been adopted between production sector (06:30) and nonproduction sector (08:00). In addition, the factory was operating in two shifts through the year, regardless of brisk or dull seasons. PTSKN also had introduced dual working hours/days between the factory (39.5 hours in 5½ days a week) and the Jakarta branch (40 hours in a 5-day week).



**BEFORE****AFTER**

Photo 3. Installation of Automatic Feeding System to Drying Tunnel in the Painting Area

In addition, the entire roof of the factory was slatted, and the high walls only had a few small windows to get in natural light. So the inside of the factory was always dim. As a result, fluorescent lights were utilized throughout the day.

After the project implementation, the unreasonable dual-time system was standardized to a single system throughout the company. The two-shift work was streamlined to one. Working hours per month reduced from 360 to 190. Furthermore, in order to save electricity consumption, PTSKN replaced 64 slatted roofs with transparent plastic plates (0.8 m x 5 m) at strategic spots to get in more sunlight. Estimation of cost saving from the improvements were IDR36 million (USD4,000) in labor costs, and IDR8.5 million (USD950) in energy costs. Furthermore, about IDR1 million (USD100) could be saved from the transparent plastic roofs monthly.

### **Reform in Infrastructure**

Factory-wide 5S implementation brought the following advantages.

- i) Working floor space increased by 500 m<sup>2</sup>. All the red-tag items that were removed to temporary depot were equivalent to USD250,000. It was reduced to USD130,000 after many items were disposed.
- ii) The ample space secured inspired PTSKN to reform the manufacturing process away from the previous back-and-forth practice. In terms of overall distance, the zigzag process was 802 meters long, while the new straight line was only 363 meters long (Table 1).

The above improvements contributed greatly to enhance productivity by removing unnecessary movement in production and shortening overall lead time in each process.

### **Second Factory (Building #09 to #13)**

The second factory (1,000 m<sup>2</sup>) located in front of the main factory across the road, was in even worse condition. Some of the unnecessary practices included the storing of packed/finished products within the factory. PTSKN started implementing 5S from mid-May 2008 and renovated it mainly to include welfare facilities such as cooperative store, clinic, locker room, prayer room, sports center, canteen, and restrooms. By transferring the R&D division to the main factory, along with some structural reforms, it generated an empty space of 592 m<sup>2</sup>. The total extra space secured in the main and second factories was about 1,092 m<sup>2</sup>.

Table 1. Reduction of Distance from Production to Finished Goods

<b>Distance Between Production To Finished Goods</b>	<b>Before</b>	<b>After</b>
From materials to finished goods	420 m	210 m
From subcontractor to finished goods	216 m	123 m
From semifinished material to finished goods	166 m	30 m
Increase in production	-	32%

Table 2. Labor Cost Data Before and After Project Implementation

<b>Description</b>	<b>Total Salary Year 2007 (IDR)</b>	<b>Total Salary Year 2008 (IDR)</b>
Indirect labor (staff)	1,905,762,530	1,797,112,568
Overtime	584,425,810	450,149,847
Direct labor (production, R&D)	923,612,790	1,245,535,798
In-house training employee	245,842,506	156,432,900
<b>Total</b>	<b>3,659,643,636</b>	<b>3,649,231,113</b>
<b>Sales turnover</b>	<b>25,591,913,538</b>	<b>33,789,176,972</b>

Sales turnover increased by 32%

Cost of labor 2007/Sales for 2007 = 14.3%

Cost of labor 2008/Sales for 2008 = 10.8%

### **New Working System**

The working day/hour changed from 5.5 days and 39.5 hours a week to 5 days and 40 hours. Start/finish time changed from dual time of production and nonproduction sectors to standardized timing: Monday to Thursday 08:00–17:15 (75 minutes for lunch and prayer) and Friday 08:00–17:45 (105 minutes for lunch and prayer). Work shifts changed from two to one.

### **CONCLUSION**

The Demonstration Project helped PTSKN implement productivity and quality tools such as brainstorming, problem-solving methodology (5W+1H), 5S, TQM, and Kaizen. The savings achieved in labor cost and energy cost were IDR36 million (USD 4000) and IDR8.5 million (USD950) per month, respectively. The freed-up space of 1,092.6 m<sup>2</sup> led to savings of IDR1.64 billion per annum. Though a marginal labor cost savings was achieved to the tune of IDR10.4 million in 2008 compared to 2007, cost of labor per sales turnover reduced from 14.3% to 10.8% due to increase in sales/production by 32% (Table 2). In addition to the above financial achievements, the project helped the company implement better production management and quality control, and good manufacturing practice. It also helped NPO Indonesia to improve competency of NPO experts in consultancy techniques.

*"We believe that the result from this program will have a big impact on productivity improvement, even though the tangible result will be visible in a year or two. However, some results have been impacting the company in such ways as improved production, material savings, production floor area clearing, manpower efficiency, energy savings, and many more. This program is a tool to improve competitiveness in the global market. My sincere thanks also go to APO and NPO Indonesia for their support. We are sure that we can implement the productivity program in the future."*

Isep Gozali  
President Director of PTSKN

# AUTOKEEN SDN. BHD. MALAYSIA

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## ABOUT THE COMPANY

Autokeen Sdn. Bhd. was established in 1988 with paid-up capital of MYR50,000. Its first operation took place in a small rented factory located on Jalan 215, Petaling Jaya, in Selangor. It started by producing metal parts for Proton (Malaysia's first national car). The business slowly grew and when the second national car manufacturer, Perodua, started its business, Autokeen was appointed a vendor. In order to accommodate the business expansion, Autokeen moved into its own building in 2000 in Kampung Melayu Subang, about 20 km from the first factory.

Engaging in activities for improvement has always been one of the main agendas at Autokeen. In 2001, the company received ISO 9002 certification and was upgraded to ISO/TS 16949 in 2005. Autokeen also actively took part in improvement programs organized by Proton and Perodua. For example, in 2003 and 2004, Autokeen participated in Joint Improvement Committees and Jetro/Jexsa activities.

## PROJECT INVOLVEMENT

As economies become increasingly borderless and businesses become more internationalized, Autokeen was expected to take a global perspective to supply products and services that would meet the needs of a variety of customers. The company had to produce goods that are competitive in price and quality for both domestic and international markets.

## MAIN ISSUES

The Malaysian automotive industry has become extremely competitive. In order to survive in this industry, a culture of continuous improvement needs to be cultivated. Recognizing this need, Autokeen former managing director Abdul Rahman Ahmad had given directives to embark seriously in productivity and quality improvement activities.

The main issues for improvement were:

- Productivity improvement
- Reducing customer complaints
- Decreasing usage of raw material
- Increasing employees satisfaction level
- Improving space utilization

## TOTAL QUALITY MANAGEMENT (TQM) IMPLEMENTATION

The TQM implementation program was based on 21 TQM handbooks under the monitoring and supervision of APO expert Eizo Asaka from Japan and the Malaysia Productivity Corporation (MPC) team. The following activities were implemented:

## i) Handbook: CEO

- Nominated TQM committee members, led by head of department of Quality Assurance (QA)/Quality Control (QC), and members from various departments to focus on several critical areas
- Provided guidelines on progress report procedure by adopting check sheet introduced by TQM instructor, and report weekly to the TQM coordinator
- Identified focus areas such as upgrading facilities for new parts development, improving quality level, improving worker satisfaction level, and generating revenue

## ii) Handbook: Manager

- Conducted training sessions
- Standardized production and downtime analysis reports such as weekly reports, developed guidelines to report on the most critical items, developed reporting procedures, and displayed the reports/results

## iii) Handbook: Common Employee

- Organized weekly motivational talks for one hour every Thursday
- Organized weekly Monday meetings involving all staff. The managing director usually addressed on company performance and motivated workers
- Provided some motivational books for workers to read at the reading corner

## iv) Handbook: Standardization

- Developed a display board at quarter inner line for inspection and quality status
- Developed quality check sheets for production team to reconfirm important quality requirements
- Developed merit/demerit system on quality issues for workers
- Improved quality check sheets to indicate the major controlling quality points at medium line
- Erected racks to store raw materials for better control and visualization
- Developed a display board for hourly delivery status for parts to Proton
- Developed supermarket area for fast-moving parts
- Developed special trolleys for parts that are major and fast moving

## v) Handbook: Daily Management

- Developed the latest process flow for each shop
- Developed job instructions for executives, supervisors, and line keepers
- Organized training and dialogue with relevant persons to ensure complete understanding of their job functions

## vi) Handbook: QC Circle

Various improvement programs were divided into five groups as follows:

- Group 1 - Reduction of raw material inventory
- Group 2 - Improvement of safety at front pillar line
- Group 3 - Improvement of stroke per hour at medium line

- Group 4 - Improvement of quality at welding line
- Group 5 - Improvement of lot size at small press line

vii) Handbook: Safety Control

- Developed company safety manual to systematically improve safety conditions
- Developed guidelines for actions during emergency situations

viii) Handbook: Management of Facilities and Equipment

- Reviewed the existing procedure for machine maintenance by revising the current maintenance procedures at stamping and welding shops
- Developed procedures to reduce downtime (Pnl Qtr Inr and side structure lines)
- Identified critical spare parts required and developed procedures to control spare parts inventory
- Developed preventive maintenance procedures for machines with high downtime (predictive at Qtr Inr line)

ix) Handbook: Education and Training

- Identified types of training required
- Developed annual training calendars for internal and external training
- Developed evaluation schemes before and after training

x) Handbook: External Supplier - Purchasing

- Invited selected suppliers to participate in the TQM implementation. The objective was to upgrade second-tier level of efficiency. The selected vendors were Suria Component Manufacturing Sdn. Bhd., Asastek Sdn. Bhd., and Brimal Stamp Press Engineering Sdn, Bhd.

xi) Handbook: Production Control

- Improved production planning procedure, detailing the requirement for each machine
- Standardized inventory control for raw material
- Developed visual control on production status at front pillar assembly line
- Developed visual control of production status at small stamping line

xii) Handbook: Disposal and Proper Arrangement

- Built designated storage area to store the scheduled waste items
- Identified items to be categorized in the scheduled waste criteria
- Sent report of scheduled waste every three months to the head of department
- Appointed licensed contractor to collect the scheduled waste items

xiii) Handbook: Cleaning, Cleanliness, and Environment

- Organized company-wide 5S campaign by setting up a committee
- Established pedestrian walkway

- Made proper arrangements and layout of medium dies
- Painted floor with striking colors to indicate 5S best practice area
- Put up 5S banners to increase awareness on the 5S practices
- Installed proper racks to store parts at store area
- Revised layout of storage of finished goods, etc.

## BENEFITS OF TQM IMPLEMENTATION

The following benefits were achieved by implementing the TQM Demonstration Project:

- It has provided a guideline to develop a comprehensive procedure, which is not only to run the process efficiently, but also to predict and react in case of abnormalities
- Increased worker awareness on the importance of having visual management, which highlighted the situation to all levels of people in the factory
- Reduced customer complaints
- Reduced raw material inventory from MYR1.3 million in June 2009 to MYR0.9 million in June 2010 (Figure 1)
- Increased worker satisfaction level from 60% in 2009 to 80% in 2010 (Figure 2)
- Increased productivity level in all the four shop floors (Figure 3)
- Additional space was made available to the tune of 15 m<sup>2</sup> and 24 m<sup>2</sup> in fender shield and slide MBE lines, respectively

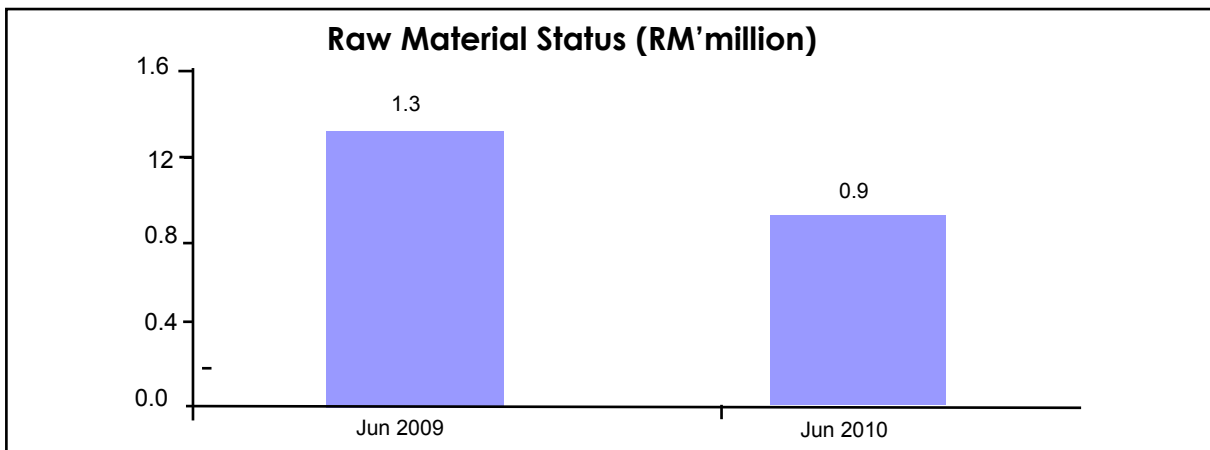


Figure 1. Reduction of Raw Material Inventory

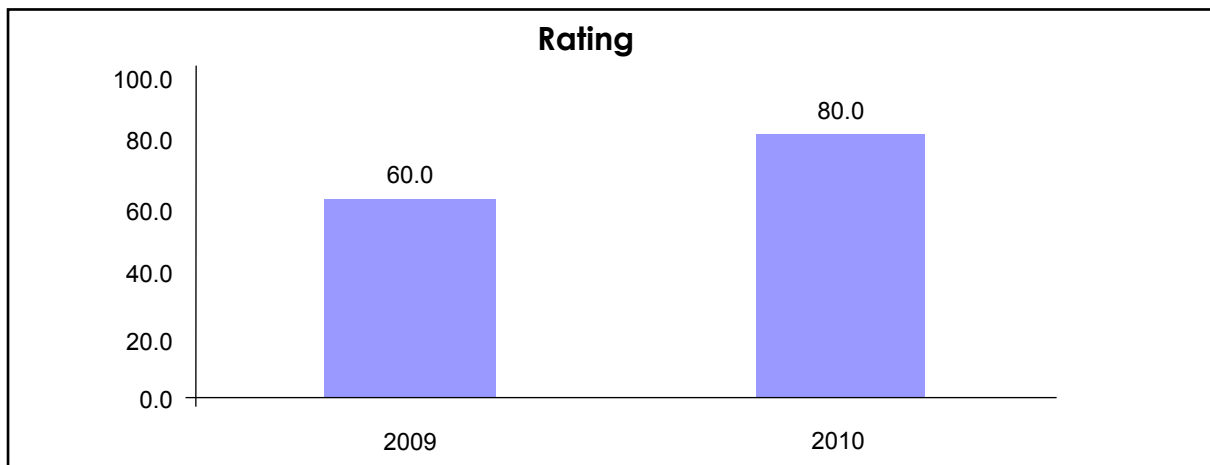


Figure 2. Worker Satisfaction Level

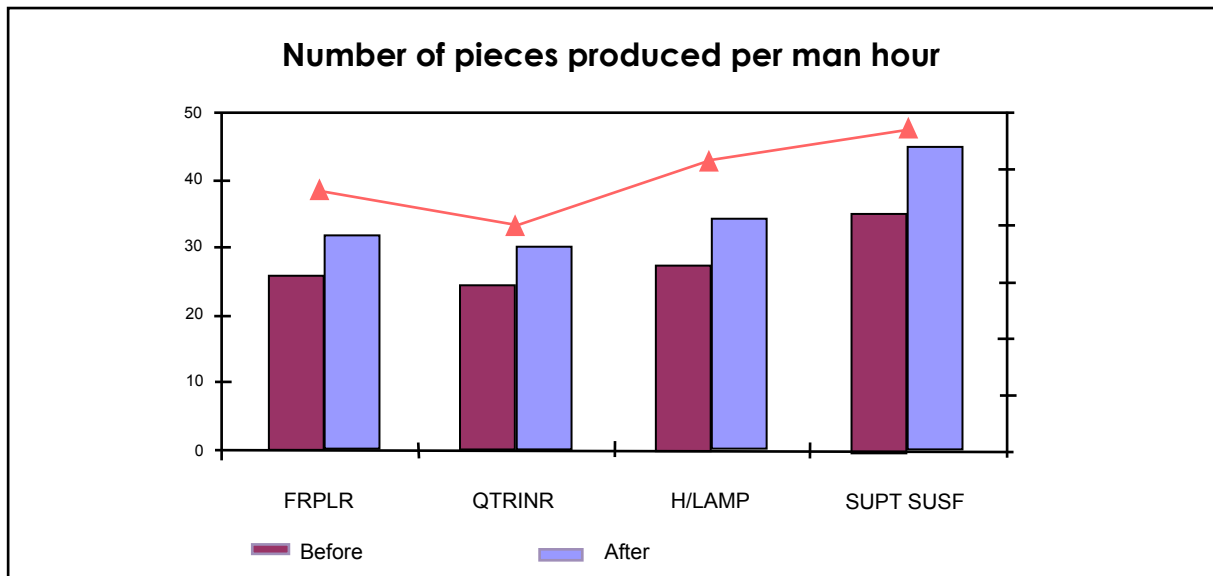


Figure 3. Productivity Levels on Various Shop Floors

## CONCLUSION

The results achieved by Autokeen motivated the company to continue the implementation of all aspects of TQM principles aggressively. The management is confident that in the long run, TQM will assist them in achieving the company vision of being a world-class automotive company. Autokeen is grateful to the MPC and APO for giving them the opportunity, guidance, and support.

*"We are devoted to our customers. This is in line with their business philosophy, which is to provide their customers with timely delivery of high-quality products at an economical price. Throughout our 24 year long history, the company has been promoting a healthy and competitive team spirit among our employees as well as a secure, healthy and friendly organizational culture".*

Abdul Rahman Ahmad  
Autokeen's former Managing Director



# SELIA-TEK INDUSTRIES SDN. BHD. MALAYSIA



## ABOUT THE COMPANY

Selia-Tek Industries Sdn. Bhd. (STISB) was incorporated in 1995. Formed as a manufacturing arm of Selia-Tek Sdn. Bhd., its objectives are to manufacture and supply customized precision plastic injection molding products. Its major products are in the power distribution industry — manufacturing the aerial bundle cable accessories for Tenaga Nasional Berhad, the local utility board. It has been appointed as a Tenaga Nasional Berhad vendor for the last 15 years. The company has produced more than 300 types of plastic products of various grades of engineering plastic materials. STISB has also established itself as one of the leaders with vast experience in the industry of precision plastic injection. Presently, the company has 10 professionals and 70 semiskilled and skilled workers in various fields.

STISB has come a long way from its humble beginnings. Its successes and achievements to date speak volumes of the dedication, commitment, and effort of the management and staff in continuously striving to achieve and live up to the ideals and corporate objectives of the company. Innovative technology and stringent quality control procedures are constantly enforced in order to uphold STISB's commitment to achieve a high standard of quality performance. The company has four types of manufacturing activities: i) aerial bundle cable accessories, ii) customized precision engineering plastic components, iii) medical products and components, and iv) contract manufacturing for original equipment manufacturer. In addition, the company assembles semifinished and finished products.

## PROJECT INVOLVEMENT

STISB manufacturing philosophy has always been to achieve uniform quality with the help of the most economical mass production technology harnessed through a dedicated production team in a harmonious industrial atmosphere. However, as time passed by, the management realized that the company was not competitive anymore and something needed to be done to improve the multidimensional quality aspects of the business. Hence, implementation of total quality management (TQM) was timely and appropriate as it was the right tool for greater improvement in quality, productivity, efficiency, and profitability of the organization. Therefore, through this Demonstration Project, the company was able to eliminate and improve various weaknesses, and at the same time, indirectly inculcate and institute a quality culture at all levels of the organization.

## MAIN ISSUES

Due to local and global competition, STISB had emphasized that quality had to be put in place, integrated into all aspects of products and services within their management system. Hence, TQM had become increasingly important as one of the managerial tools in ensuring continuous improvement in customer satisfaction and retention as well as to ensure its product or service quality.

## TQM IMPLEMENTATION

Prior to the introduction to TQM, STISB in its daily operations had already implemented other quality systems. Using the available standard operating procedure (SOP) that had been established and developed over the years, the company proceeded to develop new SOPs based on TQM guidelines and recommendations. Some of the TQM activities that had been carried out in STISB are as follows:

- i) Constructing hourly production job execution sheet  
Output was measured hourly. Hourly targets were set daily.
- ii) Reviewing and updating the organization structure  
The R&D section was put under the wing of Production, Engineering, Mould and Maintenance, and Production Planning and Control departments. The TQM section was put under the wing of Quality Assurance (QA), and Store and Purchasing departments. The modified organogram is given in Figure 1.
- iii) Reviewing and updating job descriptions  
The QA technical assistant was made responsible for TQM and assisted with QA whenever required by the head of department.
- iv) Tardiness  
Tardiness was monitored in minutes and analysis was done to overcome the root cause and to make improvements.
- v) Suggestion Scheme Group (SSG)  
The group was established, where they evaluated and discussed the suggestions proposed by employees, and every accepted suggestion was implemented.

vi) 5S

Proper filing systems and documentation were adopted. Everything was put in orderly fashion and staff maintained their work area.

vii) TQM meetings

TQM meetings were held at least twice a month by each head of department. The TQM committee also held monthly meetings to discuss the status of TQM progress.

viii) Quality Control Circle established

Employees became more conscious about the importance of Quality Control Circles and they participated fully.

ix) Process of implementation of TQM

Procedures were updated and briefing sessions were conducted for all employees on a regular basis based on a schedule.

x) Soft launch of TQM

Employees were briefed on TQM and suggestion scheme in order to increasing awareness.

xi) TQM flyers

TQM flyers were distributed to employees to increase knowledge.

xii) TQM workshops

All employees were made to attend TQM workshops and it was made an ongoing exercise.

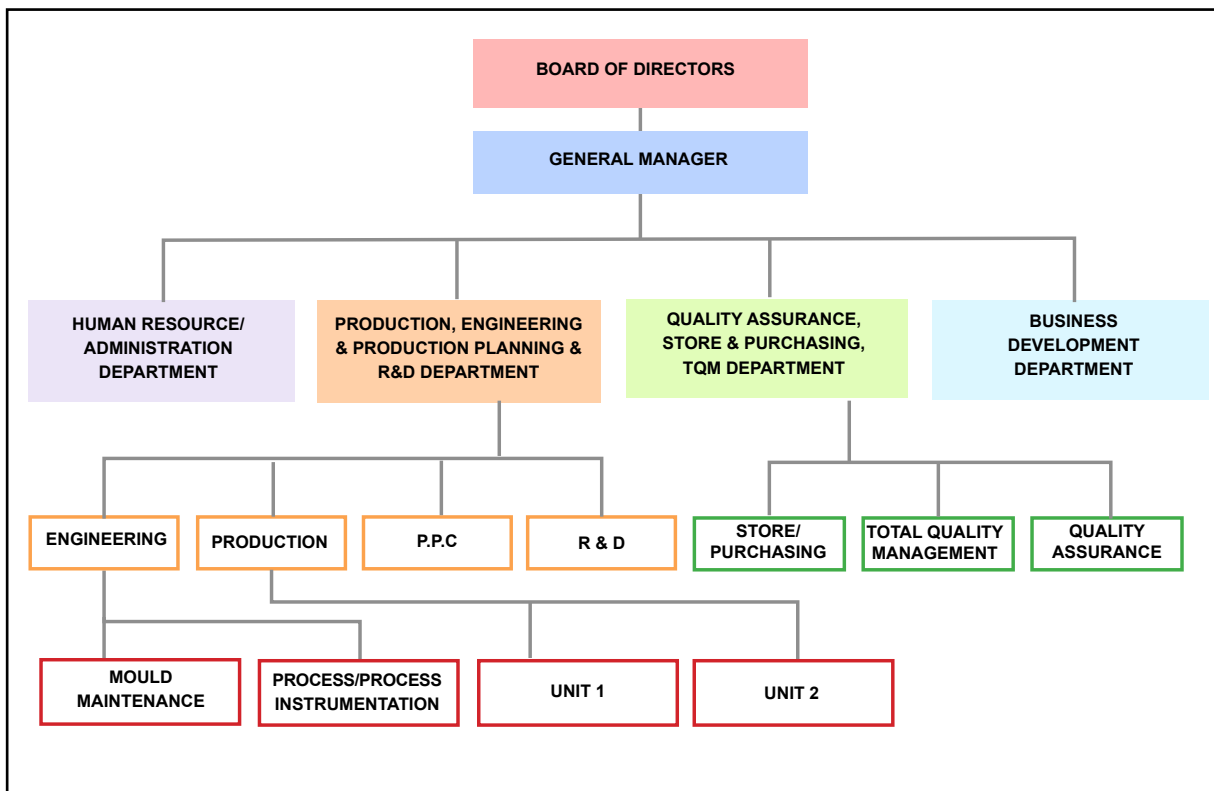


Figure 1. Modified Organizational Chart

## BENEFITS FROM TQM DEMONSTRATION PROJECT

At STISB, the impact of implementing TQM was measured by Quality, Cost, Delivery, Safety, Moral, Environment, and Production Model. The benefits achieved are described as follows:

### Quality

Since STISB already had sets of standards and SOPs available due to its ISO 9001:2008 certification, an introduction and implementation of TQM activities were made easier. Under TQM guidelines and QC story format, the company was able to review, revise, and update the existing quality manuals. At the same time, it also gave the management the opportunity to understand better the actual concept on every element of TQM. Under TQM guidelines, preparation of quality standards was not only confined to middle management or top management but extended to all level of employees. This indirectly had contributed to improvement in interpersonal relationship, unearthed individual capabilities, changed mindsets, and promoted better understanding of company policies, practices, and objectives.

During the course of implementation, the company encouraged the formation of Quality Control Circle teams, and promoted suggestion schemes, statistical process control, and autonomous maintenance. All these actions had shown positive impact and improvement in the company's performance. The percentage of customer satisfaction increased from 72.29% in 2008 to 84.49% in 2009 (Figure 2). The TQM implementation led to improvements in product designs and product quality such as the dead-end clamp assembly, which was designed to support insulated aerial bundle cable of the Low Voltage distribution system at terminal section at acute angle poles. The entire assembly did not have any loose parts nor required special tools to install. The improved design is shown in Photo 1.

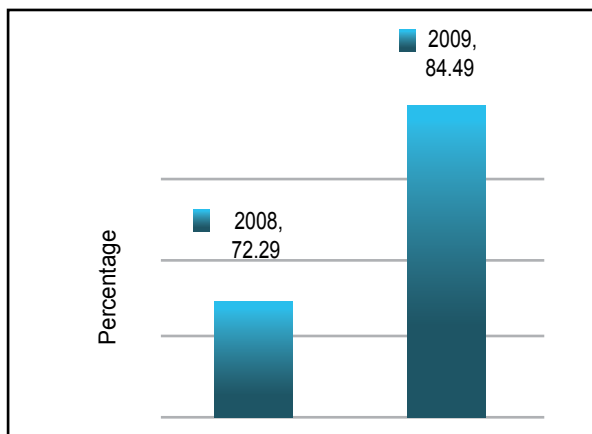


Figure 2. Customer Satisfaction for 2008 and 2009

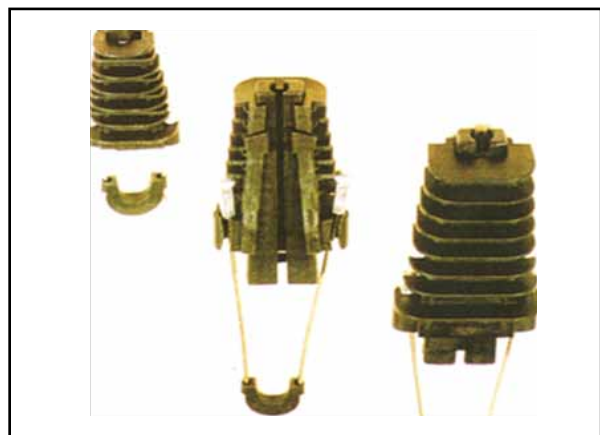


Photo 1. Dead-end Clamp Assembly

### Cost

The economic downturn experienced globally and the rising cost in raw materials had also forced the management to think seriously about cost-cutting measures. Implementation of TQM was therefore appropriate and timely. As a company, it envisaged and anticipated a positive result, better company performance, and increased efficiency and productivity in the coming months and years.

## Deliveries

STISB's main problem in deliveries had always been short on manpower and not having well-coordinated delivery plan. Using the TQM model, the ins and outs of daily delivery schedule of materials and finished products within company, suppliers, and vendors had improved tremendously and had reduced running cost. The delivery performance had increased from 67.01% in 2008 to 75.79% in 2009 (Figure 3).

## Safety

Safety first has always been the company's number one priority. While promoting TQM activities, the company advocated behavior-based safety and care. Complying with Occupational Safety and Health policies and requirements, updating safety procedures and organizing safety courses were some of the initiatives and actions taken to ensure that employees always worked in safe and healthy surroundings.

## Moral

The management of STISB strongly believed in the importance of commitment from each individual in the company. Success and progress can only be measured and achieved through discipline and full commitment shown by all parties, including the management themselves. With TQM activities, the employees felt that they also had a role to play in the running and in the success of the company. They slowly began to understand the true intent and purpose of the company's policies, practices, and objectives. The management had already seen some positive changes happening with TQM implementation and was excited over this development.

## Environment

The company had successfully implemented 5S in the Quality System, and its 5S activities have been certified by both Malaysia Productivity Corporation (MPC) and the main customer Tenaga Nasional Berhad. Due to the implementation of 5S, the factory working area was decongested and made comfortable and pleasant.

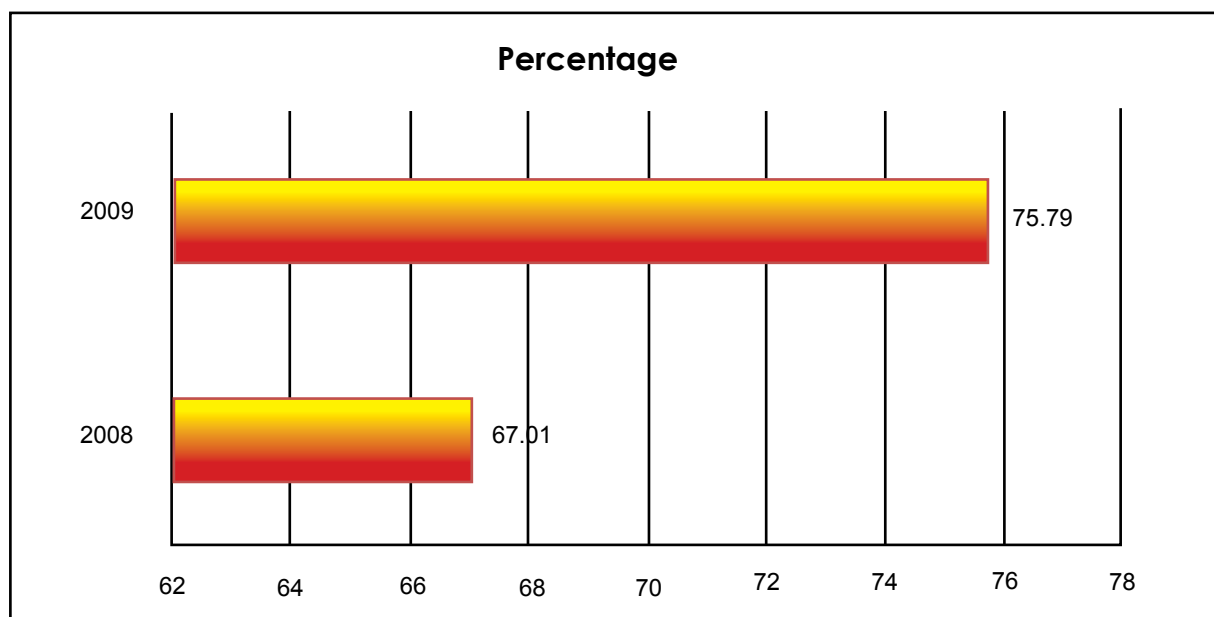


Figure 3. Delivery Performance for 2008 and 2009

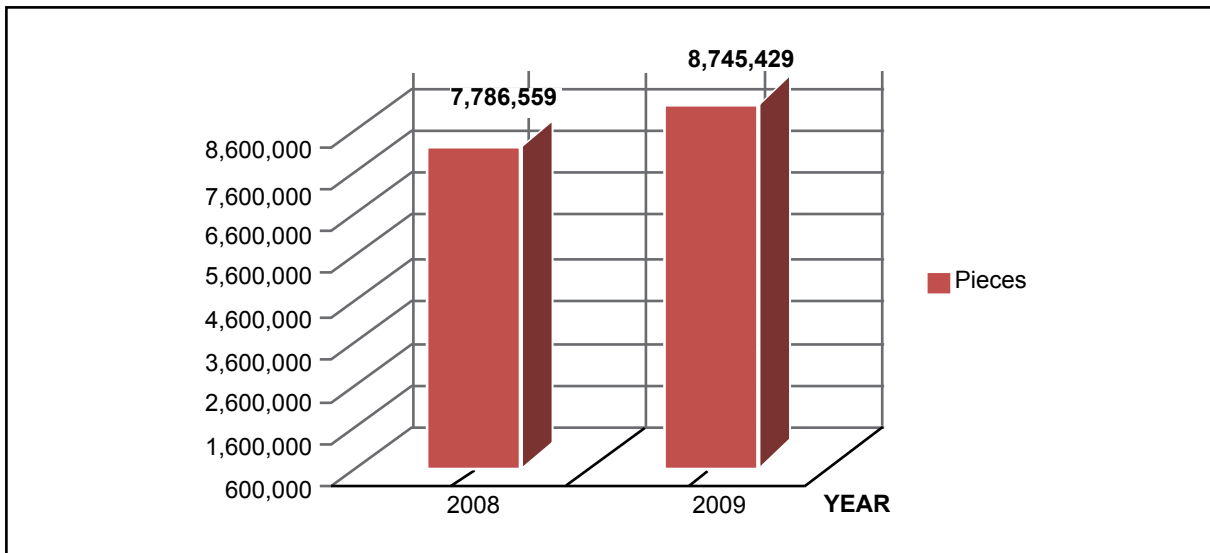


Figure 4. Production Levels for 2008 and 2009

### Production

Due to the implementation of TQM, the production level also increased from 7,786,559 pieces in 2008 to 8,745,429 pieces in 2009, an increase of 12.314% (Figure 4)

### CONCLUSION

The Demonstration Project on TQM implementation helped STISB employees to have more commitment toward TQM activities. Awareness and understanding of TQM had also increased. A higher number of SOPs had been developed based on QC stories. Elimination of errors and productivity improvement contributed to faster achievement of targets and resulted in free time allowing the employees to enhance their knowledge and apply their creativity. By monitoring the production output on an hourly basis, the production level was increased by 12.314%. This also helped the employees detect and rectify abnormalities at the same time, leading to improved quality and reduced cost of production.

The TQM culture was inculcated in all the employees to increase their pride of workmanship. Each operator had become more knowledgeable about the products and was more responsive to changes according to customer needs. Ultimately, customer satisfaction improved by 12.2%, meeting delivery schedules went up by 8.78%, and the level of production also increased by 12.314%. The factory working area was decongested and made more comfortable, safe, and healthy. In addition, the culture of the organization had changed and the employees became more motivated.

*"STISB has been fortunate and privileged to be appointed as one of the model companies to participate in the year-long TQM program conducted and organized by APO/MPC.*

*The experience gained by the exposure to the TQM system has not only helped the company eliminate and improve various weaknesses, but has also indirectly inculcated and instituted a quality culture at all levels of the organization."*

Abd Wahid Omar  
Executive Director of STISB

# ZAMRIA SDN. BHD.

## MALAYSIA

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### **ABOUT THE COMPANY**

Zamria Sdn. Bhd. is a private limited company incorporated in Malaysia in June 1990 for the principal purpose of manufacturing metal components (i.e., metal stamping and machining parts) for automotive, air-conditioner, electrical, and home appliance manufacturers. With its integrated facility of metal forming, machining, mold and die design and fabrication, and heat treatment, Zamria provides metal components to the manufacturing sector in various industries.

The equity structure of the company is 100% Malaysian-owned with paid-up capital of MYR460,000. Zamria is an SME with 60 employees. Its annual sales turnover is about MYR5 million. Zamria is in close proximity to the neighboring industrial community of Shah Alam and is strategically located in the industrial zone of Port Klang. The premises is also conveniently accessible to the Kuala Lumpur International Airport and the nation's capital city of Kuala Lumpur.

The vision of the company is to lead Malaysia's metal-based industry by manufacturing products and providing services of exceptional quality through a fully integrated operation with a worldwide distribution network. Their philosophy is to always keep abreast with the latest techniques and technology in the industry so as to provide state-of-the-art products and services for their customers. To achieve this, they constantly invest in high-quality machines and equipment. Sharing ideas is a key part of the conceptual process of the company because they know that all quality products evolve from a concept.

Through company development review meetings, they carry out feasibility studies to ascertain their customer needs. They evaluate implications such as material sourcing, tooling, process design, production lead time, schedules, and deadlines to provide the best quotation.

### **PROJECT INVOLVEMENT**

SMEs in Malaysia are the life blood of modern economies. They should remain competitive and produce high-quality outputs because SMEs are often suppliers of goods and services to larger organizations and lack of product quality would adversely affect the competitive ability of the larger organizations. Total Quality Management (TQM) is considered an important tool in quality improvement.

TQM is an evolving system of practice, tools, and training methods for companies to provide customer satisfaction in a rapidly changing world. It assures maximum effectiveness and efficiency within the organization by putting in place processes and systems that will ensure that every aspect of this activity is done without waste of effort, using the full potential of every individual in the organization. In 2009, Zamria was selected to participate in the APO TQM Demonstration Project.



## MAIN ISSUES

The SME manufacturing sector in metal components for automobile, air-conditioning, electrical, and home appliances has been extremely competitive. In order to survive in this industry, continuous improvement culture needs to be cultivated and nurtured. Therefore, there was a need to implement TQM in Zamria. The main issues were:

- i) Development of suitable organization structure
- ii) Defining the role of heads of departments with respect to TQM implementation
- iii) Establishment of company rules and regulations
- iv) Establishment of company standard practices
- v) Defining procedure for Quality Control Circle (QCC) implementation
- vi) Establishing standard requirements of 5S practices

## TQM IMPLEMENTATION

The Special Project Department was given the task to coordinate the whole aspect of TQM and was given the following responsibility:

- i) Communicate to all employees in the company about the TQM program
- ii) Act as facilitator and activity leader to guide the taskforce for 5S in implementing the same
- iii) Cooperate with Quality Management Representative to plan and implement promotion activities with regard to quality
- iv) Liaise with Malaysia Productivity Corporation (MPC) and the Asian Productivity Organization (APO) on the model company project participation
- v) Report the progress of TQM program to top management

Under the guidance of TQM expert from the APO Eizo Asaka, Zamria implemented projects by using the TQM handbooks as a guide. The following procedures carried out according the TQM approach.

### i) Handbook: CEO

- Zamria revised the previous company's organizational chart to provide accurate organizational structure and recognized the command and instruction routes ranging from the top management to the bottom level of each department
- The department functional chart was established to indicate all functions in the respective departments as clearly as possible. This was done to institute company processes that showed all the activities being implemented in order to achieve company objectives

### ii) Handbook: Manager

- Zamria believed that heads of departments should recognize their role in disseminating TQM activities companywide. In this respect, Zamria had established a proper rule for job function, responsibility, and authority to facilitate heads of departments with responsibility and awareness of their job. With this implementation, they will be able to



carry out their managerial responsibilities and interface with other departments effectively

- Zamria also implemented weekly short meetings on Monday mornings to discuss current problems and needs. The issues highlighted are to be resolved immediately and followed up the subsequent week. In this way, everyone was aware of the situations

### iii) Handbook: Common Employees

- Zamria established the company rules and regulations. These were implemented, deployed, and signed off by all current employees. For all new employees, the rules and regulations were introduced and New Employees Orientation training was carried out
- Zamria believed and recognized that training programs were important to all level of employees. Internal trainings such as on-the-job, 5S, safety, and quality were carried out to provide sufficient knowledge and skill for the employees to carry out their duties

### iv) Handbook: Standardization

- Zamria established company standard practices, which comprised six categories:
  - Basic rule for in-house standardization
  - Technical standards
  - Product standards
  - Standards for manufacture and facility
  - Standards for test and inspection
  - Standards for in-house utility service

The above practices facilitated Zamria in standardizing and synergizing their overall activities and tasks company-wide.

- Standard Operating Procedure (SOP) was designed to ensure that activities are based on TQM Handbook 1 (CEO) control items (organizational command and instruction routes). A company standardization system was established and a quality control promotion was maintained throughout the organization. The standardization of daily work activities were translated into standard practices
- To ensure the smooth implementation of TQM activities, Zamria established a system on preparing written procedures on flowcharts and work instructions with illustrations

### v) Handbook: QCC

- Zamria was still in the process of implementing the first QCC project to analyze and solve operational problems. A working committee was formed to promote QCC. Team members were equipped with problem-solving techniques and standard format for reporting the progress of activities (proper follow-up)
- Zamria's objective was for team members to be dispersed to other sections as a champion to assist them in establishing their own QCC team members. Increased productivity and quality with cost-saving factors was the basic principle in all QCC project introduced

### vi) Handbook: Cleaning, Cleanliness, Environment

- Zamria implemented and achieved the standard requirements of 5S practices, and this

was certified by the MPC. Zamria learnt an expensive lesson from its previous failure of the 5S implementation in 2003, which only focused on cleaning and sweeping activities

- Under the guidance of Eizo Asaka and the TQM handbook instructions, Zamria carried out step-by-step implementation of the 5S pillars (Sort, Set in order, Shine, Standardize, and Sustain). Zamria was able to create a set of regulations and developed a manual and procedures, which were used for the implementation of 5S. Employees were given and be responsible for a designated area
- In implementing 5S, the company utilized its intranet portal — the Zamria Information and Communication Center — to facilitate in disseminating information on the 5S activities. Among the center features that facilitated the 5S projects were Project Management, 5S e-Audit, 5S Forum, and 5S e-Document filing

## BENEFITS FROM TQM DEMONSTRATION PROJECT

The following benefits were achieved by the TQM implementation:

- Responsibilities and authorities of every department were clearly defined with the specified internal communication route
- Progressive application of QC stories in problem solving enabled the understanding of problems and building troubleshooting measures
- Knowledge and better understanding in TQM were improved
- Working method, environment, and employee morale were enhanced
- The employees' opinion survey showed that their opinion toward the company had improved considerably (Figure 1)
- Reduction in customer complaints was achieved (Figure 2)

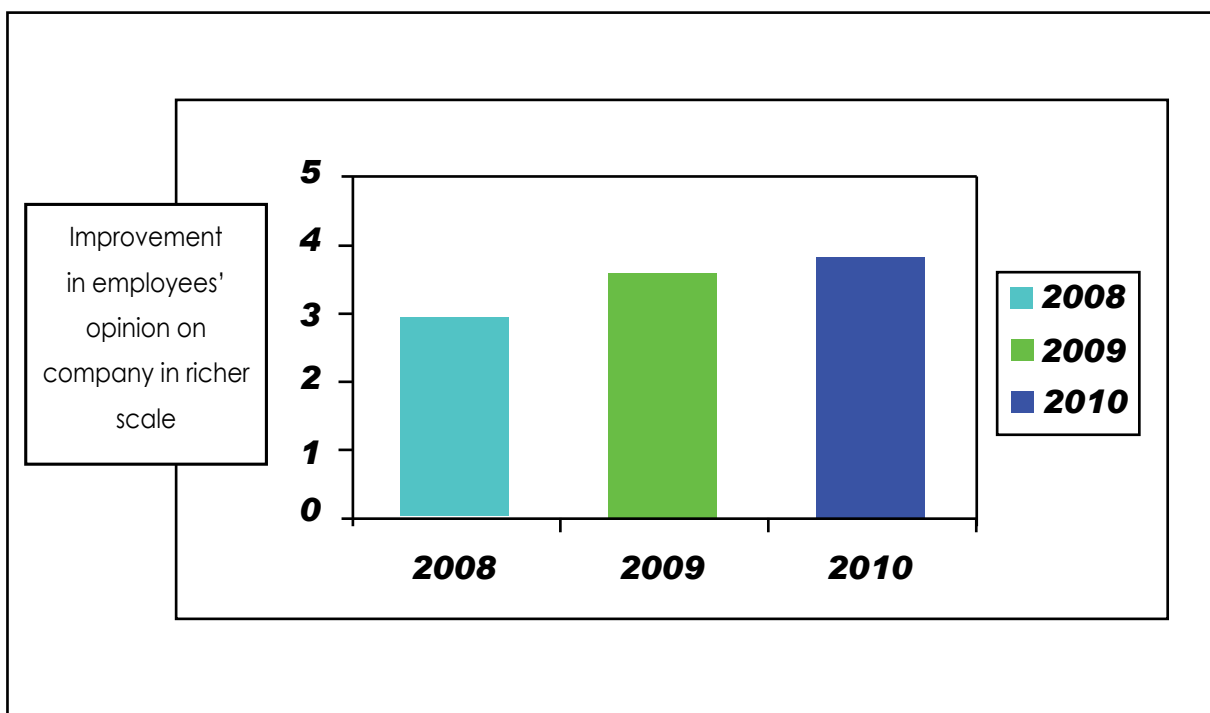


Figure 1. Employee Opinion Survey

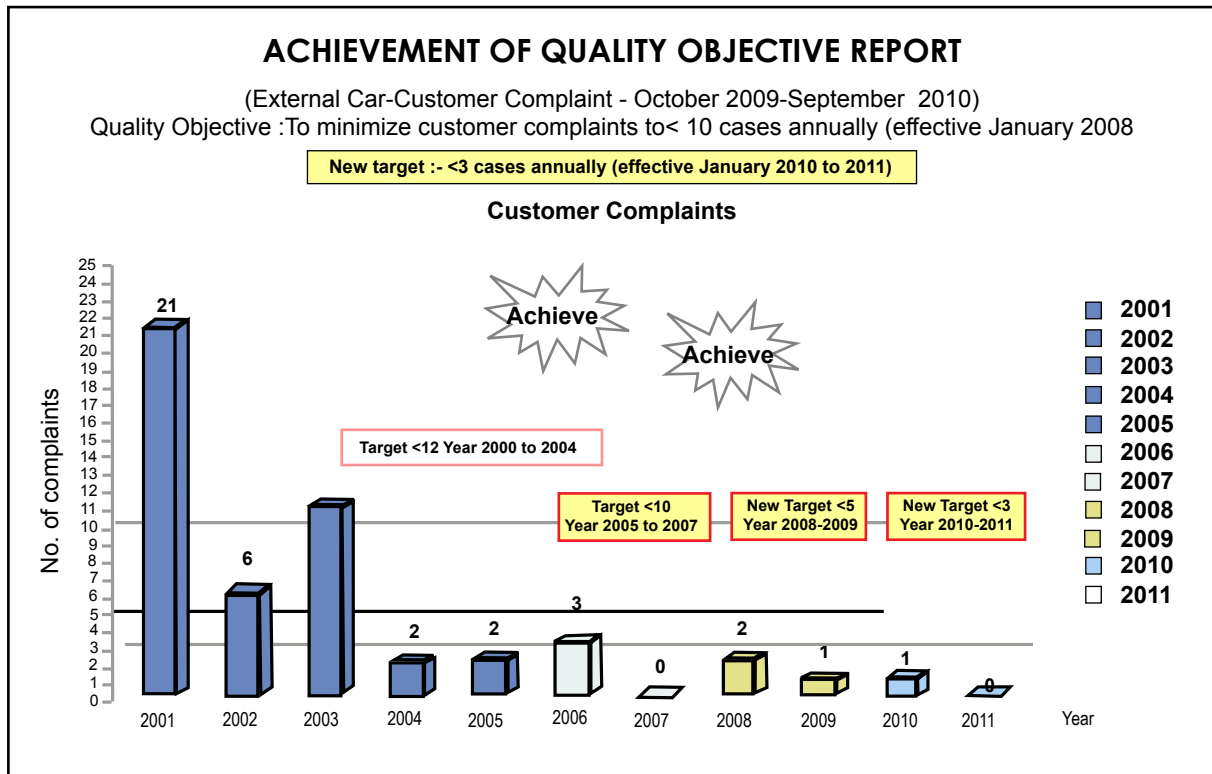


Figure 2: Customer Complaints from 2001–2011

## CONCLUSION

Zamria implemented and established many projects based on the company's prioritized needs. The TQM coordinator worked closely with all heads of departments to establish projects based on their needs and guided them so that they were able to implement the projects independently.

In the coming years, the company's general plans for TQM activities will be based on the 21 Handbooks, according to its needs. The company will also be reviewing the implemented procedures for improvements. It will also communicate with other participating model companies to exchange ideas on how to progress in TQM implementation from time to time.

*"TQM implementation is not easy and by no means a quick solution. Improvement is a slow and incremental process. However, there is no alternative in today's markets for continuous improvement in quality. This is the unavoidable challenge that our company is now faced with. Fortunately, as evidenced by earlier generations of model companies that regard it as essential to survival, TQM does provide any company that commits itself fully to its implementation with the means to meet this challenge."*

Ong Tee Gee  
Managing Director of Zamria

# NEWTEL LLC MONGOLIA

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## **ABOUT THE COMPANY**

Newtel LLC is the leading network operator among Mongolian mobile telephone service providers. Newtel was established in 2000, with 16 employees in service centers and two branch offices. The company has become a top service provider with over 500 full-time employees, 450 part-time employees, over 1.3 million customers, an Information Communication Trade and Service center, 30 main branch offices, and over 10,000 sales points in Ulaanbaatar and rural areas.

Newtel is the priority service provider for Mobicom. It is a 100% subsidiary company of Mobicom Corporation (a joint Mongolian-Japanese venture dealing with mobile telephones, Internet service, satellite communications, and fixed wireless phone services for corporate customers) making it strategically significant. Mobicom Corporation is the biggest income contributor to Newtel. According to the contract, Newtel is to provide services for Mobicom and be responsible for the customers throughout Mongolia. It has an extensive marketing service network, a large customer population, professional human resources, service experience, and contractual advantage with Mobicom Corporation. It has four core values: respect for customers, crew work, creativity and professionalism, and commitment. Newtel has defined its mission as "Satisfaction of Our Customers Determines the Development of Our Company". Its vision is "By the year 2015, Newtel will become one of the best service companies in Asia, with the interests of all its stakeholders as the priority."

## **PROJECT INVOLVEMENT**

Through this project implementation, Newtel aims to be a model company in the service sector that is recognized as an international company and share its knowledge and experience

gained through this journey to excellence with others. It also aims to attain business expansion, increased profits, and customer satisfaction and make a contribution to the development of Mongolian service sector by becoming one of the best service companies in Asia by 2015.

In order to achieve this goal, Newtel collaborated with the Mongolian Productivity Organization and the Asian Productivity Organization (APO).

## MAIN ISSUES

The most difficult task was to improve and reinforce the company's previous accomplishment. The main issue was to set up management level and internal structure reform. The effective method to overcome the problem was to call on a third party for annual performance evaluation to point out the problems for improvement.

Another issue that hindered the progress and improvement was that once employees had become used to regular routines they became inactive and bored. To tackle this problem, the company worked to incorporate new mission and goals that are more in line with the changing times. For example, customer experience. Newtel wanted to set a new Mongolian national standard toward service excellence.

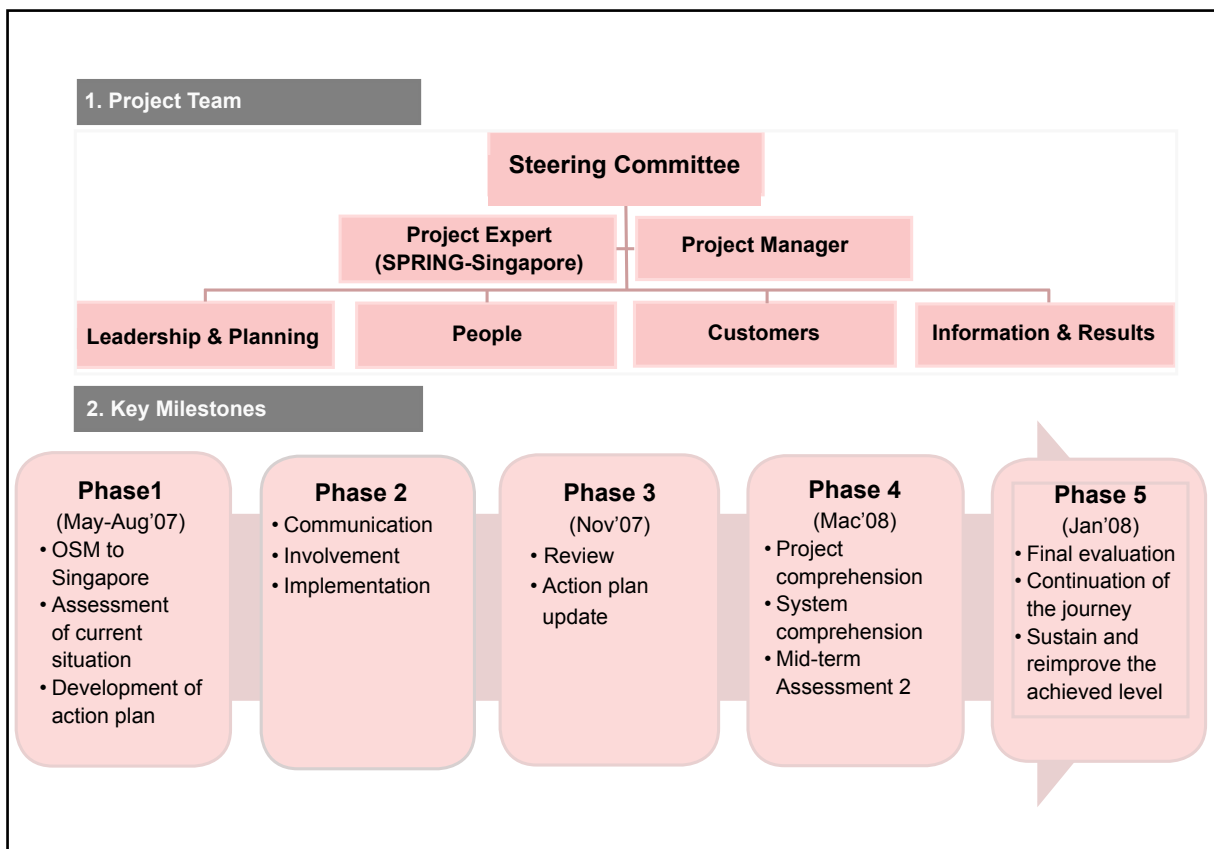


Figure 1. Stages of Project Implementation

## SERVICE EXCELLENCE IMPLEMENTATION

The different stages of project implementation are given in Figure 1.

The following Service Excellence solutions were implemented:

### 1. Leadership

The senior management reviews the corporate directions for adoptions and implementation, and sets the organizational direction, encompassing mission, vision, and core values to create an environment that is customer-centered with the spirit of continuous learning and innovation. The organization has embraced value-driven leadership.

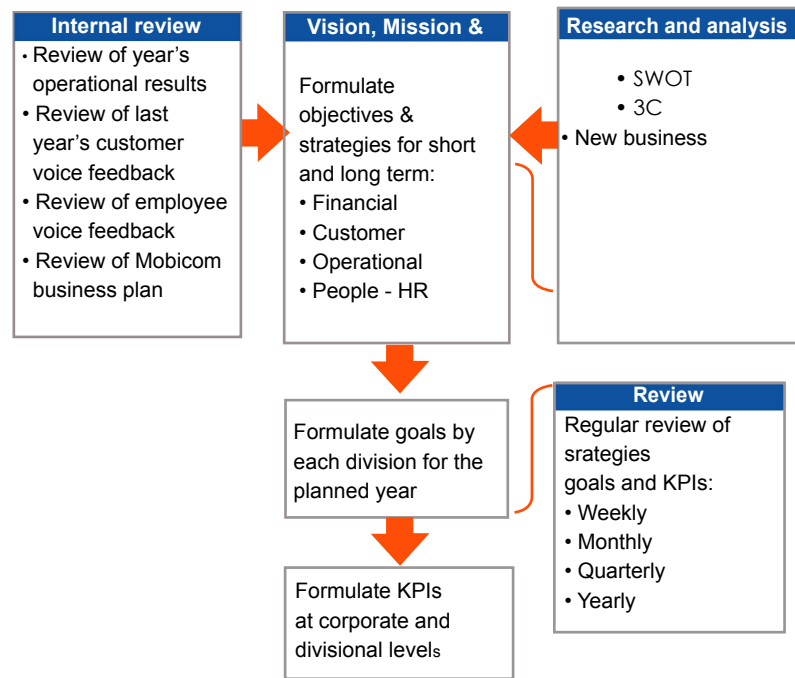


Figure 2. Strategic Planning

### 2. Planning

In developing its strategies, senior managers and some key managers participate and formulate the strategic plan collectively. Newtel has adopted the Balanced Scorecard approach to strategic planning (Figure 2).

### 3. Information

Newtel manages and updates its information using a systematic process of selecting, collecting, validating, processing, analyzing, and disseminating information to support planning, management, and operation (Figure 3).

INTERNAL		EXTERNAL	
<b>Top-Down</b>	<b>Example</b>	<b>Customers</b>	
Electronic	E-mail, Internet, Website	Electronic	E-mail, Website. E-shop
Meetings	Weekly Meeting, Trainings, Orientation Program, Contests/Service Excellence Award and Others/ Knowledge Sharing	Media Channels and Publishing	TVs, Radios, Newspaper, SMS Broadcast, Billboards, Service Manuals, Posters
Publishing	Service Manual, Information boards, and Others, Vision, Mission & Value Book, Leadbook	Events	Meeting, Customer Day
Bottom-Up		Partners and Dealers	
Electronic	E-mail, Internet	Publishing	Dealer's Manual Book, Brochures, Posters
Formal Feedback Channels	Meetings and Discussions,	Events	Meeting, Trainings, Partnerday, Monitoring
Incentive-Driven Methods	Kaizen Schemes, QCs, Others		
Others	CEO Dinner		

Figure 3. Information Dissemination Channel

### 4. People

Newtel's business goals and competitive advantage is their people. They adopted a structured system to manage their human resources to achieve their business strategies and goals (Figure 4).

### 5. Customers

During the projects, Newtel deployed customer centric strategy at every layer of the planning tree. The customer strategy can be summarized in the following concept: "By exceeding our customers' current and future expectations at every customer experience at every touch point, maximum customer satisfaction is achieved" (Figure 5).

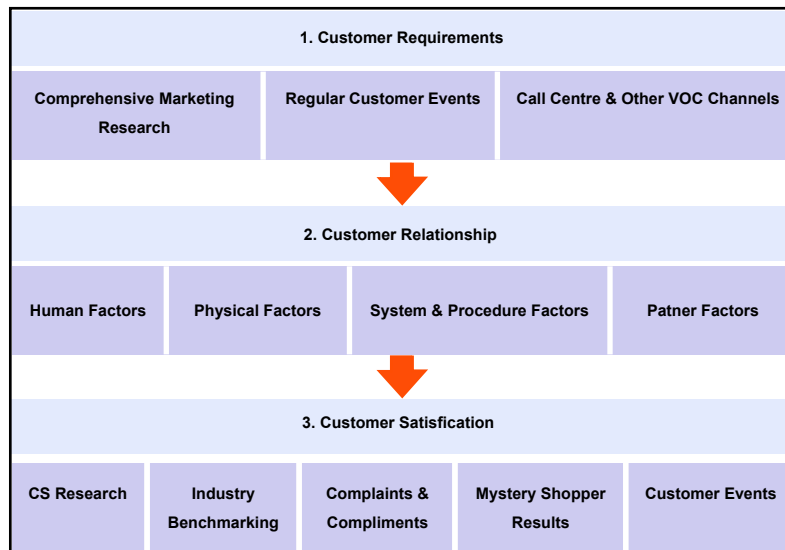


Figure 4. HR Planning

### 6. Result

Results were achieved in five areas, namely, customer, financial, market, people, and operations.

It can be summarized that the following successful and regular measurements were taken to improve customer service that has been introduced and incorporated into the company's

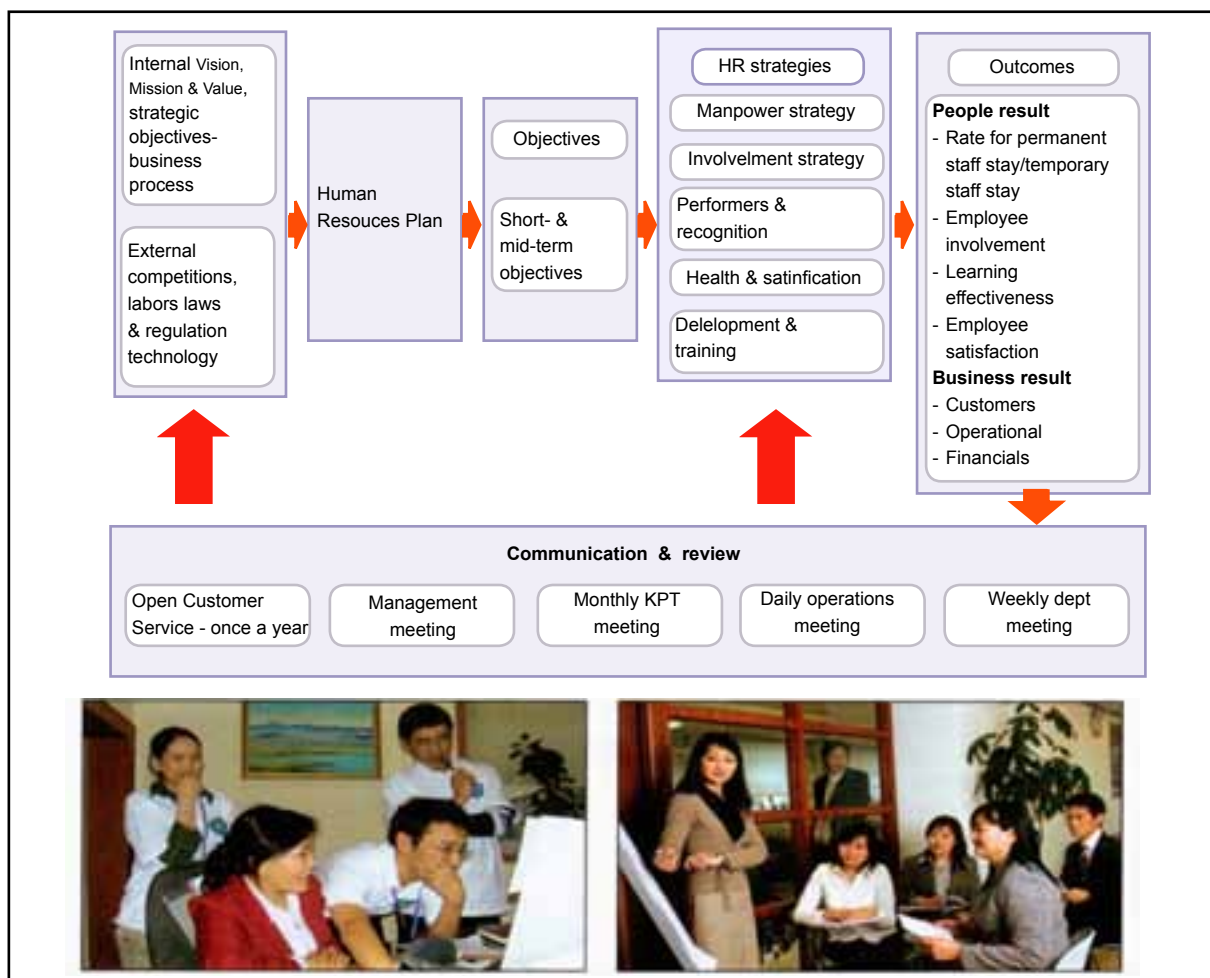


Figure 5. Customer Strategy



function:

- Opened up and increased opportunities for customers to voice their concerns such as customer day and partnership event
- Enhanced customer service standard with regular monitoring application, assessment, and improved feedback
- Developed a channel for appreciation and criticism, thereby enabling new performance measurement rate. Customers were able to directly evaluate the service
- Conducted customer satisfaction surveys on a quarterly basis
- Renewed the company's mission, vision, and core values in order to become a more customer-centric company
- Regularly monitored the company's performance efficiency with new strategies
- Worked toward developing more effective human resource strategies and systems within the company through its many workshops to increase employee participation and personnel growth and satisfaction

**BENEFITS GAINED FROM THE DEMONSTRATION PROJECT**

Newtel achieved the following benefits by implementing this Demonstration Project:

- Organizational culture substantially improved after the implementation of Service Excellence (SE) Demonstration Project (Figure 6)
- It reached "Service Scorecard band-5", where the service quality level increased from 82% to 90% (Figure 7)
- It achieved awards from the APO and the Japanese CRM Association, indicating that Newtel has been acknowledged on the international platform for the first time
- Customer satisfaction rate increased from 60% to 79% (Figure 8)
- Employee participation increased from 13% to 44% (Figure 9)
- The revenue of the company increased from 36% to 121% (Figure 10)
- The value of the company increased with its contribution to the development of the Mongolian service sector

Before	After
<ul style="list-style-type: none"> <li>• A strong organizational culture is one of the basic strengths of Newtel                             <ul style="list-style-type: none"> <li>- Teamwork</li> <li>- Speed</li> <li>- Employee involvement (QC, Kaizen etc)</li> <li>- Social activities (sports, cultural etc)</li> <li>- Events (celebrations etc)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The SE project acted as a catalyst for reinforcement of organizational culture</li> <li>• A wide-scale campaign has been launched throughout the company</li> <li>• All staff are truly united for the SE project</li> </ul>

Figure 6. Change in Organizational Culture



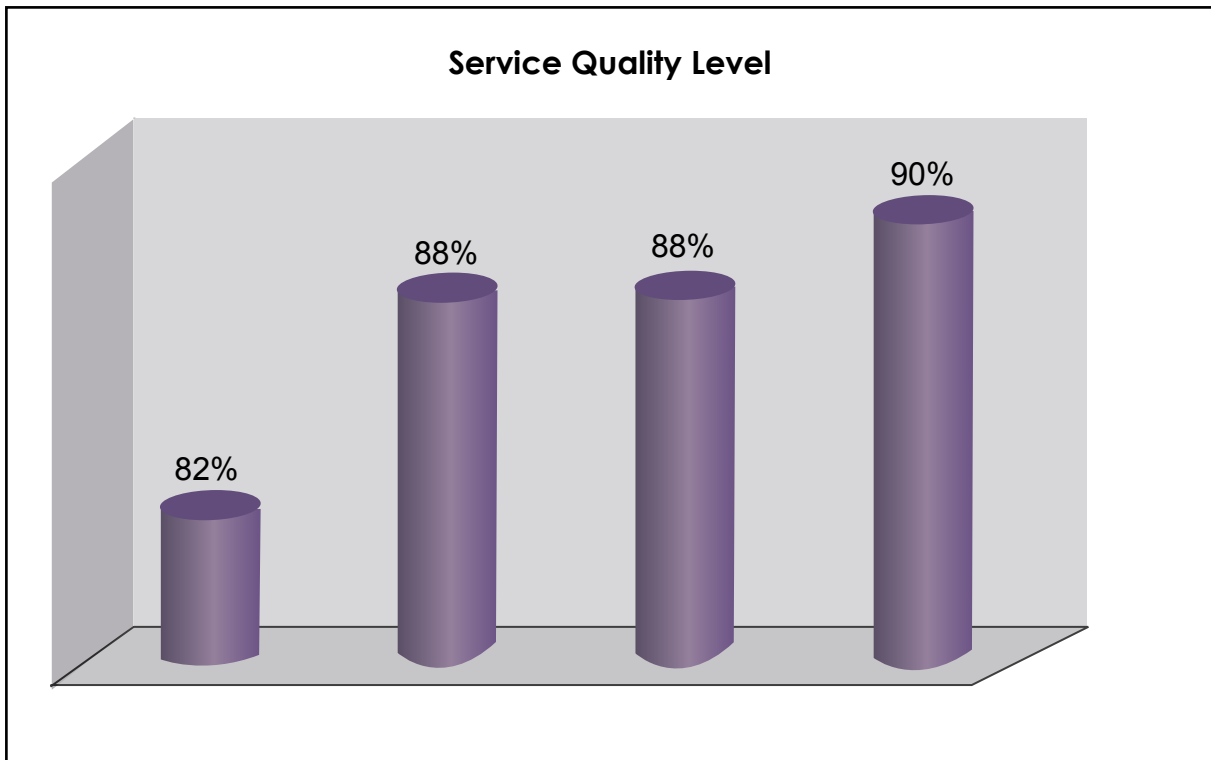


Figure 7. Service Quality Level from 2005–2008

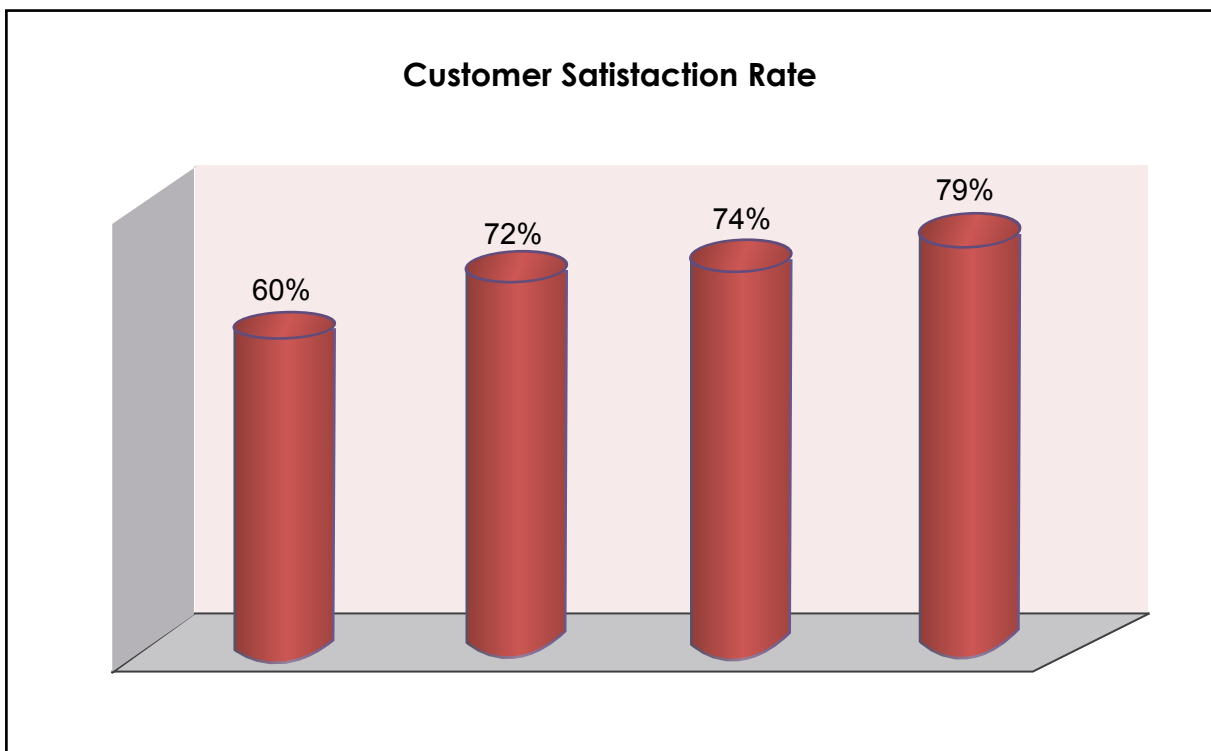


Figure 8. Customer Satisfaction Rate from 2005–2008

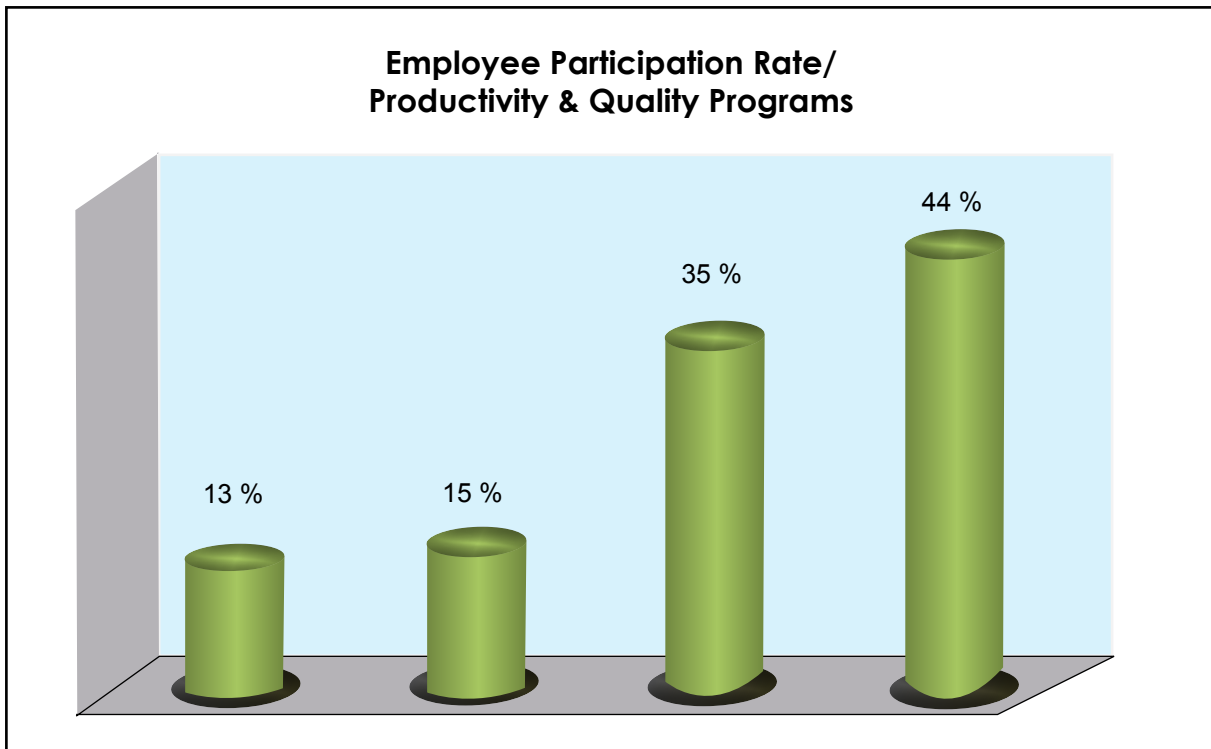


Figure 9. Employee Participation from 2005–2008

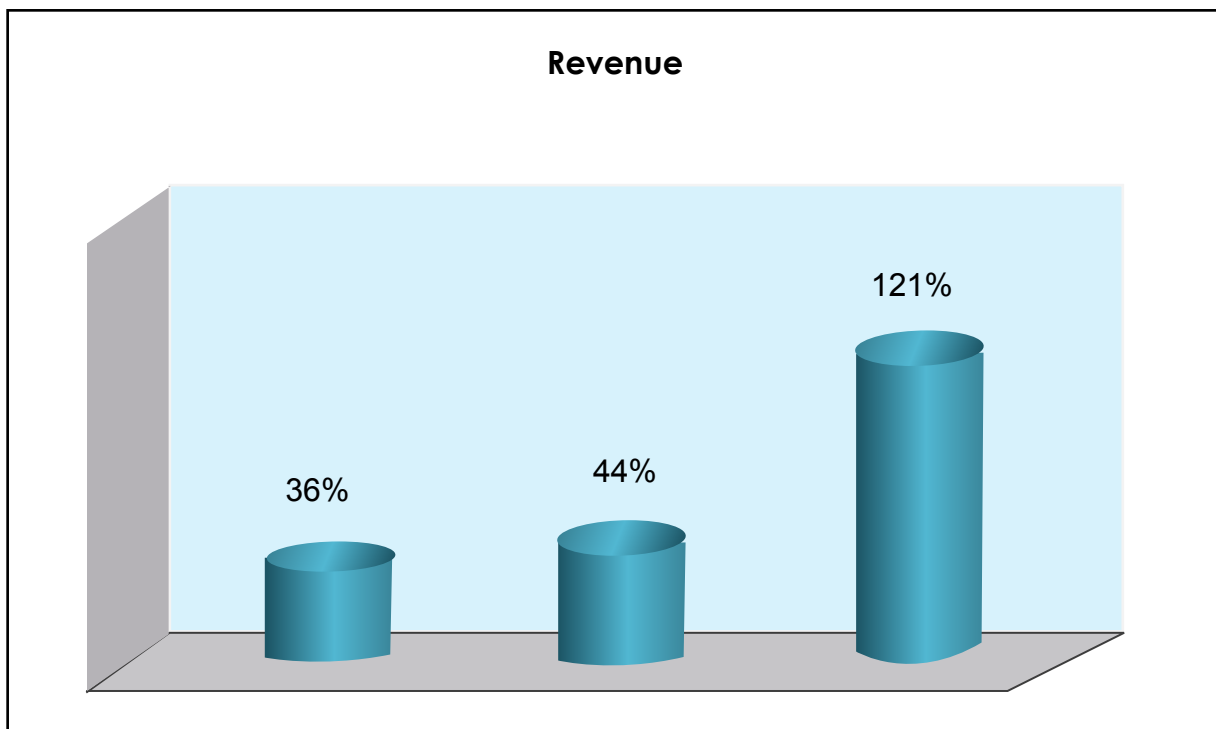


Figure 10. Revenue from 2005–2007

## **CONCLUSION**

Even though the project showed drastic improvement in service and production quality along with a change in company culture and employee attitude, without the continuous support from the management, the quality of service quickly deteriorates.

Function also weakened when the new system was not adopted into the daily routine of the employees and remained as extra work.

Though the Demonstration Project had an effective start, it required constant support and follow-up from the APO.

# INTERLOOP LIMITED PAKISTAN

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## ABOUT THE COMPANY

Interloop Limited, located in Pakistan's industrial hub Faisalabad, started its operations in 1992 with just 10 knitting machines. It now has over 2,300 machines, a workforce of more than 8,000, and a production capacity of 960,000 pairs of socks per day, transforming itself into South Asia's largest socks manufacturer and exporter offering the highest quality socks. It is one of the few completely vertical hosiery mills in the world, with in-house yarn spinning, yarn dyeing,

knitting, toe closing, piece dyeing, processing, boarding, packaging, and finishing facilities. The vertically-integrated operations help it to achieve the highest quality standards, consistency of supplies, shorter lead times, and greater flexibility to cater to world-renowned customers such as PUMA, NIKE, Wilson, CAT, etc. It is the winner of Pakistan's Best Export Performance Trophy for the last eight years. It has complied with the most demanding global quality and social standards, including WRAP, ISO 9001, REV 2000, CTPAT, OKEOTEX 100, AVE (Aubehandelsvereinigungdes Deutschen Einzelhandels), SA8000, ISO 14000, Fair Trade, ISO 17025 Lab Accreditation, etc.

## PROJECT INVOLVEMENT

The textile industry in Pakistan depends on cheap and abundant labor, which results in low motivation and high turnover. This traditional employment as well as mass production oriented mindset of the company owners has brought about poor factory management, inferior quality, high wastage, and low productivity and profitability. The manufacturers are not aware that high profitability can only be acquired by skilled and fully paid labor.

To escape this vicious cycle, company owners had to be willing to change their way of thinking. Although the machines produce the products, it is the operators and technicians who maintain the proper working conditions of the machines. It is up to these workers to achieve world-class quality and productivity.

As a solution to the above drawback, a combination of Total Productive Maintenance (TPM) and Toyota Production System (TPS) methodology used to attain Six Sigma target without using statistical tools, minimizing waste, and reducing cost for higher productivity and profitability.

## MAIN ISSUES

The following were the main issues:

- i) To reduce wastage level from 4.8% to 3%, while improving quality and productivity
- ii) To improve machine efficiency and reduce 50% production cost

## IMPLEMENTATION OF TPM AND TPS

The project was launched in November 2008 with close coordination with the National Productivity Organization (NPO) and the Asian Productivity Organization (APO) consultants. It was suggested to implement the project in two phases: phase 1 for the pilot activity and phase 2 for replication. Interloop Limited team also visited Nishat Mills to study their method.

### Phase 1: Pilot Activity

Pilot Activity consisted of a three-step program that was introduced to the staff: Step 1 - Initial Cleaning, Step 2 - Lubrication, and Step 3 - Inspection.

The Pilot teams worked on the step-by-step program for about four months and developed their learning in the form of one-point lessons. During this period, NPO and APO consultants continuously provided support and advice. For the smooth operation of all the activities of the project, Quality Council and Project Teams were established.

After four months of continuous efforts and successful completion of phase 1, Interloop proceeded with phase 2.

### Phase 2: Replication

Interloop named this project TPM and designed a logo "Target Zero" to identify the TPM machines. Quality Council finalized the logo, which was printed in three colors (yellow, green, and pink) and pasted on each machine for identification of the three teams in one line.

The following TPM activities were performed for training and development:

- Direct and indirect training of operators and technicians at the Technical Training Centre under the Chief Technicians' supervision
- Development of One-Point Lessons (Figure 1)
- Training of operators and technicians on Steps 1, 2, and 3
- Role of new operators and new technicians – Cultural Transformation
- One-Point Lessons evaluation and training
- Mind-set and change in attitude (TPM Tournament)
- Operator group discussion and feedback (Photo 2)
- To achieve standard routines for pilot machines through line incharge
- Cross audits

The following TPM activities were performed for visual management:

- Activity board
- M-TAG techniques (Figure 2)
- Breakdown Trend Analysis
- Internal Cross Audit Line wise
- Waste analysis and feedback
- Colored jackets for different teams

The following TPM activities were performed for focused improvement:

- Cone doubling (Photo 2)
- Finger tube analysis based on operator feedback (Photo 3)
- Elastic roller based on operator feedback (Photo 4)
- Maintenance of activity board to monitor results
- Audit process
- Cause and effect analysis
- Speed experiment

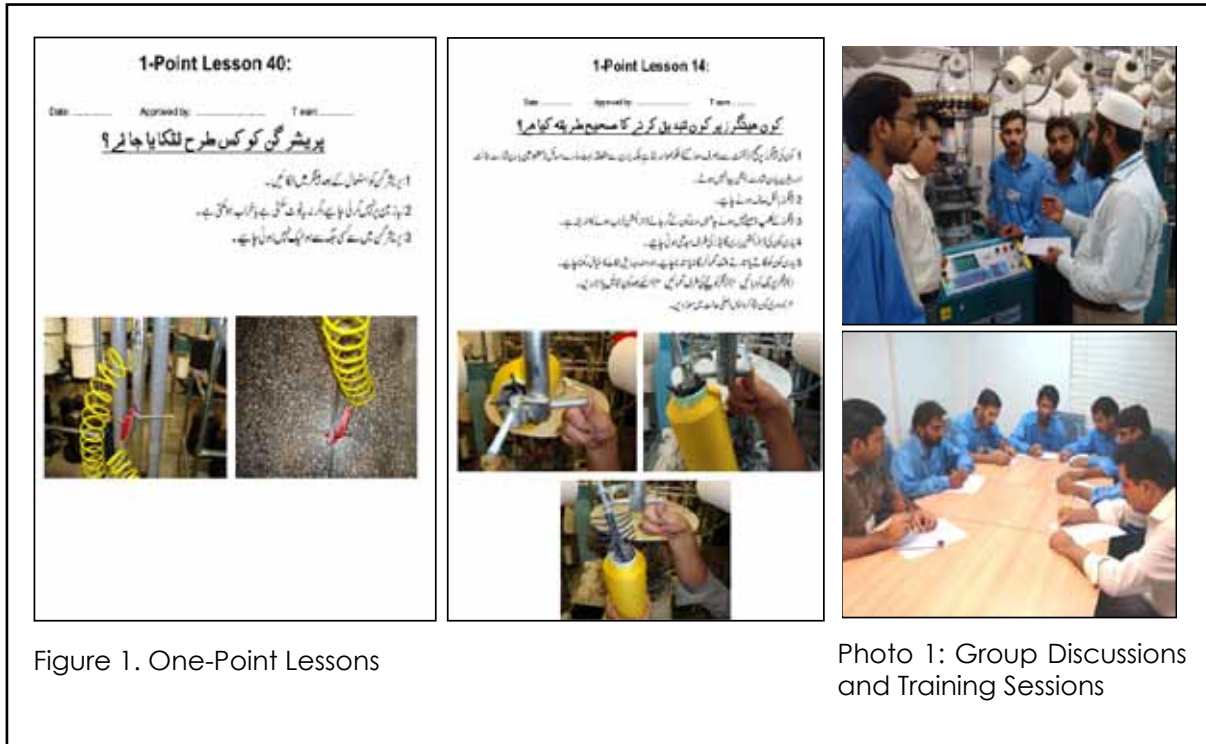


Figure 1. One-Point Lessons

Photo 1: Group Discussions and Training Sessions

**BENEFITS GAINED**

Tremendous improvements were noted in machine waste reduction, downtime reduction, and enhanced production efficiency during and after the completion of the project. Machine wastages reduced from 3% to 1.87% (Hosiery Division 01) and 4.78% to 2.89% (Hosiery Division 02); production efficiency increased from 81.07% to 92.07% (Hosiery Division 01) and 79.46% to 90.25% (Hosiery Division 02);

machine downtime reduced from 16.81% to 11.96% (Hosiery Division 01) and 14.69% to 11.62% (Hosiery Division 02), as shown in Table 1 and Figures 3, 4, and 5.

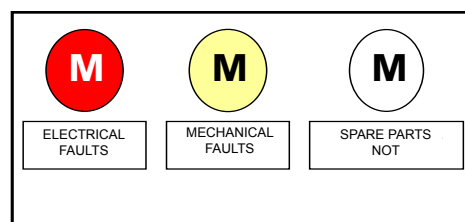


Figure 2. Types of M-Tag



Photo 2. Cone Doubling



Photo 3. Finger Tube



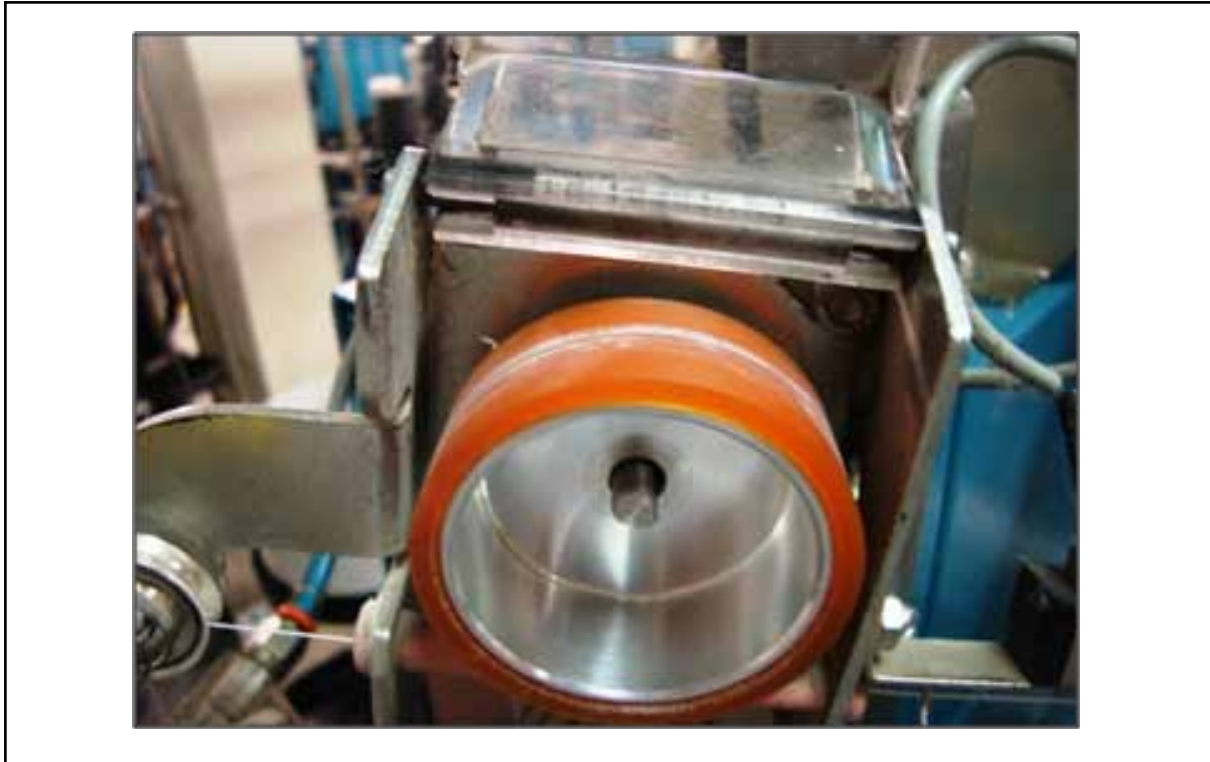


Photo 4. Elastic Roller

Table 1: Wastage, Downtime, and Production Efficiency Before and After Project  
Hosiery Division 01 (Line 2)

	<b>Machine Wastage (%)</b>	<b>Machine Downtime (%)</b>	<b>Production Efficiency (%)</b>
Achieved in April 2009 (Before Project)	3.0	16.81	81.07
Achieved Till April 2010 (After Project)	1.87	11.96	92.07
Target	2.0	< 20	91.0

Hosiery Division 02 (Line 1&2)

	<b>Machine Wastage (%)</b>	<b>Machine Downtime (%)</b>	<b>Production Efficiency (%)</b>
Achieved in April 2009 (Before Project)	4.78	14.69	79.46
Achieved till April 2010 (After Project)	2.89	11.62	90.25
Target	2.0	< 20	88.0



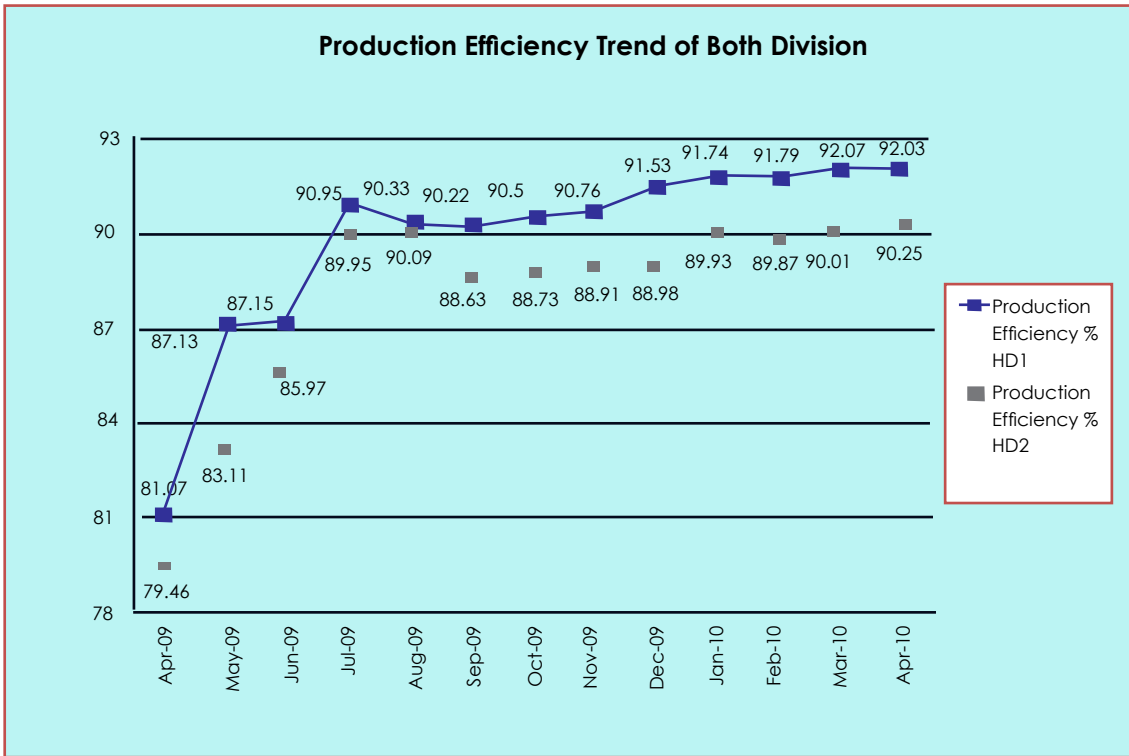


Figure 3. Production Efficiency Trend of Both Divisions

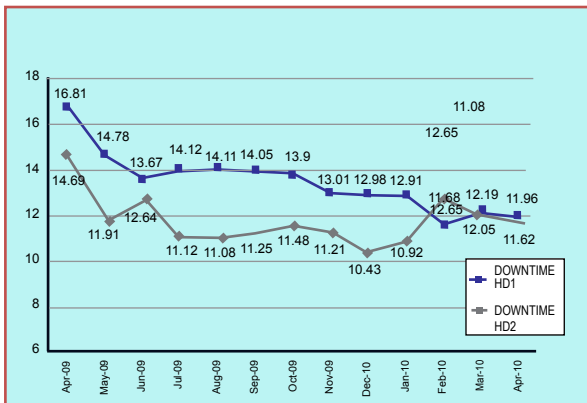


Figure 4. Downtime Trend of Both Divisions

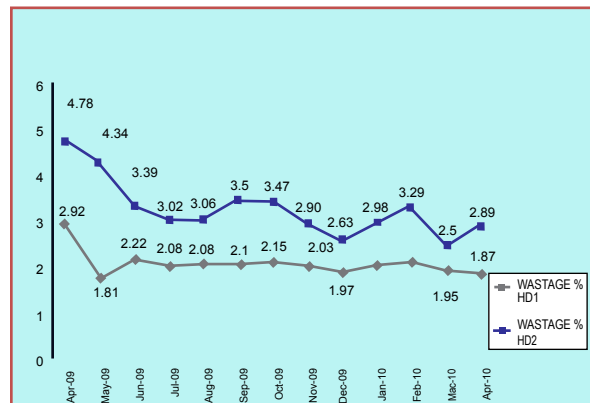


Figure 5. Wastage Trend of Both Divisions

An improvement of 1% in production efficiency and wastage would mean USD10,500 earnings per month. This project has benefited Interloop with an estimated savings of more than USD938,000 per annum. In addition, the company obtained more knowledge and skilled workers and inculcated improved team work in the organization.

### CONCLUSION

The result of this project has generated enthusiasm within the management. They set their targets to achieve 95% production efficiency by 2015. Interloop was the first textile company in Pakistan that implemented this approach to attain Six Sigma targets. The management also started capacity building of their employees on Six Sigma statistical approach. As a result, other businesses in this sector and even in other sectors began adopting the TPM/Six Sigma approach.

*"It was a new concept for us and to be honest, we were a bit apprehensive about its success. But with the encouragement from the NPO, we did move forward. One year later, I am so happy to have made that decision. The progress has been phenomenal. Our knitting wastage went down to 2% from almost 4.5%, and our machine efficiency increased to 90%."*

Chief Operating Officer  
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# MOONBAKE INC. PHILIPPINES

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## ABOUT THE COMPANY

Moonbake Inc., was established in June 1991 and started as a small bakery located along Moonwalk Avenue, Las Piñas City, Metro Manila, Philippines. As a food processing SME, it specializes in making chocolate crinkles that are mainly distributed in the local market. Its other products include Filipino native biscuits such as *otap*, *biscocho*, *lenga de gato*, and *puto seko*. As of 2008, it has 134 employees and produces an average of 8,000 cases per month (24 jars per case), with an annual sales of USD2 million.

In its continuing pursuit of excellence, Moonbake embraces the principles and practices of Total Quality Management (TQM). Continuous improvement is a priority and a strategy to provide customers with innovative, safe, and quality products. Its productivity and quality programs include 5S Good Housekeeping, Kaizen, and Feedback System.

The Research and Development Department of the company continuously pursues innovation to introduce unique products to capture unexplored markets. With appropriate technology, leadership commitment, and innovation through Knowledge Management (KM), Moonbake wants to strategically position itself as one of the leading brands in the food industry.

## PROJECT INVOLVEMENT

In pursuing its goal of becoming a "recognized producer of high quality traditional Filipino cookies and biscuits both in the local and export markets", Moonbake was confronted with various challenges. These included capturing critical knowledge on employee competencies, markets, and production processes, and storing, managing, and using said knowledge for effective decision-making and enhancing the company's capability in achieving its business goals. It recognized the strategic importance of KM and decided to gain valuable experience in learning how to implement KM to enhance business performance and sustainability.

Toward this end, the company requested the assistance of the Development Academy of the Philippines to become a Demonstration SME on KM in 2008 and received technical support from the Asian Productivity Organization (APO).

## MAIN ISSUES

In order to expand its business and market, Moonbake was confronted with the following productivity and quality-related concerns:

- i) Unsuccessful product launches in the market
- ii) Work duplication
- iii) Unorganized filing and reporting systems
- iv) High or increasing operational expenses
- v) Poor crisis management systems
- vi) Low employee morale resulting in key people leaving the company

The team conducted a KM readiness assessment survey using the APO KM assessment tool. Validation was done to identify and define the knowledge gaps of the company as well as to assess the status of the KM accelerators reflected in the framework, which would be needed in order to drive KM implementation. The validation resulted in the identification of the following knowledge gaps:

- i) Vague and unfocused company direction
- ii) Undefined staff competencies in critical business processes of the company
- iii) Undocumented company systems and procedures
- iv) Lack of a formal program for knowledge transfer (i.e., mentoring and coaching)
- v) Lack of a system or mechanism to capture, store, analyze, and apply critical customer (internal and external) and market knowledge
- vi) Weak incentive system for encouraging employees to learn and innovate

## KM IMPLEMENTATION

In order to address these gaps through KM, the team identified 15 potential KM programs. However, given the limited time, as well the very lean staff of the company, the team narrowed down the number of programs to four critical ones with the corresponding objectives:

KM Program	Objectives
1. Market Research	Gain deeper knowledge of the market to satisfy customer needs and requirements
2. Enhancement of Customer Service/Relationship	Enhance the image of Moonbake, Inc. and to create awareness and build confidence in the quality of the company's products
3. Development of Standard Operating Procedures (SOPs) in line with Hazard Analysis and Critical Control Points (HACCP)	Continually improve the production process to increase efficiency, capacity, and maintenance of quality/safety standards
4. Development of Competency Profiles of Employees and Competency-based Training	Enhance and develop staff competencies to ensure maintenance of high quality standards

The four priority KM pilot programs were undertaken to address knowledge gaps in people, process, and markets. However, two of these, Development of SOPs and Development of Competency Profiles and Competency-based Training, went beyond the one-year (2008–2009) timeframe of the KM Demonstration Project. Nevertheless, Moonbake committed to continue implementing these programs.

### **Market Research**

Moonbake top management developed its capability in making knowledge-based decisions regarding its markets. This eliminated unnecessary investments in developing new products without market study. The information from market studies proved useful in product development, packaging, and sales planning. Unlike before, decisions on what products to develop are now based on actual customer information and market research.

With a clearer business direction, Moonbake was able to identify its core business and strengths, thereby giving more focus to the manufacture of its core products. A new product, Choco Dots, was launched in the local market based on market survey. This resulted in 20% increase in sales and better employee morale.

Conducting regular monthly sales reviews that included sharing of best practices and lessons learned minimized the recurrence of problems in sales and raised the level of knowledge and skills of the sales agents.

Implementation of a standardized and a more efficient sales reporting system reduced paperwork. Now, the only reports generated are those needed by the company.

### **Enhancement of Customer Service/Relationships**

Moonbake became more proactive in capturing and sharing customer (internal and external) feedback through standard forms and processes. The results achieved include increased sales through repeat orders, strengthening of customer trust, 100% route management, and an increase in service-oriented sales agents. The use of a systematic and updated customer database paved the way to faster tracking of customer history and profile, and building a more personal relationship between Moonbake and its major customers (primarily through giving of surprise gifts on birthdays). Focused group discussions involving distributors were also initiated for a more participative process of planning and objective setting. Inputs from distributors gave new planning perspectives to the company.

### **Development of Standard Operating Procedures (SOPs) in Line with HACCP**

Company employees were likewise encouraged to develop the habit of documenting procedures. The captured and codified tacit knowledge on work processes were translated into SOPs, process flow charts, and work instructions, and were communicated to all concerned and also posted in the production areas. The work instructions helped lessen discrepancies and errors, the Ongoing Board helped monitor employee performance and motivated them to reach their production targets, while the Feed Your Mind Board provided a platform to express their opinions about specific topics for the month, as well as getting updates about company activities and the employee awards program.

## Development of Competency Profiles of Employees and Competency-based Training

The job survey that Moonbake conducted on its employees identified, adopted, and communicated the company's core competencies, which were then translated to work expectations. For the company, this resulted in a clearer understanding of the key competencies of employees and management, identifying focus areas for employee training and development, and a better knowledge on what competencies to look for when hiring people. For the employees, they became aware of the work behaviors expected of them on the job and thus, worked in line with those expectations.

To build staff competencies, Moonbake decided to shift to competency-based human resource development and acquired the knowledge to implement them. HR personnel attended trainings on competency-based human resource and pay system, and competency-based training, recruitment, and performance management. To strengthen the knowledge-sharing culture in the company, activities such as Communities of Practice (COP) and After Action Reviews (AAR) were organized. These activities helped identify lessons learned and best practices, and allowed the employees to learn and share to improve their knowledge and skills.

### BENEFITS FROM KM

Through KM, Moonbake reaped benefits in terms of improved productivity, profitability, and growth.

#### Improved Productivity

Moonbake achieved 76% increase in performance in 2009 compared to 2008, mainly due to the streamlining of its product lines from 14 to 7. This was a key result of the company's application of knowledge in core competencies and strengths derived from the implementation of market research and competency-based HR.

The company maintained the products that accounted for 80% of sales while eliminating those that only yielded 20%, and allocated limited resources to distributing its manufactured products such as Chocolitos, Choco Dots, and native biscuit delicacies as

they generate the biggest returns. Due to streamlining, transaction time was reduced to half and the logistics department became more efficient. Before, transaction time was one to two hours per customer. Now, it is only thirty minutes. Delivery was also faster, from 10–15 delivery receipts per day per driver to 15–20, which also reduced delivery cost. In terms of the actual production of the core product, chocolate crinkles, there was a 27% increase in production as shown in Figure 1 and a decrease in the percentage of product rejects. This means that the company can now produce more and deliver faster at lesser cost.

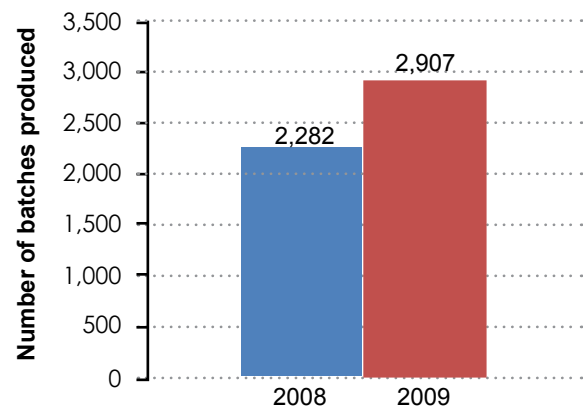


Figure 1. Increase in Production

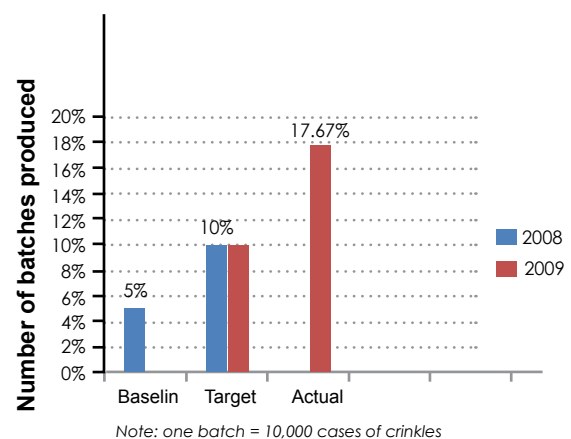


Figure 2. Increase in Profitability

### **Increased Profits**

From 5% in 2008, profitability rate increased to 17.67% by March 2009. The 20% increase in sales was the result of the successful launch of Choco Dots, a new product developed from the application of the knowledge gained from one of the KM pilot projects, which is market research. The product made direct use of the feedback and suggestions captured from the customer survey conducted under the said project. Figure 2 shows the company's increase in profitability.

### **Growth in Assets and Human Capital**

The gains from productivity improvements and increase in profitability have influenced the company's growth, not only in terms of expansion in tangible assets (i.e., additional equipment, working space), but also in terms of human capital development (i.e., improved competencies):

- Starting with one Internet connection and 12 personal computers, Moonbake now has four Internet and WiFi connections and 21 computers. In addition, it now maintains its own KM portal named Moonbakekm.ning, where staff share knowledge and make suggestions and comments
- The increase in sales paved the way for renovation of the production area that further increased the work space and enhanced working environment
- Improved teamwork enabled employees to share critical knowledge needed in problem-solving, especially for the engineers. Junior engineers were able to attend to problems normally handled by senior engineers, thus reducing the Engineering Department's backlogs, eventually reducing annual maintenance costs by 20% (from over PHP100,000 down to PHP80,000)
- The employees became detail-oriented and keen on continuous learning. They learned how to better analyze data for effective decision-making
- Eagerness of employees to learn and improve their capabilities increased. Everyone, including the management, is on the lookout for seminars and training

### **Enhanced Competitiveness**

The KM project brought about tangible and intangible benefits to Moonbake that enhanced its competitiveness:

- With a clearer strategic direction, it became easier to identify strategies and align activities toward the attainment of set targets
- The availability of comparative sales data enabled the company to have realistic sales targets and forecasts
- The standardization of knowledge within the company improved operations and developed a database of critical knowledge
- The streamlining of certain procedures provided more focus and resulted in significant increase in customer orders
- Moonbake achieved a growth rate of 30% as compared to the previous year
- Establishing better relationships with customers became more purposeful and defined
- Improved competencies of staff helped achieve higher productivity

## CONCLUSIONS

KM helped in the planning and implementation of improvement activities toward achievement of the company's business goals. As a result, sales exceeded target. This enabled the company to improve the existing structures at the production area, pay bank loans, and maintain the company's time deposit.

As proven by the testimonies of the people involved in KM implementation, it could be surmised that, although the quantitative results were significant in measuring the success of KM implementation in Moonbake, the more important benefits derived were the intangibles:

- i) development of a learning and sharing culture in the company, which was evident in the significant increase in the employees' willingness to learn and unlearn
- ii) enhancement in the company's ability to translate information into knowledge that is useful for decision-making
- iii) improvement of employee competencies, which helped increase their confidence in interacting with co-employees and external customers, and addressing gatherings or groups
- iv) expansion in innovative thinking among employees
- v) increase in proactiveness in finding solutions to problems and possession of a more positive perspective in receiving negative feedback
- vi) demonstration of the ability to be more adaptive and flexible to changes in work assignments and environments

The knowledge-sharing culture developed within the company minimized the dependence on only a few individuals possessing certain knowledge and expertise. Thus, Moonbake, Inc. became one big family, where members share and learn from each other. There were no KPIs identified for the above-mentioned intangible benefits during the KM Demonstration Project implementation. The extent to which these benefits were achieved was measured not only in quantitative terms, but was, nevertheless, given equal importance in terms of testimonials or "story telling" by the people who experienced them.

*"Last year, whenever I visited the production area, workers would be silent and grumpy. But now, with KM, they welcome me with warm smiles. They always want to show something to me, and I feel their eagerness to participate...If not for KM, Moonbake would have been in debt with the bank now."*

Rufino "Jun" Manrique, Jr.  
President and CEO  
Moonbake Inc.

Video available for this case study from:  
DEVELOPMENT ACADEMY OF THE PHILIPPINES  
San Miguel Avenue, Ortigas Center  
Pasig City, Philippines

E-mail: [apolu@dap.edu.ph](mailto:apolu@dap.edu.ph); Website: [www.dap.edu.ph](http://www.dap.edu.ph)



# INDUSTRIAL DEVELOPMENT BOARD OF CEYLON SRI LANKA



## ABOUT THE COMPANY

Industrial Development Board of Ceylon (IDB) was established in 1969 under the Ministry of Traditional Industries and Small Enterprise Development. It is the prime state organization entrusted with the responsibility of development for the industrial sector. It consists of more than 50 operational units around the country, including a dedicated network of regional- and district-level offices. It has 714 employees and consists of nine divisions through which all its activities are streamlined: Technical Services Division (TSD), Regional Development Division (RDD), Engineering Services, Marketing, Industrial Estate, Centre for Entrepreneurship Development and Consultancy Services (CEDACS), Administrative, Finance, and Planning. The services rendered by IDB include:

- Identification of business opportunities
- Quality and productivity improvement
- Project feasibility studies and reports
- Management, development, and consultancy
- Business information and linkages
- Product development
- Innovation and new technologies
- Market development and promotions
- Business counselling and extensions
- Technology development and assistance
- Engineering workshop and foundry facilities
- Infrastructure facilities
- Provision of product-specific raw materials
- Entrepreneurship development training

## PROJECT INVOLVEMENT

IDB's 2011–13 Strategic Plan noted that the company has focused much of its activity on small- and medium-scale industries. On top of that, effort was focused on micro and traditional enterprises. The Strategic Plan aspired toward redirecting IDB to its original mandate. But this proved difficult as it was not familiar with the reality that the mandate, in practical terms, had changed. In fact, the government pays the staff salary while the organization is to create revenue to cover operating costs. By way of its moderate role and its diminished ability to meet the needs of its clients, IDB could not generate sufficient funds to cover operating costs and it is mainly reliant upon government funding to run and modernize its operations.

In 2011, the Asian Productivity Organization (APO) selected IDB for the Demonstration Project to fulfill the objective of service-sector innovation and public-sector productivity based on IDB's proposal to the National Productivity Secretariat.

## MAIN ISSUES

IDB identified several productivity issues by undertaking SWOT analysis in the organization and the main issues identified were:

- Weak corporate management
- Too broad span of control
- Lack of employee recognition
- No incentives
- No focus on monitoring and improving of performances
- Lack of management information system
- Poor coordination between operational divisions
- Weak brand image and no marketing focus
- Inability to attract high level staff

Under the Demonstration Project, IDB obtained support in the following areas:

- Study of IDB three-year corporate plan
- Assist IDB on its transformation journey
- Align with existing efforts and further achieve IDB goals
- Assist implementation of concept of productivity in IDB

## PRODUCTIVITY IMPROVEMENT MEASURE IMPLEMENTATION

The project team consisted of four members from IDB and two members from the National Productivity Secretariat with a deputed project consultant from the APO. The project was launched by organizing a workshop. The APO consultant, along with the project team, evolved the Strategic Plan by holding discussions with the management and staff. The team also visited regional offices to prepare an activity plan for a one-year period. The phase-wise activity plan is given below:

### Phase I (15 June–14 September 2011)

- Implement organization structure changes, undertake assessment of services (core and non-core)

- Develop posters/placards of IDB's mission and vision and post the same to every office
- Publish the first quarterly newsletter
- Disseminate technical information across IDB and its clients
- Undertake the survey of IDB management and staff to assess the effectiveness of the organization's functioning
- Review all IDB internal administrative forms
- Review staff expenses and claims processes
- Gather baseline data for KPIs (e.g., employee absenteeism rate, number of customer complaints, lead time, overall employee satisfaction, overall client satisfaction, staff knowledge about the vision and the mission of IDB, etc.)
- Establish a monitoring committee

#### **Phase II (15 September–14 December 2011)**

- Review the results of the employee survey
- Organize regional staff meetings for communicating corporate plan
- Implement revised administrative forms and collaborate with the IT company for developing electronic forms
- Undertake a survey of IDB clients to assess service needs
- Organize productivity awareness workshops for IDB staff
- Publish the second quarterly newsletter

#### **Phase III (15 December 2011–14 March 2012)**

- Develop an action plan based on the results of customer feedback
- Develop and implement new technical dissemination system
- Create a cross-division team for pursuing IDB's efforts for continual improvement and achievement of its mission and vision
- Undertake a second survey of clients, staff, and management
- Publish the third quarterly newsletter

#### **Phase IV (15 March–15 June 2012)**

- Evaluate improvement initiatives
- Report key performance indicators
- Prepare final report on the Demonstration Project
- Organize a dissemination workshop
- Review the results of the Demonstration Project
- Prepare a video/DVD on the Demonstration Project

#### **Phase V (Post project)**

- Monitor activities on the action plan adopted as a result of the employee survey
- Develop service standard for IDB
- Develop plan for conducting customers/employee feedback on a regular basis

### **Core Business Analysis**

#### *Organizational Structure Changes*

According to the activity plan of Phase I, organizational structure changes should be made to

improve the governance and leadership of the organization. It was decided to set up a post of Director General with two Deputy Director Generals at the top level for general management. The other levels also required considerable change with redefinition of duty and responsibilities as well as the hierarchy of the workforce. It was seen as an important initiative in the effort to improve the functioning of the organization.

*Identification of Core and Non-Core Activities*

Careful analysis of the corporate plan identified several core and non-core activities in every department, and these were developed. Figure 1 highlights the development of the Result-Based Operational and Monitoring Plans.

Plan Ref.	Division						Expected Results	Activity	Results Indicators
Encourage promote & develop industry	Planning	Marketing	TSD	RDD	CED ACS	Rubber	Conduct a survey of all key industry sectors and enterprises to obtain their names, activities, email and phone numbers, etc.	Establishment of the project team	No. of teams established
								Identification of information source	No. of information sources identified
								Selection of industry sectors	No. of sectors identified
								Preparation of the database scheme	No. of database scheme prepared
								Collection of data and appending database	No. of database entries

Figure 1. Result-Based Operational and Monitoring Plans

With the objective of creating awareness in the employees of IDB, the vision and mission statements were printed and placed in selected places in the IDB premises and in every regional office. Observing that information sharing between management and staff is not taking place, it was decided to publish an internal quarterly newsletter, as shown in Figure 2.



Figure 2. Internal Quarterly Newsletter

## Employee Engagement

This is used to identify and rectify employee distress that negatively impact their productivity and performance.

### *Employee Survey of IDB Management and Staff*

The employee survey was undertaken to gain insight into the effective functioning of the organization, their perception of the service to internal and external customers, their understanding of the mission and mandate of the organization, their perception of the workplace environment, and their commitment to the organization.

In Phase 1, an employee survey was carried out. In Phase II, the team reviewed the results of the employee survey and identified three to five initiatives that could be implemented within the next 12 months. After examination of the results of the employee survey, the team built an action plan and decided to act on common improvement areas, which is training and communication. The team again carried out another employee survey in Phase IV to assess employee understanding and perception of the impact of the initiatives undertaken during the project. The results of Phases I and IV are shown in Figure 3.

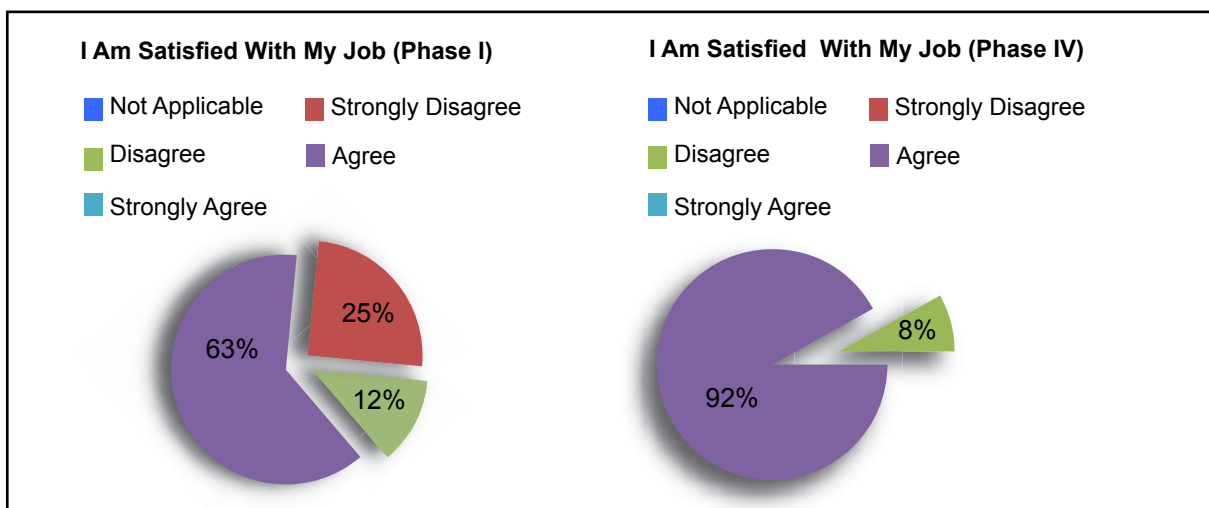


Figure 3. Results of Employee Survey in Phases I and IV

## Process Improvement

### *Administrative Forms Review*

IDB had been using administrative forms introduced by the government several decades ago. These forms consist of unnecessary statements and requirements. Hence, the project team decided to make an in-depth review of the administrative forms by discussing with the head of the departments (HODs) and reviewing the processes thoroughly. Subsequently, the team organized workshops involving the chairman, HODs, and selected officers for developing the final versions. Finally, hard copy versions were implemented during Phase III and electronic versions were made available in Phase V.

### *Online Process Improvement*

It had been difficult to measure the organization's operational and financial progress on a

timely basis. The new real time monitoring and evaluation process facilitated an improved performance monitoring, enabling IDB to achieve its goals.

#### *Internal Newsletter*

For the purpose of improvement of communication within IDB, the project team decided to publish a quarterly newsletter.

### **Client Satisfaction**

#### *Customer Service Survey*

This survey was launched in Phase II and targeted the customers of the head office and regional service offices. Based on this study, IDB developed a permanent client feedback system, which can be used via website and print.

### **BENEFITS FROM THE DEMONSTRATION PROJECT**

The following qualitative benefits were obtained after the implementation of the Demonstration Project:

- Improved internal and external communications
- Implementation of the customer feedback system leading to greater take-up of service offerings and an improvement in revenue generation
- Improvement of staff morale, commitment, and productivity, leading to improved services and customer satisfaction. Consequently, enhanced brand image and greater revenue generation was achieved
- Adaptation of the Result-Based Monitoring System helped IDB provide better services

In addition, the following post-project activities were implemented:

- The GM and executive team began to follow through and monitor the activities of the action plan as a result of the employee survey
- The Planning Division led the organization through an initiative to develop service standards for all IDB services (internal and external)
- The Planning and HR Divisions developed a plan to conduct customer and employee feedback mechanisms on a regular basis
- The Planning Division established a regular program and process review to ensure that IDB programs remain relevant with high quality and efficient delivery

Several recommendations were added after the project dissemination:

- Project to be extended for another six months for follow-up and further action
- Organize APO study missions to member countries for sharing and benchmarking activities
- Introduce 5S program as a Basic Productivity Tool to IDB
- Carefully assist the networked Results-Based Monitoring Plan

**CONCLUSION**

IDB is a government organization that delivers substantial service to the entrepreneurs of Sri Lanka. The Demonstration Project attempted to implement service innovation within IDB to provide better service to its internal and external customers. As such, it was a success story for the institution and country.



# SIRIRAJ HOSPITAL THAILAND



## ABOUT THE COMPANY

Siriraj Hospital is the oldest hospital in Thailand located in Bangkok and is the primary teaching hospital of the Faculty of Medicine under Mahidol University. The hospital was established on 26 April 1888 by King Chulalongkorn and is named after the king's son, Prince Siriraj Kakuttaphan. It employs 14,539 personnel, including medical and non-medical staff. It has 10 preclinical and 16 clinical departments in addition to seven centers of excellence: Thai-German Endoscopy, Siriraj GI Endoscopy Center, Breast Center, Organ Transplantation Center, Bone Marrow Transplantation Center, Bangkok Biomaterial Center, and Siriraj Robotic Surgery Center. It has a capacity of 2,223 beds, 61 clinics, and 113 wards, and it accepts more than two million outpatient visit per year. It has 871 full-time faculty, 1,617 undergraduate students, 397 post-graduate students, 997 residents and fellows, and 490 international students (data pertains to fiscal year 2011).

## PROJECT INVOLVEMENT

Since the vision of the Faculty of Medicine Siriraj Hospital is to be a world-class medical institution that moved toward sustainable growth, the Lean concept was considered an important one to improve all business processes. The faculty's Lean journey started with its involvement in the Demonstration Project via the Application of Lean Thinking in Healthcare Industry from June 2008 to March 2010. This project was undertaken with the cooperation of the Asian Productivity Organization (APO), the Healthcare Accreditation Institute (public organization), and the Thailand Productivity Institute.



## MAIN ISSUES

The Faculty of Medicine Siriraj Hospital was operating in a conventional manner. The main issues for sustainable growth and to become a world-class health-care institution were:

- A long wait for primary triage (a process of determining the priority of a patient's treatment based on the severity of condition) and transportation time in appointed wheelchair/stretchers in the Department of Medicine
- High turnaround time in wheelchair/stretcher appointment in the Department of Medicine
- Low staff and patient satisfaction in pre-consultation process and chemotherapy department
- High cost of treatment in inpatient chemotherapy session due to high processing time
- Lack of knowledge of Lean management concept among hospital employees
- Delay in receiving treatment in the Orthopedic Outpatient Department and Orthopedic Follow-up Clinic
- Unproductive movement and man-hours spent in specimen transportation to laboratory

## LEAN CONCEPT IMPLEMENTATION

The project began with six pilot projects as described below:

- i) Primary triage and transportation process improvement in appointed wheelchair and stretcher patients at the Department of Medicine
- ii) Pre-consultation process improvement in appointed wheelchair and stretcher patients at the Department of Medicine
- iii) Set up a specific appointment time system at the Orthopedic Follow-up Clinic at Siamintr Building
- iv) Set up a specific appointment time system at the Orthopedic Outpatient Department
- v) Decrease movement and man-hours spent in specimen transportation to laboratory
- vi) Reduction in process time for inpatient chemotherapy session (Asadang Building, 6th Floor)

A Lean Task Force was then established to promote the application of the Lean concept throughout the organization. Subsequently, a Utilization Management Team was assigned to initiate Lean application programs to assist staff in developing Lean projects to improve patient care process, which include:

Education and Training Programs: These aim to inspire and educate hospital staff to be enablers in Lean projects. The training programs are divided into three as follows:



Photo 1. Lean Basic



Photo 2. Lean Supervision Training Program

- Lean Basic: To give basic knowledge about Lean Thinking to all staff by conducting lectures and conferences for 2–3 hours
- Lean Supervisor: To conduct conferences and workshops for selected staff from various departments and divisions. They were to be groomed as Lean leaders for their respective departments and divisions

Lean Manager: To conduct conferences and workshops for the administrators and selected Lean leaders as to add techniques and tactics in supporting their staff for Lean thinking management and developing Lean capability

In 2010, a memorandum of understanding between the Healthcare Accreditation Institute and the Faculty of Medicine Siriraj Hospital was initiated with the purpose of promoting Lean thinking in healthcare across Thailand. Siriraj Lean team was then invited to be the speakers and facilitators for the APO project Seminar on Regional Sharing of Lean Application in Healthcare, from 24–28 January 2010 in Bangkok, Thailand.

Supporting System: To support the staff in improving their work by applying Lean thinking. The following activities were carried out:

- The Lean Clinic was created in 2010 to provide knowledge and understanding through Lean Simulation. Interested staff could make an appointment with the Lean Facilitator to join this activity every Wednesday afternoon. They were guided in developing the best/reasonable solutions under Lean thinking



Photo 3 and 4. Carrying Out Lean Clinic

- Lean Diagnosis was run by the Lean Facilitator Team. The purpose was to evaluate and analyze unproductive methods and wastage that occurs in the process. This activity was undertaken mainly to find the best way to minimize waste and to increase customer value as well
- The Lean Facilitator was responsible for coaching and coordinating all staff for the Lean Project so that they could work through it easily. For example, the Lean Facilitator acted as a coordinator and organizer in conducting the Rapid Improvement Event for those from the Multidisciplinary Team

Knowledge sharing: The Lean Facilitator played the major role of an organizer by setting up the stage for exchanging ideas and experiences of successful work improvement of Lean thinking. This included announcements using all communications media such as the Internet, newspapers, leaflets, etc. Siriraj Lean Open House was also created for networking with people in and out of Thailand to discuss and exchange experiences in the Lean thinking activities.

### **BENEFITS FROM IMPLEMENTATION OF LEAN CONCEPT**

The following benefits were achieved by implementing the Lean concept:

- Average time of primary triage and transportation decreased from 27–36 minutes to 10 minutes at peak period (7–8am) for the wheelchair and stretcher patients
- Incident report of cardiopulmonary resuscitation (CPR) at consultation room became nil
- Number of triage nurses reduced from 2 to 1 for wheelchair and stretcher patients
- Patient satisfaction in transportation service increased to 95%
- Turnaround time in wheelchair appointments reduced from 198 minutes to 129 minutes in the pre-consultation process
- Triage service received by wheelchair patients became 100% in pre-consultation process
- Incidence of patient identification error became nil
- Staff and patient satisfaction rose to 95%
- Total turnaround time reduced by 52% in the Orthopedic Outpatient Department and the Orthopedic Follow-up Clinic
- Delay time reduced by 55% in the Orthopedic Outpatient Department and the Orthopedic Follow-up Clinic
- Increase of value-added percentage to 62%
- Delivery maid decreased from 13 persons to 1 for specimen transportation to laboratory
- Man-hours decreased from 2,535 minutes to 195 minutes in specimen transportation
- Average length of stay reduced by 20% (from 5 days to 4 days) in chemotherapy session
- Savings achieved by patients was about THB2,000 per person in the chemotherapy department

In addition, the benefits achieved are shown in Figure 1 and Table 1 for Lean process indicators and outcome indicators of the Demonstration Project, respectively.

Lean Process Indicators	2009	2010	2011	2012
1. Training imparted on Lean Thinking in the Divisions of Faculty of Medicine, %	97	100	100	100
2. Number of Lean Projects (New Project) taken up	167	26	In process	

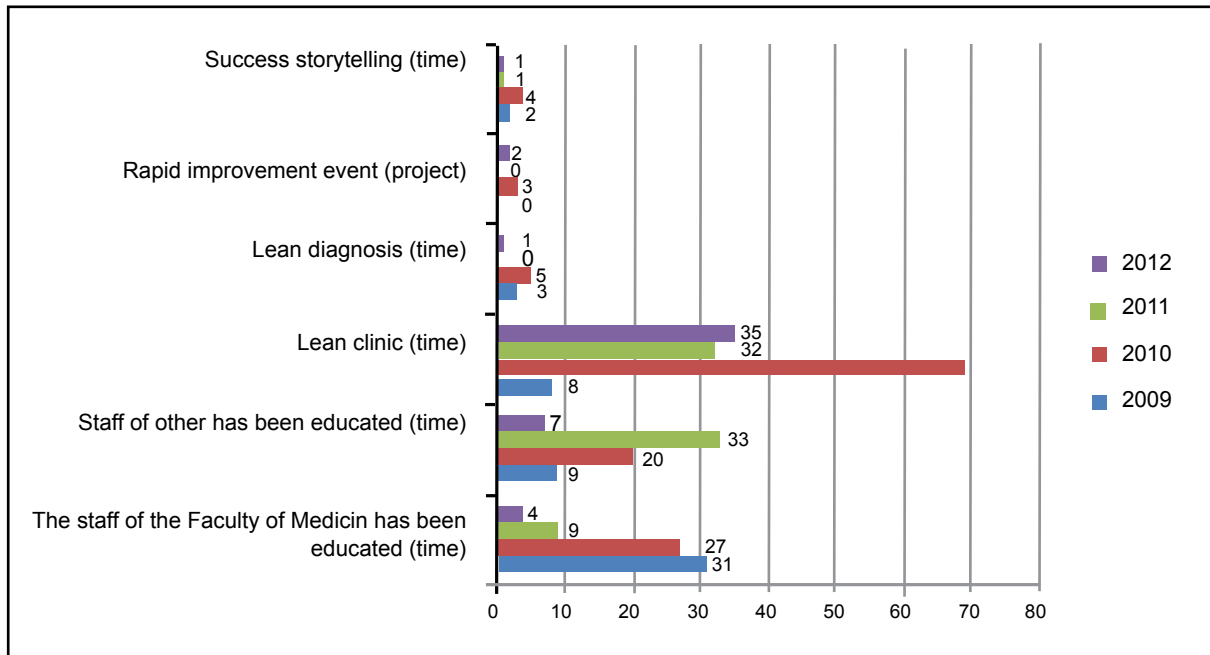


Figure 1. Lean Process Indicators from 2009–2012

Table 1. The Outcome/Impact Indicators of the Demonstration Project, 2010 and 2011

Lean Outcome Indicators	2009	2010	2011	2012
1. Quality improvement of man-hour (hours/year)	NA	83,551.53	30,267.80	In process
2. Decrease turnaround time/waiting time (hours/year)		198,998.20	202,611.70	
3. Increase safety/quality (% of total project)		68 %	70%	
4. Increase employee satisfaction (% of total project)		42 %	62%	
5. Increase customer satisfaction (% of total project)		32%	34%	
6. Cost saving (THB/year)		13,325,533	4,952,592	

## CONCLUSION

By undertaking the Demonstration Project and implementing of the Lean concept in the Faculty of Medicine in Siriraj Hospital, the productivity and competitiveness of the hospital increased. The project helped the hospital reduce waste such as excessive time of primary triage and transportation at peak workload time, the number of triage nurses, and the number of incidents of CPR at the consultation room for wheelchair and stretcher patients.

The project also reduced turnaround time in wheelchair service and ensured 100% triage service to patients in the pre-consultation process. Following the setting up of the specific appointment time system in the Orthopedic Outpatient Department and the Orthopedic Follow-up Clinic, the total turnaround time and delay time were reduced by 52% and 55%, respectively. The reduction in movement and man-hours spent in specimen transportation to laboratory resulted in a decrease in delivery maid from 13 to 1 person.

The reduction in process time in the chemotherapy department resulted in 20% reduction of the length of stay of patients in the department, leading to savings in patient costs by about THB2,000 per person. The project helped employees in gaining awareness about the Lean concept and also developed a culture in promoting Lean thinking and achieved high staff and patient satisfaction. This project will help promote the Lean concept implementation in the healthcare sector across Thailand.

# VIETNAM TECHNOLOGICAL AND COMMERCIAL JOINT-STOCK BANK VIETNAM

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## **ABOUT THE COMPANY**

Vietnam Technological and Commercial Joint-stock Bank, or Techcom Bank (TCB), was established on 27 September 1993 with the initial registered capital of VND20 billion with the aim of becoming an efficient financial intermediary, bridging depositors with investors in need of capital. The head office is situated at 72 Ba Trieu, Hanoi, Vietnam. With over 20 years of operations, TCB is now one of the leading banks in Vietnam with total assets up to VND180,874 billion (up to the end of 2011). It has a strategic partner, HSBC, with 20% shares, and a transaction network that includes 360 branches in 44 provinces and cities in the country (estimated up to the end of 2012). With over 7,800 staff, TCB is ready to meet all requirements of its customers. TCB's customer portfolio consists of 2.3 million individuals and about 66,000 enterprises. Its vision is to be the best bank and a leading business in Vietnam.

## **PROJECT INVOLVEMENT**

In order to achieve its ambitious vision, TCB had to implement quality initiatives to provide better customer satisfaction with good quality, faster, and cheaper services at all of its interaction points. By making innovative use of information technology and operations management through Lean and Six Sigma concepts, employees may work faster and create high levels of customer satisfaction. To achieve these objectives, TCB expressed keen interest in taking up the Lean and Six Sigma Demonstration Project with the assistance of the Asian Productivity Organization (APO) and the Vietnam National Productivity Institute.

## **MAIN ISSUES**

Since 2006, TCB has been certified with ISO 9001:2008. This quality management system has



helped TCB standardize its working processes and stabilize its service quality. However, to meet the highly demanding requests from customers in this changing and competitive world, the following main issues needed attention:

- Operation of the system was costly due to a lot of waste and inefficiency
- Lead time was long
- Error ratio appearing at service processes was high and error was repeated
- Service attitude within the whole system of TCB was not consistent
- Measures related to prevention, improvement, and innovation were mainly top-down based

## LEAN AND SIX SIGMA IMPLEMENTATION

The project teams used the DMAIC methodology. It is a structured problem-solving methodology widely used in business. The letters are an acronym for the five phases of Six Sigma improvement: Define-Measure-Analyze-Improve-Control. It leads a team logically from defining a problem through implementing solutions linked to underlying causes, and establishing best practices to make sure the solutions stay in place. The structure of DMAIC is given in Table 1.

Table 1. The Structure of DMAIC

DEFINE	MEASURE	ANALYZE	IMPROVE	CONTROL
Define the problem to develop a clear mandate based on a real problem	To understand the baseline and current performance using measures	To find root causes of the problem and understand their effect on the process	To develop, evaluate, select potential solutions, and implement plan	To implement the best solutions and to develop mistake proofing and Standard Operating Procedures (SOPs)
<ul style="list-style-type: none"> <li>• Review project charter</li> <li>• Validate problem statement and goals</li> <li>• Validate voice of the customer and voice of the business</li> <li>• Validate financial benefits</li> <li>• Create communication plan</li> <li>• Select and launch team</li> <li>• Develop project schedule</li> <li>• Complete Define gate</li> </ul>	<ul style="list-style-type: none"> <li>• Value stream map for deeper understanding and focus</li> <li>• Identify key input, process, and output metrics</li> <li>• Develop operational definitions</li> <li>• Develop data collection plan</li> <li>• Validate measurement system</li> <li>• Collect baseline data</li> <li>• Determine process capability</li> <li>• Complete Measure gate</li> </ul>	<ul style="list-style-type: none"> <li>• Identify potential root causes</li> <li>• Reduce list of potential root causes</li> <li>• Confirm root cause effect on output</li> <li>• Estimate impact of root causes on key outputs</li> <li>• Prioritize root causes</li> <li>• Complete Analyze gate</li> </ul>	<ul style="list-style-type: none"> <li>• Develop potential solutions</li> <li>• Evaluate, select, and optimize best solutions</li> <li>• Develop "Future State Value Stream Map(s)</li> <li>• Develop and implement pilot solution</li> <li>• Confirm attainment of project goals</li> <li>• Develop full-scale implementation plan</li> <li>• Complete Improve Gate</li> </ul>	<ul style="list-style-type: none"> <li>• Implement mistake proofing</li> <li>• Develop SOPs, training plan, and process controls</li> <li>• Implement solution and ongoing process measurements</li> <li>• Identify opportunities to apply project lessons</li> <li>• Complete Control gate</li> <li>• Transition monitoring/control to process owner</li> </ul>

TCB selected four pilot projects to demonstrate Lean and Six Sigma implementation as follows:

### **Project 1: Improve ATM Management and Operation Process**

TCB had 617 ATMs working in the entire country (as of December 2010). Among those, 70% were off-site, working 24/7; and 30% were on-site, working only during office hours. In 2009, ATM downtime percentage in the entire system (machines that stopped working or did not dispense money) was 6.5%. The time to repair out-of-order ATMs took two days. When ATMs ran out of money, it took 4–6 hours to be refilled. To increase customer satisfaction with the ATM service, TCB needed to increase the number of successful service time for customers by reducing the downtime of ATMs, ensuring working quality of the machines, and providing enough money. The project goal was to increase ATM uptime from 93% to 95% in all Ha Noi area under the management of Net Developing Center, reduce ATM repairing time from 16 hours (two days) to 8 hours, and to ensure money is fed within 4–6 hours after receiving information.

### **Project 2: Improve ATM-transaction Reconciliation Process**

One of the major duties of TCB's Card Accounting Department was to check ATM accounts to detect any mismatches between i) TCB's card system data- Journal Tape, and ii) TCB core system data and the ATM statement. ATM accounts recorded transactions of both TCB cards and other bank cards via TCB's card system. Each ATM account reconciliation took about 40 minutes to complete. With the current number of 740 ATMs, each ATM being checked once per month, it needed more than four staff to cover the work. The timeline to detect mismatches could be up to 30 days, so TCB faced the risk of inaccuracies in accounting and a reduced ability in collecting money from customers and other financial institutions. Therefore, adjustments could not be made accordingly, meaning that the balance did not reflect the actual accounts of the ATM, compared to the daily checking made by the other competitors such as HSBC, ABB, etc. Moreover, using manual reconciliation tools with the increasing volume placed TCB staff in a high pressure environment, causing employee dissatisfaction.

The project goal was to reduce reconciliation cycle time from 40 minutes to 25 minutes, thus increasing productivity by 38%, and to reduce percentage of mismatches detected after 18 days from 60% to 30%.

### **Project 3: Improve Import Letter of Credit Issuance Process**

The time to open an import letter of credit in TCB varied from hours to weeks. Other banks such as Vietcombank, Exim Bank, Citibank, and HSBC took 1.5 hours, 4 hours, 5 hours, and 5.5 hours, respectively for the whole process. Therefore, the number of customers coming to TCB to open an import letter of credit reduced by 40% in 2010 compared to 2009. The import letter of credit opening process involves four departments: Branches, Remotely Created Checks (RCC), Capital Cost Allowance (CCA), and Global Transaction Services (GTS). Among these, 80% of the services passed through CCA via GTS only, while the remaining 20% passed through all four departments (Branches, CCA, GTS and RCC). The average processing time in GTS and CCA were 3.5 hours and 1.7 hours, respectively; the expected processing time were 2 hours and 1 hour, respectively. The goal of the project was to reduce the average time for opening an import letter of credit in CCA and GTS from 5.2 hours to 3.5 hours, saving about USD742.50 per month.



#### Project 4: Improve Document Checking Against Export Letter of Credit Process

The average time for doing an export letter of credit in TCB was 4.25 hours. About 50% of the customers had to wait for more than 4 hours to get the service. About 20% of the customers had to wait until the next day while competitors offered the service within the same day. This situation had been there for many years. To become the best bank in Vietnam, TCB needed to improve this service. In addition, TCB could also lose customers, which can affect foreign currency inflow to the bank. Furthermore, excessive workload with unnecessary steps in service lowered labor efficiency and increased labor cost.

The project goal was to reduce the number of export letter of credit processing, which takes more than 4 hours, from 30.08% down to 10%. About 90% of the customers coming before 14:00 hours are served in a day. Four projects were implemented in line with the phases of DMAIC. Lean and Six Sigma tools were used to: i) identify problems, ii) measure and analyze status of process, iii) understand and define root causes and propose improvement solutions, iv) measure results of improvement and set up suitable mechanism for maintaining and expanding the system. Pareto charts were used to identify the main problems that contributed to the downtime of ATMs. Focus was given on solving these problems within Project 1 for improving ATM management and operation process (Figure 1).

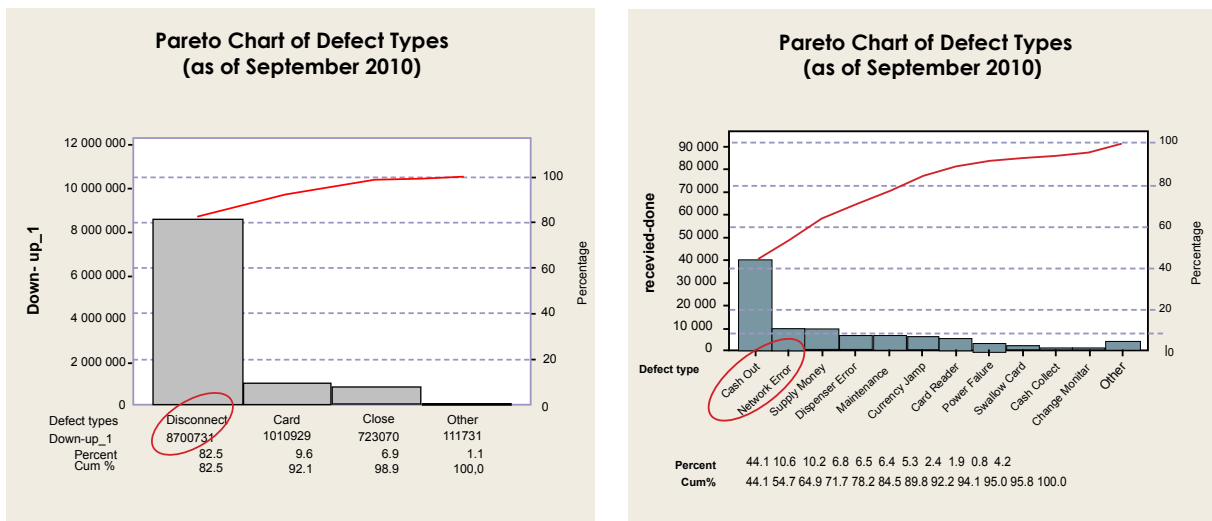


Figure 1. Pareto Chart for Downtime and Defect Analysis of ATM

#### BENEFITS FROM LEAN AND SIX SIGMA IMPLEMENTATION

Four projects were implemented successfully in 2010 and the following were their tangible benefits:

Project 1: Three steps were removed from the ATM money feed procedure, increasing up-time of ATM from 95% to 97%, saving over VND111 million (~USD5,000) per year. This has also increased customer satisfaction.

Project 2: Average time of reconciliation was reduced from 12 minutes to 8 minutes (~25%), number of mismatches reduced by 47%, time to find mismatches on system was reduced from 18 days to 5 days. This helped to greatly reduce the financial risk in TCB.

Cause-and-effect diagram was used to analyze and identify the root causes for Project 2 (improving ATM transaction reconciliation process) as shown in Figure 2.

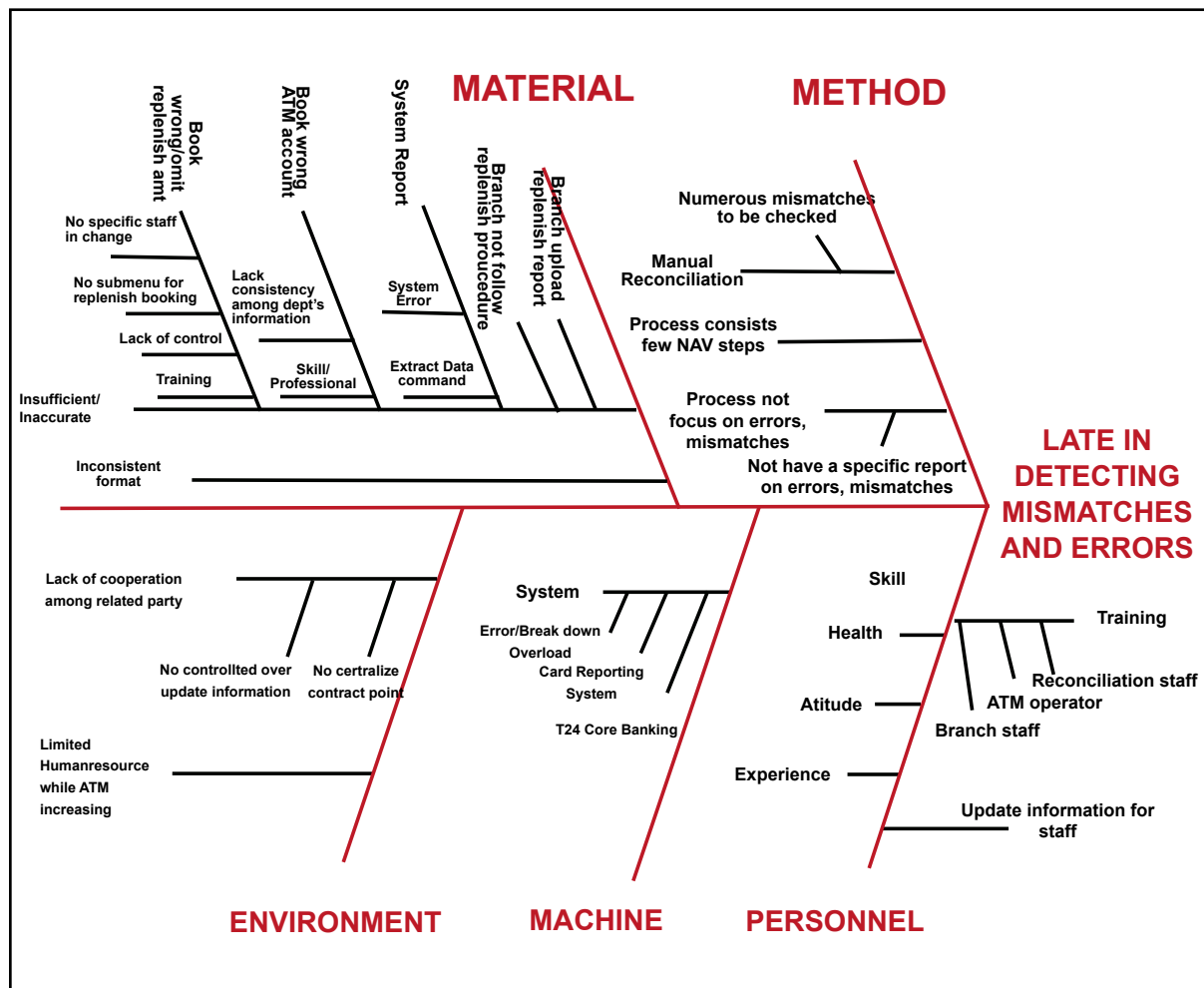


Figure 2. Cause-and-effect Diagram for Identifying Root Cause in ATM Transaction Reconciliation Process

Project 3: Seven steps and four approval signatures were removed in the procedure to upgrade Sigma level from 1.6 to 2.5, saved 20% processing time spent by customers (reduced from 198 minutes to 162 minutes). This was an enabler for customer satisfaction.

Project 4: One step and one approving signature were removed in the procedure to upgrade Sigma level from 2 to 2.7, saving 25% processing time that customers spent (reduced from 250 minutes to 188 minutes).

Other than the above mentioned tangible outcomes, extra benefits resulted from the project implementation are listed below:

- Project team members were trained to apply problem-solving methods using the Lean and Six Sigma approach. In addition, their capability in project management was built up. These members were expected to be the key personnel who will provide training and seek expansion for Lean and Six Sigma implementation at TCB in the future



Since 2011, the Lean and Six Sigma program was introduced to three pilot enterprises (including two organizations in the service sector and one in the manufacturing sector). This was a good starting point for the Vietnam National Productivity Institute to foster Lean and Six Sigma to the local enterprises and build up its consultancy capability.

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