UNIDO - ACMA Partnership Programme, India Case Study #12 National industries







BACKGROUND OF NATIONAL INDUSTRIES

"The programme has helped our employees to orientate their mindset towards continuous improvements and eliminate wasteful activities by learning new concepts. This resulted in further evolvement and progress of our organization as a whole."

Bikramjit Bembi, Managing Director

OVERVIEW

Company: National Industries

Location: Ludhiana

Programme period: September 2005 – February 2008 (30 months) Number of employees: 230

Core products and processes: Precision turned components, broaching, gun drilling and milling

Average annual turnover: INR 80 million. (USD 1.78 million) TIER: 1 and 2

KEY CHALLENGES FACED

- » High in-house rejection (PPM)
- » Low productivity and quality as compared to customer requirements
- » Machine breakdowns occurred frequently due to limited operator involvement
- » Limited problem-solving ability of operators due to limited knowledge and self-initiative.
- » Unsafe working conditions due to cluttered work places
- » High absenteesim and low employee morale

ASPIRATIONS AND AIMS

- » To ensure 100% delivery compliance
- » To achieve zero defects and zero customer returns
- » To improve productivity by low cost automation and better process flow sequence
- » To reduce process scrap

National Industries - formerly known as N.E Fine Chemical - located in Ludhiana was established in 1976 for electroplating and metal finishing job work targeting the bicycle and automotive industries. As more processes were added to the operations, the company started manufacturing various machining components and tubular parts like handle bars or leg guards for motorcycles. When the company received an offer from Kinetic Honda Motor Company Ltd. and Force Motors Ltd. to supply similar parts directly to them, the management of National Industries decided to establish a new plant in Pithampur in the year 1988, since the OEMs were located far from Ludhiana.

In order to better respond to offers for exporting bicycles, bicycle parts, hand tools and other engineering products, National Industries founded a new company in Ludhiana called Campbell International in 1992. As the business progressed smoothly, new plants were added in Pithampur in 1996 to manufacture different sheet metals and tubular components like accelerator assemblies, foot boards, and gear shifters, amongst others, for the OEM Eicher Motor Ltd. Another company was established in 1988 at a new location Aurangabad to manufacture motorcycle frames (chassis) for Bajaj Auto Ltd.

With these tremendous business opportunities, the company was able to open new plants, but could not overcome the problems that were still intrinsic to the organization, such as high in-house rejection rates and low plant efficiency due to unexpected machine breakdowns. At the same time, cluttered work places caused unsafe working conditions for the employees. Change-over became a challenge as well, since the broad product range was difficult to handle with the given plant capacity. The management of National Industries tried hard to overcome these problems, but was not able to find the right approach due to constant production pressures exerted by its clients. When the company came across the UNIDO-AMCA Partnership Programme, its management immediately took the decision to participate in it.

VISION STATEMENT

To be a world class company, known for a high customer base and ethical practices, and for nurturing and developing human resources for organizational excellence. To be a renowned organization, much sought after by both customers and suppliers.

MISSION STATEMENT "Profit through quality"

NATIONAL INDUSTRIES' JOURNEY TROUGH THE PROGRAMME





Practical demonstration on model machine



Hydraulic clamping introduced



Before



The programme started in September 2006 and lasted for a period of 30 months. A senior company counsellor, Mr. Rakesh Gupta, initially met with managers and employees to understand the goals of the firm and determine key areas of intervention. Based on the results of these first discussions, he divided the company and its employees into 6 zones to facilitate management and coordination of the improvement process based on specific needs.

Every 20 days, Mr. Gupta paid the company a visit to provide intensive class room and shop-floor training on different process and workplace enhancement approaches such as 5S, 3M, Kaizen, Mistake Proofing, Quality, Productivity Improvement, SPC, 7QC Tools and SMED. All the training given by the counsellor followed the UNIDO-ACMA road map for the continuous improvement of automotive component suppliers. Mr. Gupta also continuously made suggestions for further improvements and for involving more employees in problem solving processes. After each visit, different tasks were assigned to all zones.

Improvements and progress were tracked by comparing previously determined key performance indicators after each visit of the counsellor. In total, the company tracked 32 indicators (e.g. related to scrap clearance frequency, absenteeism, accident frequency and severity, customer return rate or number of machine defects), which were introduced in a phased manner and monitored on a regular basis by the company. In addition, the results achieved were shared with other firms assisted by the same counsellor during monthly review meetings (MRM).

OVERCOMING BOTTLENECKS IN THE PRODUCTION PROCESS TO ENHANCE PRODUCTIVITY

At first, employees were asked to identify critical manufacturing lines to **diagnose bottlenecks in the production process** and to enhance line productivity. For this purpose, the counsellor proposed to make short videos of processes as per the production flow sequence. Actual cycle time of each process along with the movements within the processes were captured, and potential as well as actual bottlenecks identified. Finally, those were analyzed and an action plan prepared to tackle each problem/bottleneck that was discovered during this process.

In total, nine critical machines were shuffled and arranged in a straight line format. The improvements achieved as part of the model-machine-initiative were primarily related to **low cost automation (LCA)**, operation clubbing and breakdown reduction. E.g. Machines with manual clamping were converted into hydraulic clamping, which led to an increase in productivity of 140%.

Another example constitutes a constantly reoccurring problem of gear box failure that caused production and time loss due to break-downs. In order to solve this problem, one person was appointed to be in charge of proper maintenance of the gear box and a hydraulic system was introduced. Through those measures, the breakdown rate could be reduced by 70%.

As a result of all LCA projects that were initiated throughout this programme, the company was able to achieve cost savings of around INR 216,000 (approx. USD 5,000) per year. Work-in-process (WIP) could be reduced by 60% and in-process rejection fell by 24%. As a result, the process capability (CP/CPK) i.e. processing with least variation within a specified tolerance (Std. minimum 1.33), increased from 0.8 to 1.3. Furthermore, additional space of 32 square meters was generated.

Kaizens Barrelling time fixed with timer



Auto changeover (PSEB Power Supply and Genset Power Supply)



UNIDO quality competition among cluster



A **Tool setup time (SMED) analysis** was conducted on power presses as this turned out to be one of the more problematic areas. The method of making videos of the process (a similar approach like in the one followed in the model machine initiative) and analyzing the recordings was deemed very helpful in this respect.

REDUCING REJECTION RATES THROUGH QUALITY IMPROVEMENTS

Every month the company had to deal with at least four customer complaints and more than 600 customer returns per million parts (PPM). At the same time, in-process non-conformance was 66,000 PPM before the UNIDO-ACMA programme was initiated, which constituted an enormous challenge for the management. The project team quickly noticed that making significant improvements in this area would not be possible without the involvement of the entire staff base of the company and intensive collective effort.

To tackle this specific problem, the counsellor first focused on delivering training covering topics such as **7QC tools, quality circles** and **mistake proofing** to enhance the problem solving capability of the firm's employees. Based on this initial capacity building exercise, 12 quality circles covering 65% of all employees were formed and a fortnight review mechanism was defined for each group. By doing so, 26 of the identified problems could be solved one by one based on detailed analysis and the implementation of around 40 mistake-proofing steps.

Emphasis was also placed on **proper material handling** and **single-piece-flow** to tackle quality challenges such as the denting and scratching of components. Furthermore, visual control boards and reference samples were displayed on all critical stations of the process to help employees understand the process parameters.

ENHANCING EMPLOYEE MOTIVATION AND REDUCING ABSENTEEISM

One of the major challenges faced by the management of National Industries was to find ways to stimulate the motivation of its employees and enhance their contribution to improvement processes, which in turn had an impact on all other initiatives in the quality and productivity domains.

The counsellor proposed to set a strong focus on the **Kaizen approach**, which required that all employees participated in the search for incremental improvements for the processes they were involved in. For this purpose, the management introduced a coupon-based system, which foresaw that each employee was handed out a coupon for each Kaizen (improvement suggestion) he provided. Once a certain number of coupons had been accumulated, the respective employees received gifts during a Kaizen award ceremony that was specifically organized for such occasion. Initially, there was resistance to the Kaizen idea, but when employees were made aware of the benefits this concept would bring to the company and, ultimately, to themselves, many improvement suggestions could be generated and implemented.

In order to **reduce absenteeism** in the company, an attendance bonus was introduced as an additional incentive (INR 200/month for 100% presence and INR 100/month for single sanctioned leave in a particular month). Rewards were provided to employees who were present continuously for more than 3 months, 6 months and 1 year. As a result of these incentives, the absenteeism rate could be significantly reduced.

Reducing clutter in the tool room led to a much safer workplace





Other initiatives implemented to enhance employee motivation included:

- » More direct interaction between the CEO and employees to better understand specific problems and find solutions. These also included personal problems faced by individual workers, such as loan requirements for illness, marriages, or school/study fees for children.
- » Imparting additional training to improve skills and knowledge of employees (e.g. on Six Sigma).
- » Organization of welfare activities, including medical treatment, uniform, shoes, etc. were provided to employees.

As a result of the above mentioned activities, absenteeism among employees has been reduced by about 50% since the implementation of the programme. Low cost automation projects helped to reduce fatigue amongst operators and enhanced to their motivation. Also, the additional benefits provided by management, such as shoes, clothes or Kaizen rewards created a stronger bonding with the organization.

TOWARDS A SAFER WORKING ENVIRONMENT

Accidents were taken as a very serious matter irrespective of severity. To improve workplace safety and thus complement activities to enhance employee motivation, the CEO and the zone leaders, along with other selected employees visited the **Gemba** (place of an accident), tried to identify the problem and jointly conducted a **why-why analysis**. Once the root cause was determined, permanent counter-measures could be taken. Safety audits were planned on a monthly basis and any shortcomings dedected during an audit were immediately diagnosed and taken care of. These safety audits and the resulting analysis helped the company to identify and correct 270 unsafe practices. In addition, safety awareness training was imparted on a regular basis and safety charts were installed around the shop floor.

All of those measures contributed to a reduction in accident frequency to less than half (from 50 to 11) and in accident severity by 50% (from 1,361 to 576). The elimination of un-safe working conditions and the support of management improved the morale of employees and contributed to more pleasant work places.

Responsible resource consumption and environmental management to reduce operational costs

Over the counseling period, the management of National Industries developed a good understanding of the relevance of environmental and social issues, as well as of the need to address those by assessing the company's performance in these areas. In the **environmental management** domain, electro-plating being the main source of water contamination was selected as a major focus area to improve upon in this programme. To tackle this issue, trainig on **3M** (a methodology for waste elimination) was imparted.

As a result of continued incremental improvements in the area of **effluent treatment** and chrome recovery to eliminate water contamination, the installation of a change over switch between city power and captive generation, and also the installation of energy meters to control **energy consumption**, the company achieved commendable results. In terms of environmental performance, National Industris accumulated considerable savings in the consumption of energy and resources i.e. 120 man-days per month in manpower, 120 kiloliters per month in water and 50 KW per month in electricity.

OUTCOMES

KEY RESULTS

- » Work in Process (WIP) inventory level reduced from 7 to 2 days.
- » Training possibilities for employees increased from 3 hours to 24 hours per year
- » Accident frequency ratio of 50 at the start of programme reduced to 11 and severity rate reduced from 1,361 to 576
- » Absenteeism reduced from 16.5% to 8.1% within 30 months
- » Productivity was increased by 40%
- » Process capability was improved from 0.8 to 1.30 (cp ratio)
- » Machine and equipment break down frequency was reduced from 21 to 10
- » Setup time was reduced from 18 to 3 minutes (model project)
- » Final inspection rejection PPM reduced from 66,000 to 12,000 ppm

Overall, the company has achieved remarkable improvements in most of the areas tackled by the UNIDO-ACMA Programme. Through the implementation of 800 Kaizens (improvement suggestions provided by employees) in the fields of costs, quality and productivity and introduction of best practices the company managed to save INR 1.87 million (approx USD 41,000). In addition, the morale of its workforce has significantly improved and employees became much more involved in initiatives for enhancing quality and productivity.

Customers have also positively responded to the improved quality of National Industries' products. The company managed to acquired three new clients as a result of these efforts and started producing 11 new products as part of its portfolio.

The company introduced single-piece-flow to reduce work in process (WIP) inventory and improved material handling by applying best practices with the support of the counsellor. In addition, National Industries changed its layout as per process sequence to further increase productivity and quality. Poka-Yoke (mistake proofing) implementation in form of 40 specific projects has resulted in a reduction of customer complaints from an average of 4 to 1, customer returns from 600 to zero, and in-process ppm from 66,000 to 12,500. Similarly, around 800 Kaizens were effectively implemented and documented - most of them related to production, quality, safety and costs. National Industries has also made it up to the first place in the "Small Group Improvement Activities (SGIA) Competition" organized within the framework of the UNIDO-ACMA Partnership Programme.

In the social domain, employee morale was raised by the introduction of welfare schemes and motivationboosting activities, absenteeism could be reduced by 51% and regular trainings helped workers to upgrade their knowledge and skills base. Accident frequency declined from 50 to 11 and severity was reduced by 57%.

In terms of environmental management, energy consumption was reduced by 50KW per month and water consumption by 120KL per month, which led to operational cost savings.

IMPROVEMENTS				
1.1.1	Before	After	Change (%)	
Productivity (Production/man-hour)	15	29.6	+95	
Process Capability	0.8	1.3	+62.5	
WIP (days)	8	3	+60	
Absenteeism (in %)	16.5	8.1	+51	
Customer complaints in numbers	4	1	+75	
Accident severity ratio	1,361	576	+57.6	
OEE in %	56	85	+51.7	
Customer returns PPM (average p.a.)	626	0	+100	
Defects due to machine breakdowns	35	4	+88.5	
(numbers/year)				
New Customers added			3	
New products added			11	
Tangible savings in operating costs USD			44,000	

Note: Positive trend mark will be '+ 'and negative trend mark will be '-'.

FUTURE OUTLOOK

Front entrance of National Industries



THE SUSTAINABILITY CHALLENGE

After the completion of the 30 months UNIDO-ACMA Programme, the CEO of National Industries exhorted employees and zone leaders to keep the learning and improvement cycles alive. The company continued to review all key indicators on a monthly basis and to sustain the efforts. Its management also decided to continue with the practice of organizing monthly review meetings with peers and sister companies in order to share the knowledge and learn best practices of others.

FUTURE TARGETS

- » To increase business by constantly adding new customers and products
- » To improve process capability and productivity by continuous efforts in the area of low cost automation
- » To further reduce in-house rejection/rework ppm
- » To embark on additional changes in the plant layout for further productivity improvement



CONTACT DETAILS:

NATIONAL INDUSTRIES,

Mr. Bikramjit Bembi (Managing Director) E-127, Phase IV, Focal Point, Ludhiana (PB)

Phone	0091 - 161 - 4696666
Fax:	0091 - 161 - 4696611
	0091 - 161 - 4696622
Email:	bbembi@metalmanauto.com
Web:	www.nationalindustries.in