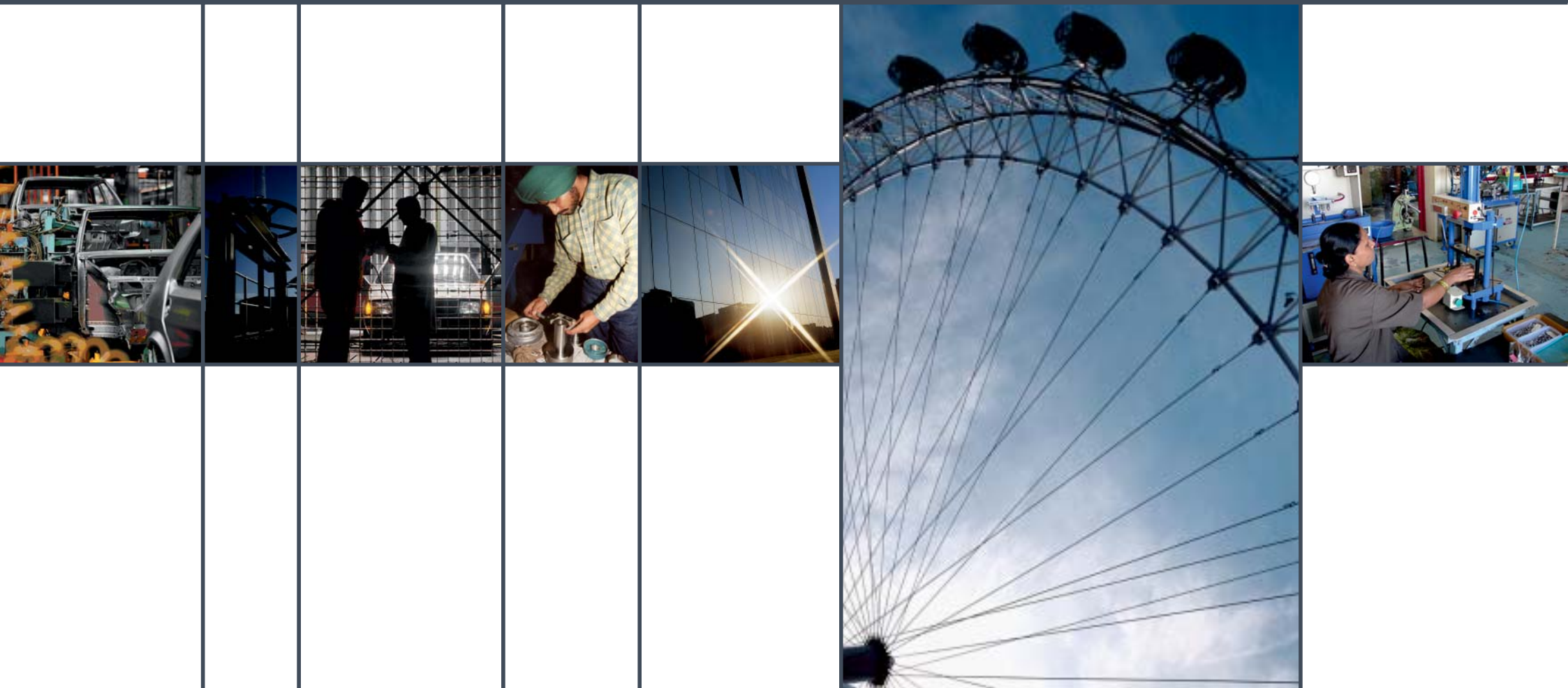


UNIDO - ACMA
Partnership Programme, India

Case Study #10:

Abilities India Pistons and Rings Ltd.



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BACKGROUND OF ABILITIES INDIA PISTONS AND RINGS LTD.

“Abilities India Pistons and Rings Ltd. was facing competition from Chinese manufacturers while trying to establish its export business due to productivity and quality challenges. After joining the UNIDO-ACMA Programme, the journey towards manufacturing excellence gained momentum as employees started getting involved in the process of change. As a result of this programme, the output per worker increased, inventory reduced and product quality improved.”

Sunil Arora, Joint Managing Director

OVERVIEW

Company: Abilities India Pistons and Rings Ltd.

Location: Sahibabad, Delhi NCR

Programme period: Jan 2005 – June 2007 (30 months)

Number of employees: 185 (1% women)

Core products & processes: Pistons and Rings

Average annual turnover: INR 96.08 million (USD 2.1 million)

Value of exports: INR 81.6 million (USD 1.8 million)

Tier: 1 and 2

KEY CHALLENGES FACED

- » Low productivity
- » High rate of rejection and low employee involvement in problem solving activities
- » High work in process inventory
- » Inadequate utilisation of resources
- » Low equipment efficiency
- » Scattered items inside the factory

ASPIRATIONS AND AIMS

- » To be the industry leader in quality
- » To provide complete satisfaction to all its stakeholders

In 1995, Mr. Sunil Arora took over Abilities India Pistons and Rings Ltd. (AIP) from its originators and started afresh. There were 181 employees available for catering to the business requirements at the time when Mr. Sunil Arora took over the company. In 1996, the company started with the production of piston rings. The company sent their first export consignment to original equipment manufacturers (OEM) in the year 2000. The company mainly supplied to OEMs like Enfield or TVS Motors and to the after-market.

Since the company was mainly an after-market supplier at inception, management was focused on a paradigm shift to become primarily an OEM supplier. Since the company was struggling with quality issues and an unsystematic way of handling things, the focus was on implementing quality management systems and thus, AIP got ISO 9002 certified in 1998. However, it soon turned out that this was not sufficient for the aspirations of AIP's management. Therefore, in 2004, the company also obtained an ISO TS 16949 certification.

In spite of making steady progress between 1998 and 2004, the company's management was still not satisfied, as there were lots of internal challenges such as high inventory levels, high rejection rates, frequent machine breakdowns, under-utilization of machineries, and very limited employee involvement that had to be dealt with. Although the company occupied large factory premises, items were lying around cluttered and a lot of valuable space was being wasted.

In 2004, the company came across the UNIDO-ACMA Partnership Programme and without any hesitation its management immediately grasped the opportunity.

VISION STATEMENT

To carve out a new market and maintain market leadership by providing world class quality pistons, rings and related products to delight our customers.

MISSION STATEMENT

Achieve zero customer complaints, zero delivery failures, zero defects, zero breakdowns, best productivity and world class quality.

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AIP'S JOURNEY TROUGH THE PROGRAMME

Information centre



Loading of vice by two operators



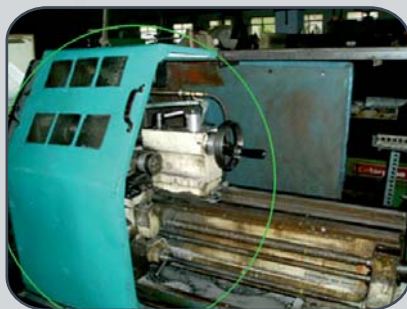
Before

Easy sliding of vice on parallel table



After

Localized guards were developed to ensure operator safety



The programme started in AIP in January 2005 and lasted for a period of 30 months. The assigned national counsellor, Mr. S. Prabhaker, met with senior management to understand the goals of the company and to jointly develop a roadmap for intervention. In the course of several subsequent visits he provided training on workplace management and improvement techniques, such as 5S and 3M. Mr. Prabhaker visited the company three times every two months and constantly reviewed the actions planned and results achieved. He also reviewed the assignments undertaken by the staff, identified challenges and problem areas, provided other inputs as per the roadmap, and assigned new tasks to the management team.

Initially, the company was organized in 12 zones to facilitate the roll out of the improvement programme. The start marked the introduction of the 5S methodology – a workplace organization system that describes how items on the workspace are stored, kept clean and functioning, and how the new order is maintained. The decision-making process usually comes from a dialogue about standardization which builds a clear understanding among employees of how work should be done. In all 12 zones, a “red tag operation” – a technique to identify and get rid of unnecessary items on the workplace – was initiated and 5S boards were placed in all zones.

Throughout the improvement programme, continuous emphasis was given on the importance of 5S, eliminating wastages, accurate data collection, safety issues, total employee involvement and enhancing the problem-solving ability of workers through the formation of Quality Control Circles (QCC) and small group activities.

To boost employee's motivation to participate in the programme activities and ensure healthy competition, a rolling 5S trophy was given on a monthly basis, enhancing the bonding between team members within a zone. Model zones and Model Machines under “My Machine Campaign” were identified and abnormalities were identified to improve the overall equipment effectiveness (OEE) of the machines.

Last but not least, a set of key indicators was introduced in a phased manner and monitored within the company as well as with peers in the framework of monthly review meetings (MRM), hosting all participating firms that are taken care of by one and the same counsellor.

ENHANCING EMPLOYEE MOTIVATION, HEALTH AND SAFETY

Since employees of AIP were very much tied to their work places, they had become set in their ways of thinking and became somewhat resistant to change. A special drive was made to enhance their motivation to contribute to the improvement of the business as a whole, and also to improve their skill levels, thereby enhancing their productivity and the quality of their work. Every month, four hours of training were imparted on various subjects and the impact of this initiative was reviewed in each zone. Presentations of different companies of the same sector were shared with employees, which really became an eye opener for them and showed them new ways and approaches about doing things on the shop floor. About 23 quality circles were made across the company covering 98% of its workforce. Employees were set growth targets and everyone who performed well according to this yardstick was given certain number of points. Occasionally, the points earned by each employee were tallied and gifts were handed over to high performers in the course of special award ceremonies.

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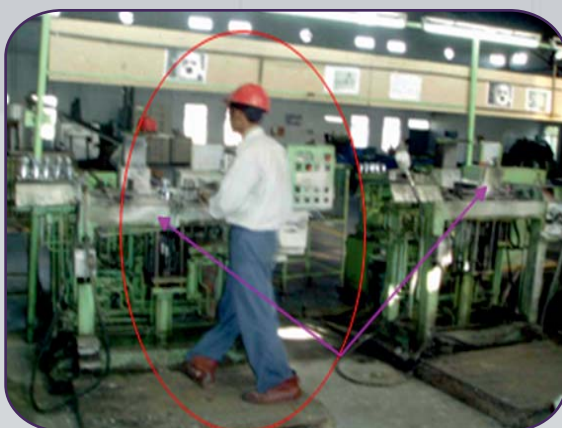
Gift for employees' children



Medical check-up within the plant



One operator working on two machines



Several key operations were reviewed by employees and supervisors together, and some simple steps were taken to improve the ease of operations. All material was moved on trolleys and designated tables were placed near the machines to facilitate the process of removing and loading heavy items such as vices and other fixtures, which in turn improved ergonomics for workers. Furthermore, machines and processes were reconfigured to avoid un-necessary movement. Safety was another parameter, which was tackled. In this context, hand guards were placed on machines, for instance, and safety equipment was provided for critical operations.

Other initiatives taken to create a stronger bonding within the company:

- » On every first Tuesday of each month, Pooja (a form of worship) is conducted and a Kaizen award ceremony organized.
- » Direct interaction between the CEO and the employees has been encouraged and became general practice. The CEO personally reviewed the progress in every zone on the shop floor, thereby encouraging interaction with employees and boosting their morale.
- » The CEO also started to provide sweets to employees on their birthdays to raise their motivation.
- » On every Saturday, the family of one employee can visit the factory and small gifts are handed over to them.
- » Another outcome of total employee involvement (TEI) activities of this programme has been the provision of advances to employees on specific occasions, such as marriages or illness.
- » On 26th January, an annual function is organized for all employees along with their families, where lunch is provided, games and competition organized for children and an award ceremony is conducted.
- » Every year, uniform and shoes are handed out to all employees.
- » Computer classes are organized for the children of AIP's employees' children during their vacation period.
- » Free medical check-up is done regularly now within the company by the doctor.
- » Finally, a subsidized canteen facility has been provided.

PRODUCTIVITY ENHANCEMENT

Optimum utilization of machines, manpower and space was a big challenge for the company. To overcome this challenge, the counselor recommended to first focus on **3M** (a concept to classify several types of wastes - muda, mura and muri – whereas muda refers to everything that does not add value; mura represents the inconsistent or irregular use of a person or machine; while muri is the act of placing excessive demands on workers or production equipment) as well as on improving **overall equipment effectiveness (OEE)**.

One model line and one model machine were selected to understand and implement the upgrading methodology. The **model line** was designed based on the tact time and machines were placed accordingly, which eliminated unnecessary movements of the operator. Secondly, heaps of components lying in between the processes on shop floor were eliminated. The material movement was reduced by 7000m per month and work in progress (WIP) reduced by 70 %. Furthermore, additional space of 500 square metres could be generated through this process. Operation clubbing was implemented based on tact time which enabled one operator to run two machines. In low cost automation, pneumatic cylinders were used for clamping and de-clamping.

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Model machine



Before

The “my machine campaign” became a role model for the entire company. The model machine selected was first cleaned by the managers, 70 abnormality tags were placed on the machine and all detected leakages were closed. In order to facilitate the process of cleaning, a coolant tank was fitted outside the machine and the surface was fully painted. As a result of these steps, OEE of this specific machine improved from 67% to 84.6%.

In addition, around 25 components with higher requirements were selected and tool modifications were made. Initially operators had to go to the store every time they needed a tool or component for their machine. Therefore, shadow boards of different sizes and requirements were prepared and placed on each machine.

OVERCOMING THE QUALITY CHALLENGE

To reduce rejection levels, all critical processes were analyzed in the course of this programme and modifications were made where appropriate. The company repeatedly faced problems like short filling, blow holes, pit marks, bulging, turning marks, grooving size and run out. In order to overcome such problems, 23 quality circles were formed. Based on prior analysis, redesigning of runners and gates, for instance, helped AIP to reduce in-house rejections in the casting section. Clubbing of operations in the casting tool also reduced the probability of manufacturing defective pieces. Re-defining processes like selection of machines for a particular product, defining speed and feed of the machines, establishing parameters and monitoring the process capability further helped to reduce rejection rates. In addition, the optimal re-sharpening frequency of the tools was clearly defined and marked. Quality alert boards were posted in all stations where critical quality parameters needed to be adhered to (fifteen in total) to prevent mistakes as much as possible. These quality alert boards included pictures showing the difference between good and bad parts to make it easier for workers to comprehend.

While carrying out improvements on machines/equipment, important learning and experiences were made. These were captured in the form of so-called “one-point lessons” (OPL) – short visual presentations that communicate standards, problems and improvements about work processes and equipment. OPLs were displayed at different places on the shop floor, so that previously committed mistakes would not be repeated. At the same time, operating procedures (master document) were standardized and displayed in a proper format in 20 crucial workstations. It took about three months for the operators to have all the above-mentioned visual displays in place.

In order to reduce work in process (WIP), the counsellor introduced the SMED (Single Minute Exchange of Dies) method, which helped to reduce equipment set-up time required for changing production from one product to another. If, for instance, one machine produces not only one but several products, the operator usually needs to change some dies, tools and fixtures.

After



By modifying Gate and runner, rejection reduced by 30 %

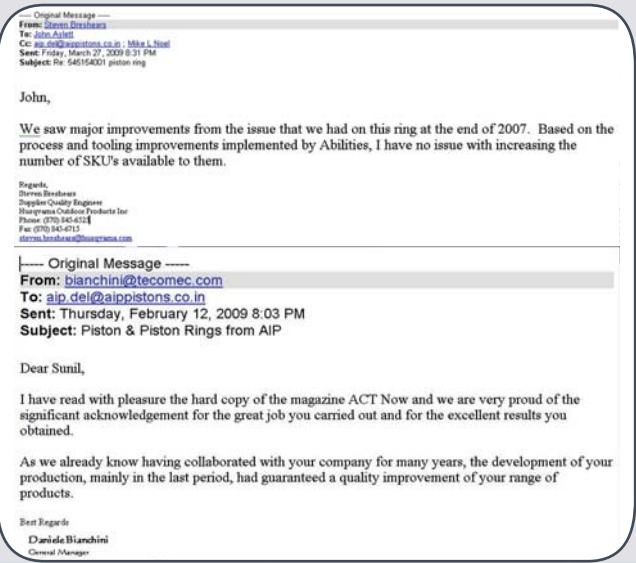


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OUTCOMES

Customer Feed back



Gold Award for Year 07-08



Export



Quality and Productivity

KEY RESULTS

- » Productivity increased by 15%
- » Additional space of 500 square meters was generated within the plant for future expansion
- » WIP inventory levels reduced from 85 to 49 days within 30 months
- » Training hours for employees increased from 8 to 48 hours per year
- » Accident frequency and severity was reduced to zero by proactively tackling potential causes.
- » OEE increased from 67% to 84.6%

The company has benefitted on operational as well as on commercial grounds. Employees are now more directly associated with growth initiatives, their satisfaction has increased and there is much stronger bonding between management and employees. At the same time, customer satisfaction levels have increased due to the programme activities related to quality improvements. .

AIP was able to increase productivity by 15%, generate space of about 500 square metres, reduce in-process rejection by 23%, improve OEE by 33.7% and, above all, generate 100% employee participation in the company's improvement activities. A platform was set for all the employees to contribute more and effectively in AIP's performance growth. The results achieved in the model machine and model line were used as training grounds for employees to develop more model machines and model lines in a similar way. AIP's operations are better organized and now count with more than 260 visual displays. The company recorded also tangible benefits of more than 20,000 USD per year, which resulted from activities launched in the course of this upgrading programme. Last but not least, AIP established a green belt and planted a series of trees.

After completing the programme journey, the company found itself standing on a platform from where they can change their focus from after-market companies to OEMs. They were also able to develop products for a new company based in the USA.

The company also received the “Export Award” and the “Quality and Productivity Award” in the year 2007-2008.

IMPROVEMENTS			
	Before	After	Change (%)
Productivity	4.98	5.74	+ 15
WIP (days)	85	49	+42
Employee involvement	71	100	+40
Training hours per employee per year	8	48	+313
OEE	67	84.6	+33.7
In-process rejection PPM	137,700	106,000	+23
Defects due to machine breakdowns (numbers/year)	2	0	+100
New customers added			1
New products added			1
Tangible savings in operating costs (US\$)			22,200

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

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FUTURE OUTLOOK

Aip Pistons



THE SUSTAINABILITY CHALLENGE

After the completion of the UNIDO-ACMA programme, AIP's management was very enthusiastic about continuing improvements based on the learnings and welcomed the opportunity to participate in the “Advanced Cluster Initiative” of ACMA.

Zone leaders and key personnel have been selected and charged with continuing quality and productivity enhancement initiatives in their respective zones. Zone leaders were then assigned the responsibility of sustaining the progress already achieved during the programme, covering the various blocks of the road map. They are also in charge of training others so that the momentum of the company is sustained.

This programme has taught AIP a systematic approach towards problem solving, method analysis and how to adopt best practices to compete in global markets.

The company is now also fully aware that sustaining achieved results in the productivity domain, keeping employee motivation high and maintaining zero accidents can only be achieved if the learning cycle never stops and if best practices are followed on a continuous basis.

FUTURE TARGETS

- » Improvement in the skills matrix of employees, by increasing training hours from 48 to 60 per employee per year
- » To add a minimum of two new customers by 2015
- » To reduce in-house rejections from 4,000 to 1,000 parts per million by the end of 2012
- » Achieve zero rejections from vendors by the end of 2010

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