

## **Transforming an Indian manufacturing company: The Rane Brake Linings Case**

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### **What does it take to be a global supplier ?**

How does a manufacturing company in India, that believes it can compete globally, transform itself? We believe, as do many others, that attaining global competence requires significant changes “back at the ranch” which can lead to a significant improvement in the domestic cost/quality frontier. In other words, thinking global is good for the local market.

We illustrate this point by focusing on one company in India, Rane Brake Linings (RBL). We use RBL as an example to show the significant transformation in business processes and thus outcomes in one organization and the top to bottom impact of such changes on the company. The examples from this company can serve as a template for managing change that is mission driven in many developing countries.

In 2002, RBL won the prestigious Deming prize and joined an elite group of 13 Indian companies that have won the Deming prize (see Table 1 for the entire list as of 2004). The Deming prize, awarded by the Japan Union of Scientists and Engineers (JUSE), was the culmination of a three year journey for RBL, which began with a visit by Prof Tsuda from Japan. The prize and its citation are proudly displayed in the front lobby of RBL’s offices in the outskirts of Chennai. But what was the three year transformation that culminated in the Deming prize? The company won the Deming award in 2002, has

ISO 9001 and 14001 certification and has accumulated over 200 man years of R&D experience.

**Table 1: Indian Deming Award winners list (1998-2004)**

<b>DEMING APPLICATION PRIZE</b>	
Sundaram-Clayton Limited, Brakes Division (India)	1998
Sundaram Brake Linings Ltd. (India)	2001
TVS Motor Company Ltd. (India)	2002
Brakes India Ltd., Foundry Division (India)	2003
Mahindra and Mahindra Ltd., Farm Equipment Sector (India)	2003
Rane Brake Linings Ltd. (India)	2003
Sona Koyo Steering Systems Ltd. (India)	2003
SRF Limited, Industrial Synthetics Business	2004
Lucas-TVS Limited	2004
Indo Gulf Fertilisers Limited	2004
<b>QUALITY CONTROL AWARD FOR OPERATIONS BUSINESS UNITS</b>	
Hi-Tech Carbon GMPD (India)	2002
Birla Cellousic, Kharach-A Unit of Grasim Industries Ltd. (India)	2003
<b>JAPAN QUALITY MEDAL</b>	
Sundaram-Clayton Ltd., Brakes Division (India)	2002

*Source: JUSE website: [www.juse.or.jp](http://www.juse.or.jp)*

## **New Goals**

Mr. Sundarram, President of RBL, explains it as a transformation that begins with changing the goal of the company. He describes the purpose of RBL is to “create a customer”. He explains that while there are many possible objectives to be met, there is only one that needs to be maximized and that is to “maximize customer satisfaction”. He believes that TQM provides a philosophy that aims to define a methodology that creates Quality that delights the customer while satisfying all other stakeholders. He views this as a competitive imperative because he thinks that for a business to succeed, it must

create quality that is superior to the competition “in the customer’s eyes”. He goes even further than applying TQM for improving quality of products and services and adopts the technique to almost every facet of decision making at RBL.

Is this a significant choice? Yes, as it seems to fly in the face of conventional wisdom that the only goal of a firm is to “maximize shareholder value”. But, RBL treats stock returns as a constraint – steady returns as promised are considered a target that has to be achieved, not maximized. We believe that this is a key choice for the company. In other work, we have examined whether Indian companies that have won the Deming prize have delivered better metrics than comparable companies in the Indian marketplace. Our results suggest that Deming companies seem to have chosen a deliberate strategy not to “milk the cash cow” (that is not to drain the firm of resources that fuel the generation of ideas for the future – killing the golden goose through a low carb diet?) but instead focus on improving quality subject to financial returns targets. This resulted in a deliberate choice to focus on the Deming prize – a deliberate strategic choice regarding how to compete.

## **History**

Rane Brake Linings (RBL) is a division of the Rane group, an automotive components company with a sales turnover of \$ 131 million and 4600 employees. The Rane group consists of Rane (Madras) focused on steering and suspension, Rane TRW focused on power steering and seat belt, Rane engine valves focused on valves, valve guides and tappets, Rane Brake Linings focused on brake linings, disc pads, composite

brake blocks and clutch facings and Rane Nastech focused on energy absorbing steering columns.

RBL started in 1967 in Chennai, with the second plant in Hyderabad in 1991 and a third plant in 1997 in Pondicherry. Sales turnover for RBL was \$ 70 million in 2003-04. RBL has a technical collaboration with Nisshinbo, a Japanese company. Until the 70's, Quality meant fitness for use of product sold at an affordable price. Thus, businesses differentiated themselves on this basis and superior quality in the customer's eyes, fewer defects, less irritants, lower purchase price etc. Total Quality Control focused on reducing defect rates and reducing the cost in the factory.

But in the new business environment, companies needed to differentiate their offering in the eyes of the customer, comparatively, not necessarily superlatively; by making it lighter, faster, safer, etc.; or differentiate in a manner that may be subtle: by improving service, reliability, etc. The TQM journey began in 1999 at RBL. Getting to be more profitable required finding new markets, but that required first managing the company better so that costs decreased as quality improved. RBL chose to aim for the loftiest goal, winning the Deming prize, in order to contain costs and improve quality. We believe apart from the fact that this decision was momentous and led to impressive results, the rapidity of the transformation provides further food for thought. How is it that RBL was able to achieve so much within such a small time span? We discuss this issue at the end of the case as being reflective of the potential of engineering and related services available in the subcontinent, as well as, how we believe these capabilities came about.

## **The Japanese Professors at RBL**

Rane was ready to announce its commitment to quality by submitting to rigorous examination by their Japanese professors. This represented a movement that had been termed by a local business magazine as “India endeavors to become an economical Japan to the world”. Indian manufacturers were eager to become suppliers and collaborators to larger European, Japanese, and US companies. This also reveals their (initial) reluctance to take business risk inherent in product design and direct marketing to end users. It reveals their preference for competing through engineering and technical innovations.

RBL’s TQM journey began with the choice of Prof. Tsuda as their coach. He established the following criteria for excellence: 1. Develop a business model to generate business for long period through Uniqueness in products & technology and Uniqueness in achieving certain excellence 2. Reduce technological dependence on another company 3. Create new market(s) or achieve drastic expansion of existing market 4. Unique and enhanced utilization of manpower/human resources that drives a company to supply excellent people/manpower.

As an example of the criteria used by the examiners for the Deming Prize, Prof Iizuka (Lead examiner for Diagnosis) focused on RBL’s answer to the following question: “What is your approach to competition?”. Prof Shiba (Lead examiner for final examination) focused on “How do you deal with change?” (Technology, Legislation, Competition, etc.). In other words, winning the Deming prize provided an interesting challenge whereby RBL had to justify not just use of TQM tools but its justification in managing change and managing against competitive forces shaping the business.

## **Executing TQM at RBL**

RBL decided to focus on Policy Deployment and Daily Routine Management (DRM) to achieve their TQM implementation. As a result, RBL redefined its management of processes for New Product Development System, Manufacturing Quality, Supplier Quality and Customer Quality. In the new system, each manager was required to define his role, his metrics, his measurement of performance to date and the steps being taken to improve performance. DRM deployment meant that (a) Each function will have unique purpose, (b) Each purpose will have role, (c) Each role will have managing points to achieve the purpose, (d) All managing points have measure of performance, (e) All managing points have metrics, (f) All management points have either graphs or vital activity monitoring chart, (g) Development of metrics or indices is important, specifically for non-manufacturing areas. The impact of such measurement and associated financial incentives is that the discussions of year end bonus is now a short discussion merely verifying the numbers and thus the results.

TQM implementation created tangible and intangible benefits for RBL. Intangible benefits included role clarity so that each person understood their role in the organization, their suppliers and customers, and their metrics. The focus on competency and involvement resulted in a different approach to managing people. The focus on management points and check points and the systematic approach to planning (including catch balling or adjusting plans across roles) all resulted in a management system where charts, goals and current performance relative to plan all became commonplace

throughout the company. Also, common for every problem that came up was a systematic analysis of the problem, steps taken to resolve it, impact of the steps and learning from each observation.

How does all this affect execution of specific tasks at RBL ? Customer line rejections dropped from 16000 ppm in '99 to 1750 in '03. Plant in process rejections decreased from 2.1 % of total pieces to 0.85 % of total pieces produced. Sales per employee went up from \$ 22000 to \$ 40000. Number of employee suggestions went from 280 to 7500 during the period. In other words, TQM represented a dramatic and measurable improvement across many specific metrics that would impact the company.

But, the key benefit was the continual improvement potential unleashed by TQM. When a potential buyer contracts to RBL, they become part of the TQM processes for improvement. This means that the specific business processes affect the cost reduction rate or the quality improvement rate for the buyer. The speed of response to engineering specification changes, customer requests etc. all affect the overall cost to do business.

In short, how RBL deals with cost increases, performance issues etc provide important insights into their potential for transforming into a first class global supplier. To illustrate this, we discuss specific examples provided to us by managers at RBL. The purpose of these examples is to provide a glimpse of the processes that would be experienced by a buyer in his interaction with specific functions at RBL.

### **Materials Management at RBL**

A significant issue at RBL is that raw material contributes to 39.0 % of Total product cost, i.e., 65 % of the Total Variable cost (TVC), and has an appreciable impact on product contribution. RBL defined a Material Price index – MPI, to measure the variance in the prices of key raw materials with reference to the base year 2000-01. They also focus attention on the group of high value materials that contribute to 80% of the total purchase value. Their plan was to take the then (2000) current MPI index of 100 and work to decrease it to 96 by March 2003. Of the materials consumed, asbestos constituted 60% of the total raw material cost and was imported in a fiber form from North America. Data regarding potential world sources of asbestos showed that North America provided 30.0% of world volume, CIS (Commonwealth of Independent States represented) provided 46.0%, South America 13.0%, South Africa 5.0%, Zimbabwe 3.0%, China 2.5% and India 0.5%. The decision was made to focus on CIS as a potential source replacing the North American source. In addition, the quality was expected to improve with the new fiber with the potential for reduction of in process rejections. Potential savings were expected to come from alternate source price reductions over time, savings through negotiations, savings through government incentives (to reduce foreign exchange use) etc. The implementation of the plan with the new source material was coordinated with a new product introduction at the higher level of quality, but required the new product to be tested and approved by the user, the chemical composition (called homologation) to be registered with the appropriate authorities, the sources established and deliveries streamlined, planned production coordinated with purchases to reduce air freight (and associated costs) etc. The overall impact was a delivered reduction of the MPI as planned.

How does this help a buyer making a decision regarding RBL as a potential supplier ?

It is clear that material costs are a large portion of overall costs for many automotive products. A study by Balakrishnan, Iyer, Seshadri and Sheopuri (2004) finds material costs to account for 60 to 70 % of the total costs for many auto components and related products. Thus, material cost fluctuations will require creative engineering solutions to maintain or reduce product costs. RBL's carefully documented example of cost reductions shows that the buyer can reasonably expect similar actions for their products over time, thus maintaining price competitiveness without the need for repeated supplier changes. We believe that RBL is thus selling their process management capability in addition to their products. The careful attention to programmed details brings confidence in not only the stability of the process quality but also the buyer-supplier relationship.

### **Customer and Supplier Coordination to Improve Product Specification and Performance**

One of RBL's customers introduced a new two-wheeler disc pad in the Indian market. While RBL produced the product to specifications, the pads were found to stick during use by the end customer. The customer reported the problem to RBL on 14 April 2004. The two-wheeler manufacturer claimed that the parallelism of the installed pads was not up to standard, and the flatness and surface finish were not acceptable. The possible causes could be attributed to (a) the supplier of some components of the disc brakes to RBL, (b) RBL's manufacturing of the brake linings, (c) the customer (two-wheeler manufacturer) installation of the disc brakes in the two wheeler, or (d) its use by

the end customer. However, given RBL's stated goal to maximize customer satisfaction, they decided to solve the problem for the two-wheeler manufacturer.

The first step was to devise a measurement gauge that would be used by all three companies – the supplier to RBL, RBL's manufacturing personnel and the customer. This gauge was designed to measure thickness all around the pads. RBL stationed its engineers at the supplier and the two-wheeler manufacturing sites and proceeded to use these (now standard) gauges to measure the pads. This step alone decreased error rate from 25 % to 3 %. The next step was to work on correcting the plate manufacturing process at the supplier's end. The original process at the supplier had a 0.2 mm gap between the rollers, the direction of pass of the roller (the side which faced the roller) was not specified, as well as, the number of pieces per pass was not specified. In the modified process, developed jointly by RBL and the supplier, the machine was set to have a 0.1mm gap between the rollers, the direction of pass was specified as the Lug Side, and the number of pieces per pass was set to one. These changes increased the acceptance rate from 75 % to 98 %. At RBL's manufacturing, the grinding wheel was changed from a Diamond wheel to Aluminum Oxide (60 Grits). In addition, buffing was done to clean dust. This decreased productivity at RBL but increased roughness necessary to deliver the required performance. To improve productivity, RBL changed to a 120 Grits diamond wheel. To further improve productivity, RBL switched to a three step wheel. The end point was an improved disc pad in which the sticking problem was completely eliminated. The completion date of this project was May 10, 2004!

What does this example show? It demonstrates that RBL is capable of not only understanding how they fit into the supply chain but also how the product is used by the customer. They are interested and capable of both managing process improvement across the supply chain, as well as, completing this process in a short time frame. The top management goal of maximizing customer satisfaction means that employees at RBL and managers do not need spend time authorizing engineers and other personnel to tackle such problems. Suppliers and customers do not have to worry about paying for such service. This provides RBL with an edge over companies without such top management commitment.

How does it help a potential buyer of RBL's products? The buyer can now potentially decrease the overhead (engineering and procurement staff) that would otherwise be required to play the coordination role described above. This reduction in overhead is an added reduction in direct item related costs that can make RBL more competitive overall even if their product prices are higher. In fact, one of RBL's overseas customers, who chose them over stiff competition from a supplier in another country, claimed he did it so that he can potentially take a vacation as planned, knowing that potential problems would be resolved by RBL within the supply chain. This capability may be worth a lot to a global buyer.

### **How has RBL evolved as a result of its Deming journey ?**

Sundarram, the president of RBL describes "the state of being" of an organization as the attitude towards customers, employees and improvements. He describes RBL as

having evolved from basic to systematic to strategic in its “state of being” and thus its approach to business.

Prior to the ‘90s the organization could be described as “basic,” i.e., it was focused on survival. The top management and a few employees dealt with the customer. For most employees, there was a distinct lack of awareness of the customer needs. The approach was top-down with instructions provided by top management that were executed by the rest of the company. There was no approach to improvement, the goal was to maintain status quo.

In the early ‘90s, RBL moved to a “systematic” mode of operation which was methodical but bureaucratic in its approach. The approach to the customer was contractual in nature, thus mechanical. Employees had role clarity, but, conformance not creativity was rewarded. Small improvements were permitted but large changes required top management intervention.

The end of the ‘90s through today, RBL is described as having moved to a “strategic” mode of business operation. In such a mode, leadership focuses on strategic direction and uses cross-functional interfaces at all levels. Customer contacts are viewed as opportunities and closeness with customers is encouraged. Employees are regarded as key resources with large investments in human capital. RBL proudly describes their investment in employees, which comprises of sending them for training several times over the course of just a few years to receive advanced technical training in Japan to develop their R&D capability. Finally, the company is focused on making big improvements, market expansion, and achieving its global ambitions. The organizations

is now focused on relationship quality with the introduction of (a) customer satisfaction index (CSI) and customer relationship index (CRI) and (b) direct contact between new product development and quality assurance and the customer.

## Discussion

RBL's story of quality improvement, strategic focus and creation of a modern management team empowered by a modern philosophy might seem to be an exception. However, the mantra of success at RBL is being repeated in many manufacturing firms across India today. The rapidity with which the transformation is taking place can be assessed by the table given below comparing quality and delivery related performance metrics for auto component firms.

**Table 2: Quality Performance of the Indian auto-component industry**

2001	2003
Process conformance through Quality Certifications	Process Improvements through Quality Initiatives like TQM, TPM, Six Sigma
Customer (OE) Line Rejections 1000 plus ppm	Customer (OE) Line Rejections 100 – 400 ppm
Rework 3 – 5%	Rework < 1%
First pass yield < 80%	First pass yield 95 to 97%
OEE 70 to 80%	OEE 90 to 95%
Warranty > 95%	Warranty 500 – 2000 ppm

*Source: Customer Satisfaction Tracking Surveys*

**Table 3: Delivery Performance of the Indian auto-component industry**

<b>2001</b>	<b>2003</b>
Functionally oriented delivery mechanisms	Integrated Supply chain Systems
OEMs maintained raw material & components inventory at their end	Stocks maintained by suppliers to service OEMs Just In Time (JIT) systems
Component suppliers used "push" systems - minimum batch quantity	Component suppliers use Kanban, Bin Systems - "pull" system
Key Delivery Metrics: OTD - OEMs: 70 to 80% JIT Adherence: 80 - 90% Milk Van Residence Time: 60 mins	Key Delivery Metrics: OTD - OEMs: 90 to 100% JIT Adherence: > 95% Milk Van Residence Time: 30-45 mins

*Source:* Customer Satisfaction Tracking Surveys

There are several contributing factors for the improvement in quality and global competitiveness of the Indian manufacturing sector and the auto component sector in particular. We classify these into macro-economic factors, industry related factors, infrastructure related factors, human factors and intangibles. Amongst the macro-economic factors are the liberalization strategy pursued by India since 1990 as well as the growing affluence of the middle class, thus, increase in purchasing power that has led to demand for more sophisticated products and services. Amongst the industry related factors, the establishment of Maurti Udyog in collaboration with Suzuki in the 1980s created a nucleus for propagating Japanese manufacturing best practices amongst suppliers. It is perhaps surprising how large Japanese firms ventured to enter the then small and underdeveloped (in several dimension) Indian market! The industry also saw the entry of major auto OEMs in the nineties. Survival was an issue for auto component suppliers in many ways: meeting quality, productivity, and delivery standards became essential to stay in business. The infrastructure related factors are better communication

facilities and better roads, as well as, some critical urban services. It is easy to document changes in the three areas mentioned above.

The last two factors are difficult to quantify. Amongst human factors is the fact that the Indian engineering schools have kept pace with growing demand and changing technology. Even medium sized engineering schools teach sophisticated and current topics. Moreover, there has been more and more exposure to modern design and engineering ideas due to easier exchange of ideas. Among intangibles, we list the IT revolution and its impact on several aspects: ability to handle large complex projects, communication skills, professionalism, systematic thinking, etc.

Among intangibles is also the ability of CEOs and Presidents, like Sundarram and the Chairman of the Rane group, to take a long term view towards improvement. The change to professional management at all levels that emphasizes detailed planning and customer focused execution is an important factor. The way TQM is practiced at RBL is also an eye-opener, such an approach is not found in any text book on quality in the US. There have been studies published that suggest that TQM has not really helped firms improve their financial performance. For example, Ernst and Young (1991) found that firms did not benefit from TQM. Many have blamed the failure of TQM due to poor implementation (see discussion in Sterman, Reppenning, and Kofman, 1997). What is sometimes overlooked in these studies is that TQM might have extended the lifecycle of poor products or permitted firms to compete under intense competition. TQM could simply have been a strategy to survive. RBL is different on these counts. It has invested in process improvement and capability development almost equally with a view to

gaining competitive ability. It is also different because it has adopted TQM to managing non-manufacturing processes.

### **Conclusions:**

How does a manufacturing company in India develop a capability to compete in global markets? We suggest that the strategy used by Rane Brake Linings provides one approach to the development of such capability that focuses on both policy deployment and daily routine management and thus moves a firm from a “basic” state of operation to a “strategic” mode of operation. The end result is an ability to engage with a potential buyer both to deliver current product designs as well as to evolve new designs and products over time. As most global buyers would attest, learning about a potential supplier’s “mindset” is a crucial step in the final choice – RBL’s journey to adjust and document their new “mindset” offers them significant future potential to engage with the global buyer.

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