



भारतीय प्रबंध संस्थान वस्त्रपुर, अहमदाबाद 380 015

INDIAN INSTITUTE OF MANAGEMENT Vastrapur, Ahmedabad 380 015

Dr. N.Ravichandran
Professor

March 29, 2001

Mr. P.K. Purang
Chief Executive Officer
Royal Enfield Motors Limited
Post Box No. 5284
Thiravottiyur
Madras 600 019.

Dear Mr. Purang :

Enclosed please find the case on Royal Enfield Motors Limited which is being used at Indian Institute of Management, Ahmedabad regularly in our strategy courses. As I mentioned to you, this also appeared in the book "Competition in Indian Industries: A Strategic Perspective" as a chapter. I had sent a complimentary copy of this book to your office long back.

If you are interested in buying more copies of the book you may want to contact Mr.P.K.Madhavan, Vijay Nicole Imprints Pvt. Ltd, Chennai. His email address is pkmadhu@md3.vsnl.net.in . His telephone number is 044-3743062.

I would like to prepare an independent case on ERP implementation in Royal Enfield as well as in the other units of Eicher. The focus of this case would be to concentrate on the implementation methodology and how it is being institutionalized from one unit to other unit. The managerial issues related to such a process orientation are very important and are normally not documented.

I would appreciate if you can help us to prepare such a case. On hearing from you, I would come back to you on the details.

With regards

Yours sincerely,



N.Ravichandran



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September 8, 1998

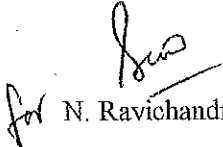
Mr. P.K. Purang
Chief Executive Officer
Royal Enfield Motors Limited
Post Box No. 5284
Thiruvottiyur
Madras 600 019.

Dear Mr. Purang :

Enclosed please find the case release form and copy of the revised version of the case. I request you to kindly sign this form and return it as early as possible to complete the formalities.

With regards.

Yours sincerely,


for N. Ravichandran

Encl: as above

Indian Institute of Management
Ahmedabad



Organization Release Form

I authorize the use of the case entitled

ROYAL ENFIELD MOTORS LIMITED

for educational purposes at the Indian Institute of Management, Ahmedabad, other institutions, companies, organizations, and in printed books and journals, provided anonymity is maintained in the said use of the material.

N. Ranichandran

Case Writer's Signature

Date 8-9-98

Signature [Handwritten Signature]
Name P. K. PURANG
Designation Managing Director
Organization ROYAL ENFIELD LTD.
Date 7.10.98.

Royal Enfield Motors Limited

The year 1993 had brought a new generation of management to the erstwhile Enfield company. After successful completion of the winning partnership, during 1990-92 between REML and Eicher Tractors, REML was incorporated as a separate two wheeler division under the corporate umbrella of Eicher Tractors, and named as Royal Enfield Motors Limited (REML) and Mr. P.K. Purang, was designated as CEO of this division in April 1994.

Mr. P.K. Purang, before taking over as CEO of REML division, was seen as a successful manufacturing head who had implemented Total Quality Management (TQM) principles effectively in the Alwar plant, one of the manufacturing facilities of Eicher Tractors Limited, situated 120 km northwest of New Delhi. The new assignment was a consequence of Eicher management decision to revamp the manufacturing efficiency at REML under the broad framework of TQM. The new assignment was seen as a career advancement for Purang, as it provided an opportunity for him to manage a complete business.

Speaking on a wide range of issues related to REML Purang said, "The year 1993-94 was focused on winning the confidence of REML workforce by explicit and extensive communication to them that the management in Madras and the larger Eicher management team in Delhi cared for their individual and family welfare. This had gradually led to a friendly environment in the manufacturing plant conducive for productivity improvements and quality performance. The year 1994-95 was concentrated on enhancing the quality of our product Bullet. A host of new measures and initiatives were taken to upgrade the image of Bullet and fix several product performance and quality related issues reported in the field. During this time, REML prepared and initiated the process of executing a strategy of developing manufacturing capability of a new engine (AVL engine) for Bullet which would enhance Bullet's power and performance, and meet the new emission norms (stringent than developed countries) of the Indian government beginning April 1997. In the year 1995-96, we concentrated on capacity, de-bottlenecking, and modernizing the production facility and investing on new machines in the plant at Thiruvottiyur, near Madras. We are roughly aiming at 5 per cent of the Indian motorcycle market. The possibility of building additional capacity either in Thiruvottiyur or elsewhere is being actively considered. The options of expanding our product portfolio in other uncovered or existing markets is a strong real possibility. A strategic planning exercise is in the advanced stage of preparation based on consultations and internal assessments."

REML Division

The beginning of REML, erstwhile Enfield India, can be traced to an initiation made by two young dynamic entrepreneurs Mr. Eswaran and Mr. Sundaram of Kalladaikurichi, a small town in the southern tip of Tamil Nadu, in 1936 when they migrated to Madras to work as mechanics in a cycle shop owned by a Gujarati businessman. The two entrepreneurs in 1939 set up the Royal Cycle Company, an independent outfit, with the intention of selling bicycles. In 1945, Sundaram's eldest son Sankaran joined the cycle business and in order to give thrust to the motorcycle business formed an independent retail outlet called Madras Motors in Broadway, Madras.

In 1949, Madras Motors bagged the first order for the supply of (Enfield) motorcycles to the Indian army. In 1952, the Indian army laid down a condition that further orders with Madras Motors would be placed only when it took up manufacturing of motorcycle indigenously. Following this, on November

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Teaching material of the Indian Institute of Management, Ahmedabad, is prepared as a basis for class discussion. Cases are not designed to present illustrations of either correct or incorrect handling of administrative problems.

21, 1955, Enfield India was incorporated as a public limited company. The first year of operations recorded a production of 163 Royal Enfield Bullet motorcycles resulting in a sales turnover of Rs. 3.8 million. The technology and knowhow for manufacturing motorcycle came from the British partner Royal Enfield Motorcycles.

Royal Enfield, UK, was incorporated in 1893. By 1904, Royal Enfield, lost interest in the motorcycle business and closed its operations, and started a motor car trade, which was operational for a while. Between 1904 and 1962, several variations of sports motorcycle were tried out by Royal Enfield in the European market. In 1962, Royal Enfield, UK, merged with a large group of engineering firms called E&HP Smith Limited. In 1967, in response to adverse business conditions, the long history of Royal Enfield, UK, came to an end, and machineries and stocks were sold off.

Product, Usage and Market

Until early 1980, Enfield India was manufacturing and selling a 350 cc motorcycle popularly known as Bullet, presumably to reflect the resemblance of the speed of a bullet shot from rifles or guns. The business portfolio of Royal Enfield, UK, included selling guns and rifles. This led to the adoption of gun shaped emblem as logo for Bullet motorcycles and this was fitted on the petrol tank of Bullet motorcycles.

Bullet was a single cylinder, four stroke motorcycle with an engine capacity of 346 cc and maximum power of 18 BHP at an engine speed of 5675 rpm. Unlike other motorcycles and scooters available in India, the engine was as an extension of the motorcycle frame. The contrast metallic (silencer) exhaust and the dark colour of the body of the vehicle, usually black, added to the impressive look and charm of this wonder vehicle, a pride of ownership for rural rich and urban young. The long telescopic front suspension and the stable shock absorbers made driving this vehicle an enjoyable experience even on the most difficult terrains.

Bullet was the only four stroke motorcycle available in India with an enviable combination of power and fuel efficiency. Bullet was designed for a topline speed of 100 km/hour, with a fuel efficiency of 35-40 KMPL. The pick up of this vehicle at 9.6 seconds (from 0 to 60 KMPH) was admirable. The imposing fuel tank with a main capacity of 14.5 litres and a reserve capacity of 1.25 litres made the vehicle suitable for long travels of up to 500 km without refuelling. It had a dry weight of 163 kg Bullet was a sturdy vehicle suitable for any terrain with excellent fuel economy. A wheel base of 1370 mm and a ground clearance (140 mm) made it the safest in its class. The vehicle was designed to move at a speed of 25 km/hour on the lowest (fourth) gear, with an enchanting beat.

The appearance and performance of this vehicle generated a sense of pride with the owner a sense of attraction in the minds of potential buyers, and a sense of disappointment with those who could afford to buy it. The army, paramilitary forces, the police department and other government establishments purchased Bullet for its sturdiness, utility in the most difficult terrain, fuel economy and long life. Bullet's useful lifetime was estimated to be about 15 years.

To a motorcycle enthusiastic, Bullet was a vehicle of excitement. Enchanting beat, power, pick up, riding comfort, sturdiness, and majestic look were all additional features which enhanced his interest. For a trader or a small size business owner, Bullet was a substitute for common company transport. The features of Bullet made it a vehicle for long distance commuting (the riding comfort, fuel economy) vehicle for the rural mass, who had their base in a developing villages but occupation or business interest in a nearby urban centre. For rural rich, Bullet was an exhibition of power, authority and importance. Generally, owning a Bullet was considered as one of the important ingredients of someone being recognized as leader. The majestic image that a Bullet ride could produce in the public eyes was the main source of inspiration for owning this vehicle.

For a motorcycle enthusiastic living outside India, Bullet was a perfect choice as a classic bike. The important considerations that made the Bullet a classic bike were (a) its long and European history, (b) the closure of manufacturing operations by the original promoters in UK. (c) the exact reproduction of the original design, preserving the classic look of the Bullet. The absence of after sales service in the markets abroad was not a constraint, primarily because a motorcycle enthusiastic was talented enough to fix minor problems. Also, as a classic vehicle, this was the second best choice of a motorcycle enthusiastic to Harley Davidson bikes. The fact that Harley Davidson produced less than the demand and hence generated a long waitlist kept the demand for Bullet vehicles alive.

EIL : The First Quarter Century (1955-1980)

The first 25 years of EIL operation was characterized by steady and moderate growth in a protected environment under the leadership of Mr. Viswanathan, the eldest son of Mr. Sankaran. Up to 200,000 vehicles had been put on road by end 1979. Bullet had become a household name in the Indian sub-continent and more specifically in the southern states of Tamil Nadu, Andhra Pradesh, Kerala, and northern states of Punjab and Delhi. It was moderately well known in certain pockets of Gujarat, rural rich segments of Maharashtra, and interior pockets of central and eastern India. Over a period of time, the company had established a wide dealership network integrated with marketing regional offices in almost all the states of India. Enfield India followed a non-aggressive pricing policy with 5 per cent dealer margin. In view of very little or virtually no competition, neither variations of the basic Bullet model nor new models were attempted. Since the design of the vehicle was fairly robust and adequate enough to the Indian consumer's expectations, not many performance or quality complaints from field were reported. Even those reported received a traditional response of indifference from a manufacturer in a protected environment. The market conditions and the business environment did not impose any need to upgrade the manufacturing plant and machinery, model features, etc. Productivity improvement in the plant was invariably linked with some enhancement in the compensation paid to the workforce after a detailed and frequent discussion with the workforce and the CEO (Mr.S.Viswanathan).

The presence of 200,000 Bullet vehicles on the road had created substantial spare parts. The parent company (Enfield India) played a limited role in the development of this market, which was estimated to be worth Rs. 600 million a year. The Bullet dealers provided a service (after sale) function for vehicles put on the road. The efficiency of this function highly unpredictable since it was dealer dependent. Also, the vehicle owners were scattered in rural and urban areas. This required an extensive service network with deep penetration in the urban and rural markets, in which Enfield was particularly weak. The large Bullet population base coupled with the lack of technical knowledge of several Bullet owners, and their unwillingness and lack of confidence to fix problems related to this bike on their own enthused, several roadside mechanic's to become experts in fixing the operational problems of these vehicles. In practice, the roadside mechanic's word of mouth publicity was the best advertisement for Bullet. Enfield India itself did very little advertising or sales promotion. It became natural and routine for several potential buyers of Bullet to consult a mechanic before finalizing their purchase options. While the brand equity of Bullet was strong, there was also an opinion among the Bullet owners that vehicle maintenance was expensive.

Enterprising mechanics made useful innovations and upgradations of the basic Bullet model. Two such variations evoked positive response from Bullet buyers. Several owners with the help of local mechanics converted the petrol driven engine to a diesel engine and operated the vehicle. This resulted a tremendous cost (operational) advantage as the diesel price in India was roughly one third that of petrol. The mileage characteristics were not significantly different. For the additional savings in the operating cost, the owner compromised somewhat on pick-up and power. The noise, vibration level, and toxic emissions (additional) were of little consequence to an enthusiastic Bullet owner. This conversion was extremely popular in certain pockets of Tamil Nadu and was flourishing systematically cutting into the sale of original Bullet vehicles to the extent of about 200 vehicles a month during 1975-80.

Some mechanics in the Delhi region came up with yet another innovation. They rebuilt a Bullet engine after its suggested economic life and offered the rebuilt engine at half the market price of the original engine. This became instantaneously popular among the Bullet owners who were in need of either a new vehicle or a replacement of their existing vehicle. According to market estimate, roughly 100 vehicles a month had been reassembled regularly by this route. Enfield India did nothing to counter this trend. The dealers were neither capable of responding to this market need and development on their own, nor had any influence on the company to initiate actions to respond to these developments.

The Decline of EIL : (1980-1990)

In the early eighties the Indian government had initiated several macroeconomic measures to facilitate the globalization of the Indian economy. The government allowed Indian companies to access global technology with ease and permitted joint ventures with international two wheeler manufacturers. This led to the availability of several state of art Japanese motorcycles in the 100 cc category in the Indian market. Existing Indian motorcycle manufacturers formed joint ventures with select leading Japanese manufacturers. The RX100 Yamaha, RX350 Yamaha, TVS-Suzuki, 4S Kawasaki Bajaj, and Hero Honda motorcycles were introduced in the Indian market as a consequence of a liberalized licensing regime.

Enfield India also had options for a joint venture. After detailed deliberation and careful considerations, Enfield India decided to choose German technology to provide good looking, rugged, fuel efficient range of vehicles suitable to Indian road conditions. The most important aspect which influenced this decision was the fragile look of Japanese vehicles and the management's view that Indian roads needed sturdy vehicles.

EIL chose Zundapp, one of the major manufacturers of light and medium range motorcycles, as technical collaborator and obtained a production licence in April 1983. A state of art manufacturing plant was set up on a 53 acre plot in Ranipet, 120 km. from Madras, at a cost of Rs. 280 million. Computer controlled machines and electronic quality control devices dominated the production shop. The new project was funded by financial institutions led by IFCI and the European Asian Bank which handled the foreign exchange component. The Ranipet plant was set up to produce Silver Plus, Explorer, Moped, and Mini Bullet, models.

EIL introduced two models - Explorer and Silver Plus - in the 50 cc category. The first Silver Plus vehicle rolled out of the Ranipet plant in January 1984. Silver Plus was a three geared moped with a kick starter and gave average mileage of 70-75 km per litre in the city traffic conditions. Silver Plus was priced at Rs. 8,000 when the 100 cc motorcycles were priced at Rs. 13,000 (1984 prices).

The Explorer was a 50 cc motorcycle with 3.3 BHP engine, a 6.5 litres fuel tank for long distance travel, hand operated gears for easy gear shifting, and a step through frame meant to be more convenient for lady riders. It had a fuel efficiency of 70 KMPL. Both Explorer and Silver Plus were designed for tough Indian roads. They could carry two persons even on rough roads with quick pick up and a top speed of 60 KMPH.

The Silver Plus was positioned at the moped high end and the Explorer was a low end motorcycle with comparable attributes including price. There was also tremendous confusion in the market on the availability of new (Japanese) vehicles. When Explorer/Silver Plus vehicles were announced, there were no 100 cc motorcycles in the market. During the booking and delivery period of these Enfield vehicles, the (Japanese) 100 cc vehicles were announced with a price differential of Rs. 5000. Further, the 100 cc vehicles were to be produced with real collaboration which extended to model, design, technology and manufacturing. However, in the case of EIL, the Zundapp tie-up was limited to only design transfer. Immediately after the tie-up the Zundapp plant ceased operations. Further, there was

no one to help EIL to actualize the manufacturing of Explorer and Silver Plus. After product launch, sales volumes dropped drastically because the vehicles had many problems. A plan to upgrade the 50 cc engine to 80 cc was thought of but found to be infeasible on pricing terms for the intended market segment. The capacity at the Ranipet plant was planned at 450,000 units per year. In early 1984, the plant was producing about 800 vehicles a month.

EIL introduced in 1985-86 a 175 cc, high speed, high power bike named Fury in collaboration with Zundapp. This two-stroke motorcycle was aimed at a fuel efficiency of 25 KMPL. Fury was a good match for several 100 cc motorcycles available in the Indian market at that time. A comparison on some of the technical and design parameters of these motorcycles is provided in Exhibit-. While in terms of design and other performance parameters, Fury was a good substitute for 100 cc Japanese vehicles, there were problems in its manufacture. Fury when produced and used on road provided a mileage of 17 KMPL as against a promised 25 KMPL. Several conformance problems were reported from the field. The noise and vibration level of Fury left nothing to be desired about this vehicle. Because of adverse market response, Fury was withdrawn, relaunched (in about six months) as Fury Deluxe, withdrawn and again relaunched (in about six months) as Fury GPX. Claims were made by EIL that all technical problems had been solved, but in reality all the problems reported earlier remained. A consultant when commissioned to work on the relaunch of the product required 12 months time for the revised launch. As this timeframe could not be accommodated by EIL, Fury was dropped from further consideration.

In June 1991, EIL launched a new model called Mofa in the Tamil Nadu, Andhra Pradesh, and Gujarat markets. This was an upgraded version of a bicycle and was positioned as a mechanized two wheeler meant for school going children as well as retired salaried employees who needed to travel short distances. This was the smallest range of a two wheeler manufactured by EIL. This 24.5 cc two-wheeler, with a mileage of 90 KMPL, was expected to be priced less than Rs. 3000, when the bicycle price was around Rs. 1000 and a comparable moped was priced at Rs. 7000.

When Mofa was actually launched it was priced at Rs.5000, thus depriving EIL of the clear market segment for which it was targeted. Hence, this product was neither a substitute for mopeds nor upgraded bicycles. The product launch was characterized by several technical and design problems. Around the same time, TVS (an important player in the two-wheeler market) launched its 35 cc Luna Champ in the market at a comparable price of Rs. 5000. These developments and the market reality made selling Mofa very difficult. The Mofa vehicle was manufactured for a short span of time in the new Ranipet manufacturing facility.

EIL also attempted in 1983 an unsuccessful launch of a Mini Bullet (175 cc) vehicle to be positioned in the Rajdoot market segment. This vehicle was meant to be the common man's Bullet. Mini Bullet a heavy duty vehicle was premium priced (higher than half of Bullet price). The sale of Mini Bullet was supported by hire purchase scheme. The Mini Bullet had technical problems in the field. In addition, the potential buyer refused to accept the concept of Mini Bullet: he either wanted to buy a Bullet or nothing. Thus this model could not take off.

During the period 1980-85 several models which directly competed with Bullet in terms of power and performance started appearing in the Indian market. RX-Yamaha 350 was a motorcycle launched in collaboration with Yamaha by Rajdoot which was positioned directly against Bullet. This Japanese vehicle was bought by several traditional Institutional buyers of Bullet, like the Police departments (in Delhi and Andhra Pradesh) and the Indian army. They soon reverted to Bullet in 1995.

Thus, EIL was an undisputed and unchallenged market leader of 350 cc motorcycles during 1985-1990. Several competing products had appeared in the market. EIL had made substantial new investments in terms of capacity expansion with borrowed capital. The plant capacity utilization at Ranipet was very low. The new products were either marginally successful or utter failures. Even Bullet was facing

threat from the new generation (of Japanese) vehicles. The Thiruvottiyur Bullet plant was the only manufacturing facility which generated some cash. The surplus generated by this plant was not sufficient to support the operations of the Ranipet plant and other related overheads. Hence, EIL started experiencing mounting losses and ever-increasing interest burden on borrowed capital. Working capital became very scarce. Things reached such a pass that vendors could not be paid for several months. The morale of the workforce put an all time low. Talented staff and management team members either left the company or were in the process of leaving soon. The brand image of Bullet was no more the first recall of a potential Indian motorcycle buyer.

Revival Strategy: Alliance with Eicher (1990-1993)

To counter the declining economic, technical, and marketing health, EIL signed a strategic alliance in 1990 with Eicher a large Delhi based automobile company with a turnover of approximately Rs. 5 billion. Eicher had diversified business interests including tractors, two wheelers, commercial vehicles, gears, garments, leather, financial services, management consultancy, and export trading. Its operations were supported by eight manufacturing locations primarily distributed in the Delhi-Haryana belt, involving 7500 employees (10% professionals). Eicher had developed and sustained a 400 strong dealer network with 1000 auto ancillary units scattered across the country.

Mr. Vikram Lal, Chairman of Eicher group, and Mr. S. Viswanathan, CEO of EIL had known each other for long. In fact, Mr. Vikram Lal was represented in the Enfield board for several years and the strategic alliance was partly a response from an old friend and a co-businessman in the auto industry. In addition, Mr. Vikram Lal himself was a motorcycle enthusiastic. His broad business vision envisaged a manufacturing and marketing presence in every segment of the auto industry. Towards this end, possibility of working together with EIL provided a complimentary market presence to Eicher, which had so far been concentrating only on light commercial vehicles.

By 1990, Enfield India was in a bad shape. The company had accumulated losses of over Rs. 220 million. The interest burden was about 11 per cent of its sales. Resources (manufacturing and human) were spread in several locations. The manpower cost at 19 per cent of turnover was one of the highest in the auto industry. The investment of Rs. 210 million in the Ranipet plant was not paying for itself and was fast becoming a burden on the company.

The Indian two-wheeler market was expected to be the largest in the world with sales exceeding 2 million vehicles per year. Roughly 25 per cent of this total market constituted the motorcycle market. The two wheeler market had recorded the fastest growth rate (of 30 per cent) since 1980. The industry went for a brief recession for a two year period (during October 1990 to October 1992) with a 25 per cent drop in the gross all India sales. The year 1993-94 witnessed a 17 per cent growth in sales and 1994-95 a little over 25 per cent sales growth.

Since Enfield was one of the oldest two wheeler companies in India with a strong brand equity, it was difficult to move out of the two wheeler business for the alliance partners. The broad revival strategy of the alliance partners was to initiate several short-term measures which would improve the operational performance of the company, and go through a financial and business restructuring to prepare EIL for its future operations. To facilitate this, Eicher brought in fresh working capital, and Enfield allowed Eicher professionals to manage and control its operations.

After financial and business restructuring, EIL was redesignated as REML, a motorcycle division of Eicher Tractors Limited. Mr. P.K. Purang took over as CEO of this division in April 1994. Since then, the management had initiated several activities to enhance the capabilities of REML to align and prepare itself with the vision of being a global market player in the motorcycle segment.

Redefined Market Segments

The potential buyers of Bullet were broadly youngsters who wanted to be trendy, exhibit power, and racing associated with youth; usually the funds for purchase were made available by parents. The second segment represented a group of users who used motorcycles for commuting long distances. This segment was typically young men working in urban cities and living in rural areas, or rich agriculturists or businessmen who need to travel longer distances. Small traders of this segment also used Bullet as a utility vehicle. The emerging third segment was the machismo segment typically characterized by single, young executive with less than 5 years of job experience or post-graduate student living in one of the urban centres. The government segment essentially consisted of defence and police departments. Less than 10 per cent of Bullet sales went to this segment.

Before 1990, all these market segments were serviced by the basic and delux models version. A major product repositioning strategy resulted in repositioning the government segment as Army and Police models with additional fittings, the standard and delux models for the traditional segment of semi-urban, rural markets, a diesel Bullet for the rural rich market, Machismo model for the urban youth, and the city bike for the Metro market, the AVL engine fitted Bullet as a substitute for the top end of 100 cc motorcycle market. According to DGM (Marketing), "Traditionally we enjoyed a protected market segment and share. The new Japanese (100 cc) motorcycles have started encroaching into our market segment, especially the urban workhorse segment. While we may not want to directly compete in this segment, we intend to prevent the further penetration of 100 cc bikes (more so TVS-Suzuki and Hero Honda vehicles) into our niche market. Consequently, product development, positioning and policy have been suitably modified to suit these needs. In addition, the implementation of fuel emission norms by April 1996, has been a major government influence in shaping our product policy. As of June 1996, all our vehicles meet the fuel emission norms. Some of the two-stroke engine models of our competitors do not meet this requirement. Accordingly, these manufacturers have requested time to modify their models."

Export Market

The performance and presence of Bullet in the international market had been marginal. REMC had exported Bullet and its variant models to the United States (120 vehicles in 1995), Japan (200 vehicles in 1995), Canada (200 vehicles in 1995), and Europe for the last ten years. Small volumes were being exported to Australia. The Korean, Taiwan, Singapore, Indonesia, and Malaysian markets were being actively explored. In 1996, 1500 motorcycles were exported, approximately at twice the domestic sales price value and higher contribution.

The international market for Bullet type of vehicles consisted of purchasers who were interested in buying a classic bike and purchasers who bought a Bullet for fun and utility value. Classified as vintage models, classic bikes were characterized by a particular year of design and/or manufacturing. The classic clones were characterized as vintage origin, old in style, and classic in all other parameters, and essentially meant for utility purposes.

According to General Manager (Exports): "The classic and vintage motorcycle model of Harley Davidson was priced at US \$ 10,000 in these markets. As of November 1, 1995, Harley Davidson had a long waitlist of 120,000 vehicles. These bikes were in acute short supply in these markets. Further, Harley Davidson operated on a quota system of regulating demand and supply. About 50,000 vehicles are sold in the primary market and a similar quantity is sold in the secondary market. Thus, the potential market for these bikes is about 100,000 a year. Bullet was priced at US \$ 4000 in these markets."

The classic vintage motorcycle market was further segmented in to two groups. Genuine, desperate vintage bike buy, who were normally in mid 40s, affluent, and owned several vehicles constituted the

first group. Price and performance were of secondary concern to these buyers. The authority and vintage value were prime concern. Bullet, by virtue of having (Enfield) a history, not a product designed in India yet manufactured in India like a product manufactured by British, provided tremendous advantage to be present in the market as a good substitute for Harley Davidson Motorcycles.

The second group consisted of buyers who wanted to own a classic like vehicle. There were usually in the late 30's. They had never faced operational problems in a bike in view of their life style and availability of trouble free motorcycles. For them cost and reliability were prime attributes. The closeness to vintage model was of secondary concern. Bullet was not best suited for this segment in view of several of its functional deficiencies.

REML export strategy for the classic market segment was to make the product available in the motorcycle shows and clubs, sell by word of mouth advertisement and target the hard core motorcycle enthusiasts. Occasional sales would be attempted to the near vintage subsegment. Aggressive marketing and sales to this segment would have to wait until the completion of the AVL project, and quality upgradation of the basic model.

The emerging export market representing the utility use of this vehicle in the developing countries was to be approached on differentiated price. The competition would be on product quality against established multinational giants. As a preparation to be present in this segment, REML had opened Bullet clubs, which would enable and encourage an international customer to travel across the breadth and width of the country to get a real experience of riding a Bullet.

REML had plans to introduce two new version of Bullet known as EGLI's motorcycle, a product developed by an independent consultant in Switzerland who modified the standard Bullet to suit the requirements of European customers. REML bought this design on royalty basis and planned to introduce these models in the Indian and overseas markets.

Distribution

REML sold Bullet through an exclusive dealership network. Bullets were shipped in specifically designed carriers with capacity of 40 Bullets to any of the 16 depots (roughly one depot for each state) by a stock transfer arrangement. The depots in turn supplied to the 280 strong dealer network, spread all over the country. Since 1990, there had been a major dealer (of REML) upgradation programme. The dealers had been motivated to change to respond effectively to the market situation. Those who could change were retained. Those who could not or did not want to change the style of operations or management were not given the dealership.

The service function of REML had been working more closely with the dealer network to enhance service revenue, and increase market spread and penetration to enhance customer confidence in the product. The average non-fuel maintenance expense of Bullet was estimated at Rs. 150 per month (1990 price). With an estimated population of 250,000 vehicles the spares market was valued at Rs. 600 million. Roughly, 25 per cent of this market was serviced by original equipment manufacturers.

Before 1990, sales and service teams were independently dealing with the dealers and the market. These were combined to reduce overhead expenses. According to a senior marketing executive, "As on April 1, 1993, our annual vehicle production was 10,000 vehicles with Rs. 100 million annual sale of spare parts, deploying 145 persons in marketing. Today (May 1996) with a staff strength of 77 persons in marketing, we manufacture and sell about 22000 vehicles per year and the spares sale is up by Rs. 50 million."

Prior to the formation of REML, the dealers used to manage the sale and marketing of spares. The distributors in turn managed the dealers. This led to the flourishing of several spurious spares manufacturers in the market. REML's spare sales represented a small share of the potential market. During 1990-94, the number of spares items had been rationalized from 1400 to 600, packaging of these items had been improved, and pricing decisions had been made more realistic (market led prices rather than contribution driven prices based on cost of manufacturing).

To keep spares sales going up, mechanics were supported by incentives for using original spares. Administration of promotional schemes (for about 250 items contributed to roughly 80 per cent of the value of spares sold. Consequently, in the three years 1993-96, spares sales had increased by 300 per cent.

As a part of revised marketing strategy the institutional market for sale of Bullet and spares sales was receiving special attention. Roughly 10 per cent of Bullet sales were to the army and police departments. This segment was being extended to forest departments, public sector units, Life Insurance Corporation, commercial banks, and other service units. The cost of selling to an institutional customer was one third of the corresponding cost of selling to a regular customer. The major strategic marketing objective was to dominate this market segment.

By focusing on large spare customers in Pune, with differentiated service, revised administrative procedures and spares order processing, and appropriate payment schedule, the spares business with defence department in Pune had increased from no sale to Rs. 20 million.

The huge dormant market potential for certain aggregates of REMC like gear boxes and engines was very tempting. According to an estimate, up to 200 gear boxes/month and about 5000 engines a year could be sold. The potential for these aggregates to cut into Bullet sale needed caution in servicing this market.

Service Function

In order to reduce the incidence of service problems subsequent to sales, a detailed procedure on pre delivery inspection was established. The handing over of new Bullet to a customer was considered an important activity and this was recognized by the service team and managed with professionalism. This occasion was also used to collect data on buyer profile through an installation form for subsequent analysis. This form ensured that customer needs were met and served as an audit on the dealers.

Detailed documentation on owner manual, wall charts on routine preventive maintenance, extensive tips for safe driving, and special tools manual for mechanics were some efforts by the service team to promote the Bullet brand and enhance the quality of after sales service.

Before to 1990, after sales service of Bullet vehicles was essentially left to the numerous roadside mechanics who were capable of fixing a Bullet. Beginning April 1994, this function was being recognized as an important support service to the marketing and sale of Bullet. A set of new measures and initiatives had been taken to harness the effectiveness of the service function in the short and long term. Apart from supporting sales, service was given an orientation of building customer confidence, enhancing the capabilities of service mechanics at roadside shops and with authorized dealers, and helping the dealers in improving the service performance in terms of capabilities and reach to customers. A team was formed for this purpose, with a Deputy General Manager in charge, who reported to the Director, Technical.

A detailed documentation on service policy and procedures was developed and was considered a sure way of ensuring dealer compliance and customer satisfaction. As a consequence a service audit for dealers had been institutionalized which covered every area of dealer operation. This audit consisted of

two parts, viz. the qualitative and quantitative segments. The audit considered to be one of its kind in the auto industry and was used for dealer performance evaluation. Initial response from dealers to service audit was reserved. The dealers perceived it more as policing. Subsequent conversation and discussion convinced them that this was a professional instrument to ensure better customer service. Gradually the dealer network started responding positively to these changes. The service department hoped that the old culture and practices of the dealership network would give way to the new motto of "quality service and quick service."

To ensure quality service access to Bullet customers, private mechanics were trained by REML. In some cases, to compensate their immediate revenue losses (during training) REML paid Rs. 60 as subsistence allowance per day per person. In addition, routine regular meetings on new products and features were conducted. To help them perform quality maintenance job, special toolings were sold at 25 per cent discount.

In 1992, a mobile service van was pressed into service. The van went to certain remote areas (where the population of Bullet vehicles did not economically justify the viability of a service dealer) and provided on the spot solutions to vehicle maintenance problems. It was fully equipped to respond to problems of a Bullet including a Bullet wash. The service van moved with spares, team of mechanics, senior executives, and nearest dealer (mechanic). During 1995-96, the service van was scheduled to visit approximately 100 locations. Until 1995, this service van had attended complaints of about 1000 vehicles. According to DGM (Service), "we have one van now. This concept has helped us to communicate to the customers that we care for their vehicles. Also, this activity has provided an opportunity to get online spot feedback on the performance of Bullet vehicle." The service van cost about Rs. 350,000. The operations of this service concept required a support of Rs. 10,000 a month as overhead and Rs. 500 per site visited.

The new service department also streamlined warranty claim administration. Every Bullet sale was supported by a warranty of six months duration or 8000 km whichever was less. The dealers were reimbursed for the expenses on warranty claims. Roughly 40 per cent of the vehicles sold registered a warranty claim. The average cost of a warranty claim was about Rs. 200 per vehicle. The service department had aimed at a response time of 15 days feedback on warranty claims as against the existing system of once in 30 days.

Manufacturing

The General Manager (Manufacturing) of REML who reported to the CEO had a wide range of experience in the auto components industry. Prior to his current position he had overseen and streamlined a manufacturing system in an auto components unit in Madras. His responsibility included actualizing the manufacturing of AVL engines, implementing the plant modernization project, plan productivity improvements, and supervise day-to-day shopfloor activities and production.

Describing his perception on the changes, the General Manager (Manufacturing) said, "During the early 1990s, the organization was struggling to survive. The manufacturing overheads were heavy. Plant capacity utilization was low. New (REML) breed of manufacturers both within Eicher and outside Eicher had joined REML. The buzz word in manufacturing now is modernization, process orientation, and product quality."

Commenting on the production system, processes and facilities during 1990-1993, he added: "This plant was characterized by old machinery, with no additional investment on facilities. The plant was dirty with very little or no housekeeping. Management attention before 1990, was in Ranipet and the Enfield plant generated resources were used to enhance facilities at Ranipet. The process shops were old. Labour skills were very narrow. Assembly was an outdated set-up. The final assembly was done essentially by using hand tools."

Explaining the incentive system he said: "The only production system operational was based on incentives, which was administered on a group basis. Different groups of workmen were assigned to components and aggregates. The ratio of total man hour available and standard hours of work needed decided the basic quantity to quality for group incentive. When this basic level was exceeded a fairly complicated tapering incentive system was operational. The least that can be said about the groupings of these operations was that they defied any logic and industrial engineering sense. For example, operation of one component and operation of another related component often formed separate work groups contributing to work-in-progress (WIP). In other words, the company was providing incentives to employees for contributing to WIP."

"The workman compensation system was governed by a long term agreement which was renewed once in three years. The essence of the contract was for a certain percentage increase in output, a certain percentage increase in wage was negotiated. For every new component, compensation was based on minimum quantity. Productivity improvements were based on deep seated hard negotiations on wages."

Describing the production planning system he said: "The production planning and control (PPC) system was essentially driven by shortages. A group of workers on a shift basis would decide how many vehicles can be assembled and the actual production quantity fluctuated considerably. The plant employed 3000 employees in 1985 and produced 100 Bullets/day. This dropped down to 35/day in 1990 with roughly the same manpower in the shopfloor. In May 1996, we were assembling 80 Bullets/day with a manpower strength of 900."

Explaining the manufacturing processes and methods prior to 1990 he said, "No process planning or manufacturing engineering did exist. The engineering function was carried out by the workman or operators. The focus on methods improvement had become the history of the past. Quality was determined by what was accepted by the market. The British designed engine was playing a significant role in the performance of Bullet."

Commenting on industrial engineering practices he noted: "The industrial relations situation was characterized by mutual mistrust, indifference and tough negotiating positions. Periodical industrial unrest was accepted as a way of life in the plant. During 1990-92, a VRS (Voluntary Retirement Scheme) was announced for a specific time period, which provided a one time payment of approximately Rs.100,000 per workman opting for VRS. Roughly 240 employees opted for VRS."

"The system did not believe in training. Workmen were never (almost) sent out on training. Once in a while, supervisory staff were sent on training. Consequent to the new management policy and philosophy during 1992-93, supervisory and workmen were sent on extensive training. Management and workmen started interacting more frequently. A large contingent of employees went on a plant tour to Alwar. Kaizen and small group activity (more than 100) were becoming increasingly popular. The workman planned and acted on their own for shopfloor improvement initiatives. The employee issues were no more on a confrontation mode or based on mistrust. Increase in productivity by methods and process improvement was gaining acceptance. Amount of work done measured in hours, in an eight hour shift has gone up. The management has recently signed a historic agreement with the union with no emphasis on the number of units produced."

As a consequence of strategic restructuring, modernization of the plant had become very critical. Streamlined materials flow, reduction in manufacturing cycling time, and offloading routine components were some priority areas. The surplus generated from operations was used to buy new machines. In (December 1995), an amount of Rs. 28 million was invested in buying the first two CNC machine centres. The modernization process had started from the final assembly (11 meters to assemble a vehicle) in view of low investment needed, and was expected to travel back to process shops, machine shop, utility and infrastructure departments (like canteen, Engine and Transmission

assembly) and then to civil works. One of the final assembly lines was conveyerised and the other line was in the process of being automated.

As a part of new facilities created, a plating shop was established in early 1994. The new painting shop was being commissioned in April 1996. The confidence of the department was so high that it was ready to face the challenge of manufacturing the state of art AVL engine with in-house capability and facility. Consequent to the modernization plan, the aesthetic quality of Bullet had gone up and was comparable to any other Indian motorcycle. The plant was assembling 50 vehicles/day in 1993, 80 vehicles/day in 1996 and aimed to assemble 100 vehicles/day by 1997.

Commenting on the near future, the General Manager (Manufacturing) said :

"In the next one and a half year we would have a completely modernized manufacturing facility. Several CNC machines would have been commissioned. The engine assembly would be on the conveyer. Both the painting and plating shops would be state of art and comparable with the best in the industry. From elementary volume, we would have respectable volumes. Quality, productivity and flexibility would be the focus. The machine shop would be organized in a cellular form. Strategically manufacturing would be restricted to only aggregates and assemblies with substantial outsourcing. Rework would be considerably low. Computerization of the shopfloor would also have begun."

Materials Management

The General Manager of materials management while acknowledging 30 per cent growth in the auto industry in the last few years (1994-96) also mentioned that REML had its share in the growing volume of business. After successful cooperation with Eicher and restructuring, several initiatives had taken place in the materials function. Elaborating on these changes he said: "Traditionally, all parts/components used to be manufactured in house. During the years 1994-96, we have off-loaded many simple, moderately critical components. Six hundred out of roughly 1000 components that go into a Bullet are being outsourced under this new strategy. This has enabled REML to reduce the cost of components and improve production volumes without additional manpower and facilities. The daily production doubled in 1995 (79/day) from 35 day (in 1994) and increased by another 30 per cent to 80/day in 1996, with no appreciable increase in manpower in the materials function."

The challenge before the materials department was how to ensure the availability of materials/components when the production volume was expected to increase further. The operational strategy was to shift to planning mode from fire fighting mode. The department had identified four major areas of action : (a) cost reduction, (b) quality inspection, (c) involvement of staff, and (d) supporting new product development.

Cost reduction: As part of the corporate strategy, the materials department announced that every vendor would attempt a cost reduction of 2 per cent which would aggregate to Rs. 200 per Bullet. This was initially met with a surprise response by vendors. Teams were formed between vendors and materials executives to identify items to reduce cost by 4 per cent. At the end of the year a 1.5 per cent savings on the cost was achieved. As suggestions were generated jointly, no problem in implementation was encountered. The alternatives generated to reduce cost essentially related to weight reduction of components, and alternative ways of manufacturing components. Generally, alternatives were generated by asking SWs and one H as per the TQM framework.

Quality: The materials department strongly believed that the quality of the final product was influenced and determined by the quality of components. Every year top ten parts (based on rejection and segregation) were taken up for detailed analysis to identify the causes of problems (equipment,

process, capability) with the vendor's manufacturing systems. Based on need, joint investment option (up to 50 per cent) was also explored to improve component quality.

Involvement of Staff: The development of the internal staff and officers of the materials department was achieved primarily by behavioral science oriented training for supervisors and managers. Workshops on role expectation and task clarification were a major instrument.

Supporting new product development: The AVL engine required development of 150 new components involving 40 suppliers out of which 17 suppliers were to be introduced afresh. A 30 per cent reduction in manufacturing lead time was achieved by using principles of simultaneous engineering, involving the supplier (vendor) at the design stage, sorting out issues in joint meetings, etc.

Vendor relations: To keep communication open with vendors, several routine meetings were held at vendor locations in Madras, Bangalore and Coimbatore. Major vendor locations were visited at least twice a year based on the magnitude of last year's billing. A 15 member vendors advisory committee was formed to discuss periodically vendor problems, concerns, and wishes. Exchange visits between vendor locations and factory was seen as a catalyst to change the mindset of vendors on product quality and process conformance. As a consequence, a strong linkage was established between the REML production plan and vendor production plan. Also vendors were routinely informed about new product development efforts.

The materials cost of a standard Bullet was Rs. 20,000 on a cost price of Rs. 32,000. The work-in-progress which was at 55 days during 1990 had been brought down to 45 days in March 1995, 33 days in 1996, and aimed to be 25 days in 1997. According to the General Manager (Materials),

The computerization of the materials management system and formal vendor rating systems are the immediate concerns of the department.

AVL Project

The DGM (R&D) in charge of the AVL project summarized the status of this project in April 1996: "The prototype of the new engine has been proven. It meets all the design, functional, and performance requirements. The reliability of the engine is being established. Multiplicity of production is yet to begin. We are somewhat delayed on this project (by say six months) but are moving in the right direction."

The introduction of AVL engine was a strategic response by REML for several reasons: (a) business compulsion for state-of-the-art (technology) engine to present Bullet as a comparable product to 100 cc Japanese motorcycles by enhancing its performance; (b) the need to effectively meet the revised fuel emission norms of the government without compromising on fuel efficiency; (c) need to position Bullet as a substitute product for upper-end of the 100 cc market motorcycle buyers; (d) to counter the encroachment of the Bullet market share by the Japanese vehicles which were priced lower for comparable usage, with one third of cubic capacity of Bullet; and (e) to establish firmly that an effective alternative to Bullet did not exist.

The AVL engine (of the classic Bullet) would enhance Bullet's fuel efficiency from 35 kmph to 70 kmph, compared to the fuel efficiency of 50 kmph of 100 cc Japanese vehicles. The new AVL engine was envisaged to deliver an increase of 30 per cent in fuel economy, 25 per cent increase in power and acceleration, 75 per cent reduction in emission, 10 per cent increase in maximum speed, 200 per cent reduction in (lubricating) oil consumption, and reliability of critical components of the new engine to at least 50,000 km.

The considerations that went in selecting AVL, a 600 strong Austria based research and development company as a partner to this new venture, were several. From REML point of view, upgradation of the Bullet engine was inevitable, the design to manufacturability of AVL engines in the Thiruvottiyur plant was governed by a strict time schedule, and REML needed a technological partner who would meet all the requirements of the project in total. Such stringent specifications left only three possible candidates for the partnership: Ricardo of UK, Southwest Research Institute (USA), and AVL, Austria.

Among the three, AVL was the largest independent research and development organization, and had the experience of having designed a wide range of engines, from the smallest cubic capacity engines to large (1500 HP) locomotive engines. The other two agencies had worked with some Indian manufacturers like Hero, Escorts, and Simpson earlier. The final reported output had not been very comprehensive on such associations. AVL had also earlier participated in similar projects with Indian manufacturers like Premier, Mahindra, TVS Suzuki, and Bajaj. In all those associations the joint outcome had been reported to be successful. Accordingly, AVL was chosen for this joint venture.

The formal contract with AVL was preceded by a feasibility study, joint discussions on how to improve the performance of Bullet engine, etc. Consequently, a clear project specification emerged. The project with a budget provision of Rs. 40 million, was to be completed in October 1995 (with a span of roughly 30 months from the beginning date). The payment release was related to specific milestones achieved in the project. The most important consideration in the evaluation of final outcome was agreed as the manufacturability of AVL engines in REML manufacturing base. A core team of three people was identified in REML and given the responsibility of this project implementation. The DGM (R&D) who supervised the AVL project had joined REML under the new management, and had worked before with a reputed two-wheeler manufacturer in India in a similar role.

The first stage of the project was marked by establishing clearly what AVL was attempting to do and what REML was capable of manufacturing. This consequently led to the design input of the new engine. A team of consultants from AVL visited REML manufacturing facilities to make a realistic assessment of the manufacturing capabilities of REML. The AVL team played the role of a consulting reference point, and suggested the investments that may be needed. REML's participation at this stage was marked by problem sharing orientation and openness to AVL design team, and this helped AVL to understand the limitations of the manufacturing capabilities that existed in REML. This stage was completed by August 1994.

The second stage was devoted to finalizing the engine layout. The sub-systems that would constitute the engine were decided. The design was influenced by the manufacturing facilities available with REML, the changes that may be needed in facilities if the elements of the engine design are finalized and conversely the redesigning of engine elements if the manufacturing process and/or facilities at REML are not changed. The sequence followed was design-manufacturability design until a final decision was made. The REML project team involved members from Production Engineering, Manufacturing, Materials, Quality Control, and Vendors during design related negotiations. An extensive communication campaign on the AVL engine was organized within REML.

The third stage began in December 1994 when the detailed design and drawing specifications were made. The role of R&D in REML in this stage was to receive the advanced drawing print, examine it from the manufacturing point of view, share the designs and drawings with the vendor, make an estimate of cost and leadtime, feedback the vendor and manufacturing REML's suggestions to AVL. REML ensured that standard components were sourced from the existing vendors and for new components the collaborators of the existing vendors abroad were suggested for sourcing. Out of 150 total components sourced 70 components were sourced off the shelf and the remaining were sourced from the list of vendors supplied by REML. The project team insisted that all tooling developed for specific components need to be transferred to REML.

By January 1995 the project entered the fourth stage, during which the tentative designs and drawings were shared with the larger project team. Vendors were encouraged to develop toolings simultaneously. From January to June 1995 a prototype was made. In the process AVL used some components directly procured from REML. In some cases the raw components were prepared by REML and (manufacturing) value addition was supervised by AVL. Whenever needed, direct component purchase was also resorted to by AVL. The engine assembly was completed in June 1995 and the first functional test was conducted in June 1995. Until November 1995 Engine tuning and optimization of the engine performance went on till November 1995. The role of REML team in this stage was more of participative and understanding the engineering changes. Subsequently, the engine was proved for performance in Austrian and Indian conditions using Indian grade fuel. Because of fall weather in Austria during November-December 1995, the road worthiness and related tests were not conducted. The fitment certification was obtained from the Automobile Research Association, Pune, in February 1996.

Describing the tasks ahead the DGM (R&D) said :

Five more engines are to be produced by AVL for accelerated testing; subsequently 50 vehicles would be assembled with AVL engines for field testing in three different regions before mass production of these engines. These developments would take place under the supervision and inspection by AVL.

Information Technology

The information systems function in REML was a part of finance and accounts department, which also supervised implementation of corporate strategy, secretarial and legal functions, government interface, and taxation. Before 1990, information systems and technology had a low profile. Payroll was the only computerized system.

During 1991-92, a materials accounting system was developed inhouse on a mini computer in a Local Area Network (LAN) environment. This was partially operational. The Information Technology (IT) functions at Ranipet, Thiruvottiyur, and Thoripakkam were brought under central control in 1992-93. By the end of 1993, the materials accounting system was in place. An attempt was made to move to an online inventory control system as motivated by the experience in the Alwar plant Eicher, but met with moderate success.

During 1993-94, the financial accounting system was implemented from scratch. The year 1994, saw financial and business restructuring and sale of the corporate office. There was perceived instability in EIL, and the year 1994 was marked by the departure of talented information system executives. An IT head, who was an engineer by training and qualification, was identified in 1995 to head and oversee data processing operations. A sequence of over 30 applications had been developed and implemented. The newly recruited executives had greater involvement. Training was used as a major enabler. Every computer application developed had complete documentation. Electronic mail (E-mail) facility was added in 1996. Connectivity with the Delhi and Pune offices was established by modem. The department employed in 1996 eleven programmers, two operators, and a senior manager who reported to General Manager, Finance.

A comprehensive strategy for IT implementation in REML was in the planning stage in 1997. The management saw great potential on investments in this function. To stay in touch with industry trends, several (about 50) personal computers were in use. A network connected with 40+ nodes was operational in spares, services, design, etc. Secretarial and routine office functions were automated. Two major areas in which computerization would make an impact were manufacturing (shopfloor, PPC, MRP, etc.) and materials.

Total Quality Management

Total Quality Management (TQM) was used to bring about change and effectiveness at all levels of employees. Formally, the TQM activities were coordinated by a senior manager who reported to General Manager (Manufacturing) in the plant.

The TQM activities focused on : (a) enhancing small group activity (SGA) approach; (b) stress on non-monetary recognition; (c) streamlining housekeeping and visual control in the shopfloor; (d) developing and implementing mistake proofing and quick change concepts; (e) initiating innovation and creativity; (f) workman education and development (leading to worker faculty for inhouse training); and (g) support to modernization projects.

Workmen training was conceptualized, designed, coordinated and delivered by the TQM cell. Since the plant modernization projects had very limited budget, workmen training was considered to be a significant input to obtain the desired results in terms of process enhancement, technical knowhow, and work practices. The training courses were broadly divided into three groups:

1. Knowledge based (how to modernize the plant, new manufacturing system package, AVL engine, and its utility).
2. Conceptual courses (TQM, SGA process, Kaizen, etc.).
3. Technical courses (CO₂ Welding, Plating, Painting, and CNC machines operations).

Kaizen was being systematically promoted. A suggestion scheme was operational. The number of suggestions per month increased to 400 in 1996 from a meagre 10 per month in 1993. Employee's motivation to take part in the suggestion scheme was kept high. Token gifts were part of the Kaizen system. Display of the suggestion added to the visibility of the suggestion scheme. According to TQM-Manager, REML :

Preparing employees to work for non-financial/monetary rewards is a challenging task. Eventually we would like suggestion scheme participation as an important input to promotion.

*Appendix 1***Salient Features of the EIL - Eicher Alliance**

1. Eicher's equity stake was increased from 30 per cent to over 51 per cent as a consequence of financial restructuring. Mr. S. Viswanathan, former CEO of Enfield India Limited (EIL), was redesignated as the Chairman of the Board of REML for life. Some of the major decisions related to the time period 1990-1993 were as follows:
 - a. The Anakaripatti plant which produced genset was shifted to the Ranipet plant (advantage, saving cost of operations).
 - b. The Bullet spares godown was shifted to the main plant.
 - c. Manpower Rationalization: By operating a voluntary retirement scheme, manpower was brought down from 4000 to 2700.
 - d. Organizational Restructure: The organization levels were reduced from nine to six. The average age of employees was brought down to 35 from 42 years. Fifty per cent of the executives and 70 per cent of the departmental heads were freshly recruited.
2. The financial and business restructuring of EIL was achieved by implementing the following scheme of activities. EIL in future would focus on its core two-wheeler business. Consequently, the agro engine and genset businesses along with two plants (Toripakkam, Ranipet) were sold for a consideration of Rs. 450 million.
3. After prolonged negotiations with financial institutions, accumulated interest and dividend (preferential) liabilities were waived (Rs. 220 million) against a one-time settlement of Rs. 330 million. The break up of Rs. 220 million of interest and dividend was as follows :
 - a. waiver of 75 per cent of simple interest outstanding as on March 31, 1993, equivalent to Rs. 140.7 million
 - b. waiver of 100% of compound interest
 - c. liquidated damages and other personal charges Rs. 71.3 million
 - d. waiver of 75 per cent of unpaid preference dividend of Rs. 76 million. As a consequence of financial restructuring the interest burden went down to 2 per cent from 11 per cent of net sales.
4. A substantial reduction in fixed cost was achieved by shifting corporate office to the factory and the sale of the corporate office building in Madras.
5. As part of manufacturing strategy, component manufacturing was reviewed resulting in offloading of several components. The manufacturing plant which had not heard of any training at the workman level, saw a massive emphasis on employee training. Employees were taken into confidence by extensive communication on business, current status and future action plan. The seeds were sown for trust based management.
6. Product quality became a prime area of attention and importance. The dealership network was reorganized by rationalizing the association of dealers. A new diesel engine motorcycle was launched. Drastic measures lead to an inventory (WIP) reduction. A fresh wage agreement was signed with the union by which there would not be any regulation on the number of units produced per shift for work; improved work practices would be adopted; and there would be better discipline in the plant.

*Appendix 2***Two Wheeler Products, Market Segmentation and Players**

The Indian two wheeler market is broadly characterized by three types of vehicles: mopeds, scooters, and motorcycles. The moped is a commuter vehicle for personal transport and was used by lower class and lower middle class population. The scooter is used predominantly by middle class households. The motorcycle is a vehicle for personal transport, commuting, and utility purposes. The three categories of vehicles constitute roughly 25 per cent, 50 per cent and 25 per cent of the total two wheeler vehicle population respectively.

The largest two wheeler market segment viz. scooters, is shared by manufacturers like Bajaj Auto Limited, Lohia Machines Limited, and Kinetic Honda Motors Limited. The lower end of the two wheeler market, ie. mopeds, is shared by manufacturers like TVS, Kinetic Engineering, and Bajaj Auto Limited. The motorcycle market segment has been traditionally dominated and shared by three Indian brands; Rajdoot by Escorts Limited, Yezdi, and Bullet by Royal Enfield. Royal Enfield enjoyed 25 per cent share of the motorcycle market.

Motorcycles are in general characterized by their larger size, and bigger engine capacity than scooters. The larger wheel base (distance between two wheels), riding position, large wheel size, and front suspension add to the safety, riding comfort and stability of the vehicle. Motorcycles with a cubic capacity ranging from 100 cc to 634 cc are manufactured in India. Motorcycles with still larger cubic capacity.

The fuel compression cycle in a motorcycle may be in two strokes or four strokes. Four stroke engines are in general more fuel efficient than two stroke engines. However, two stroke engines are generally more powerful in terms of pick up and speed. Four stroke engines are more environment friendly as they emit less of pollution causing gases. Typically a 350 cc four stroke motorcycle would provide a mileage of 30 kmpl as against 40 kmpl of a two stroke 100 cc Japanese motorcycle. Two stroke engines are characterized by less number of parts and are comparatively easy to manufacture than four stroke engines.

The Indian motorcycle market is represented by leading global motorcycle manufacturers. Hero Honda well known for its motorcycle engines, is present through Hero Honda Motors Limited in the four stroke motorcycle sub-segment. Bajaj Auto Limited a powerful large volume player, has a collaboration with Kawasaki for a four stroke motorcycle. Suzuki two stroke engines are used in motorcycles manufactured and marketed by the TVS group. Escorts Limited, a traditional manufacturer of motorcycle, has technical and manufacturing collaboration with Yamaha (for RX-100 and RX-350 range of vehicles).

A 350 cc diesel engine Bullet would average 70 kmpl. The diesel engines required for REML in 1996 were sourced from Greaves Limited. Bullet was the only motorcycle which was available with a diesel engine. A motorcycle fitted with diesel engine was characterized by higher noise level, vibration, low on pick-up and sluggish in performance. An average Indian user prefers a more fuel efficient vehicle than a powerful vehicle. With the administered price of diesel lower than that of petrol, diesel vehicles are more popular in India.

The liberalization policy and arrival of 100 cc Japanese motorcycles helped the market to expand (since early 1980) and the market is now categorized as the Japanese motorcycle market sub-segment (notable brands are RX-100 Yamaha, RX-350 Yamaha, Hero Honda, TVS Suzuki, and Kawasaki Bajaj 4S) and the Indian motorcycles market sub-segment.

The considerations that influence the purchase of a brand of motorcycle are vehicle cost, mileage provided, kind of (expected) usage of the vehicle (predominant travel in the city or country), aesthetics of the vehicle, availability of spares and services, load carrying capability, and Japanese manufacturing collaboration (substitute for perceived higher quality of the product).

The Bullet with AVL engine is designed to be a tough competing vehicle, positioned against the Japanese 100 cc motorcycles. Some parameters of comparison are included in Exhibit 3.

*Appendix 3***A Profile of Major Two Wheeler Manufacturers****Bajaj Auto Limited**

Bajaj Auto was incorporated in 1945 as Bachraj Trading Corporation. In 1948 the company commenced assembling autorickshaws, and scooters using imported components. In 1960, the name of the company was changed to Bajaj Auto Pvt. Limited, and the company commenced production of scooters at Akurdi (Pune). After the expiry of the foreign collaboration agreement with Piaggio of Italy in 1971, the brand name of the two/three wheelers was changed from Vespa to Bajaj. Production of Bajaj-Chetak scooters began in 1975 and of Bajaj-Super scooters in 1976-77. In 1975, a joint sector company, Maharashtra Scooters Limited, was set up to manufacture scooters at Satara (Maharashtra) and production of Priya scooters started in August 1976. The Pune unit of Bajaj Auto Limited, supplies CKD packs up to 350cc engine capacity to Maharashtra Scooters. A three wheeler with rear engine was developed and marketed in 1975-76. In 1981-82, it commenced the manufacture of 50cc motorcycles. A new plant at Waluj (Aurangabad) commenced production of scooters in May 1985. The machine tool division at Waluj for the manufacture of special purpose machine tools commenced operation in 1988. The KB-100 RTZ motorcycle manufactured with technical assistance from Kawasaki Heavy Industries Limited., Japan was launched in February 1988. The two wheeler (50cc) Bajaj Sunny, entirely developed by the company, was introduced in 1990. This was followed by Kawasaki-4s (a 4-stroke motorcycle), Bajaj-Super FE (a 125cc fuel-efficient scooter), Chetak Classic, and 4s Champion motorcycle.

Hero Honda Motors Limited

Promoted by Hero Cycles (P) Limited, in January 1984 in New Delhi in collaboration with Honda Motor Company, Japan. According to the agreement, Honda Motor was to provide complete technical and know-how, trade secrets and other relevant data. The agreement was for a period of ten years from June 21, 1984. Honda Motor also participated in the equity to the extent of 26 per cent. Trial production commenced in April 1985 at Dharuhera (Haryana). Hero Honda CD-100 was the first four stroke motorcycle to be introduced in India in the 100cc range. The company installed modern facilities for machining most of the aluminum components and steel components of the engine, thereby enhancing the indigenisation level to 85 per cent. The company introduced a new model, Sleek during 1989. Following its trail run in 1985, the company received permission to produce two-wheelers up to 350cc. The company is setting up another plant near Gurgaon, Haryana, to manufacture motorbikes with an engine capacity of more than 100cc. The expansion project for increasing the capacity from 120,000 units to 150,000 units was completed in 1990-91, which was further expanded to 175,000 units in 1994. With the completion of manufacturing facilities at its second plant during 1995-96, the installed capacity would go up to 3.3 million vehicles per year.

TVS-Suzuki Limited

The company originally was incorporated as Indian Motorcycles Pvt. Limited, on 15 July 1982. The name was changed to Indo-Suzuki Motorcycles Company. It was promoted by Sundram-Clayton in collaboration with Suzuki Motor Company Japan. According to the terms of the collaboration agreement, Suzuki was to provide complete technical information and know-how. Suzuki also agreed to participate up to 26 per cent in the equity stake. The agreement which ended in August 1991 was extended for three more years. Commercial production of motorcycles commenced in September 1984. The company acquired the assets of the moped division from Sundram-Clayton Limited, during 1986-88. From September 1987 the manufacture of mopeds started. The company launched a new moped with displacement of 34cc and two new models of motorcycles, Samurai and Shogan. The name of the company was changed to TVS-Suzuki with effect from August 1986.

The comparative financial performance of major players in the two wheeler industry is summarized in Exhibit 11.

Exhibit 1 Ownership pattern of EIL						
Owners	April '90		June '96		April '94	
	Rs. Million		Rs. Million		Rs. Million	
SV Group	24.8	45%	24.8	30%	-	-
Eicher	-	-	25.0	30%	50.1	54%
Financial Institutions and Banks	18.5	33%	18.5	22%	22.2	24%
Others	12.1	22%	14.3	18%	20.5	22%
Total	55.4	100%	82.6	100%	92.8	100%

Exhibit 2 Statistics Related to TQM Activities			
TQM related training	1993-94	1994-95	1995-96
No. of persons	-	557	1406
No. of programmes	-	52	156
Total Mandays	-	1770	2278
Training Manday/person	0.97	1.60	2.10
No. of Kaizens	949	2100	3420
Kaizen/Person/Year	0.84	1.86	3.03
Number of SGA Groups in operation	-	-	34
Number of Mistake proofing completed	-	-	32

Exhibit 3 Comparison of Motorcycle Brands			
Motorcycle Brand	Cubic capacity	BHP	Acceleration 0-60 kmph
TVS Shogan	110	14	6.5
RX-125 (Rajdoot)	125	12.5	7
Bullet (AVL engine)	350	19	7

Exhibit 5										
Two Wheeler Industry : Production Volume (Units)										
Category	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96
Scooters										
1. Bajaj & Mah. Scooters	431000	455700	521900	642900	656278	599240	438421	623890	741104	838672
2. LML	113400	68000	132600	148200	156891	88628	87324	136042	199440	238942
3. Kinetic Honda	17300	25300	37500	60500	76849	87477	80639	70529	92827	112496
4. Others	9300	31000	33000	28400	21872	4488	1625	860	140	31417
Total Scooters	571000	580000	725000	800000	911690	769833	608009	833321	1033511	1221527
Motor Cycles (Indian)										
1. Rajdoot	73000	84500	93300	97400	84625	53127	46076	58134	73272	94843
2. Enfield-Bullet(350cc)	17100	17700	18800	17100	16900	15681	11728	14141	16352	21637
3. Yezdi	16800	15000	6200	14100	5848	0	630	2519	5884	6451
4. Rajdoot-Yamaha	28700	44500	54000	60000	69238	64334	49036	56572	86557	92899
5. TVS Suzuki	53500	56700	54000	37900	37042	33744	30085	53120	87212	125276
6. Hero Honda	85700	70700	98000	96000	120058	134991	127803	150456	183671	230194
7. Baj. Kawasaki (Incl. 4S)	4900	19000	41000	38000	47219	35116	32547	40936	73903	89368
Total Motor Cycles	259700	308100	365300	363500	380930	336993	297905	375878	526831	660668
Mopeds										
1. Kinetic	208600	201000	231000	216000	187525	144359	128340	127121	122853	154338
2. TVS	152200	194000	181000	135700	117865	133737	128012	150910	202627	254859
3. Bajaj - M 80	37000	24900	56000	51700	75429	82521	77346	93197	125152	148826
4. Hero Majestic	58500	69000	42000	66000	74040	74783	82202	105215	121036	119280
5. Bajaj	0	0	0	0	2127	34574	61115	62286	73882	72839
6. Others	22050	62600	73400	73958	62102	32047	19292	9610	2310	19264
Total Mopeds	476350	551500	683400	543358	519088	502021	496307	548339	647862	769406
Total Two Wheelers	1309050	1430600	1673700	1783858	1811908	1608847	1402221	1757538	2208204	2651601

Model		Product Description				500 CC	Exports 350 CC & 500 CC	Enfield Diesel
		350 CC		Army	500 CC			
Items	Standard	Deluxe	Machismo	Army	500 CC	Exports 350 CC & 500 CC	Enfield Diesel	
1. Colour	Black	Peacock Blue Post Office Red	Black Post Office Red	Olive Green	Athena Grey Bottle Green	Black Post Office Red Athena Grey	Vevelite Green	
2. Handle Bar	Low Lift	Low Lift	Medium Lift	Low Lift	Medium Lift	Medium Lift	Low Lift	
3. Petrol Tank	Black Painted	Blue/Red Painted with decorative side panels	Chromium Plated and Partially Painted with knee pads	Olive green painted with knee pads	Grey/Green Painted with ENFIELD letters screen printed	Std.-> Painted Dlx.-> Plated and Partially Painted	Green Painted with ENFIELD DIESEL Stickers	
4. Seat	Dual seat plain	Dual seat plain	Dual seat step up	Dual seat plain	Dual seat step up	Dual seat step up	Dual seat plain	
5. Front & Rear Mudguard	Painted	Plated	Plated	Painted	Painted	Std.-> Painted Dlx.-> Plated	Painted	
6. Air Filter Cover	Black Painted	Blue/Red Painted	Chromium Plated	Olive green Painted	Athena Grey/ Bottle Green Painted	Black/Red Painted	Black Painted	
7. Silencer Muffler	Regular	Regular	Long	Regular	Long	Long	Regular	
8. Tyres - Front Rear	3.25x19 3.25x19	3.25x19 3.25x19	3.25x19 3.50x19	3.25x19 3.25x19	3.25x19 3.52x19	3.25x19 3.52x19	3.25x19 3.25x19	
9. Breaks - Front Rear	153 mm Single Lead 153 mm Single Lead	178 mm Twin Lead 153 mm Single Lead	178 mm Twin Lead 153 mm Single Lead	153 mm Single Lead 153 mm Single Lead	178 mm Twin Lead 153 mm Single Lead	175 mm Twin Lead 153 mm Single Lead	153 mm Single Lead 153 mm Single Lead	
10. Side Stand	Nil	Nil	Provided	Provided	Provided	Provided	Nil	
11. Keys	Key for ignition switch	Key for Ignition switch	Separate Key for Ignition switch & side box	Key for Ignition switch	Common Key for side box, Ignition switch steering, Petrol tank cap	Separate Key for steering, side box, Ignition switch	Key for Ignition switch	
12. Electricals	6V/12V DC with electronic rectifier	6V DC with electronic rectifier	12V DC with R.R. Unit	6V DC with Plate rectifier	12V DC with R.R. Unit	12V DC with R.R. Unit	12V AC/DC	
13. H/L Bulb	6V 30/24W 12V 36/36W	6V 30/24W	12V 36/36W	6V 30/24W	12V 36/36W	12V 36/36W	12V 50/40W	

Exhibit 6
Product Description

Exhibit 7
Environmental Legislation - 1996 (Applicable to Two Wheelers)

Exhaust Emissions	India		Europe	
	Current Values	April '96 Norms	Current Values	December '96 Norms
Mass Emission (gms/km)	CO - 20 HC - 2.3	CO - 4.5 (HC + NOX) - 3.6	CO - 32 HC - 3.5 NOX - 0.3	CO - 13 HC - 3 NOX - 0.3
Idling (%)	CO - 4.5	CO - 4.5	-	-

Exhibit 8
Price Differential (Bullet Price - Other Brand Price)

EIL Bullet S/V Std	Year	Escorts AC123 Rajfoot	Escorts ELE 223 Rajfoot	Escorts 236 Rajfoot	Escorts Fix 100	TVS AX100 RDLX	TVS Samurai	TVS Max 100	TVS Shogun	Bajaj KB 100	Bajaj 4S	Bajaj Endura SX	Hero Honda CD 100	Hero Honda Sleek	CD100 SS Black	Hero Honda Spldr	Yeaddi Road King
19813	1986	5337	-	3928	6200	-	-	-	-	-	-	-	4733	-	-	-	-
19318	1987	5162	-	2819	5017	-	-	-	-	3775	-	-	3683	-	-	-	-
20780	1988	5347	-	2224	3950	-	-	-	-	5095	-	-	3682	-	-	-	-
28486	1991	8446	-	1771	4835	-	-	-	-	5163	-	-	3635	1524	-	-	-
34418	1992	10555	-	867	4446	-	-	-	-	4858	-	-	3937	2042	-	-	-
38727	1993	10967	-	1942	-	4427	9631	-	-	4952	3588	-	4748	2907	3588	-	-
40358	1994	12596	10908	2653	-	5292	9670	2617	-	5258	3483	-	4722	3523	3977	-	-
43346	1995	N.A.	13516	4776	-	6795	11169	4355	-	7578	6162	8285	6955	5413	5938	3284	10064
47902	1996	N.A.	14682	5237	-	9698	14709	5843	-	10306	9072	11398	10815	7992	8527	6337	12504

Exhibit 9
What The Buyer Gets

Technical Features	Brand	Fury Grand Prix	RX 100 Rajdoot Yamaha	KB 100 RTZ Kawasaki Bajaj	Yezdi 250	Yezdi 175	AX 100 Supra TVS Suzuki	CD 100 Sleek Hero Honda
Engine		2 stroke	2 stroke	2 stroke	2 stroke	2 stroke	2 stroke	4 stroke
Cubic Capacity		163	98	99.7	248.5	175	98.2	87.2
BHP		15.2 @ 5300 rpm	11.00 @ 7500 rpm	10.5 @ 8000 rpm	13.0 @ 4500 rpm	9.5 @ 5500 rpm	9.65 @ 7000 rpm	7.2 @ 8000 rpm
Comp. Ratio		10.3:1	6.7:1	7.1:1	7.6:1	7.6:1	6.6:1	8.8:1
Gears		5	4	4	4	4	4	4
Shift System		Heel-toe	Heel-toe	Heel-toe	No heel-toe	No heel-toe	Heel-toe	Heel-toe
Ignition		Electronic-CDI	Electronic-CDI	Electronic-CDI	Fly Wheel Magneto	Magnynamo	Electronic-PEI	Electronic-CDI
Battery		6V	6V	12V	6V	6V	6V	12V
Suspension (Front)		Hydraulic telescopic	Hydraulic telescopic	Hydraulic telescopic	Hydraulic telescopic	Hydraulic telescopic	Hydraulic telescopic	Hydraulic telescopic
Stroke (mm)		155	120	125	130	130	120	120
Breaks Front		Hydraulic disc brakes	Drum	Drum	Drum	Drum	Drum	Drum
Dia (mm)		280	130	130	165	150	120	120
Rear		Drum	Drum	Drum	Drum	Drum	Drum	Drum
Dia (mm)		160	130	130	165	160	120	120
Wheels		Die cast alloy	Spoked	Spoked	Spoked	Spoked	Spoked	Spoked
Max. Speed (kmph)		110	100	95	105	95	100	85
Wheel Base (mm)		1320	1240	1260	1350	1310	1208	1220
Tachometer		Provided	Not provided	Provided	Not provided	Not provided	Not provided	Not provided
Day Flash		Provided	Not provided	Not Provided	Not provided	Not provided	Not provided	Not provided

Exhibit 10										
REML Operating Performance										
(Rs. Million)										
Liabilities	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
1. Preference Capital	10	10	10	10	10	10	10	10	10	10
2. Equity Capital	31.2	50.3	50.3	50.3	55.45	80.44	80.44	82.565	95.637	96.154
3. Share applications money	-	-	-	-	-	2.12	2.12	.733	-	-
4. Reserves & Surplus	183.78	94.49	91.48	90.01	88.11	84.53	79.13	73.764	75.805	93.347
5. E&L not written off	-	-	(52.03)	(65.60)	(123.05)	(149.33)	(224.39)	(91.779)	-	-
6. Net Worth	-	-	-	-	-	-	-	75.323	181.442	199.501
7. Secured Loans	306.28	340.63	373.37	393.46	408.32	469.06	517.38	415.294	133.198	136.786
8. Unsecured Loans	72.18	60.39	78.94	73.55	72.16	113.96	112.07	100.493	15.890	-
9. Total Debt	378.47	401.03	452.32	467.01	480.49	583.02	629.46	515.787	149.088	136.786
10. Current Liabilities & Provisions	187.53	164.43	142.57	142.97	165.51	156.35	176.89	177.316	160.775	173.855
11. Total Liabilities & Net Worth	790.99	720.35	694.73	694.90	676.52	767.14	753.65	768.426	491.305	510.142
Assets										
1. Gross Block	525.86	549.53	552.21	560.23	568.92	580.29	601.85	612.50	445.758	412.447
2. Depreciation	97.24	121.22	148.91	171.50	199.45	229.58	266.13	290.871	179.475	191.444
3. Net Fixed Assets	428.61	428.30	403.30	388.73	369.43	350.70	335.71	321.179	266.283	221.003
4. Investments	13.87	15.72	15.72	15.72	15.72	11.83	11.50	11.507	0.500	0.500
5. Bank Balances	10.18	7.16	3.32	1.80	15.06	215.45	18.52	10.461	24.407	37.938
6. Receivables	58.71	23.8	49.53	49.18	47.51	57.30	55.04	63.377	73.417	42.721
7. Inventories	291.86	170.26	146.62	150.79	141.29	215.45	181.98	139.3210	91.275	96.101
8. Current Assets (other)	77.73	70.09	76.22	88.59	87.49	111.32	150.87	222.692	35.423	111.879
9. Total Current Assets	348.50	276.32	275.71	290.45	291.36	404.60	406.43	435.740	224.522	288.639
10. Total Assets	790.99	720.35	694.73	694.90	676.52	767.14	753.65	768.426	491.305	510.142

(Rs. Million)										
Year ending March	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Sales	660.467	572.72	659.71	538.70	723.81	818.03	872.91	815.447	889.80	724.13
Gross Profit/(Loss)	37.37	(55.21)	(24.32)	7.43	(43.45)	1.91	(43.57)	(10.26)	54.21	54.03
Depreciation	18.25	24.46	27.49	21.00	27.69	26.93	32.12	23.74	8.78	11.19
Net Profit/(Loss)	19.12	(79.90)	(62.40)	(13.66)	(76.14)	(26.01)	(75.69)	(34.00)	45.43	42.84

Exhibit 11 Performance of Select Two Wheeler Companies												
(Rs. Billion)												
	1990	1991	1992	1993	1994	1995	1990	1991	1992	1993	1994	1995
	Bajaj Auto Ltd.						Hero Honda Ltd.					
Sales	10.18	11.59	12.15	12.46	16.03	21.49	1.497	2.118	2.713	3.015	3.646	4.771
Other Income	.394	.532	.567	.593	.721	.120	.025	.030	.028	.078	.053	.067
PAT	.621	.554	.430	.515	1.46	3.09	(.0032)	.1593	.1618	.1563	.1545	.1945
Net Worth	2.80	3.16	3.40	3.73	4.89	10.71	.1369	.2633	.3899	.5062	.6176	.7623
Borrowings	1.60	2.07	2.10	1.63	2.03	1.99	.4857	.4343	.5042	.6307	.5298	.3955
Net Fixed Assets	3.01	3.04	3.10	2.91	2.53	3.34	.6015	.6029	.6435	.6703	.7500	.8393
Growth in												
Sales (Percentage)	69.18	13.94	4.81	2.49	28.69	34.04	N/A	41.46	28.03	11.10	20.95	30.85
PAT (Percentage)	104.44	(10.69)	(22.40)	19.62	183.77	111.79	N/A	N/A	2.21	(3.40)	(1.15)	25.89
Average Days of												
RM Stocks	84	94	109	70	56	76	45	41	46	33	40	34
FG Stocks	11	14	9	14	10	7	13	15	14	18	11	28
Debtors	7	7	10	17	16	16	9	13	15	29	14	10
Creditors	74	62	79	64	70	70	62	68	57	36	62	74
	Lohia Machines Ltd.						TVS-Suzuki Ltd.					
Sales	2.167	2.273	2.120	2.615	3.490	5.173	1.431	1.4001	1.667	1.861	2.717	4.088
Other Income	.1328	.0550	.0639	.0650	.0667	.0330	.0915	.0014	.0010	.0027	.0031	.0030
PAT	(.0123)	.0169	(.3481)	(.0807)	.2640	.3024	(.0055)	(.0020)	.0032	.0037	.0131	.0337
Net Worth	.1946	.3214	.0721	.0123	.3056	.6152	.1217	.1009	.1329	.1707	.2745	.5542
Borrowings	1.140	.8248	.7941	.6798	.6421	.8957	.3466	.4438	.3808	.3964	.3548	.2839
Net Fixed Assets	.8722	.7932	.7350	.6539	.6101	.8867	.5413	.5361	.5297	.5101	.4988	.5372
Growth in												
Sales (Percentage)	18.95	4.88	(6.72)	23.37	33.44	48.21	(17.93)	(2.18)	20.54	10.29	45.99	50.46
PAT (Percentage)	N/A	N/A	N/A	N/A	N/A	16.82	N/A	N/A	N/A	16.13	247.88	156.65
Average Days of												
RM Stocks	121	119	84	92	90	81	40	40	30	34	30	46
FG Stocks	19	14	21	12	16	19	12	17	9	16	13	11
Debtors	28	44	32	43	28	22	62	39	47	41	35	42
Creditors	151	136	149	184	159	132	81	98	84	83	60	73