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IIPE Manufacturing News

Monthly Newsletter of the Indian Institution of Production Engineers January 2007

CHAIRMAN'S MESSAGE

Dear Friend,

My very best wishes to you and your family for a happy and prosperous New Year.

At the Indian Institute of Production Engineers (IIPE), the year 2006 was significant in the sense that we drew up the agenda for enhancing the Institute prospects and activities. The initiative was perhaps inclusive as we attempted to encapsulate the intentions and aspirations of the members. It is a matter of pride that the Institute is now 28 years old.

India is emerging as a manufacturing hub for world renowned companies. It is an acknowledged fact that the country has significant factor advantages as regards back office operations (BPOs). While the country graduates to knowledge/wealth driven economy, the opportunities for engineering goods manufacture would I believe be immense.

It is a happy augury that we at IIPE are initiating transformations at this crucial juncture. I am sure we will succeed in our efforts to reorient and reconfigure the activities of the Institute. I am sure I can count on your support and cooperation in these initiatives.

My best wishes for a very happy new year once again.

M S Zahed
National Chairman, IIPE

2006 – The Year that has gone by –

The story began in the early 1990s when then prime minister P V Narasimha Rao along with his able finance minister Dr Manmohan Singh opened the Indian economy to globalisation and reforms.

The journey still continues. The economy grew at a scorching 9.2 per cent in July-September 2006, compared with 8.4 per cent in the same period last year. The sectors that registered significant growth are manufacturing at 11.9 per cent, construction at 9.8 per cent, trade, hotels, transport and communication at 13.9 per cent, and financing, insurance, real estate and business services at 9.5 per cent. Agriculture grew by 1.7 per cent in the same period.

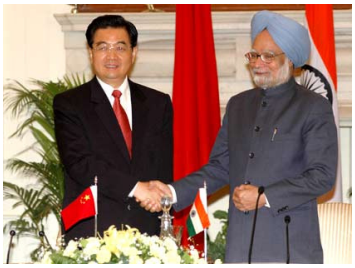
India also reported the highest average salary increase in Asia -- again -- at 13.8 per cent in 2006, compared to 14.1 per cent last year, according to the 7th annual Asia-Pacific Salary Increase Survey conducted by Hewitt Associates. And, from being the undisputed king of business process outsourcing India is set to become a leader in the global knowledge economy by 2010.

The story does not end here. The Western media, for many years, went ga-ga over the China story, featuring India for all the wrong reasons. But that has changed. From *New York Times* to *Financial Times* to top magazines like *Time* and *Fortune,* India's development stories now routinely make the headlines.

SOME NEWS MAKERS

The UN-successful
(above left)

am-Bush-ed



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INDIA NOTES

ECONOMIC REPORT, DECEMBER 2006

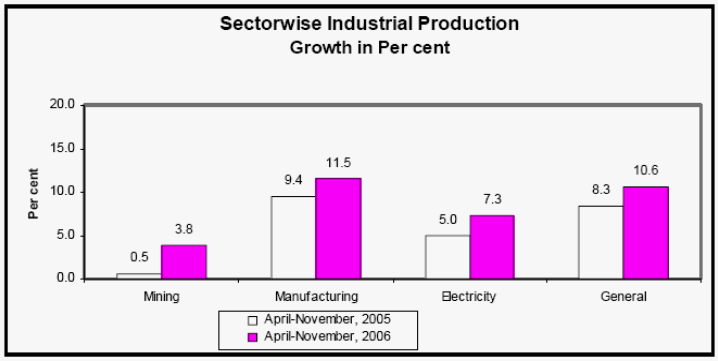
ECONOMIC GROWTH

The Indian economy grew by 8.5 per cent and 7.5 per cent in 2003-04 and 2004-05 respectively. As per the revised estimates released by the Central Statistical Organisation, the economic growth is estimated at 8.4 per cent in 2005-06. The overall growth of GDP during the second quarter (July-September) of 2006-07 was 9.2 per cent as compared to 8.4 per cent during Q2 in 2005-2006. At disaggregated level the growth was 1.7 per cent in Agriculture, 10.3 per cent in Industry and 10.9 per cent in Services.

INDEX OF INDUSTRIAL PRODUCTION

The overall growth rate of index of industrial production (IIP) during April-November, 2006 was 10.6 percent as compared to 8.3 percent in April-November, 2005. The growth rate achieved by the mining, manufacturing and electricity sectors during April-November, 2006 was 3.8 percent, 11.5 percent and 7.3 percent respectively as compared to 0.5 percent, 9.4 percent and 5.0 percent during corresponding period last year.

As per the use-based classification, growth rate in production, in April-November, 2006 of basic goods and intermediate goods showed higher growth whereas capital goods and consumer goods registered lower growth as compared to April-November, 2005.



FOREIGN TRADE

Exports, in dollar terms, during April-November, 2006 increased by 39.5 percent. Imports increased by 36.5 percent. Oil imports increased by 40.5 percent and Non-oil imports increased by 17.0 per cent.

INFLATION

The annual rate of inflation based on Wholesale Price Index (WPI) stood at 5.58 per cent for week ended December 30, 2006 compared with 4.56 per cent a year ago. This rate was contributed by an increase of 9.09 per cent in Primary Articles, 3.47 per cent increase in Fuel, Power, Lights and Lubricants and 5.04 per cent increase in Manufactured Products as against an increase of 5.13 per cent, 7.95 per cent and 3.05 per cent respectively on the corresponding date of last year.

CONSUMER PRICE INDEX

All India Consumer Price Index for Industrial Workers (CPI-IW) for November, 2006 stood at 588 (stable at previous month's level of 588). The level of CPI-IW of November, 2006 was higher than the level of November, 2005 by 6.3 per cent.

OTHER HIGHLIGHTS

- The Post-Monsoon season rainfall from October l, 2006 to December 31, 2006 was normal/excess in 25 per cent of meteorological sub-divisions.
- Food grain stocks were 18.50 million tonnes as on November 1, 2006.
- Core infrastructure sectors achieved an average growth rate of 7.8 per cent during April-November, 2006 as compared with 5.2 per cent in April-November, 2005.
- Broad Money (M3) growth (year-on-year) was 19.4 per cent as on December 22, 2006 as compared with 17.8 per cent last year.
- Forex reserves (excluding Gold and SDRs) stood at $170.19 billion at the end of December, 2006.
- Rupee appreciated against US Dollar and Japanese Yen and depreciated against Pound Sterling and Euro in December, 2006.
- Tax revenue (net to Centre) during April-November, 2006 was higher by 36.0 per cent compared with an increase of 22.0 per cent in corresponding period last year.
- In terms of value, Fiscal deficit during April-November, 2006 was lower by 4.2 per cent over corresponding period last year.
- In terms of value, Revenue deficit during April-November, 2006 was lower by 3.1 per cent over corresponding period last year.

INDIA HEADED FOR HARDWARE BOOM

The country is waking up to a hardware manufacturing boom. Over the last 18 months, investments worth $18 billion (around Rs 80,000 crore) have been committed by major global players in the electronics, IT and telecom sector (hardware manufacturing or chip design or research and development or developing software products) in the country. The Indian government expects a fresh commitment of about $2 billion over one year in telecom manufacturing alone, according to Dayanidhi Maran, Union minister of communications and information technology.

The kind of growth the government has targeted to achieve by 2010 is expected to attract investments of about $20 billion, churning out more jobs, contribution to GDP and increased government revenues. The money committed is already showing results. In less than a year of operations, Nokia's factory alone has manufactured over 20 million mobile handsets. The PC market – desktops and notebooks taken together – sold 5.04 million units in 2005-06, a growth of 32 per cent over the previous financial year. Besides, global majors such as Cisco, Motorola, Dell, Nokia, Flextronics, LG, Siemens, Foxconn and Aspocomp have already lined up or announced plans for large investments for India in hardware manufacturing.

A report by Indian Semiconductor Association-Frost & Sullivan indicates that electronics consumption in the country was around $28 billion in 2005, which formed just 2.5 per cent of global market. However, the country consumption of electronic equipment, the report states, is expected to reach $126.7 billion by 2010 and $363 billion by 2015, growing at a CAGR of 29.8 per cent.

PUNE MEETING

Quality Circles – A Presentation by Harita Seating Systems

Mr. Suresh Patil, Sr. Manager, Harita Seating Systems introduced the subject. He said the total presentation will be in three parts. A) What is Quality Circle? B) Which are the tools used in Quality Circle? C) Case study explaining how a problem related to a customer complement is solved. Harita Seating System is the manufacturer of Automobile seats and their parts. Their customers are Tata Motors, Mahindra and John Deer Tractors etc.

What is Quality Circle?

Quality Circle started way back in 1965 in Japan. Many companies like Telco, Thermax and Bajaj etc. in Pune have introduced this in their organization during 1980-85. With Quality Circle mainly we can achieve two things. One is **Employee Involvement** and second is **Problem Solving**. In this circle, a group of persons come to-gather to solve a problem at their work place.

Structure & Tools Used in Quality Circles

Mr. Kishan from Harita Seating System, explained the Structure and tools used in Quality Circle in their organization.

At the very beginning of QC, Mr. Kishan said that they gave Quality Circle Awareness Training to every employee of the company. The purpose is to understand what is QC? What are its benefits, what tools are used while working on it and how QC is to be implemented? They started this training activity at the operator level and then continued it for supervisors and others.

In Harita Seating Systems they have made a structure for this activity of Quality Circle. Each team consists of a Coordinator, a Facilitator and Team Members working in that area. Coordinator coordinates all the activities in which management decision is required or any help required from other departments etc. Facilitator sees that the progress of the team is as per schedule, the meeting are taking place regularly, there are no interpersonal problems within the team and if there are, they get sorted out. In short he sees that everything in a particular team is going smooth.

Each team is given a name like names of flowers, names of planets etc. As an example the team which gave presentation on that day was 'Prajakta'. The team meets every week after working hours after the shift is over. No body is forced to participate in this work. It is completely voluntary.

Mr. Kishan further added that to begin with the team starts collecting the problems in their area of working. These problems are related to Productivity, Quality, Control (e.g. transport or packing etc.), Delivery, Safety etc. The Quality Circle Activity includes following.

a) Discovering or Identifying a problem
b) Organizing the information
c) Generating Ideas to solve the problem
d) Analyzing actions
e) Taking actions for effective improvement
f) Establishing control for sustained improvement

Mr. Patil said that the presentation will be from Industrial Relation Point of view. He said that for an employee the wages are decided by the settlement of the Union and Employer. So what monitory benefit he is going to have is already decided, how much he has to work is also decided. Then what is the motivation for him to involve in activities other than his regular work. This is where the HR role comes in to picture and Quality Circle is one such useful activity apart from suggestion scheme and team building.

Mr. Patil further added that bringing four or five people on one platform for sharing their ideas themselves is very difficult. These people may be very good in their work but asking them to talk on a common platform is very difficult as they have never done it before. Mr. Patil was proud to tell that in his organization an operator who has only passed 10th standard with Marathi medium, by involving him in Quality Circle activity could finally give a fluent presentation in English on the work which he has done in QC. He believes that by involving workers in this activity, any thing is possible. He told that they started the presentation initially in Marathi in the factory, then in Hindi at national forum and finally in English at international forum. At Bangkok their presentation was judged as outstanding amongst the some presentations from Singapore, China etc. There was no award or any other monitory gain but making a presentation at international level was itself a motivation. While preparing for the presentation the team members used to work on weekly holiday as well as till late in the night.

Mr. Patil was very happy to tell that this is how their workers were motivated and this was just the trigger. Now everybody in their organization wants to work in QC including security persons and they have formed 10 such teams which are working on Quality Circle and solving problems in productivity, quality, cost etc. they have made a rule that same team members who have made a presentation abroad will not make it again for three years. This gives a chance to others to come forward and work hard.

While working on Quality Circle following are the tools used as stated by Mr. Kishan.

1) Check Sheet: Recording the collected data in a simple but effective method is called a check sheet. Check sheet depends on facts. By check sheet we can analyse the past and present situation. We can find out the cause and initiate countermeasures and control. Therefore a format is to be designed to suit each case. Check sheet is very important for further work and therefore following points are to be taken care of.

- Clearly identify the purpose of data collection
- Decide on how to gather data
- Decide on time period of the data collection
- Design a format which is clear and easy to understand
- Collect data consistently and honestly

2) Pareto: Pareto analysis (sometimes referred to as the 80/20 rule and as ABC analysis) is a method of classifying items, events, or activities according to their relative importance.

A Pareto chart is used to graphically summarize and display the relative importance of the differences between groups of data.

The Pareto effect even operates in quality improvement: 80% of problems usually stem from 20% of the causes. Pareto charts are used to display the Pareto principle in action, arranging data so that the few vital factors that are causing most of the problems reveal themselves. **Concentrating improvement efforts on these few will have a greater impact and be more cost-effective than undirected efforts.**

The questions Pareto Analysis answers are

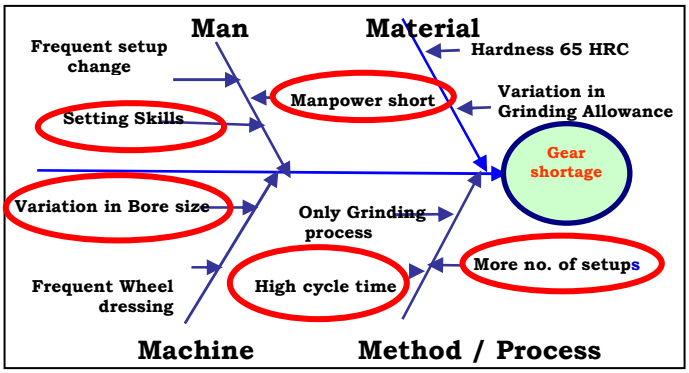
- What are the largest issues facing our team or business?
- What 20% of sources are causing 80% of the problems (80/20 Rule)?
- Where should we focus our efforts to achieve the greatest improvements?

3) Brain Storming: It is a technique to obtain creative ideas by a group of persons involved in some activity within a shortest possible time. Brainstorming is a lateral thinking process. It asks that people come up with ideas and thoughts that seem at first to be a bit shocking or crazy. You can then change and improve them into ideas that are useful, and often original and very attractive.

The QC team meets for ½ or 1 hour and start giving ideas about the problem at hand. Define the problem clearly which you want to solve. Keep the session focused on the problem. Leader has to note down all the ideas. He should not only allow all the persons in the team to talk but also encourage them to give ideas even if they seem to be wild at this point of time. Therefore leader has to really lead the team to generate many ideas.

During brainstorming sessions there should therefore be no criticism of ideas: You are trying to open up possibilities and break down wrong assumptions about the limits of the problem. Judgments and analysis at this stage will stop idea generation.

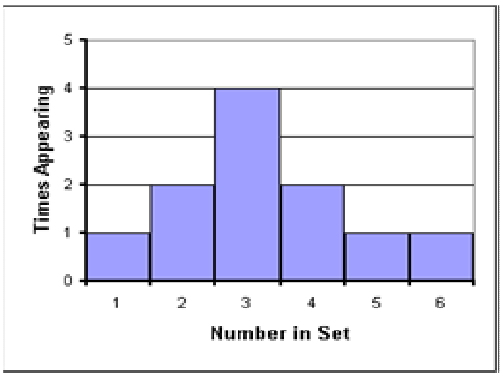
4) Cause & Effect Diagram: The cause-and-effect diagram is also called the Ishikawa diagram (after its creator, Kaoru Ishikawa of Japan), or the fishbone diagram (due to its shape).



An example of Cause and Effect Diagram is shown above. This diagram is created so that all possible causes of a result could be listed in such a way as to allow a user to graphically show these possible causes. From this diagram, the user can define the most likely causes of a result. As shown above the causes for the particular problem pertaining to all 4M (Man, Machine, Material and Method or Process) are shown against each category.

The diagrams are drawn for different level. 1st level diagram is drawn immediately after brain storming and all the causes listed in the brain storming are shown in this diagram. After discussing in detail in team meetings some of the causes are eliminated in level 2 or 3, till we conclude for the related causes for the problem. Here we need to do the 'Gamba' analysis, which is nothing but visiting the actual workplace and analysing it by thorough observation. Once we arrive at conclusion for the causes we can mark them and then can take action to eliminate the same.

5) Histogram: A histogram is used to graphically summarize and display the distribution of a process data set. In plotting a histogram, one starts by dividing the range of all values into non-overlapping intervals, called class intervals, in such a way that every piece of data is contained in some class interval



A *histogram* is "a representation of a frequency distribution by means of rectangles whose widths represent class intervals and whose areas are proportional to the corresponding frequencies."

The strength of a histogram is that it provides an easy-to-read picture of the location and variation in a data set. Histogram is used in QC for checking the process. If we mark the upper and lower limits of the tolerance to be achieved we can find whether our process is capable or not. If maximum number of observations are at the middle of the tolerances that is at the mean of higher and lower limit then our process is capable. Action is required to be taken to bring the process to the mean if it is not.

In addition to these 4 tools Mr. Kishan also discussed in brief the following tools used for QC activity.

- Graphs : Line graph, Bar Graph, Pie Graph and Radar graph
- Control Charts

After this, team members of the team which was judged outstanding at international convention Bangkok, presented a case study of their work done as a Quality Circle.

Case Study:

A team for Quality Circle from production operators was formed on 21st Nov 1998. The team was named as 'Prajakta'. The supervisor of their section was coordinator of the team and a facilitator was also identified for the team. The team members worked on a problem of customer rejection and they completely solved the problem. They all participated voluntarily and were working after their regular working hours.

a) Problem Identification: There was a list of 90 problems in the production area. The problems were grouped in A, B, C category.

'A' category means problems which can be solved within the department. 'B' category means for solving those problems help of other departments is required. 'C' category means those problems for which management permission and guidance is required.

'A' category problems were further divided in to three groups. They are Productivity related, Quality related and Customer related. They found that customer related problems were in maximum number. These problems were further divided as Critical, Major and Minor. After going through all the problems they identified that rejection of John Deer Tractor seat was very high and critical. Therefore Prajakta team decided to solve this problem by Quality Circle technique. The team found that two types of rejection.

1) While adjusting the seat forward and backward by sliding mechanism to suit the driver's height the seat was not getting locked properly.

2) The pin which was used to locate and lock the seat in position was rubbing against the bracket and was getting worn out or damaged.

b) Brainstorming: After studying the problem they conducted a brainstorming session of the team members and listed out the possible causes for the problem. And then the causes were categorised in to 4M as mentioned above. After again discussing it further they came to conclusion that the problem arises due to problems in Spring, Bush, Pin and the Lever in the sliding mechanism. The parts of sliding mechanism were checked for the dimensions as per the drawing, they found that there were some errors. The rejection was 12380 PPM.

c) Root Cause & Counter measures: Then by 'Why-Why' analysis they found the root cause for these dimensional errors. They had to work with the suppliers of these parts to get these parts defect free. For this they had to do some changes in tools, jigs and fixtures. With this the rejection was totally eliminated and the problem in the sliding mechanism was solved. After trials at customer end they found that spring used to engage pin, gets loose and after some use the force gets reduced. They took this problem to their R & D department. They designed a new spring and the problem is now totally eliminated.

d) Standardization: After they confirmed the results they standardized it and recorded the entire actions so that the same problem should not arise in any other seat. They conduct the audit at every three months to check the whether the rejection is not increased.

e) Benefits: According to the team members they got benefited as follows.

- They understood how to work in team and solve the problems systematically.
- They are now bold to talk in front of audience
- Their confidence is increased considerably for solving any problem.

Future Plans: The team has taken further project to reduce the rejection of the same seat due to other problems. The rejection which is reduced from 12380 to1547 PPM due to QC, will further be reduced because of next project.

Pune Annual Get-together, December 19, 2006

As usual, the get-together was thoroughly enjoyed by one and all who were present on the Tuesday evening, at Hotel Mahabaleshwar for the annual family get-together. In all, 23 members and 13 family members attended.

The list of those who attended is like this : Mr. & Mrs. Suhas B. Bothe (Cummins India Ltd.), Mr. & Mrs. Gadre , Mr. & Mrs. Piloskar (Retired from Bank), Mr. Anil Gaikwad, Mr. Prakash Huli (Amphenol Interconnect Pvt.Ltd. and Mr. Sachin, Prof. & Mrs. Kanbur, Mr. & Mrs Anil J. Kothari, Mr. & Mrs. Mandavgane, Mr. R.G. Hotwani (Kirlsokar Oil Engines Ltd.), Mr. & Mrs. S.S.Khire, Mr. & Mrs. Madhav P. Gore, Mr. & Mrs. Bhagwan Harani, Mr.,. Mrs. And Master Toraskar, Mr. Hemant Urdhwareshe, Mr. S.V. Phansalkar, Mr.& Mrs. S.S.Marathe, Mr. Prabhu Mantha (Force Motors Ltd.), Mr. Kuldip Deshmukh, Mr. Parag Chajed, Mr. Ashutosh Bhagat, Mr. Shantanu Bhile (all V.I.T.). Special mention must be made for the prsesence of Mr. R. Chandrasekar (National Secretary of I.I.P.E.) who had come from Bangalore, specially to attend the get-togther.

There was no dirth of entertainment, although the usual entertainers i.e. Mr. Rajendra Bharate, Mr. Balaji Reddie, Mr. S.R. Valunjkar, Mr. Ramesh Keskar and Mr. Vinay Anturtkar & family were conspicuous by their absence. Mr. Hemant Urdhwareshe regaled the audience with his accordion – both Hindi and Marathi songs. Mr. Madhav Gore narrated hilarious anecdotes from his experiences in Kolkata and East Africa. Mr. Singhal told some interesting stories about travelling by local trains in Mumbai, while he was studying at I.I.T. Powai. Mr. Bothe sang melodious songs which were tremendously appreciated by the audience. Then it was the turn of Gadre couple. First, Mrs. Gadre presented two Marathi songs, then Mr. Gadre presented a "Goulan" by Sant Eknath, and then Mr. and Mrs. Gadre sang the duet – "Bolaa Daajibaa".

The stream of programmes had to be stopped, as hot soup was served.Immediately thereafter followed the delicious dish of Crispy, Spicey Vegetables.

This was followed by Dinner – Stuffed Parathas, Plain Parathas, Veg. Biryani, Palak-Paneer, Dal Maharani, and roasted papads, pickles, bundi raytaa, green salad, etc. To top it all, there was Vanilla Ice Cream with hot Chocolate Sauce.

Every one was extremely happy, about the wonderful evening spent together, although the programme ended a little late, around 11.00.

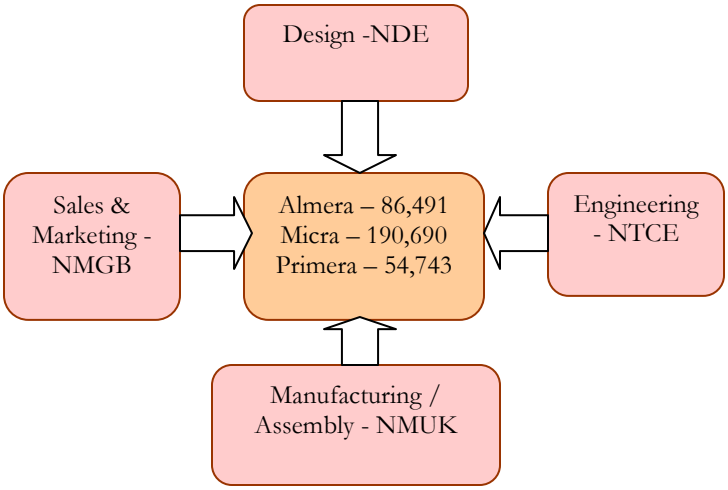
The need of a Digital Camera to catch all the action was felt by all those who felt that these memorable moments should have been captured forever. Let us hope next time we shall have a digital camera around. Mr. Chandrasekar felt bad that he had not brought his camera, else he would have been pleased to put the pictures in IIPE-Mfg. News.

CASE STUDY

Planning for quality and productivity

Introduction

Nissan Motor Manufacturing UK Limited (NMUK) is the UK's largest car manufacturing plant which is located near Sunderland. In terms of the number of cars produced annually for every person employed, it has been Europe's most productive car plant for the past seven years. This achievement is no accident. It was designed and planned for from the outset. This case study looks at some of the key elements that have contributed to Nissan's success. NMUK handles all aspects of the manufacturing/assembly of the Primera, Micra and Almera ranges:



By the end of 2003, NMUK produced 331, 924 vehicles, over 70% of this output was exported to 55 markets worldwide. As well as NMUK, Nissan operates four other UK sites.

Nissan Design Europe (NDE) supports design teams responsible for aspects such as colour and trim design, digital design, modeling, design strategy and communications. The main focus is on design for the European market, but this Nissan sub-division also contributes to global design.

Nissan Technical Centre Europe (NTCE) is in Cranfield. This is a centre of excellence for the design and development of vehicles for Nissan's European operations. NTCE is part of Nissan's worldwide network of development centres (in Japan, USA and Europe). Each centre focuses on cars prepared for specific markets; Cranfield concentrates on European customers' requirements.

Nissan Motor (GB) Ltd (NMGB) is the sales & marketing division for the UK. In ten years the company has sold over 1 million vehicles to UK buyers. The product range caters for different consumer needs, and includes:

- Micra (small, economical town car)
- Almera, Tino (medium sized multi passenger vehicle: MPV)
- Primera (saloon, hatchback and estate)
- X-TRAIL, Terrano, Patrol GR (4 X 4 vehicles)
- A complete range of Light Commercial Vehicles (LCV) - Kubistar, Primastar, Interstar, Terrano Van, Cabstar and Pickup.

Lutterworth Parts Distribution Centre is the Alliance (Nissan and Renault) parts distribution and storage facility which delivers over 135,000 parts per week to Nissan and Renault dealerships throughout the UK and Southern Ireland.

Why locate in Sunderland?

One key decision with a car plant is where to locate it. For its UK factory, Nissan chose in 1984 a 300 hectare former airfield near Sunderland. Sunderland's attractions included:

a) Skilled labour force: Manufacturing has a long tradition in the area. A decline in other local manufacturing meant that skilled labour was readily available.

b) Communications: Sunderland has good road and rail links to all major UK areas. This makes it relatively easy to bring in supplies from 105 separate UK component and sub-assembly suppliers, and also to distribute completed vehicles. A nearby deep water port (Port of Tyne) gives ready access to export markets and for the import of vehicles to the UK.

c) Government support: The government provided financial and other incentives to manufacturers who set up in an area where employment opportunities had reduced sharply and new jobs were needed. Since 1984, Nissan has increased the scale of its Sunderland operation; almost 3.5 million cars have already been made.

Production

Car assembly is a complex operation with many components requiring skilled assembly. For example,

Model	Number of parts	Start to finish (hrs)
Micra	2,239	7
Primera	2,977	10
Almera	3,471	10

That's a crude indication of what is involved. Management are particularly keen to monitor total machine-hours and total labour-hours that each vehicle requires. So far, Nissan has invested over £2.1 billion in the Sunderland site, taking its production capacity to 500,000 vehicles per year. Production methods must be able to produce what customers want, in the quantities customers require, at a price consumers are willing to pay, and at a cost that yields a profit to the business. That means that being efficient is vital to success.

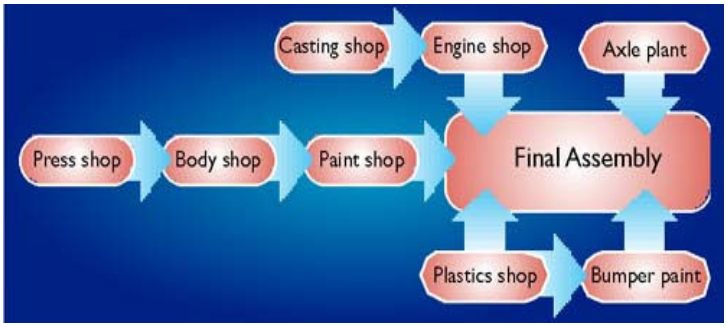
In some industries it is possible to carry out individual job production to meet a particular customer's request e.g. a wedding dress, a birthday cake, a fitted kitchen. However, very nearly all of the world's car manufacturers mass produce standard models, with

individual consumer choice being accommodated by offering various colours, interior designs, and optional extras within a limited flexible production process. People can still personalise their cars further e.g. by choosing a particular car registration or accessories.

In pursuit of high output at low average cost, car manufacturing typically uses a continuous flow production method, where sub-assemblies are brought together in a final assembly area. This is the most cost effective and efficient method of production and the speed of the final assembly line can be adjusted to match consumer demand. If demand picks up, the production line can be accelerated, within predefined limits.

At NMUK, the production flow draws on three main production shops, as well as support areas. The three main shops are:

- body assembly
- painting
- final assembly.



Supporting manufacturing areas are:

- press shop - produces panels for the vehicles
- plastics shop - makes bumpers (fenders) on site
- castings shop - makes engine parts e.g. cylinder heads
- engine shop - assembles engines, installs oil, coolant fuel
- axle plant - produces axles that are joined to engines in final assembly.

Widely different processes generate different jobs across three main broad areas.

Area of operation	Proportion of workforce
Direct manufacturing/assembly	63%
Maintenance and quality assurance	23%
Administration	14%

The machinery is scheduled to work at a given level although when demand requires it; there is flexibility in regard to both the machinery and the workforce of 4,300. At the moment, with a two-shift pattern, NMUK has a total production capacity of around 360,000 units/year - a third shift can be introduced which would take production up to 500,000 units/year if and when required.

Flow production

Nissan's Sunderland plant is technically highly advanced. It uses sophisticated robotics and computer integrated manufacturing techniques to create a carefully monitored production process that reduces errors to an absolute minimum.

Automated machines can only do so much however; the human element remains vital. Organising an effective flow of production at Nissan has involved developing a way of doing things and an attitude towards work based on giving responsibility to employees at every step. This approach raises employees' morale, and reduces absenteeism, which could severely impact on continuous flow production.

Nissan expects and requires its employees to become multi-skilled decision makers. Most employees also want that for themselves. Reaching that goal involves:

- training employees to develop their skills
- encouraging them to make decisions
- organising employees into participative teams
- developing open-channel, multi-directional communication systems
- placing quality at the heart of flow production
- flexible working practices
- providing the employee variety within his/her role.

The open communication policy includes daily face to face meetings between management and employees, a company council, employee surveys, and employees having ready access to the company's intranet system.

The emphasis placed on 'going for quality' means that each employee is responsible both for their own work and the standards of their co-workers. By ensuring management recognises that individuals have this control results in everyone taking the culture on board.

'Going for quality' emphasises 'building good quality in' rather than 'inspecting poor quality out'. Each employee controls quality by checking that the previous job has been done properly.

Total Quality Management

Total Quality Management (TQM) is a key feature of Nissan's way of working. TQM involves making customer satisfaction top priority. Given this goal, everything the organisation and its people do is focused on creating high quality. To achieve this, Nissan has to:

- understand customer requirements
- consider the processes involved in providing quality, not just the end result
- prioritise and standardise tasks to deliver quality
- educate all employees to work in this way.

In practical terms TQM involves:

- identifying customers and their requirements
- establishing and using objectives (targets) for all areas of activity
- basing decisions on researched hard facts rather than on hunches
- identifying and eliminating the root causes of problems
- educating and training employees.

TQM is an ongoing process; a way of thinking and doing that requires an 'improvement culture' in which everyone looks for ways of doing better. Building this culture involves making everyone feel their contributions are valued and helping them to develop their capabilities.

A cycle of Plan, Do, Check, Action becomes part of every employee's thinking, because it represents Nissan's way of working.

Just-in-time technology

With a just-in-time approach, specific vehicles and their components are produced just-in-time to meet the demand for them. Sub-assemblies move into the final assembly plant just as final assemblers are ready to work on them, components arrive just in time to be installed, and so on. In this way, the amount of cash tied up in stocks and in work-in-progress is kept to a minimum, as is the amount of space devoted to costly warehousing rather than to revenue-generating production. Nissan's just-in-time process depends not on human frailty but on machine precision.

Every vehicle is monitored automatically throughout each stage of production. A transponder attached to the chassis leg contains all of a vehicle's production data e.g. its required colour, specification and trim. This triggers sensors at various points along the production line thus updating the records.

When, for example, the transponder sends a message to the production system at a supplying company to produce a seat in a particular colour and trim, this triggers the relevant response and a seat to the required specification is produced. Further along the production line the specifically produced seat arrives to meet the vehicle to which it belongs - just in time.

The importance of training

It is vital to train people to work in such a hi-tech industry with such sophisticated quality systems. NMUK's training department conducts a training needs analysis to assess individual employees' needs and to organise training programmes.

The department concentrates on five main areas:

1. technical development - e.g. teaching skills relating to robotics and electrics, plus the required knowledge e.g. wiring rules/regulations.

2. people development - identifying employee needs and ambitions; providing courses to help personal development e.g. in team building and communication skills

3. understanding processes - workshops covering safety, production operations etc

4. computer skills and graduate training - from basic to highly technical

5. trainee development - courses for graduate trainees ranging from accountancy to team building.

Kaizen

Nissan is famously associated with 'Kaizen' or continuous quality improvement. Nissan states: '*We will not be restricted by the existing way of doing things. We will continuously seek improvements in all our actions.*'

Kaizen can be applied everywhere, any time, any place. It can involve the smallest change in everyday working practice as well as a major change in production technology. Typically these improvements are initiated by teams of employees sitting down together and sharing ideas for improvements. Small steady changes are maintained to make sure that they actually work. No improvement is too small. Everyone at Nissan is responsible for thinking about the current way of doing a job and finding a better way of doing things.

Kaizen improvements can save:

- money
- time
- materials
- labour effort

as well as improving quality, safety, job satisfaction, and productivity.

Kaizen permeates the NMUK suggestion scheme, which offers not financial or individual rewards but items that benefits the whole team e.g. a microwave for the staff kitchen, a pool table for the canteen.

Conclusion

Productivity levels at Nissan's plant in Sunderland, and the quality of final production there, have not happened by chance or good fortune. They stem from an all-embracing approach to a production process, designed to bring out the best in both people and machines. It continues to be conspicuously successful.

CORPORATE CLIPS

Ford to drive in clean diesel technology to India

Ford Motor Company is planning to extend its clean diesel technology engines to the Ford family of cars in the Indian market. "Alongside clean diesel technology, the company has been working on developing micro hybrids for the global market. Micro hybrids are currently being developed at centres located in New Jersey and Germany. The technology would be ready for the commercial markets in the next couple of years," Haren Gandhi, manager, chemical engineering department, Ford Research & Advanced Engineering said.

"If you ask me what is the answer for every country's fuel problems, I would say there is no single solution for any nation. If ethanol worked for Brazil, it does not mean it could work for the rest of the world. I was quite excited by the recent discovery of natural gas at the Bay of Bengal. This augurs well for India and would reduce India's dependence on imports.

The introduction of CNG buses in Delhi is a prime example," Gandhi said, adding that a multitude of solutions would work for India. If India was producing ethanol, the country should go ahead and blend fuels by five% to 10% to reduce imports, he said.

Mathew Oommen, general manager, product engineering, Ford India said the company was examining the economics of introducing it's clean diesel engine Duratorq in all its models. "Currently, Duratorq is fitted in Fiesta. There are plans to extend the Duratorq engine family to other Ford vehicles in India such as Fusion, Ikon and Endeavour," he said, unwilling to give a specific time frame.

Diesel is the way forward. Several countries are seeing an increase in the number of diesel vehicles. Europe is seeing a rapid penetration of diesel passenger cars helped by favorable government policies and evolved diesel technologies

M&M to invest Rs 2,500-cr in trucks plant

Automotive major Mahindra & Mahindra on Tuesday said it would set up a Rs 2,500-crore greenfield facility at Pune in Maharashtra to manufacture commercial trucks. For this, M&M will use its joint venture with US-based International Truck and Engine Corp. This JV, which would have an initial manufacturing capacity of 2,50,000 units, will produce medium and heavy commercial vehicles as well as other M&M products. Of the total production, 40,000 to 50,000 vehicles will be exported to the rest of Asia and parts of Africa.

The scale of M&M's commercial vehicle plans will make existing players sit up and take note. The plant would also make new-generation vehicles as well as engines, transmission units and other aggregates at the plant. This would be M&M's fourth facility in the state, after Kandivli, Nashik (for Logan) and Igatpuri (for engines), said Pawan Goenka, president, automotive sector, M&M. Commercial production of vehicles at the Pune facility was expected to start in two years.

Most of the production is expected to cater to domestic demand. The product mix is not known but the plant will have the flexibility to produce a wide range of vehicles for commercial purposes. Its existing set of commercial market products could be made at this plant too. But key is that in a short span of two years, it will be able to adapt the existing range of trucks from International Truck and Engine Corporation (ITEC) for the Indian market. That could trigger a war of sorts in the Indian commercial vehicle market where Tata Motors and Ashok Leyland are the key contenders at the moment. In recent times, the shift in tonnage has been to heavier trucks, due to better roads, higher throughput and the ban on overloading. These are the segments M&M will most likely target two years hence when the production starts.

VIP plans to check into luxury baggage

The luxury baggage segment in India seems to be hotting up. Close on the heels of Samsonite's decision to enter the luxury category, VIP Industries is planning to foray into the high-end designer luggage segment. The company would also be introducing a new brand in the domestic market for the new range of luxury products. "At present, Louis Vuitton is the only brand that represents this category in India and we see an opportunity there. We may also rope in a foreign partner for design and manufacturing," said a top official of VIP Industries.

However, the company is yet to finalise its plans. "It is too premature to give any concrete plans. The luxury segment in India is very small. As per estimates, it is about Rs 5 crore and we may consider entering the segment in future. But it may not be under the VIP brand. Besides, we need to look at our manufacturing capacity as well," VIP Industries director Sudhir Jatia told. The overall luggage market, he said, was pegged at Rs 850 crore and growing at 15%. "Currently, our focus is on the retail segment. We are planning to relaunch Skybag and Aristocrat line of baggage in the below Rs 1,500 range for hypermarkets and malls," he said.

VIP, the flagship company of the DG Piramal Group, is expecting to clock revenues of about Rs 500 crore this year against Rs 400 crore last year. They are also awaiting the Mumbai High Court nod for our merger with Blow Plast, which will bring synergies due to integration in operations from manufacturing to marketing.

Recently, Samsonite announced the introduction of a sub-brand, Black Label, with products priced Rs 20,000 upwards. Besides roping in a number of international designers, the company is also planning an exclusive retail network to support the new sub-brand. Global luxury brand Louis Vuitton (LV), part of the $17-billion Moet Hennessy Louis Vuitton (LVMH) group, is also understood to have plans to set up its first manufacturing plant in Asia at Pondicherry through a joint venture with Hidesign. LV brands are present in India since 2004. Prices at the Louis Vuitton store range from Rs 15,000 to Rs 1.5 lakh.

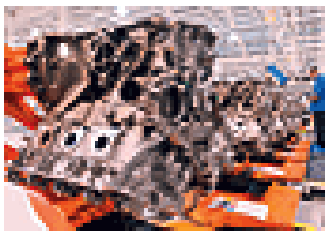
TECH TRENDS

Fluid situations

Cutting fluid is an often-neglected component of a manufacturing facility, but with increasing cost of purchase and stricter environmental controls over its disposal, it is a vital element of any production strategy. It is not just the choice of coolants and lubricants that counts, but how to manage their use and disposal. Two of the most popular options available for high-volume manufacturers are to enter into a service arrangement with one of the main suppliers or invest in a coolant recycling system.

One of the heaviest users of coolant is the automotive sector, so it is no surprise to see it leading the way. A cutting fluid reprocessing facility installed and managed by Castrol has reduced waste fluid disposal by more than 80 per cent at Perkins Engine plant in Peterborough. The two transfer systems on site have an annual output of 20,000 cylinder heads and cylinder blocks for Caterpillar engines. A cylinder head machining line produces 80,000 units and a bearing cap machining facility produces 150,000 sets for a variety of different engines.

Four years ago the company adopted Six Sigma methodology and applied the system to evaluate the potential for outsourcing fluid management. After the review, which included proposals from the existing cutting fluid suppliers, the company concluded that a total fluid management programme would not benefit the business. However, some of the specific proposals put forward in Castrol's proposal were of interest, and the company decided to use them in a separate working partnership. Initially the partnership focused on a specific project, and Castrol was awarded a contract to install and manage coolant reprocessing and laundering equipment in the main metal cutting facility responsible for producing cylinder blocks and heads.



The performance of the three-year contract exceeded expectations by making a substantial saving in costs and, more importantly, a significant reduction in the amount of waste cutting fluid that required disposal. Commenting on the project, Perkins manufacturing manager Chris Baty-Symes explained that the waste fluid volume was reduced from 466,000 litres to 45,000 litres — a cut of over 90 per cent. He added that while cost savings are important, meeting the demanding target of zero emissions to landfill by 2010 set by parent group Caterpillar's environmental policy was an even greater incentive.

'We expected the environmental benefits to be at least cost-neutral,' he said. 'But this was a major environmental improvement that was cost-beneficial and meant that the equipment paid for itself within the contract period.' The waste reduction improvements achieved in the first 12 months not only met Perkins' 2003 target, but also enabled the company to meet its 2006 targets two years ahead of schedule. And, having demonstrated the effectiveness of the products and the technology that it brought to the partnership, Castrol is now working with Perkins to investigate other opportunities to improve the way its fluids are managed.

Increasing the performance of a coolant system does not necessarily mean handing the entire process over to a third party. Excellent savings can be achieved by installing a cutting fluid recycling system, as did Nissan UK. The car giant installed a Master Chemical fluid recycling system last year with an initial aim to reclaim between 60 and 80 per cent of its waste production cutting fluids. The system soon substantially broke through this target and within months was achieving levels of 90 to 95 per cent. Now, less than a year on, the results continue to surprise with reclaim efficiency levels of 100 per cent being recorded in recent months, assisting Nissan's control of on-site waste and ISO 14000 environmental objective — in particular the on-site waste management volume.

Demand on the system has grown in line with the company's increased production of cylinder heads at its Sunderland plant. This growth in manufacturing was resulting in its swarf-centrifuging system extracting upwards of 1,000 litres of machining fluids a day. Keen to conform to ISO 14000 environmental management standards, the company invested in a Master Chemical XYBEX 3000 Autodesludge Centrifuge Recycling System. This water-miscible system is specifically configured to remove tramp oil and particulate matter from coolant, and wash fluids down to eight microns or less. The unit is equipped for use on high temperature and high pH fluids and, being mobile, is able to process fluids in different locations within the group's engine parts manufacturing facility. Since the launch of the system, Nissan UK reckons to have saved just over 160,000 litres of metalworking fluids This presents the prospect of the company saving in excess of £20,000 a year in coolant oil alone. So a speedy return on investment is certainly assured. All in all, the system has far exceeded the initial expectations/ planning calculations.

At Ford's Dagenham plant, the high-volume car maker opted for a coolant recovery system from Clearwater Systems for its machining and process operations. It purchased a dedicated coolant recovery system after the company realised the vast potential for savings from its stamping operations. A year on Ford is enjoying the benefits of increased tooling life and a notable reduction in coolant disposal. High-volume engineering, such as Ford's production of wheel rims, uses large amounts of coolant that had to be replaced frequently to ensure high-quality products and prevent tools from being damaged by contamination. This in turn meant higher coolant purchases and hazardous waste disposal costs.

Clearwater was brought in to design and install a system that would address these issues. The cost savings on coolant became apparent within the first quarter, and hazardous waste disposal costs were reduced dramatically. A hydrocyclone system was also introduced to remove swarf particulate which links to Ford's existing band filter to remove large particulate. According to Horn, from machining workshops to large plants, everybody with the need for extending coolant life can benefit in the same way as Ford.

VARIETY

TOON CORNER

TIME TO THINK

Culture Lag – Sri Sri Ravishankar

When you are at peace with yourself and facilitate ease in your atmosphere, your work culture improves automatically. All managers should constantly be thinking of ways and means of creating an easy, informal atmosphere. Whenever you walk into your office, you always get a salaam; but do you look behind the greeting? Is it really genuine?

Most of these pleasantries that we exchange; saying thank you, how kind, have a nice day... all tend to come from a superficial level. Its like the mechanical, usually meaningless greeting…"Have a nice day", that you get from the airhostess while disembarking. The entire work environment is marked by such superficial, sometimes even hypocritical greetings. How can you expect such an environment to be productive?

The President of the World Bank once asked me, What is the secret of your success? How do you get so much work done with so little money? I said it is not just money that gets work done but something more... It is the freedom in your workspace. Just in one year's time 3,000 volunteers adopted 25,000 villages in India; they made roads and provided proper drinking water among other things. And, all with less than Rs 2 crores at their disposal.

Though difficult to believe, it became possible only due to the dedication and inspiration of the workers. But if someone isn't inspired from within, a healthy work culture is just not possible. Goals are attained either due to inspiration, or due to emergency deadlines and fear psychosis. If fear psychosis is created (and many of our organisations run on fear psychosis), it may help attain deadlines but is not a healthy practise. To achieve deadlines, the insecurity must be dropped rather than the motivation.

The mindset must also be attended to. And it manifests at two levels; the authoritarian mind, and the labour union mind. The authoritarian mind finds everybody wanting; it says, "Only I am right, nobody can perform as well as I can", and so does not take on responsibility for making others work. This happens at the managerial level; the authoritarian mind does not trust anybody. And if it doesn't trust anybody, how can it inspire someone to work? Delegation is critical to success, but is possible only when you step out of the authoritarian mind.

Conversely, the labour union mindset constantly complains that the manager is not good, he doesn t let me function. The labour union mind thinks "I can't do anything because so-and-so is in-charge; it is this so-and-so who is responsible for me not doing my work." It always tries to pass on the onus of responsibility. The labour union mindset must learn to take total responsibility and to revere dignity of work, whatever its nature.

We need to shed both, the authoritarian mind and the labour mindsets. And, instead, we must imbibe a determined, practical mindset. When you are allocated a task that you believe is mortally impossible, once you take it on, you will see that it happens; and it happens because of your Atmik Shakti, your Sankalpa Shakti. What you call Sankalpa is your determination. For instance, I had announced that I would go to Pakistan. But even on the day I was supposed to fly out (a good fortnight later), I had no visa and everybody was discouraging us. But at 4 O'clock we get the visa, at 6 O'clock I take the flight and go. There are many such instances; not once, but over and over, time and again it has happened.

The human mind says "only I am functioning, I am in charge of everything"; but there is actually something else that is at work, that gets the work done. You can move ahead against all odds and achieve what you want, however impossible; as long as you have faith. Your conviction will make things happen. Even nature supports you when you have conviction.

This country lacked conviction for ever so long; it was Guru Gobind Singh who gave conviction back to us, who inspired us to work like warriors. It is the warrior in you who can achieve anything, not the "you" who just lives in your own comfort zone. Unfortunately, our current corporate culture is clogged with that comfort zone. We do not want to be adventurous, to stretch ourselves a little more than we think we can.

In China, there is a village that just makes buttons. The buttons that we all have on our shirts are made in China. One may say, "Button is a small industry, what's so big about it?" But the expertise lies in the way in which the industry has grown and empowered the village. Specialisation in different things, however trivial, is something that can boost our economy, our self-confidence, and the morale of our people. We need to bring morale up.

January '07 **SU DO KU** **December '06**

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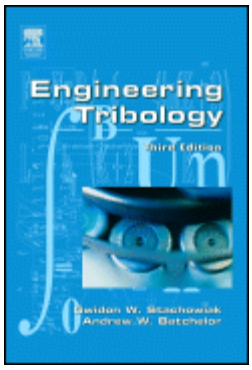
BOOKS

ADVANCED COMPUTER-AIDED FIXTURE DESIGN – Yiming (Kevin) Rong, and **Samuel Huang**,

424 pages, publication date: MAY-2005, USD 89.95
ISBN-13: 978-0-12-594751-0
ISBN-10: 0-12-594751-8
Imprint: ACADEMIC PRESS

Fixtures--the component or assembly that holds a part undergoing machining--must be designed to fit the shape of that part and the type of machining being done. This book discusses the fundamentals of Computer-Aided Fixture Design (CAFD) techniques and covers fixture planning, fixture design (both modular and dedicated fixtures), fixture design verifications, and the overall integration with CAD/CAM. The book shows how CAFD may lead to a significant reduction of product and process development time and production cost, and how CAFD can increase quality assurance through simulation and science-based technical specification and cost estimation in business quoting, especially in current supplier-based manufacturing. It also provides case study examples.

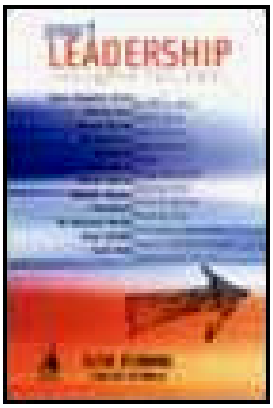


ENGINEERING TRIBOLOGY – Gwidon Stachowiak, and **A W Batchelor**,

832 pages, SEP-2005, USD 89.95
ISBN-13: 978-0-7506-7836-0
ISBN-10: 0-7506-7836-4
Imprint: BUTTERWORTH HEINEMANN

As with the previous edition, the third edition of Engineering Tribology provides a thorough understanding of friction and wear using technologies such as lubrication and special materials. Tribology is a complex topic with its own terminology and specialized concepts, yet is vitally important throughout all engineering disciplines, including mechanical design, aerodynamics, fluid dynamics and biomedical engineering. This edition includes updated material on the hydrodynamic aspects of tribology as well as new advances in the field of biotribology, with a focus throughout on the engineering applications of tribology. New to this edition are end-of-chapter problems and an accompanying solutions manual, increasing the book?s value as a textbook. The book offers an extensive range if illustrations which communicate the basic concepts of tribology in engineering better than text alone. All chapters include an extensive list of references and citations to facilitate further in-depth research and thorough navigation through particular subjects covered in each chapter.

Excellent book for Advanced undergraduate and graduate students in mechanical/materials engineering, involved in the design of gears, bearings, or wear-resistant components. Professional engineers involved with fluid mechanics, lubrication, biomedical technology and other related areas.



SMART LEADERSHIP: INSIGHTS FOR CEOs – Gita Piramal and **Jennifer Netarwala**

Pages : 207, 2005, Pernuin Books, INR 325
ISBN : 0670058327

For corporate leaders, the challenge is to find new ways of doing things. Smart Leadership: Insights for CEOs presents twelve CEOs who have done just that and set new benchmarks for growth and performance in their respective industry in the process. More outstandingly, whether it is Kumar Mangalam Birla, N.R. Narayana Murthy, Rahul Bajaj or K.V. Kamath, they have shown how such growth can be sustained, year after year, even as the business environment becomes, in the words of one CEO, ferociously competitive, rapidly changing and fluid. In this compact but insightful book, Gita Piramal and Jennifer Netarwala draw insights from these CEOs, heading companies as diverse as Lijjat papad to Tata Consultancy Services, on how they accomplished their goals in such a competitive environment and what others can learn from them. They come up with lessons on some of the core aspects of leadership: decision-making,

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