

Industrial Technology

Timber Products and Furniture Industries

Industry Study Notes

Structural Factors

There are many factors that impact on an industry in the pursuit of the production of a product or the provision of the service. Industry of any kind is based on the demand for certain articles. If there is a demand for an article and it can be produced at a price that consumers will pay, an industry can be established.

ORGANISATION AND MANAGEMENT

Industrial organisations can take the following forms;

- **Public Company** - This is a company which is listed on the Stock Exchange and the public can purchase shares in the company
- **Private Company** - This is owned by a select few and a large majority of the shares may be owned by one person
- **Partnership** - This organisation is owned in conjunction by two or more people.
- **Sole Trader** - A single person organises and is responsible for the business

In order to set up an organisation to produce goods or services the main requirements needed are; land, capital and labour.

Land is the first essential need for production. It refers to natural resources obtained from the land to be used to produce the products, such as timber, oil, minerals. It also refers to the land on which the factory will be built or organisation located.

The location of an industry is critical to its development and success. Factors that influence a successful selection of a site for a new factory/industry are as follows:

- availability of labour
- market proximity
- land suitability for rail connections, main highways, etc., for transporting materials and the finished product
- proximity of facilities (transport for labour force)
- proximity to power source
- satisfies local government regulations (Environmental and Sociological Effects)

Capital does not refer to money alone, however, it is required initially to set up an industry by providing the buildings, raw materials, machinery, transport systems and so on. These items which are used to produce the articles that are in demand, are referred to as capital goods.

Labour refers to the use of human resources in all forms and at all levels, from management, through research, design, development and production, to final delivery of the product. Labour is one of the highest cost factors for the proprietor of any firm. In employing labour, wages are only one component of cost. There are many more cost factors besides wages that must be taken into account when hiring additional labour. These consist of:

- holiday loadings and holiday pay
- insurance cover for sickness, accident and workers compensation
- payroll tax
- long service leave
- superannuation and retirement funds
- cost of additional equipment
- employee facilities
- first aid facilities
- uniforms

Any manufacturing process is organised into many activities. People must be employed with a broad range of skills to match the activities. Most companies have an organised structure which will be dependent upon the size of the organisation, the type of goods being produced and the manufacturing processes being used. In general a hierarchy is formed and different levels of management are created. An example of a manufacturing management structure is shown on the next page.

It is important to realise that an inability to attract suitably trained and skilled workers at any one level of the organisation will reduce the overall efficiency of the manufacturing plant.

Upper or senior management includes the chairman, directors, secretary and treasurer of the company. The people in these positions control all parts of the process and make decisions about the future directions of the company.

Middle management includes the manufacturing manager, finance manager, marketing manager and personnel director who make the day-to-day decisions about the operation.

The management's role in the company is to establish the goals for the organisation to work towards. Each level of the structure must have specific tasks to work on. Middle management's tasks will be different from the machine operators' tasks, but both are important to the success of the company.

Research and Development team includes engineers, scientists, and designers who work on developing new products and improving existing ones.

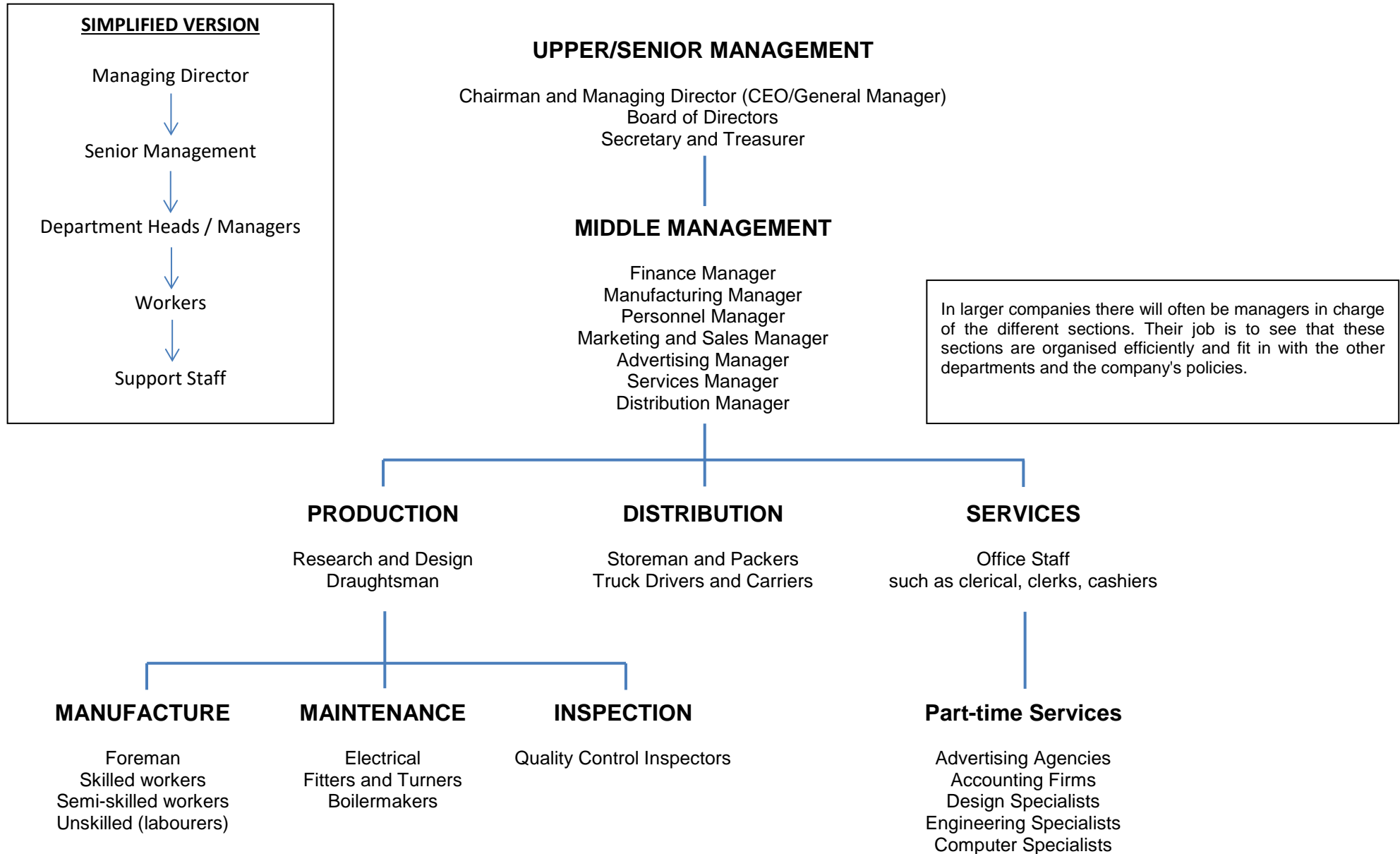
Labour force includes floor supervisors and production workers. This group does the actual production work.

For any management structure to be effective, communication is essential. So too, is a clearly defined chain of command.

In smaller organisations, a few staff may have several roles; partnerships may share decision making.

In all organisational structures the flow of the information may come from the top down, or up from the bottom. This is dependent upon the leadership style of management.

ORGANISATIONAL STRUCTURE OF A MANUFACTURING INDUSTRY



Finance – Companies can finance the operations from various means;

- personal savings that may be used to start up the business or to supplement capital growth
- bank / building society loans – which incur interest, eating into profits
- selling shares in the company to raise funds for expansion. The listing of additional shares in the company on the Stock Exchange may 'water down' the value of existing shares
- profits - from the sale of merchandise or providing services
- selling capital items or equipment to upgrade to new technology

MARKETING & SALES

For profit to be forthcoming, goods and services must be sold to the public. These goods should be of the highest quality; this is only achieved through competition.

Competition, the keystone of the free enterprise system, is defined as a group of businesses, acting independently to each other, to produce and market similar products and services. It is competition which provides the market place with high quality, low cost goods and services.

The following conditions exist in a competition system;

- a. Composed of large number of sellers
- b. New and old companies can enter and leave the market without arbitrary control
- c. No individual company has the ability to supply enough of the market to influence price

Marketing is the function of business activities which direct goods and services from producer to consumer. Marketing functions include;

- Distribution
- Establishing goals and incentives, sales and training
- Selling
- Advertising
- Sales, promotions
- Publicity (media)

The marketing manager is therefore responsible for:

- Preparing strategy and goals
- Trains and motivates sales people
- Develops sales incentive program
- Maintains product control

Marketing helps to deliver the right kind of goods and services to us, in the right form at the right time. It involves developing strategies for promoting, distributing and selling products and services to consumers.

Market Research is a vital part of marketing. Insufficient or inaccurate investigation can lead to an expensive failure. Marketing is an area of activity which is nearly always concerned with the habit, attitudes, likes and dislikes of people that the marketing personnel never meet. Obtaining this information, is a key function of the Marketing department.

Other important functions of Market Research are;

- a. Improve quality of product.
- b. Improve public relations.
- c. Increase sales.

If an organisation over-produces, then this is an indication of poor marketing strategies. This over-production can cause needless extra expense resulting in a cut back in production, which in turn results in less overtime and possibly a cut back in staff.

Therefore the quantity of product that an organisation plans to produce should be based on its estimate of the size of the market and NOT on:

- the size of its manufacturing capacity
- the amount of money it has to pay for raw materials and labour
- its previous year's production.

The results of reliable market research conducted by an organisation are most likely to affect:

- the product it makes.
- the number of units produced, and
- its product promotion.

The research should NOT affect the;

- management structure of the company
- the working conditions of the employees
- the advertising campaign
- quality control
- safety of employees
- capital investment
- maintenance or export success

How is Market Research carried out before a new product is introduced to the public?

There are a number of ways, as indicated below;

- pilot marketing
- phone calls
- free samples
- customer follow-up
- letter box drops
- home visits by survey teams
- magazines (NRMA - Open Road)
- new product warranty questionnaire e.g. kettle- where purchased, knowledge of product, age group, etc.

The most common methods are surveys via questionnaires, through the use of either telephone, mail or interview. The method chosen is based upon several factors:

1. size and location of the area to be surveyed.
2. availability of personnel to assign to the project.
3. availability of funds.
4. amount of time allocated to gathering of the data.

A study of both the advantages and disadvantages of each method shows which method is the most appropriate for a particular project.

TELEPHONE:

Advantages:

1. The quickest way of making contact with people.
2. Telephone calls are relatively inexpensive.
3. Questioning can be carried out from a central point, without sending people into the field.
4. Information is obtained very quickly.

Disadvantages:

1. People without telephones cannot be reached. Business catering to the lower socioeconomic groups may not be able to contact their customers using this method.
2. People are frequently reluctant to answer callers they cannot see.
3. People living outside the local calling zone might not be called because of the high cost involved.
4. Calls might be annoying to customers.

MAIL:

Advantages:

1. Postage is relatively inexpensive even though postal rates have increased.
2. Wide distribution (for trading areas of nationally distributed products) does not affect the cost for any person being questioned. Telephone costs could be different because of toll costs.
3. Time allotted for studying and answering questions is longer.
4. Interviewer cannot have an influence, as might happen in an interview.
5. Field staff is eliminated.

Disadvantages:

1. Rate of return is very small. A 5-10% response is considered to be average.
2. Cost per return is very high, since the cost of the unanswered questionnaires must be considered part of the overall cost of the survey.
3. Questions might not be completely understood without an interview.
4. The time it takes to receive the answer is longer than it is for interview or telephone.
5. Persons responding might not be truly representative of the sample.

INTERVIEW:

Advantages:

1. Trained interviewers have great success in the percentage of people who will grant interviews.
2. Questions that are not completely clear can be explained.
3. Additional probing can be carried out by using the open-ended question. This is not possible via the mail.
4. Observations may also be recorded.

Disadvantages:

1. Responding to an interviewer may cause interviewees to colour their responses because of embarrassment, e.g. the response to such questions as age and income.
2. Employment of experienced interviewers is costly.
3. Interviewers' bias might be reflected in responses.
4. Interviews in the home might come at an inopportune time.

The personal interview may take place at an individual's home, at work, shopping centres, in front of a retailer's store entrance, or in other places where people come together. This is the only method employing face-to-face involvement. The questions may be of either the short-answer variety or open-ended, with the respondent giving a complete reaction to the question.

Marketing Mix

Marketing means different things to different people. There are various "correct" explanations of the marketing concept. Understanding them all will help in studying the sales function.

First, in simplest terms, marketing involves delivering what the market needs. By contrast, advertising and sales, push what an organisation has.

Secondly, "marketing is the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchanges that satisfy individual and organisational objectives". Although this may seem complicated, it still boils down to servicing the market needs.

Thirdly, when we talk about 'good marketers', we are usually referring to people who have a natural sense of how to meet market needs. They are usually gifted at understanding people. But people who are strong in people and communication skills often are weak in structured discipline, including planning. The successful organisation over the long term is one that effectively plans. Poor planning, underutilization of resources, or missed opportunities are essentially identical problems and are all in clear opposition to good marketing practices.

Marketing success is achieved by blending together;

1. Product.
2. Place.
3. Promotion.
4. Price.

These are known as the four P's of marketing and often includes

5. Services.

Product - Generally speaking, the companies that are growing most quickly are those that are spending the most money for product research and development. The success of a company's product line depends upon decision in the following areas:

- selecting the right product.
- knowing when to add new products to the line
- dropping products from the line at the right time
- branding and packaging

Place - In marketing, the term 'place' is used to indicate the method used to get the goods to the target market. The choices are very great. Questions that must be answered in solving the problem of place include the following:

- what sort of wholesale and retail institutions should be used?
- should the goods be marketed through multiple outlets or, in the case of consumer goods, through a few exclusive stores?
- where should the outlets be located?
- would a consumer product do best in discount, low-priced stores, or in high prestige, well-serviced stores?
- how should the goods be shipped and warehoused to ensure their availability when the customer wants them?

Promotion - involves communicating with the target market about the product, place, and price of the goods. There are many ways in which this information can be directed to the consumer, and the marketing division must select the media that are best suited to the particular marketing mix. Sales promotion, advertising and personal selling are the elements that must be considered in the determination of a promotion policy.

Price - In addition to product, place and promotion, the marketer must also select the proper price at which the goods must be sold. Some factors involved in this decision are competitors' actions, existing practices on markdowns and discounts, target profits, and legal restrictions.

Services - refers to the customer service that is provided at the point of sale and after the product has been sold and distributed. With many customer outlets offering similar products at similar prices, and consumers are becoming more knowledgeable about the products they buy, consumers are moving away from the influence of price and convenience to the service they receive. Consumers want to talk to staff that know about the products they are selling and would prefer to spend a little more if they receive quality service before and after they have purchased the product. After sales service can take the form of advice, training in use, warranties, spare parts and repair facilities once they take the product home.

Good marketing planning requires that the marketing mix be under continuous review, and that individual factors be constantly altered to adjust to a changing market. All elements of the marketing mix are so closely interrelated that it is impossible to consider one more important than the others. The success of an institution's marketing program depends upon the effectiveness of each and every element of the marketing mix.

Sales in Industry

Sales and Marketing are very similar to each other, so much so, that they are often bracketed together to form a Sales and Marketing department. But, there is a slight difference. Marketing finds out if there is a justifiable market for the product, and once this is proven, it is then the job of the Sales teams to establish markets for the product being produced and to arrange their distribution to consumers in a saleable manner.

The most important part of sales is to meet the plan or target. If they go over the target they may not have the goods to supply the customers which can lead to dissatisfaction. To avoid this;

1. The marketing department needs to be accurate with its estimate on the demand for the product.
2. The production team must know what can be produced each week and,
3. How much the company can afford to make each week and,
4. How much can be kept in stock.

If sales of a product drop consistently over a period of time, then this must be investigated. This is usually carried out by the marketing research department through surveys, etc.

Investigation usually indicates that cheaper items are entering the market by competitors. If this happens, the company has various ways of regaining sales. These are:

- reduce cost of product
- promotion of product (new advertising campaign)
- redesign of product
- repackaging of product
- market testing to determine quantities sought by consumers

If these poor sales happen to be export sales, then they can be influenced by other factors, such as;

- government action
- import tariffs
- raw materials (rising costs)
- currency fluctuations
- industrial action
- fashion trends
- increase in environmental awareness

PRODUCTION AND EFFICIENCY

Products are now being made in many different ways, and it is not possible to give one description of the manufacturing process. The suitability of each process depends entirely on demand for the product. There are four basic types of production methods used today and they are:

1. One-off or Job Lot Production.
2. Batch Production.
3. Continuous Production.
4. Line Assembly Production.

One-off or Job Lot Production - This is a manufacturing process where the customer and/or designer requires a unique article. There is usually customer input in regards to the design and materials used. The designer of the article in most cases is the craftsman or manufacturer of the article. Generally, this is an expensive method to use as no economies of scale can be derived for labour, materials or equipment. Each item is essentially hand crafted requiring adjustments of machinery or special materials and assembly techniques. Custom furniture is often built in this fashion.

Batch Production - This process involves the manufacture of a specified number of articles to fill an order received on a regular basis. A supplier may receive 3 monthly orders for nuts and bolts used in the assembly of office furniture. The process involves a team of workers assembling or producing the product. The whole process is done in the one location and is carried out by the one person or team. In recent years, this process has started to be used on what would previously have been done using the Line Assembly Production method. The reasons for this are that line assembly does not allow for very much flexibility, and people are happier working on batch production. They prefer it to the boredom of standing in the one spot doing the one simple task over and over again. The batch process means that the worker is involved with the project for more of the production time, and manages a range of processes.

Continuous Production - This process occurs when the customer requires a steady supply of the product. This type of production is often associated with component manufacture such as the memory chips used in computers where demand is relatively constant.

Line Assembly Production - This process of manufacturing is organised for large amounts of production. The production line is based on a system such as a conveyor belt which moves the product through the factory from the start to the finish of the process. People or machines are positioned at stations along the way, each working on one single-step process. This process may be simply stacking sheets of timber veneer or tightening some bolts, or soldering some wires or electrical components into place. This organisational structure relies on large numbers of products being produced. The high cost of setting up the line must be paid for by a large number of goods being sold.

EFFICIENCY

A simple definition of efficiency could be "the best possible result when all factors are taken into consideration concerning the energy used".

Factors that affect the efficiency of the organisation are;

- cost of energy- production methods cost of wages - pricing structure
- position of the factory (with regard to energy).
- raw materials, sales, outlets, availability of labour investors
- for workers (overtime, profit sharing, public relations, condition of work.)

Efficiency or the uses of efficiency plays a major role in what article the factory is producing. The factory must strive to be smooth running as much as possible.

Periodically, management must reassess the efficiency of their company. This especially applies to times of recession when the downturn in the country's economy, may have a damaging effect on the company's production, profitability and even its survival.

Improving efficiency ensures costs are kept to a minimum. Improvements in efficiency can be measured by comparing the costs of production with profits, lower costs and greater profit means increased efficiency.

Some factors that help to promote a high degree of efficiency in a company are:

- The use and maintenance of machinery to help to produce the product far more quickly. Even replacing human labour with automatic machines and computerising areas of the business such as in administration

- Specialisation of labour, i.e. one person doing one task becomes more efficient at that task than a person doing many different tasks. If the industry is a small one, employing only a few employees and multiskilling.
- Good industrial relations between management, union and employees. A mutual trust and cooperation among workers and management.
- Replacement of old methods and materials by new ones, e.g. solid timber replaced by veneered particle board, and traditional woodwork joints replaced by biscuit joints or K-D fittings, still maintaining a high quality product.
- Mass production techniques, e.g. many parts made in standard sizes in large numbers.
- Manufacturers are continually looking for ways to reduce wastage through interchangeability of parts. They achieve this by using the same shape but reducing the size of the product, e.g. foot stool and bar stool.
- Specialise in one product so that 'economies of scale' can be achieved
- Use of new sources of power, e.g. steam, gas, oil, electricity, solar.
- Sure supply of good quality raw materials, even bulk buying.
- A successful program of recycling and minimising of waste material.
- A good safety training program.
- Well run finance department.

Just in Time (JIT)

Just in Time has developed from the efficiency of supply and demand. It is a system used for ordering and storing materials for a production run so that only what is required is ordered and produced. JIT aims to reduce waste of storage space, money, time and stock. There are problems involved if the speed and efficiency of ordering, delivery, manufacture or pick-up are hampered in some way.

Profitability

At times, some companies need to increase their profitability. This is done mainly to improve the financial situation of the company in the business sector and to secure the employment future of its workers. There are a few strategies that can be employed. They are;

1. Increase output and thus lower the cost of the individual product.
2. Seek further markets.
3. Increase product price.

TECHNOLOGY AND RESTRUCTURING

Technology and its rate of change is developing so quickly now that what you buy today is superseded in 6 months. A typical example is both hardware and software in computer technology. This change has affected us to a greater extent than probably any previous generation, altering the way we do things in almost every field of human endeavour.

The application of technology to the field of communication, to production of energy and power, to materials and their processing, and problem solving has led to a lifestyle which depends to a great extent on electrical energy, labour saving devices and sophisticated communication systems.

When we think of technology we are likely to immediately think of the computers. The current range of computer applications is vast and continues to expand rapidly, influencing many aspects of our society, from the home and workplace, to scientific research, manufacturing and leisure activities.

Computers in Industry

Computers are used in TWO areas of industry. They are:

1. Administration and
2. Manufacturing

Following are a few examples of where computers are used in a firm, their advantages (benefits) and disadvantages to the firm and to the employee.

ADMINISTRATION AREA

USES: To keep detailed records of the firm's activities e.g.

- financial accounts
- advertising
- ordering and purchasing materials
- distribution of product
- payment of wages and salaries
- internal movement of product from department to department within the firm.

ADVANTAGES: Helps to increase productivity in the following ways:

- able to organise accounts, debits and credits, therefore in an instant showing the company's financial situation e.g. spreadsheets for financial calculations.
- 'Desktop Publishing' used for advertisements.
- reduction in personnel, therefore resulting in less wages being paid. Reduction in the amount of paper work, duplication, etc., carried out by the clerical staff.
- a more compact store of records e.g. 'Data Base' for client's records, i.e. names and addresses, and 'Word Processing' for form letters for customers.
- a capacity to analyse the firm's activities.
- the opportunity to tap into a broader set of resources.

DISADVANTAGES: Introduction of computers have created some negative factors and have provided for firms in the past and will probably always do so to a certain degree in the future. These are:

- job losses for some personnel.
- high initial cost of introduction, causing a strain on company's financial resources.
- high cost of maintenance.
- selection of unsuitable hardware/software packages can be a problem.
- cost of re-training personnel in the use of more sophisticated computers, when they become available.
- ongoing capital expenditure in purchasing computers to keep up the new technologies.

MANUFACTURING AREA

USES,: To speed up production of articles e.g.

- designing and producing working drawings of product by using CAD machines (Computer Assisted Drawing).
- manufacturing of product on the assembly line e.g. CAM machines (Computer Assisted Manufacturing).
- automation i.e. robots transporting product between each manufacturing stage of its production process.

ADVANTAGES:

- designs and drafts by CAD are quicker and far more accurate than drawings produced by a draftsman.
- CAD have replaced drafting machines, making it possible to easily modify and store part drawings.
- CAM allow precision machined products to be produced by unskilled labour.
- CAM produce goods more quickly and far more accurately especially when machining identical components.
- increased efficiency i.e. greater output for less input.

DISADVANTAGES:

- job losses on factory floor, therefore increasing the unemployment figures.
- initial high cost and installation of CAD and CAM machines.
- high maintenance costs.
- cost of on-going training programs.
- advancement of new technologies would possibly require more advanced CAD and CAM machines to produce the work required. The cost involved to keep up with new technology is extremely high - possibly every five to ten years or so.

RESTRUCTURING

Restructuring within companies is becoming far more common, because of the competition within Australia's industry and from overseas. Competition is a good thing for industry because it helps to maintain the high quality of the product, but it can also have a negative effect as well. It is a well-known fact that products produced here in Australia are far more expensive than similar products manufactured overseas, especially in Asian countries. For this simple reason, manufacturers here are continually trying to maintain their profit levels and to achieve this, restructuring is sometimes unavoidable. This is usually done as a last resort after all other avenues have been investigated.

The company may choose to restructure by;

- upgrading technology, to improve production time, save long term costs (eg. staff) and to improve quality
- outsourcing various processes to other companies or overseas saving initial capital expenditure, training costs and so on
- subcontracting workers, saving costs of holiday pay and so on
- retraining and moving workers to other areas
- retrenching redundant staff
- amalgamating with other companies to achieve economies of scale.

QUALITY CONTROL

Quality control is used to evaluate how good a product is. It is also used to improve the product so that it remains competitive in the market place. Quality control ensures that all items on a production line are manufactured in accordance with a set standard of quality and that they are identical to each other. Any product that is manufactured or processed has to maintain a quality or tolerance that is consistent over time. Therefore, inspections and testing are carried out to ensure this happens.

Poor quality control can exact a terrible price from any business. Visible costs of poor quality are:

1. Customer complaints
2. Customer returns
3. Excessive scrap materials
4. Reworking of items.

Each aspect is a significant cost to the business - in lost wages (i.e. doing things twice), freight charges and loss of market reputation. Continuation of one or all of these aspects would probably cause bankruptcy.

Quality assurance

Has been included in building contracts to ensure that the clients actually get what they pay for. The contractor takes more responsibility for the end product and this results in quality control for the timber and building industry.

Having quality assurance in place improves the standard of work, as that is required of the end product. The benefit of quality assurance will be a saving in cost as the material supply and the quality of the work will be of a good standard the first time.

Quality benefits

Quality is of benefit to everyone: from the consumer, who expects and demands quality in the goods and services they receive; to management, who know it will increase profits; to the employee, who benefits from job security and better pay; and of course, to the whole country, as it will be more competitive in the world market.

Cost-benefit

Cost-benefit will be achieved if staff are trained to be more skilful and more productive. Each member of staff will have job security and will know that she or he can do the job better, thus being a valuable human resource for the company.

Quality of materials

Quality, when applied to all the materials supplied to a project, results in less waste and a better quality end product. When quality standards are specified, suppliers are responsible for orders placed. This guarantees the quality of the materials.

Personal responsibility

If the employer knows as much as possible about the product or service (this might involve working to tolerances), and that each employee pays attention to detail in every area of job performance, then personal responsibility can be an added bonus for the employer. Having the right attitude certainly affects the world around you. Problems can be prevented by maintaining standards and building quality into procedures, products and design at the start of a job. Rather than finding mistakes, take the time to analyse failures and succeed the next time. Take the initiative when it comes to accepting new challenges, and stick with them. Set goals to do your job better and aim to do it quickly and accurately. Share ideas you might have to improve procedures, save money or increase efficiency or productivity with your employer.

All of these personal responsibilities will lead to a quality improvement for everyone.

TOTAL QUALITY MANAGEMENT

This is about having all members of an organisation working together to solve problems. It is basically an organisation wide teamwork approach which breaks down the traditional barriers between workers and management.

When adopting the TQM philosophy, the organisations current situation is assessed by a consultant and then a program of awareness and education is undertaken by all members of staff. Team building and workshop activities are next to promote and develop the necessary skills. Finally, the TQM approach is applied on a daily basis across every aspect of the organisation which allows all employees to participate in production decisions.

Technical Factors

MECHANISATION

With few exceptions, today, most furniture manufacturers are using mechanised processes to produce furniture pieces. Although a small percentage of customers still seek out craftsperson's to hand make items, the cost is extremely high and beyond the scope of most people.

Mechanisation is not confined especially to the machines producing the components themselves, but to the handling of the material around the factory and also the manner the machine loads and unloads themselves, etc.

Machinery has resulted in the cabinetmaker leaving his bench and becoming skilled at operating high technology machinery, instead of the traditional hand crafting methods. With the advent of these machines, the cabinetmaker becomes purely an assembler of furniture rather than the craftsman he was required to be in bygone years.

Some advantages of mechanisation are:

- the higher volume of goods that can be produced in a shorter time
- more consistent quality of goods produced
- machines don't tire or take holidays and will work 24 hours a day
- machines are less likely to have accidents and claim workers compensation

Some disadvantages of mechanisation are:

- the high initial cost of purchasing capital equipment and the cost of training workers to operate the machines.
- the loss of jobs in an industry which becomes highly mechanised
- the high cost of maintenance and repairs to machines

SPECIALISATION

Not all furniture manufacturers can afford the large range of machines necessary to produce furniture items. Instead a manufacturer may specialise in producing only one component of a furniture item, e.g. raised panelled cabinet doors, drawer components. These components are then supplied to the large furniture company to utilise in their cabinets.

Large furniture making companies should always have more than one 'specialist' component supplier because this ensures competition within the suppliers and helps to maintain high quality construction and finish of components. Also it covers the possibility of one of the suppliers going out of business or not being able to supply the component on time or in the required quantity.

Specialisation increases productivity, reduces mistakes, maintains quality and increases company profit.

MASS PRODUCTION

Mass Production refers to the manufacture of lots of identical items at the same time in order to reduce costs. Each item passes along a production line. A worker is stationed at each of the stages along the production line where he or she carries out the same task on each item as it goes past. When each worker has completed his or her job on the production line, an item is finished and ready for sale. It usually takes some time to prepare the production line, but once it is in place, manufacturing time is relatively quick and cheap.

AUTOMATION

'Automation' refers to the use of machines to do the work on the production line, without human intervention. Computers are often used to control how and when various machines will function on a production line. This manufacturing technique has come about for economic and quality production reasons. It has also resulted in a decrease of production line workers but has increased the need for people to operate the computers.

ROBOTICS MANUFACTURE

The term 'robotics' is used to describe a more developed version of the 'automated' production line. Machines linked to computers are programmed to follow a sequence of instructions to assemble objects. Robots may be used for jobs which humans find difficult, boring, unpleasant or dangerous to do. They can operate 24hrs a day and without coffee breaks, and enable the manufacture of goods with minimum change over time. Robots can also be reprogrammed so that once one production line has been completed, they can be adjusted to do a different production run.

EMERGING TECHNOLOGIES

Rapid Prototyping processes are a relatively recent development. The first machine was released onto the market in late 1987. While rapid prototyping is the term commonly applied to these technologies the terminology is now a little dated, reflecting the purpose to which the early machines were applied. A more accurate description would be layer manufacturing processes.

These processes work by building up a component layer by layer, with one thin layer of material bonded to the previous thin layer. There are several different processes. The main ones being:

- Stereolithography
- Laser sintering

All these processes essentially start with nothing and end with a completed part. This is in contrast to conventional manufacturing processes such as milling machines that start from a solid block of a substance and cut material away to form the finished part.

Rapid prototyping processes are driven by instructions which are derived from three-dimensional computer-aided design (CAD) models. CAD technologies are therefore an essential enabling system for rapid prototyping.

The processes use different physical principles, but essentially they work either by using lasers to cut, cure or sinter material into a layer, or involve ejecting material from a nozzle to create a layer. Many different materials are used, depending upon the particular process. Materials include thermopolymers, photopolymers, other plastics, paper, wax, metallic powder, etc.

Environmental and Sociological Factors

RESOURCES

All products are created by using a combination of available resources. Technology uses and modifies resources in order to meet human needs and improve the quality of everyday life. The resources available to us are:

- Materials- (a) Renewable e.g. timber, cotton
(b) Non-renewable e.g. gas, oil, coal, plastics.
- Tools - hand, electrical and machines.
- Techniques - industrial methods of joining materials.
- People - required in all forms and levels of industry.
- Finance - purchasing power for tools, energy, materials and expertise.
- Energy - steam, methane gas, wind, solar power, waves/tidal, water flow, combustible (gas, coal, oil, diesel, alcohol and petrol), atomic or nuclear
- Time - positive and negative use of time management.
- Information - aural/ audio, printed, visual, broadcast.
- Skill - planning, designing, manufacturing, research.

Non-renewable resources cannot be replaced as they are used and therefore, will one day be completely used up unless improvements in technology make it possible to replace them.

ALTERNATIVE RESOURCES

The use of fossil fuels for energy is not sustainable. We need to be aware of this and look for alternatives. At present there are alternative methods of electricity production and these are;

1. Hydro-electric
2. Solar power
3. Wind generators
4. Geo-thermal
5. Wave power- tidal
6. Methane gas

Hydro-electric : River waters are stored in dams for both irrigation and power generation, e.g. Snowy River Hydro-electricity Scheme. This technology uses a bountiful resource which is free instead of a non-renewable resource.

Solar Power : Manufactured solar cells allow the maximum amount of light energy to be captured. This technology is replacing windmills and engines as power sources in remote areas, because the cells are reliable and cheap to produce. An example of this type of power is the Solarhart hot-water heater which has become a very common sight atop Australian homes.

Wind Generators : These are similar to a windmill but of course they are far more modern in design. The electricity is generated by the power of the wind turning the arms of the windmill. The problem for this kind of generator is that these machines must be situated in very windy locations, otherwise there is not enough power generated to make this type of resource viable.

Geo-Thermal : Geothermal electricity is obtained by harnessing the heat released from the earth to drive the turbines. New Zealand has power stations of this type.

Wave Power/Tidal : This type of electricity is not used in Australia. France has the world's first tidal power station. It consists of a dam across the tidal estuary. In the dam wall are turbines which are powered by the ebb and flow of the tide. The turbines drive generators which produce the electricity.

The above two examples of power generation are appropriate because they use natural resources which are abundant in each country.

Methane Gas : Methane gas is produced when plant and animal wastes decay. This gas can be used for heating or cooking applications or for use in internal combustion engines. The left over waste can be used for fertilisers and contains no dangerous bacteria. Making energy from waste is certainly a good idea but is not yet at the stage of development to be used on a large scale.

LIMITATIONS

The advances in technology over the last half-century have been accompanied by an increase in the amount of waste produced. The world's resources, e.g. timber, minerals and natural gases, though very large, are limited, which leaves the question.

Can we keep going the way we have been over the past few decades ?

It has become accepted that living standards will keep rising and that innovation and technology will solve all our problems.

Using timber as an example, it is estimated that since European settlement of Australia, two-thirds of the trees have been cut down. At their present rate of deforestation, the Amazon rainforests in South America will disappear in about 50 years.

Much use of renewable and non-renewable resources produces vast amounts of waste which is becoming a very large area of concern to manufacturing industries and governments. The 1990's have seen a reaction to this and a change to a more ecologically aware Australia. A major solution to the problem is recycling.

RECYCLING

A product that is initially designed for a certain purpose is recycled and used for a different purpose. Below are some examples:

- timber beams from old buildings reused to make furniture.
- the reuse of material for the same purpose e.g. egg cartons for paper, PET from drink bottles to form new drink bottles.
- scrap aluminium cans melted down to manufacture other aluminium products.

Today, however, the concept of material reuse is becoming important to the designer. There are significant cost and marketing advantages for products based on recycled materials. Some European car manufacturers have even designed body parts such as bumper bars, dash board and door handles specifically for recycling.

POLLUTION

Pollution is an industrial problem which has received considerable attention in recent years. In relation to the furniture industry the following areas create pollution problems;

- Noise Factors
- Airborne Materials
- Waste Materials

Noise Factors : Machines create noise. Some of this noise is audible to the human ear and some has such a high frequency it cannot be heard. Both types of noise can be damaging to the human ear. A number of industries now pay compensation to their employees for subsequent loss of hearing as a direct result of industrial deafness.

To overcome the noise pollution problem two areas of endeavour are being pursued. Obviously, the ideal solution is to reduce the noise levels from the machine themselves. Manufacturers of new machines are currently trying to do this by re- designing components on the machines which cause the most noise. However, noise cannot be eliminated and so guards are also used to trap the noise within the machine itself. These guards can incorporate sound deadening materials to gain maximum effect.

In order to complete the attack on excessive noise, the use of personal ear muffs is encouraged. These appliances are worn by individuals who work in areas on the shop floor where noise levels are unacceptable. They may fit completely over the ear or be inserted in to the ear canal itself. We should keep in mind that the dust extraction system which are used to reduce another pollution problem may, themselves, create a noise pollution if not correctly designed. The large vacuum systems required to collect dust are located outside the main factory floor to help dissipate the considerable noise produced by the large fan(s).

Airborne Materials : These materials are either dust or finishing solvents (Lacquers, paints, etc.). These can be controlled by the use of filters which collect the overspray via a vacuum system. The filters are cleaned or replaced as required. In addition, spraying jobs within an enclosure helps to improve the efficiency of the vacuum system itself. If a spray booth is used, then good ventilation is essential, using some sort of extraction system. For personal use, the operator must use a face mask that covers the mouth and nose. These disposable masks may be used by people spraying furniture or using dusty machines. Incidentally, the filter system to collect flammable substances e.g. lacquers, paints, etc., are specially designed. They, and for that matter all electrical equipment (such as lights, power points, switches, etc.) must be spark proof if in the immediate area of the spray unit. Spark proofing equipment is very expensive.

Waste Materials : Waste materials today, come in all shapes and forms, e.g.

- liquids, (Toxic Wastes e.g. Grease, oils, chemicals, etc.)
- gasses (Burnt fossil fuels, car exhaust fumes, etc.) and
- solids (Whitegoods, cars, timber off-cuts, etc.).

MANAGEMENT OF WASTE MATERIALS

Liquids (Toxic Wastes) : These wastes should always be separated and then collected by a waste collection company who are then responsible for disposing of it in the correct manner. Some industries in the past have dumped their waste by diluting the concentration of the toxins but all these methods have had drastic effects on wildlife and water collection regions, e.g. rivers, reservoirs, etc. Only recently have laws been passed, heavily fining those who dispose of their waste in an unacceptable way that eventually harms the environment.

The most effective way to remove toxic waste from industrial plants today would be for these industries to invest in waste recovery systems. This has not been done to a large extent because of the initial cost of setting up such a system. It has always been cheaper for industries in the past to dump their waste. These days of course, the fines imposed on industry are nearly, in some cases, more than the cost of setting up a system (\$100,000's). Large industries built today, must by law, have these systems to protect the environment.

Solids (Timber Wastes) : Solid timber furniture off-cuts are usually utilised for many smaller components of furniture pieces or making of small utensils e.g. toothbrush racks, spoons, paper towel holders, chopping boards, etc. Sawdust and shavings from solid timber are used in the horticulture industry e.g. an additive to potting mix. Sawdust from man-made boards is collected in dust extraction units and disposed of either by burning in a furnace or dumped at a local tip. This material is not used because of its high formaldehyde and resorcinol glue content, which is carcinogenic (cancer producing).

Utilisation of Materials

Solid timber off-cuts in the furniture making industry are usually utilized for many smaller components of furniture pieces or making of small utensils or 'nic-nacs' e.g. Ikea Furniture uses smaller pieces left over from large furniture items, to make kitchen and bathroom utensils e.g. toothbrush racks, key racks, spoons, paper towel holders, laminated cutting boards, etc.

The use on a large scale of man-made boards such as particle board and plywood in furniture making has meant a greater utilisation of species such as teak, mahogany, rosewood, cedar, etc., which are in short supply. The bulk of man-made boards today are veneered using these exotic species of timber, or a plastic laminate (laminex). Because of this, it has enabled these timbers to last that much longer.

Significant development and advancement in the areas of stains and special finishes has resulted in reasonable 'look-a-like' (if you do not look too hard). For example, pine veneered MDF boards are stained in all different colours, such as mahogany, walnut to name just a few, that they look the 'real thing'.

Nitro-cellulose lacquers and polyurethane varnishes are now being used in the vast majority of furniture. They are nearly as good as the traditional French Polish finish but because it takes far less time to apply, the labour costs involved are that much cheaper. Therefore it is more viable to use these modern day finishes in mass production because of its cost-effectiveness.

Interchangeability

Manufacturers are continually looking for ways to reduce wastage. This can be achieved through careful design and utilisation of the material's properties. They achieve this by using the same shape, and reducing the size or design to make two different furniture items. For example, dining room chairs where there is very little difference in design. The seat rails and legs are all the same shape and size, the main difference being in the shape of the back rest frame. The construction processes of the chairs would be the same but the final product gives some variety. The use of different stains, give a variety of colours that suit the customer's needs.

GOVERNMENT LEGISLATION

Legislative requirements refers to the laws made by governments which are aimed at:

1. Protecting the consumer from unsafe products.
2. Protecting workers from unsafe work practices.

Consumer Safety : This relates to such aspects as:

- safe function of the product when in the hands of the purchaser.
- correct electrical wiring
- adequate electrical insulation
- ergonomically correct
- non-toxic
- non-flammable

The Standards Association of Australia (SAA) - is a body which establishes minimum requirements which ensures the safety of the product when it is being used correctly by the consumer.

It is important to note here that producers of products can still be liable if the product causes harm to the consumer even when the consumer is using the product correctly e.g. a child's toy should not have small components which could break off and choke the child during possibly misuse.

Some examples of the SAA requirements are,

- labelling of children's nightwear regarding flammability
- design and use of electrical tools and goods
- bicycle and motor bike helmets
- seat belts in motor vehicles
- design of motor vehicles sold in Australia

The Poisons Act (1966) - controls the sale, supply, labelling and packaging of poisonous substances available to the consumer.

The Occupational Health & Safety Act 1983 - requires employers to provide a workplace which is healthy and safe. The Act also requires employees to co-operate with employers in maintaining health and safety at work. There are hefty penalties for not meeting these requirements.

WorkCover NSW is a State Government body set up to manage the State's workplace safety, injury management and workers compensation systems. WorkCover promotes a culture of safety through public awareness programs, education and other community activities. It also strives to improve the performance of the workplace safety, injury management and workers compensation systems by:

- reducing work related death, injury, illness and disease.
- supporting injured workers to remain at work or return to work safely and quickly following injury.
- minimising occupational health and safety risks to the public, providing workers and employers with incentives for improved injury management and safe, early return to work.

- providing for fair weekly and lump sum benefits and affordable compensation to injured workers.
- funding a Conciliation Service at the Department of Industrial Relations for prompt resolution of disputes concerning compensation.
- performing advisory, regulatory and enforcement functions in relation to workplace injury and illness prevention, management and compensation.

ENVIRONMENTAL IMPACT STUDIES (EIS)

A production process that consumes a natural resource will be seen to be ecologically sustainable if it is determined that the consumption of the natural resource causes no harm to the related ecosystems and the environment.

To determine the ecological sustainability of a project, the impact of the project on the environment must be examined. This process is normally carried out through the development of an environmental impact study.

The objectives of an environmental impact study are to;

- ensure that decisions are taken following timely and sound environmental advice.
- encourage and provide opportunities for public participation in environmental aspects of proposals before decisions are taken.
- ensure the proponents of proposals take primary responsibility for protection of the environment relating to the proposal.
- facilitate environmentally sound proposals by minimising adverse aspects and maximising benefits to the environment.
- provide a basis for on-going environmental management through the results of monitoring, among other processes and
- promote awareness and education in environmental values.

DEVELOPMENT OF SUSTAINABLE TECHNOLOGIES

Sustainable Technology is an increasingly important concept due to growing World concern about non-renewable resources. Sustainable technology simply means the use of resources in such a way as to not deplete them too quickly.

Much of the energy used in Australia today is based upon non-renewable resources such as oil, gas and coal. We are becoming increasingly aware of the need to be less dependent upon these resources.

It is therefore very important to develop sustainable or renewable resources to continue to meet the demands of today's society as this places less demand on the non-renewable resources.

An example of this renewable resource would be timber. This resource can be replaced by natural processes within the time span of an average human life. This is achieved by establishing plantations to maintain equal areas of trees in succession of growth from one year to maturity. This produces a sustained yield from which a certain amount can be cut annually for an indefinite period. Softwood tree plantations reach maturity in approximately 30 years and hardwood tree plantations reach maturity in approximately 70 - 100 years. Through research and development, the use of particle board, MDF and other man-made products has greatly decreased the demand for solid timber, thus helping this natural resource to last longer.

Further research and development must continue to provide more efficient technologies.
The results of this development will ensure;

- less short term cost to the consumer
- less reliance on non-renewable resources
- less depletion of natural resources
- less cost to the environment in terms of pollution

Personnel Issues

WORKING RELATIONS

Industry is complex. It is developing all the time not only in technology but also in techniques for carrying on every activity more efficiently. Its activities are affected by complicated legislation, so therefore somebody has to be made especially responsible, especially knowledgeable. This role is usually carried out by the Personnel Manager.

For a firm to be found efficient, profitable and therefore successful, it usually follows that the working relationship between the management and employees and management and unions are very favourable. In other words, there's obviously give and take on both sides.

There can be a number of factors that are conducive to good working relations between management and their employees. These are;

- acceptable salary
- profit sharing
- good working conditions and facilities
- acceptable safety rules and regulations
- starting and finishing times
- consultation between management and employees being part of decision making

INDUSTRIAL RELATIONS

Industrial Relations refers to the process of establishing the terms of employment and working conditions of people in a business.

Industrial Relations have two basic influences on a business;

1. The terms of employment and working conditions must be such that they are able to attract and hold the most appropriate people for the job.
2. Wage rates and work practices are the most significant influences on productivity and therefore, directly affect the business's profitability and efficiency.

There are two groups of people who are concerned with what are appropriate wage rates and working conditions:

1. Employers (Management)
2. Employees (Workers)

These two groups also determine the labour market (the demand for and supply of labour). Sometimes matters regarding wages and conditions can be negotiated by the two groups to their mutual satisfaction. In other cases there can be confrontation between the groups.

When this happens, the matter is usually taken before the appropriate court. In this case a Commissioner will attempt to negotiate a voluntary settlement between the groups - this is called *conciliation*. If this fails, the Commissioner may impose a legally enforceable ruling on the groups - this is called *arbitration*.

To carry out these roles in Australia, we have the State Industrial Courts, and the Australian Industrial Relations Commission. In the past, (the first half of the 1980's), we had changes in wage rates and working conditions implemented on a national basis by the Industrial Relations Commission. This was referred to as a centralised industrial relations system.

There is currently a shift to a more decentralised system, with a greater emphasis on encouraging direct negotiation between workers and management at the workplace. This process is called *enterprise bargaining* and involves workers, or their representatives (unions), negotiating with management on work practices and wages. It is hoped, enterprise bargaining will result in more internationally competitive business in Australia because it enables restrictive work practices to be abolished in return for other benefits.

ENTRY - LEVEL TRAINING REQUIREMENTS

Entry levels in all aspects of industry today will require tertiary education of some description. Depending on what aspect of industry you wish to follow as a career path, e.g. business (accounting, management, computer technology, engineering, etc.) will require a university degree. If you wish to be a machine operator, technician, tradesperson specialising in manual skills, then a TAFE qualification will be sufficient.

Some small firms, prefer 'on-the-job' training for the workers. Some of these workers may not be qualified, but are still excellent craftsmen at their particular machine or task. They achieve this skill after many years of experience and repetitive practice, usually working or starting at the bottom, rising to foreman or supervisor.

It is quite common knowledge that a machinist/cabinet maker after many years of experience and knowledge would probably make a better furniture designer compared to a person who has completed a 4 year course in design at a university. This person may have the design and drawing skills, but will most probably not have practical knowledge of materials, machine processes and their limitations.

RETRAINING

When a firm recruits people, they come with certain skills and knowledge relevant to a particular job description, but in most cases will require additional training before they can do that job effectively. Until recently, this initial training was often the only formal training people received, apart from occasions where a specific event made re-training necessary, for example:

- the installation of a new machine or computer software
- replacing skilled staff who are retiring over the next few years

As jobs have become more sophisticated and subject to technological change, employee training and re-training has become increasingly important. Currently, management is emphasizing re-training and development programs which will enhance these skills and abilities throughout the working lives of its employees. Other advantages of re-training are;

- increase employee earning capacity
- increase job satisfaction
- increase productivity

For these reasons, re-training and development are now seen as an integral part of the overall strategic planning for a business in just the same way as is marketing, finance and production.

MULTI-SKILLING

This refers to the training of employees to give them skills to carry out tasks not covered by their present job classification, i.e. where one person is trained to do many jobs. Advantages of multi-skilling are;

- greater flexibility in the ways management can use their workforce
- greater range of tasks to be performed by the same worker
- reduces boredom on the production line
- absenteeism of a worker can be covered by another worker

UNIONS

Unions were formed early this century mainly because of the exploitation of the working force by the employers. Working conditions were, to say the least, deplorable and salaries were barely enough to survive on.

Wherever work is done, whether in a large firm or small, in the private or the public sector, and whether its aim is to produce goods or supply a service, you will find both workers and managers. Both share concern for the long-term prosperity of their workplace, but sometimes there is disagreement about how to achieve this. An increase in the worker's wage is an increase in the manager's costs. Money spent on improving working conditions means less profit or surplus. The manager may increase efficiency by automating a job; to the worker it may mean a loss of job satisfaction or even redundancy.

The conflict of interests is no one's fault and it has nothing to do with the personality of the manager or the militancy of the worker. It arises from the fact that there are two groups with different interests in the way in which money is spent. To recognise this is not to suggest that workers and management are always at battle stations. Usually differences can be resolved through discussions at management/union representative level. If these discussions fail, one side or the other resorts to sanctions or strikes. If this situation is still allowed to continue, the matter usually ends up in the arbitration court.

What are Trade Unions and What is their Job?

Trade unions are groups of people who have something in common - they are all employed. They may also have in common a skill or trade, an industry, an employer or an occupation. Trade unions are organisations formed, financed and run by their members in their own interests. Since the turn of this century, significant gains have been made by the unions for the workers. These gains are many and varied, such as;

- increase in wages
- better working conditions and facilities
- health schemes
- workers compensation
- superannuation schemes
- long service leave
- recreational facilities
- child minding facilities
- less working hours
- 17½ % holiday loading
- introduction of safety features and training programs
- clothing and/or footwear
- legal assistance

Although unions were initially introduced for the benefit of the worker, management and employer groups have subsequently gained benefits as well, such as .-

- given the management the opportunity to discuss any problems that may arise, before the workforce take the drastic action of striking which is usually the last resort.
- improved working relationships i.e. broken down the barriers between the management and the employees.
- have fostered a mutual commitment to conciliation therefore reducing the number of confrontations between the employee and management, i.e. if there is a worker who is not pulling his/her weight, the workers or the union representative can discuss the problem with the worker, thus preventing the management taking the action of sacking the employee, with the possible outcome of industrial action by the rest of the workforce.

One of the most prominent areas of union involvement for the betterment of the worker, has been in the area of Health and Safety Issues. Demarcation or the working within certain guidelines e.g. standardising of safety practices throughout the various unions has been a great benefit to the workforce. Accidents are always going to happen in industry, even when factories meet all the legal requirements for safety. Industry has come a long way in reducing the accident rate by instigating safety practices.

These practices include some or all of the following

- the provision of all new employees with correct safety clothing e.g. boots, safety glasses, overalls, etc.
- the completion of safety tests, written or verbal.
- lunchtime viewing of safety videos.
- films regard the importance of danger awareness which are shown on a regular basis.
- the placement of safety signs in appropriate positions in the factories.
- encourage the attendance of first-aid courses.

If a worker is seriously injured, the union will step in and act as an overseer and see that he/she is entitled to all the benefits that are rightly his/hers. This is done with the assistance of the following personnel or departments :

1. The Safety Officer will investigate the accident, check all the procedures and report back to management and union representative. WorkCover inspectors will also by law, be required to be involved in the investigation process.
2. The finance department will check out his sick leave, health insurance and workers compensation.
3. The personnel department will ensure the employee's entitlement and organise the replacement of personnel in the injured workers absence.

All this of course has improved the relations, morale and confidence between the workers themselves, but have also removed some of the worry and responsibilities that management might have had in the past, regarding the issues of Health and Safety of their employers.

How do Trade Unions do their Work ?

All union policies are decided by the members. Trade unions operate at three levels:

1. The workplace
2. The industry
3. The Government

In the workplace or in industry the union negotiates with the employer on terms and conditions of employment. This is called Collective Bargaining and the agreement reached with the employer is called a Collective Agreement. Usually is put in writing and covers many-aspects of work.

Role of Union Official

There are two groups of officials who negotiate on behalf of the members of the union;

1. *Union Workplace Representative* : Often called Shop Stewards and Office Representatives in 'white collar' jobs. They are elected by a vote of the members of the union at their workplace and they represent to the employer the needs and views of those who elected them. They are not paid by the union and they work at their own job when not carrying out union business. They are trained by the union to carry out their union functions.
2. *Full-time Officials* : They are elected by the members of the union or appointed by the union. Their wages are paid by the union and they work for it full-time. To do this job well, a trade union workplace representative needs:
 - skill in talking to members and gaining a clear view of their problems.
 - he must also be able to address and run meetings so that members' views can be reflected in union policy.
 - he must prepare and present to management arguments for improvements.
 - he must also be familiar with union policy and agreements which have already been reached with management.
 - he needs to know about the employer, his accounts, production levels, plans and position in the international market.
 - he must understand the laws which concern working conditions and which give members legal rights in matters of health and safety, dismissal, period of notice and redundancy.

Many decisions which affect worker's lives and their standards of living are not taken by employers but by the Government. Just as workers have joined together to form unions, so unions have come together to form the ACTU (Australian Council of Trade Unions). As unions take up issues with employers, so the ACTU raises with Government matters of concern to workers.

It is clear that unions play a very important part in the working lives of many people in this country.

INDUSTRIAL NEGOTIATING TERMINOLOGY

Awards : An award is the law that establishes the wages and conditions of employment in defined industries or occupations. An award is made after a dispute is registered by a decision of, for example, the Industrial Commission of NSW for state awards in NSW, and the Conciliation and Arbitration Commission for federal awards. An award provides for minimum wages and conditions, e.g. overtime, sick leave, annual leave loading and occupational health and safety.

Mediation : Mediation refers to the intervention into a dispute by a neutral third party who is not acting on State or Federal legislation. While mediation is similar to conciliation (where the third party would be a commissioner), in mediation this third party does not necessarily have to be a member of the IRC (Industrial Relations Commission). The mediator could be a well-respected politician, business person or any other mutually acceptable person.

Conciliation : The Industrial Relations Act states that either party to a dispute can inform the industrial registrar that a dispute exists and request the Commission to call a compulsory conference. Conciliation is the first, informal, stage of the hearing.

A commissioner of an industrial tribunal orders the parties to a dispute to a meeting with the aim of allowing the parties to negotiate an agreement themselves. If the conciliation meetings fail to bring about an agreement then the parties will enter the final stage of arbitration.

Arbitration : Is the most formal stage of the resolution process. The parties are represented by experienced industrial advocates (lawyers) employed by the federal branch of the union and employer's association. These representatives make submissions on behalf of the parties that argue their respective cases, and present evidence to support their claims. The commissioner evaluates the arguments and comes to a decision. The decision may be expressed as an award or an order which is legally binding on both parties and enforceable through the legal system.

Incentive Schemes : Some businesses, especially those which can set sales targets, provide incentives in the form of various Fringe Benefit Schemes (Bonuses) for those employees who reach their targets or goals first, or exceed their targets by the greatest amount. Bonuses could take the form of cash, holidays abroad and shares in the business. Footballers who win 'Man of the Match' awards are benefiting from an incentive scheme.

Collective Bargaining : Collective Bargaining is the name given to the direct negotiation on disputes, wages and conditions between unions on the one hand and management and employers on the other, without the intervention of a third party.

During collective bargaining, the relevant union officials are likely to become involved on behalf of the workers. The officials will prepare tactics and strategies to use in negotiations.

Enterprise Bargaining : These bargains or 'agreements' (EBA), may be made directly between employers and their employees, as long as a majority of employees approve of the agreement. The negotiations can result in;

- changes to award conditions
- reward packages made up of salary and fringe benefits
- superannuation entitlements
- training opportunities for developing career paths
- social justice issues such as job security and equal employment opportunity
- flexible working hours (flexi-time)
- set overtime rates

By allowing individual workplaces to negotiate issues of particular concern, rather than being forced to accept decisions passed by the IRC, it is felt that individual enterprises (workplace), will be able to;

- increase productivity
- increase competitiveness
- increase profitability

Workplace Agreement : These are agreements negotiated at executive level of very large companies. They usually come as a part of a salary package and can include the company paying for, e.g.

- company car for business and private use. An option of either an annual salary of \$100,000 or \$80,000 pa, plus car.
- the executive's family health scheme annual payments
- free private education for executive's children
- superannuation fund payments

ROLES OF INDUSTRIAL PERSONNEL

People that work in the manufacturing industry, especially that of a large company could be classified under the following headings.

1. Management
2. Production
3. Distribution
4. Services

1. Management

Board of Directors: (Managing Director/General Manager): These people act on behalf of the shareholders to see that the company is properly organised and controlled (policy and decision making) in order to achieve its objectives. They have responsibilities (many of them, laid down by law), to their shareholders, to the government, to the community around them, including their employees and the trade unions that represent them, and to their customers. To assist them are the:

Secretary and Accountants (Finance) : These co-ordinate the correspondence, recording the financial accounts of the company, and ensuring that accurate budgets exist and are observed. They are also called upon to analyse costs i.e. to see whether the company is spending its income in the most effective way. Efficient accounting is the good housekeeping of a factory.

Production Manager, Distribution Manager and Service Manager : These act as liaison officers between Management and Production.

Personnel Manager : Most companies (even quite small ones) have personnel specialists (skills in negotiating and employment law). Their main task is to create the best climate for people to work in and give of their best. They also advise managers before they make decisions about people. They can also be in charge of training and re-training of staff, and of course hiring and firing of labour.

Marketing, Advertising and Sales Manager : These people arrange the research, community needs and establishing the markets for selling the product. Once this has been arranged, advertising the product can then take place.

2. Production

Production Manager : This person is responsible for the integration of many functions within the factory. Their duties are to see that the raw materials are received and successfully processed to the final product.

Research and Design Engineers : These conduct research into properties of materials and design the product. These people should have a background experience in the workings of factory floor machinery, thorough knowledge of the materials being used, etc.

Draughtsmen : These plan and produce working drawings for the manufacturing section. Once again these people should have a thorough knowledge of what machines are capable of producing, use of jigs, etc. An ideal draughtsman would be a person who has initially worked on a the production line and knows the restraints and capabilities of various machines and has then furthered his or her career by completing a design/drafting course in CAD.

Production can be divided into three sections:

- i. manufacturing
- ii. maintenance
- iii. inspection

Manufacturing

Foreman : These distribute work to be done to the tradesmen, such as wood machinists and to other workers best suited to their particular type of work.

Semi-skilled : These workers generally carry out repetitive work and operate machines set up by skilled workers.

Un-skilled or Labourers : These assist tradesmen in carrying and stacking materials when required and are responsible also for the cleanliness of the factory.

Maintenance - All types of equipment concerned with the production process are maintained by skilled tradesmen, such as electricians, fitters and turners, welders, wood machinists, etc. Some big firms have their own mechanics to maintain all motor transport vehicles.

Inspection (Quality Control) - Inspectors, usually tradesmen with a knowledge of the processes being carried out, conduct regular tests of sizes and quality of manufactured articles to maintain the high standards required.

3. Distribution

Marketing Manager : These people conduct market research into the generation and development of new ideas, by identifying and then satisfying the potential customer's needs. They watch trends in taste for example. They keep a wary eye on the company's competitors. Other methods of marketing are by surveys, pilot marketing, phone calls, free samples, customer follow-up, letter- box drops.

Sales Manager : These establish markets for the articles being produced and to arrange for their distribution to consumers in a saleable manner.

Storemen and Packers : This group of personnel actually 'handle the goods', by packing the articles and then loading for transportation.

Truck Drivers and Carriers : These complete the whole process by transporting the finished article to the wholesalers, retailers or individual customer.

4. Services:

Administration Personnel : Services in a one-man business may mean one secretary three mornings a week, and another part-time to keep the accounts straight.

In a medium-size company, the Officer Manager may have an accountant, clerks, typists and cashiers to record and conduct sales of goods, purchases, movement of stores and payment of salaries and wages, to co-ordinate clerical activities in all departments and receive and distribute communications between departments and other industries.

Purchasing Personnel : A company can use tons of typing and computer paper, new cars for the managerial personnel and sales department staff, materials such as timber, metal, plastics or whatever the firm uses in its products. When you are dealing with such quantities, it pays to have some specialists in buying (at the right price).

Companies that do not employ specialists, tend to use these services when the need is not continuous, or where specialist knowledge is required perhaps because the firm is exploring a completely new product or process.

EQUITY AND EQUAL EMPLOYMENT OPPORTUNITIES (EEO)

Anti-discrimination legislation is designed to ensure that people are employed on the basis of work related skills and not discriminated against because of their, sex, race, sexual preferences, age or ethnic background. Society has realised that it is unfair to deny people the opportunity to work on the basis of factors that have nothing to do with their ability to do the job well. This legislation makes it illegal to discriminate in advertising job vacancies, testing and interviewing job applications, selecting, recruiting and promoting employees.

Workplace Health and Safety

GOVERNMENT LEGISLATION

Government legislation refers to the laws or acts made by governments which are aimed at protecting the consumer from unsafe products and the worker from unsafe work practices. One such act is the Workplace Health and Safety Act of 2011 which requires employers to provide a workplace which is healthy and safe. The Act also requires the employees to cooperate with employers in maintaining health and safety at work.

There are hefty penalties for not meeting these requirements.

To make sure that this WHS Act is strictly adhered to, the State Government of NSW has set up a body called WorkCover. Its main purpose is to manage the State's workplace safety, injury management and workers compensation system. They do this by;

- reducing work related death, injury, illness and disease.
- supporting injured workers to remain at work or return to work safely and quickly following injury.
- minimising WHS risks to the public
- providing for fair weekly and lump sum benefits and affordable compensation to injured workers.
- providing workers and employers with incentives for improved injury management and safe, early return to work.
- funding a Conciliation Service at the Department of Industrial Relations for prompt resolution of disputes concerning compensation.
- performing advisory, regulatory and enforcement functions in relation to workplace injury and illness prevention, management and compensation.

Environmental Legislation

Because of increased environmental consciousness in Australia, laws or Acts have been passed requiring industry to reduce the emissions of pollutants by improved technology.

Examples of legislation include.

- The Environmental Protection Act
- The Clean Act
- The Environmental Protection Authority (EPA)

The outcome of these legislations have resulted in industry in Australia being cleaner and more efficient and thus long term environmental costs to society are reduced.

Safety Legislation

This is related to the safe use of products, safe manufacturing of products and the establishment of safe working practices in the workplace. Safety legislation includes mandatory safety requirements based on standards developed by Standards Association of Australia (SAA), and published through that organisation.

INDUSTRY REQUIREMENTS

Standards Association of Australia (SAA)

This is a body which establishes minimum requirements which ensures the safety of the product when it is being used correctly by the consumer. Some examples of SAA:

- Bicycle and motor bike helmets
- Seat belts in motor vehicles
- Child restraints in motor vehicles
- Design and use of electrical tools and goods
- Labelling of children's nightwear regarding flammability

Commonwealth Trades Practice Act, 1974

Involves Federal and State laws on the safety of the consumer and the general public in the purchase and use of products and the safety of the workforce during the production process. Part V Division I A (Product Safety and Product Information) - this legislation provides for the publication of the standard of safety of products, products deemed unsafe and products that have been recalled because they are deemed unsafe.

The Poisons Act, 1966

This Act controls the sale, supply, packaging and labelling of poisonous substances, e.g. medications, chemicals and fuels.

Australian Standards AS 2216, 1978, specifies the use of glass and rigid plastic containers for poisonous substances as well as the shape and size of the bottle and the positioning of the lettering.

FIRST AID

Some very large industrial organisations employing hundreds of workers, e.g. Ford of Australia, BHP, etc., employ on a full time basis, a nursing sister. The nurse usually has the most up to date equipment to deal with the most serious of accidents. This equipment is enough to stabilize the patient until the ambulance arrives.

Smaller firms (20-100 workers) would have trained and qualified personnel that have done a course in First Aid. These people are usually referred to as Safety Officers. These courses usually train these people to handle minor accidents, heart attacks where CPR (Cardiac Pulmonary Resuscitation) is required, etc.

In very small businesses with a workforce of less than twenty workers, very few of the workers would possess a certificate in CPR or have completed a course in St Johns Ambulance First Aid. This is a shame, because it could mean the difference between life and death.

In recent years, there has been a move towards first Aid training courses within all types of industry. This has come about through the 'management' realising the importance of such courses, and the failure to provide the opportunity of such courses, could result in litigation by government legislative bodies.

SAFETY TRAINING AND HUMAN FACTORS

The very large industrial organisations conduct safety courses and lectures on a regular basis. These lectures in some cases are compulsory and are usually held during lunch breaks. Practical demonstrations are usually given and in other cases, videos are shown. Some employees even have to pass a test to be able to use certain machinery.

Monitoring and Supervision

All workers are monitored or supervised on a regular basis and safety programs are continually being updated to keep up with new machinery and new technological advances.

In small firms, safety programs as mentioned above are not usually carried out. Individual training is the method used to train employees. The foreman supervises the apprentice in all aspects of safety first in the workshop. Clear procedures are set down by the firm and it's the foreman's duty to see that these procedures and instructions are carried out by the rest of the workforce.

Safety Zones and Signs

Practical ways and methods used in industry to ensure that accidents are kept to a minimum are many and varied. Whether it is a large industry or a small manufacturing firm, the following precautions should be taken:

- all machines that have exposed cutting tools should have safety guards around that area of the machine to protect the operator.
- yellow safety lines should be painted on the floors around the machines. These are known as 'safety zones' for the operator. Only the operator of the machine should be situated inside these zones.
- pictorial warning signs depicting 'danger' should be placed in appropriate positions around the factory. Other signs may be of a written nature.

Personnel Protective Equipment (PPE)

To prevent injury to their workers, firms supply free of charge, clothing and other items of equipment that can help prevent serious injuries. These are as follows :

Hard Hats - These are worn in the building industry especially on construction sites where there is a lot of overhead work.

Steel Capped Boots - Used mainly in the metal and mining industries.

Safety Glasses - Used wherever an injury can occur from flying objects.

Dust Extractors - These machines extract about 90% of the dust from the air and surrounding machines. This waste is then blown along ducts (overhead pipes) to a main collection area.

Dust Masks - Used mainly in the timber industry e.g. sawing and sanding of materials, especially man-made products. These are used to prevent fine dust particles from entering and damaging the lungs. Other types of masks are especially made to prevent poisonous fumes, e.g. cellulose lacquer, acetone and lacquer thinners.

Ear Muffs or Plugs - These are worn to protect the worker's hearing in areas where there is a high volume of noise.

Maintenance of Equipment - Checking that the machines are working correctly and safely on a regular basis is very important. Machines that are neglected and are allowed to deteriorate will eventually break down possibly causing an injury to the operator. In this case, the worker could be covered by Worker's Compensation and the firm held

responsible. It is therefore always in the employers interest to make sure that all machines are working satisfactory and safely.

Workers Compensation

Regardless of the size of the business, number of workforce, etc., every employer, by law, must insure their workers against industrial accidents. This is paid for by the firm and can be expensive. Workers Compensation covers all medical expenses, hospitalisation costs, sick leave on full pay (22 weeks) while recuperating following an accident and can also involve a large pay out figure which could be in the hundreds of thousands of dollars, depending on the severity of the accident.

Health Insurance

Some firms as an incentive to attract skilled employers or executive members, have built into their wage agreement or structure, a policy of paying their health insurance. This can amount to approximately a saving of \$2000 a year to the employee.

This type of agreement is usually only offered to the executive members of the firm - it would be too costly to introduce, for all members of the workforce.

MATERIALS HANDLING

One of the major causes of work-related injury compensation is to do with materials handling - lifting, pushing, carrying, etc. Incorrect work practices lead to a number of physical problems. The most common of these are hernia, lower back injury and fatigue. Fatigue in itself is not a problem, but can cause a lack of concentration which in turn can lead to other accidents. Most problems associated with back injuries can be solved in two ways:

1. mechanical means of lifting e.g. forklift
2. education, e.g. talks and videos.

The handling of chemicals and toxic substances is another major area of concern to human health and safety. Chemicals which are not obviously toxic can, over long periods of exposure, cause skin disorders, e.g. dermatitis. Special protective clothing and face protection should be used when handling any solvents, chemicals, acids, etc.

Repetitive Strain Injury (RSI)

This is probably the most common of all injuries associated with administrative work. This affects the tendons in the wrist and forearms. It is caused by repeated movements of a limb without fully extending the muscles, causing localized fatigue resulting in tissue damage. This type of injury is common with keyboard operators who spend most of the day typing and doing nothing else.

WORKPLACE CULTURE:

There are three areas which can be influenced by workplace culture, which in turn, can have an effect on the on-going production of a product.

1. Worker Participation in Decision Making.
2. Worker Commitment.
3. Absenteeism.

Worker Participation in Decision Making

This has proved to be one of the most successful ways of increasing production and improving the quality of the product when it is part of company policy. Sadly, this fairly recent concept is not widely used -perhaps some firms look upon it with a cautious attitude - don't give the worker too much authority or power, it is not good for the company'

Where it is policy, one or more representatives, depending on the size of the firm are chosen from the workforce. These people are highly respected both by their working colleagues and by the management for their high degree of expertise in their chosen field and other personal attributes.

The side effects of this new concept of manager/employee relationship are many, the main one being the breakdown of 'them and us' attitude, which in the past has caused many misunderstandings and problems. By presenting this opportunity to the workers to put forward their ideas, of how to improve the product, etc., has improved the feeling of self-worth, improved morale throughout the factory and in the long term has helped to make the workers more loyal to the firm.

Workers Commitment

It is mainly because of worker participation in the decision making, that worker commitment has increased. The worker now feels that he has an invested interest in what the firm is producing. He knows that his point of view will be listened to, and acted upon, if found to be advantageous to the firm. The workers encourage and assist each other and in doing so, feel more committed to maintaining the standard, because if they don't, they know that they are letting their colleagues down and that includes the management as well.

Absenteeism

Management must not turn a blind eye to excessive absenteeism in their workforce. If it is not corrected, in the long term, it can cause ill-feeling amongst the workers and be a financial burden on the successful running of the factory.

Absenteeism must be investigated and if areas of concern are discovered by the management then they must be rectified as soon as possible. This is done usually with a meeting between the parties concerned, i.e. the employee concerned, the union representative and a member of the management team.

The main problem that absenteeism causes is the disruption to the processes of mass production of a product. This happens when a firm has a policy of not employing multi-skilled workers or training their workers to gain experience or skills on machines in other areas of the factory. The advantages of having multi-skilled workers, is that when an employee is absent, another worker from some other area of the factory, can step in to carry out his duties.

The three main reasons for absenteeism are:

1. Poor Working Conditions:
 - unhealthy working conditions (noise, pollution, etc.).
 - unhygienic working environment (cleanliness of toilets, canteen, etc.).
 - dangerous working environment (non-existent safety precautions, etc.).
2. Poor Management/Employee Relations:
 - poor lines of communication, causing low morale amongst the workers.
3. Poor Strategies to Combat Chronic Absenteeism:
 - no multi-skilling policy
 - lack of training programs

WORKPLACE COMMUNICATION

Verbal : Internal, formal oral communication occurs most frequently between an employee and their immediate supervisor. This needs to be brief and to the point, and then should be followed up by a written confirmation of what was discussed and most importantly, what decisions were made. Such communication may take the form of a simple memo.

Telephone : with telephone calls, some businesses keep a record of both incoming and outgoing calls. Other electronic means of communication, such as; fax messages, include such details as the date and time of the message.

Written : Businesses generate a substantial amount of written communication, most frequently in the form of letters, memos and forms of one sort or another. Word Processors and modern type writers have the facility to produce correspondence without errors, which obviously can help to form a good impression of the business.

Picture and Word Signs : These are usually situated in the manufacturing area of a factory near machines, etc. They consist of 'warning' or danger signs and with a business consisting of a high non-English speaking workforce, picture signs are predominately used, with written signs usually in the language of the ethnic workforce.