

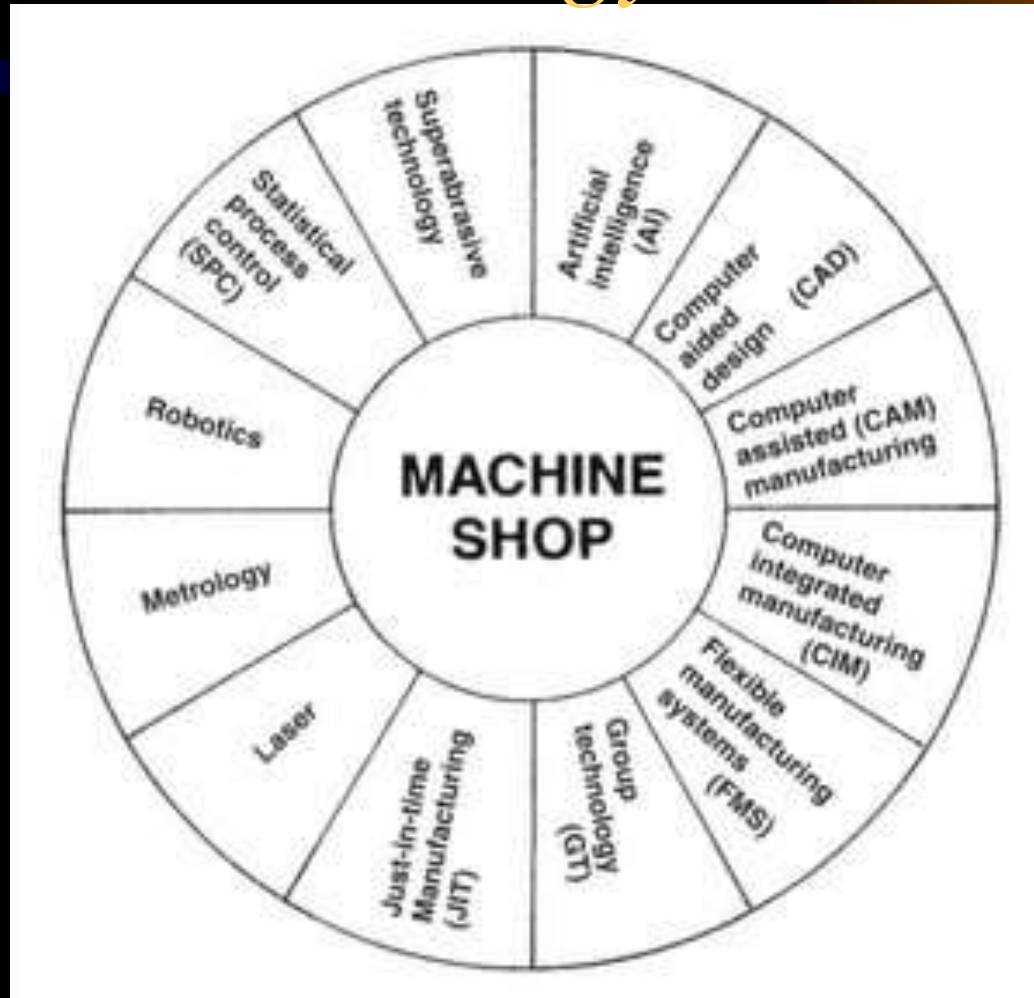
*Conestoga Student Seminar*



# *Technology Courses*



# Technology Careers



## *World a User of Tools*

- The world is a user of tools and those that learn about the tools of tomorrow and use them today, will share in tomorrow's prosperity.

# *Student Qualities*



- **Regular Attendance**
- **Neatness – neat in work habits**
- **Loyal to employer**
- **Good communication Skills**
- **Team player**
- **Ability to change**
- **Lifelong learning**

# The Law of Production

EVERYTHING CONTRIBUTING TO Man's Material Welfare is the product of Natural Resources plus Human Energy multiplied by Tools.

$$NR + HE \times T = MMW$$



Natural Resources include all of the things made available to man. These are never used nor are changed into form, position, or place.

Human Energy, both mental and muscular, is the power which is used to produce the things that man uses.

Tools, which may be thought of as including everything used by man to produce and exchange goods and services, from money and credit to tools.

Man's Material Welfare, in addition to food, clothing, and shelter, includes all of the other things that man uses to improve his life.

## *Law of Production cont'd*

- **Nothing in our material world is free**
- **Government is not source of goods**
- **The only Valuable Money**
- **In Modern Exchange Economy**
- **Customer Security**

## *Law of Production cont'd*

- **Wages, the Principle Cost**
- **The Greatest Good for the Greatest Number**
- **Productivity Based on Three Factors**
- **Tools only one of Three Factors**
- **Productivity of Tools**



# Material Progress

## All Material Progress Begins With Machine Tools

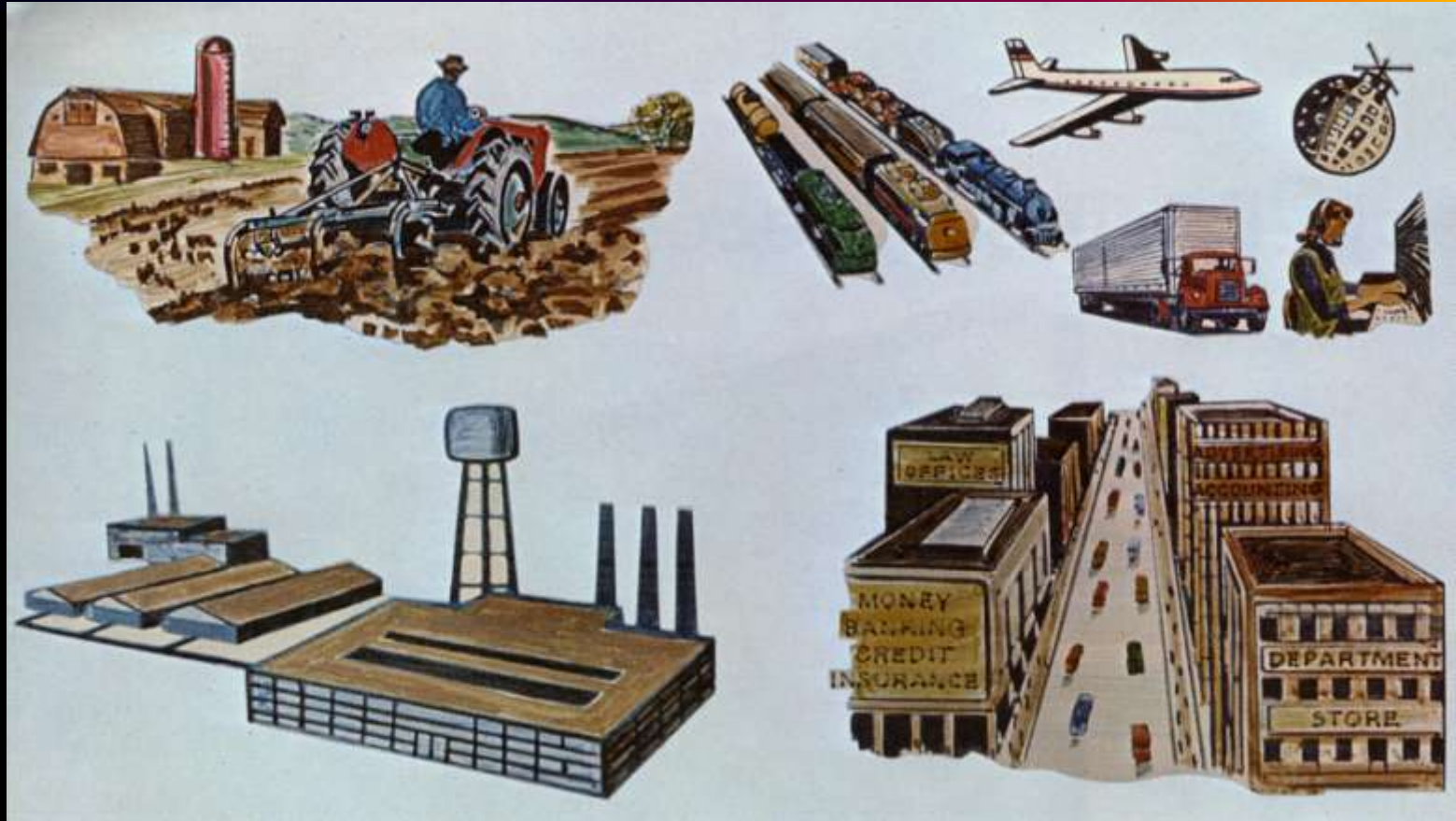


"Machine tools are a distinct class of machinery which are used to make all other tools. Machine tools are used to do the first work operation, such as labeled and illustrated above."

Besides making the special machinery used for all types of manufacturing, machine tools are often employed to directly manufacture the parts used in production.

The machine tool industry is relatively small, but it is the key to all material progress.

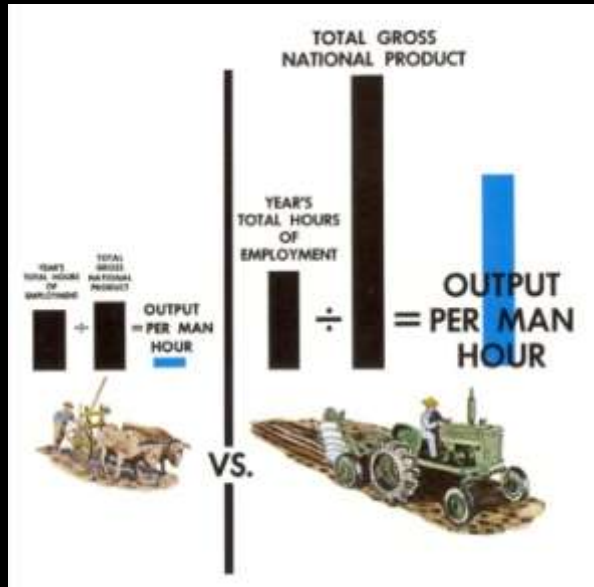
# *Tools of Business/Industry*



# *Business/Manufacturing Tools*

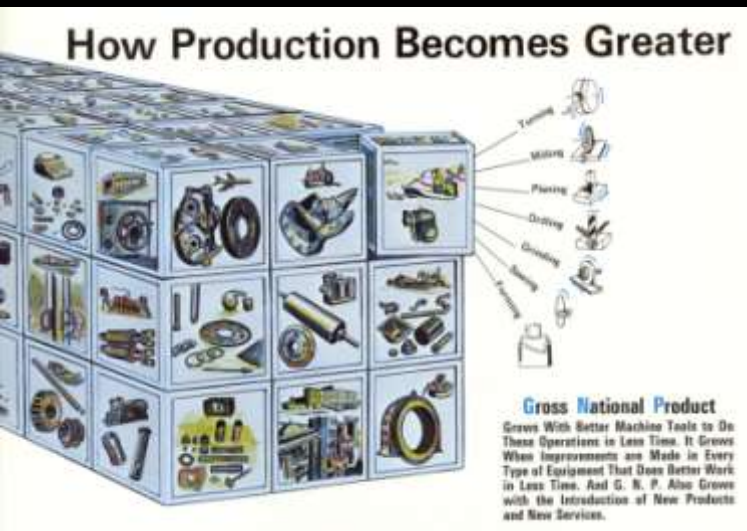
- Everything used in production or for supplying a service is a tool.
- Includes everything owned by a corporation.
- These include land, buildings, equipment, finances, communication equipment.
- Without these there could be no work, no jobs and no stockholders.

# Output per Human Hour



- A measure of building block growth in standard of Living.
- Growth through improving a product or service.
- Attracts more customers.
- New tools and equipment lower manufacturing costs.
- Better quality goods produced in less time.

# Production Grows



- Better, more accurate tools used.
- Improved manufacturing processes used.
- Less time manufacturing due to accurate machines.
- New products developed to suit customers.



# *Machine Shop 1940 to 1960*



# The Evolution of CNC

## 1. Reading drawing



## 2. Programming

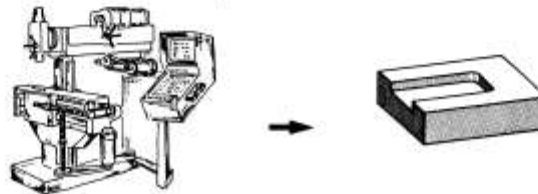


```
N9001  
N1 G18  
N2 G54  
N3 G98 X-10 Y-20 Z-10 I95 J30 K74  
N4 G99 X0 Y-20 Z0 I75 J20 K54  
N5 G0 X-7 Y-5 Z23 M3  
N6 G1 X45 F100  
S630 T1 M66
```

## 3. Inputting program



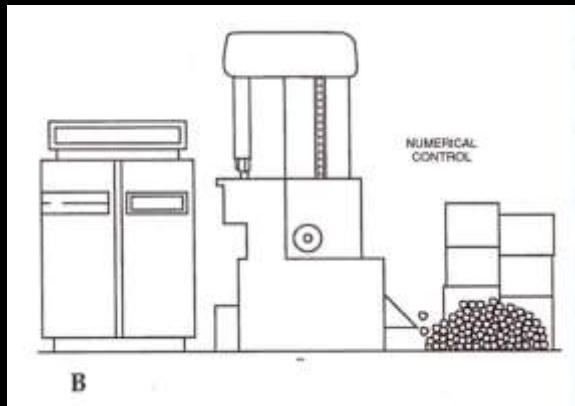
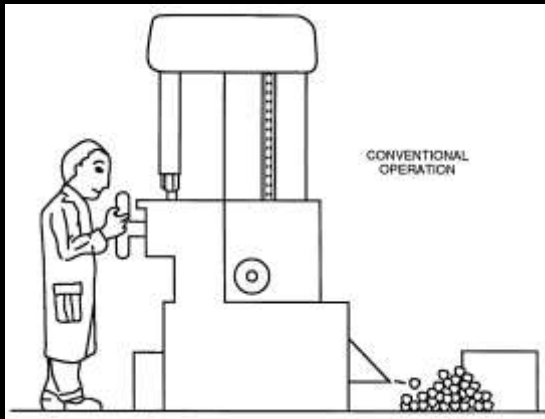
## 4. Manufacturing



# Computer Numerical Control

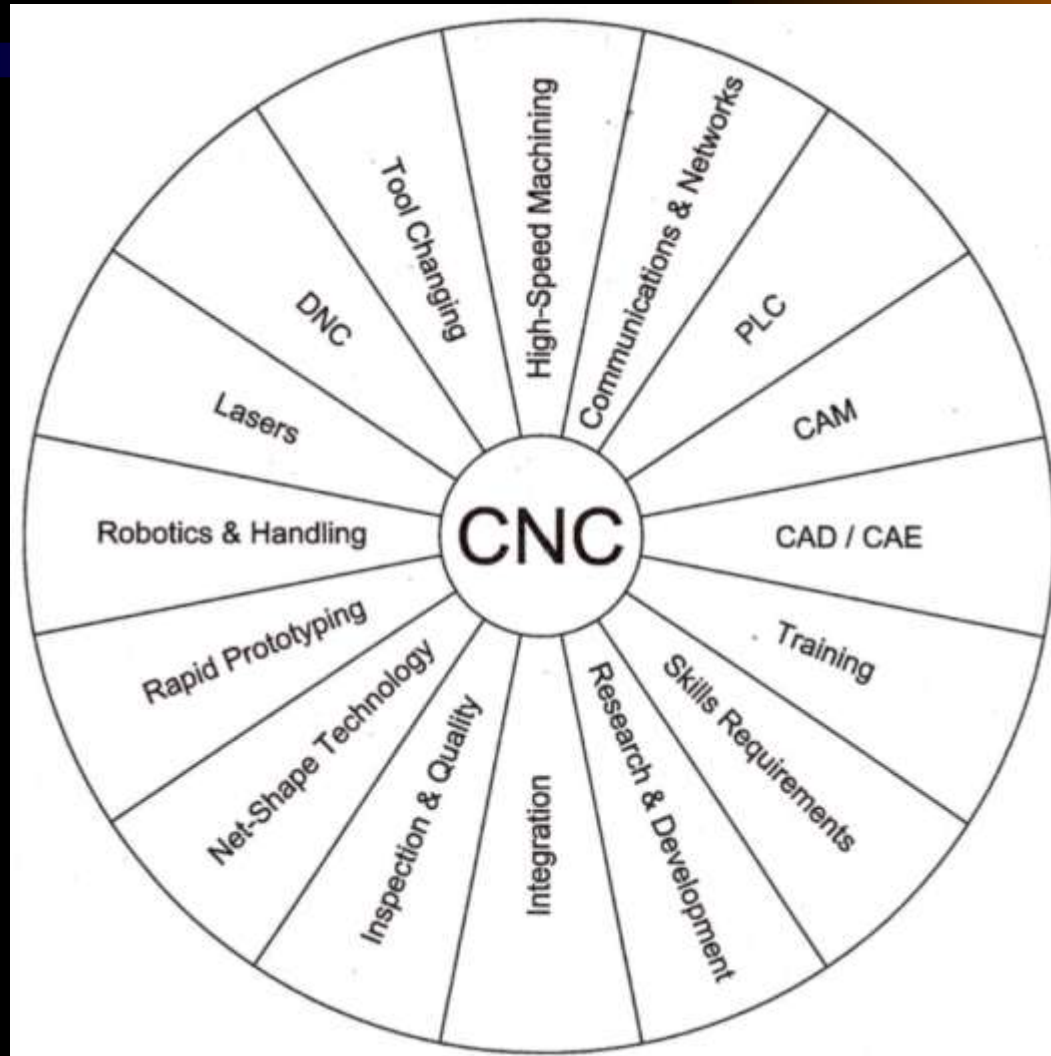
## Advantages

- Accuracy – capable of working to .0002 inch.
- Reliability – can repeat accuracy again and again.
- Repeatability – each part produced is exactly the same as the others.
- Productivity – goal is to produce better quality goods at lower prices.





# Computer-Related Courses

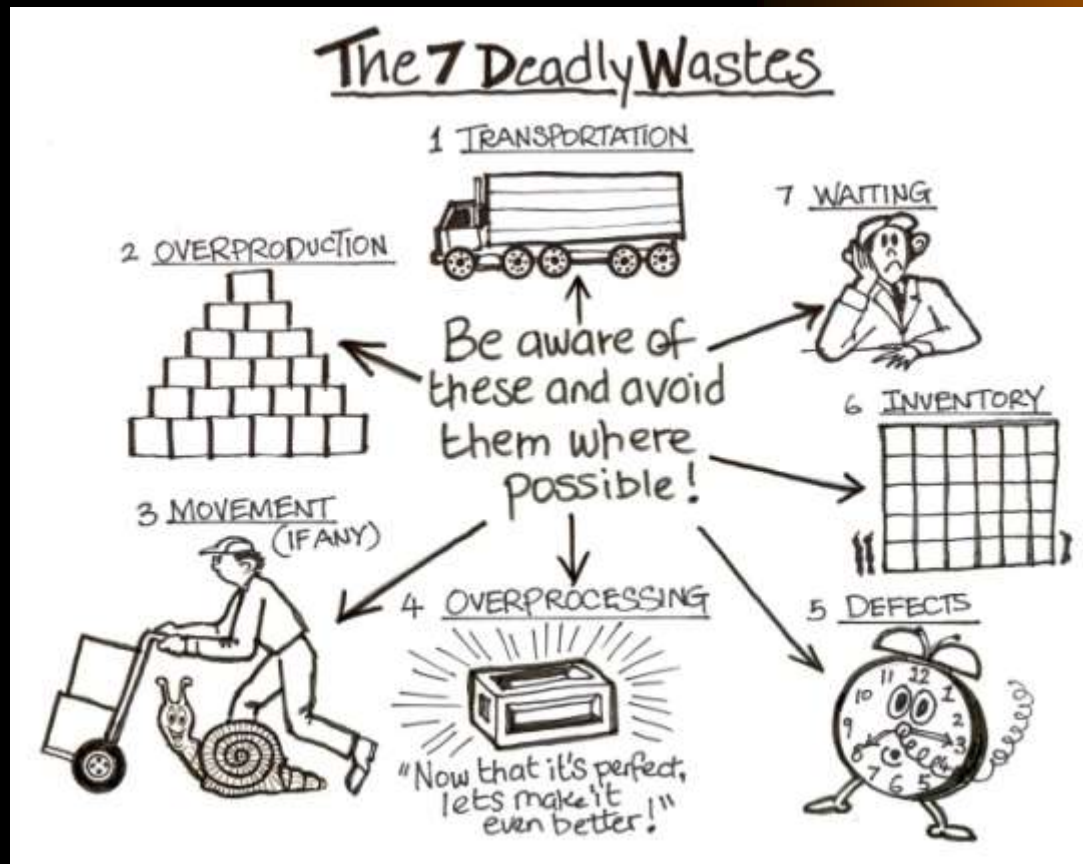


# Finding Waste



- Waste is anything a customer is not willing to pay for.
- Value-added activities – those that add value to the product.
  - Manufacturing parts
  - Fastening parts together
- Non-Value Added activities – those that add time but no value.
  - Inventory, Defects, Waiting.
  - Moving parts

# Seven Deadly Wastes



# *Lean Manufacturing Tools*

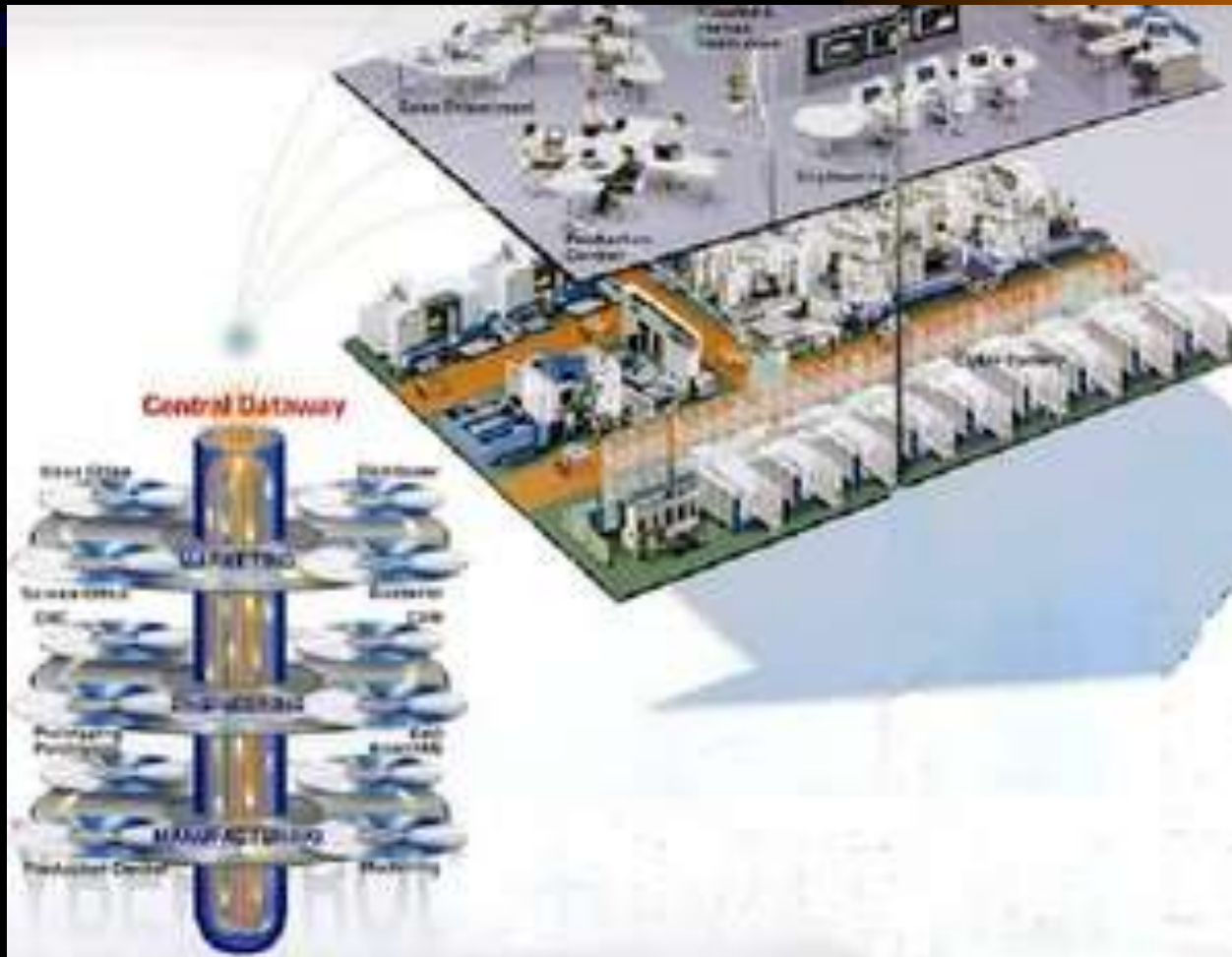
- **Cellular Manufacturing**
- **Continuous Improvement**
- **Lean Manufacturing**
- **Pull/Kanban Systems**
- **Total Productive Maintenance**
- **Value Stream Mapping**
- **Workplace Organization**

# Lean Manufacturing Tools

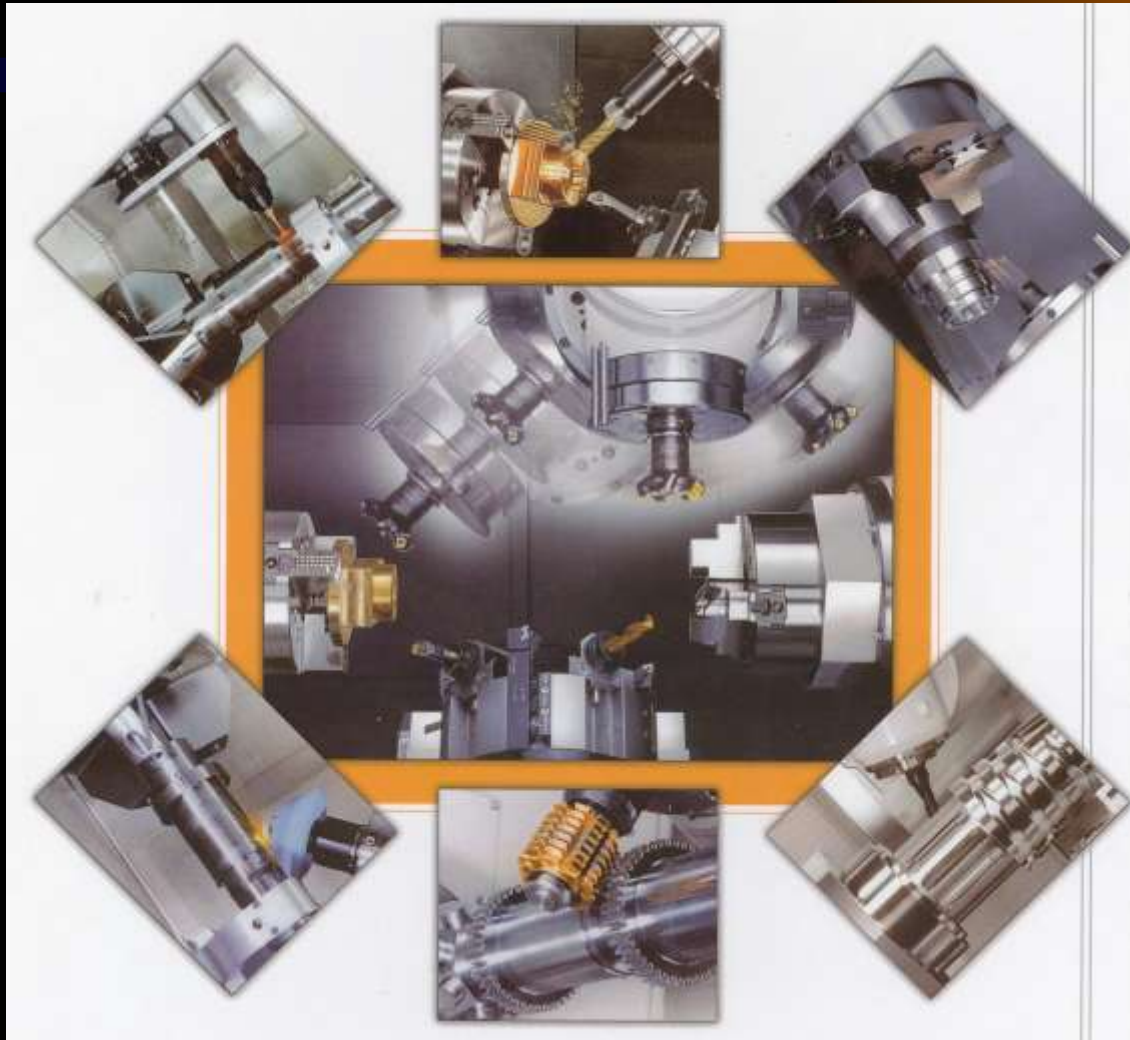




# Cyber Production System



# *Multi-Tasking Machine*



# *MultiTasking Advantages*

- Can perform operations of 5 or more machines.
- Saves factory floor space.
- Parts completed in one machine.
- Reduced tooling and fixture costs.
- Reduced manufacturing costs..
- More accurate parts possible.
- Faster delivery to customers.



# *Emerging Technologies*

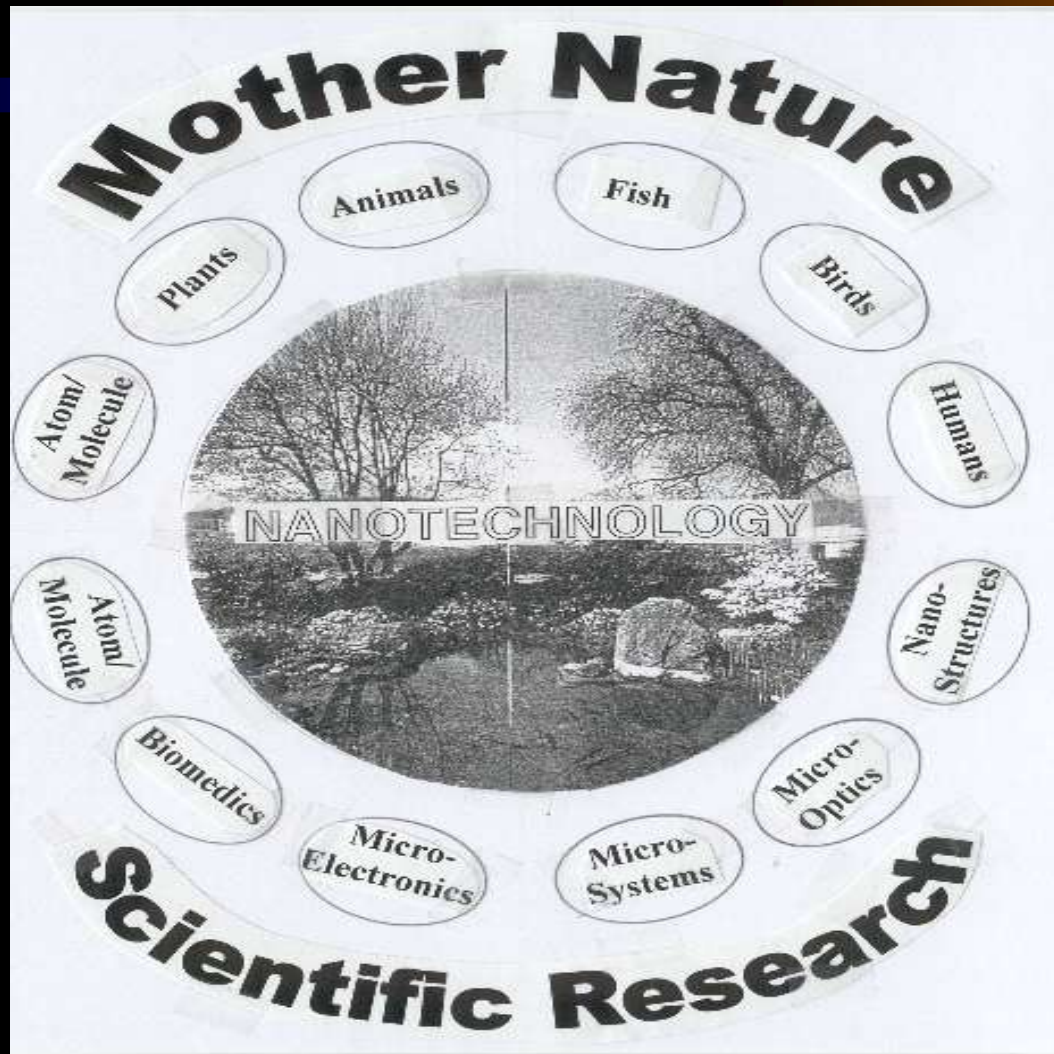
## **Done in One**

- **One machine required vs 5 or more and 1 fixture**
- **Reduced time on electric generator from 47 hours to 6 hours and 43 minutes**
- **Profit increases, lower overhead, less factory space used, better part quality**

## **Production on Demand**

- **No work started until order received**
- **Reduced inventory and WIP**
- **Customers better served, on-time delivery**

# Nanotechnology



# *Nanotechnology Description*

- Working with matter 1/75,000 thickness of a human hair.
- Opens possibilities that will leave today's electronics as out-of-date as mechanical adding machines.
- If electronics are reduced to individual molecules, it will change forever the way products are produced.

# *Future Technical Feasibilities*

- World on brink of technological revolution capable of bringing wealth, health and education without pollution to all on earth.
- Automatic factories (factory-on-a-chip) producing consumer goods.
- Computers a billion times faster than today.
- Safe affordable space travel.
- Medical benefits – non-intrusive surgery, end to illness, slowing of aging process.