

UNIT - I

①

Automatic and Robotics:-

→ Automatics & Robotics are two closely related technology in an industrial context. It defines the automation as a technology that is considered with the use of mechanical, electronic and computer based system in the operation and control of production.

they are three broad classes of industries.

- 1) Fixed Automation
- 2) Programmable Automation.
- 3) Flexible Automation.

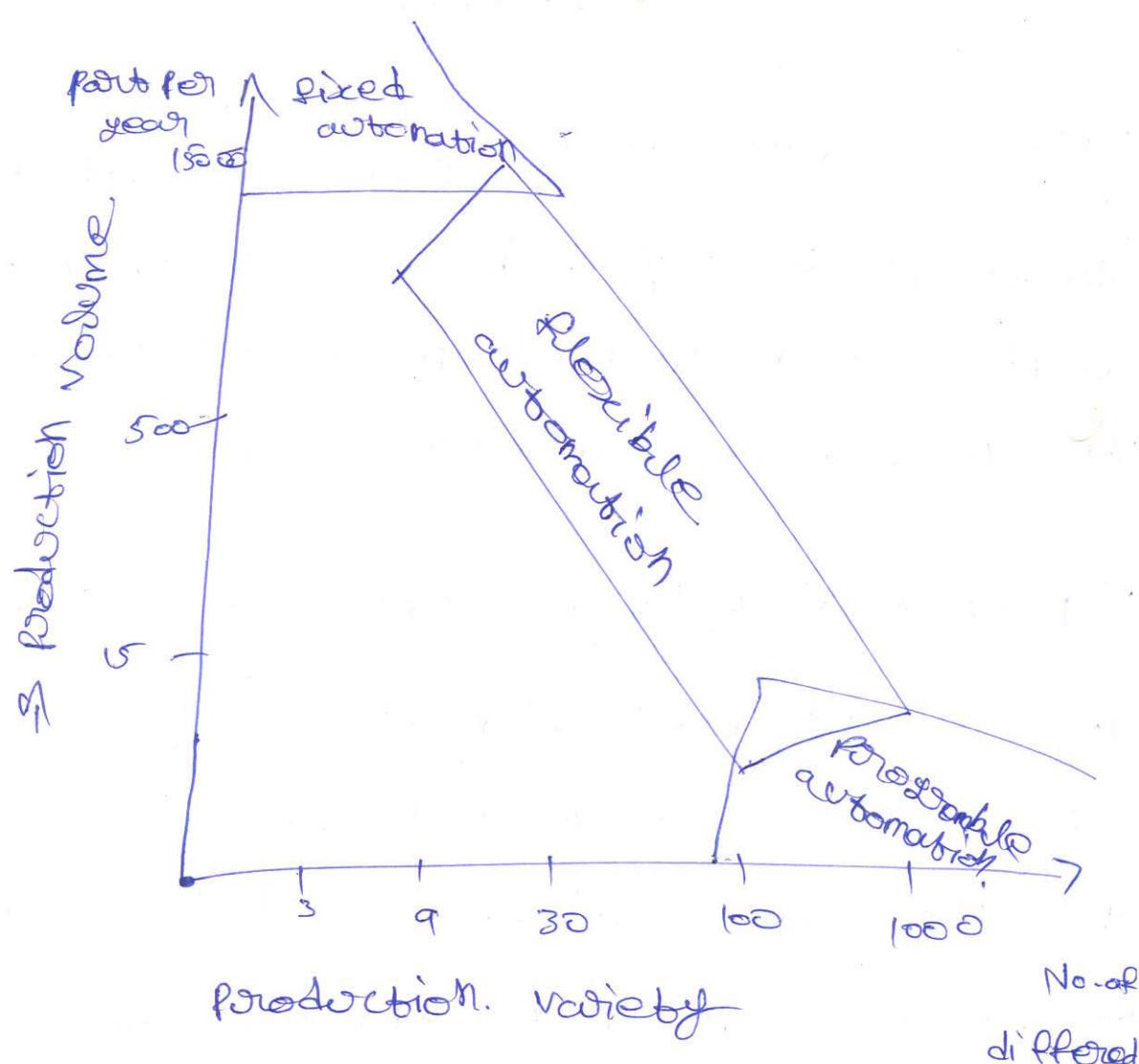
1) fixed automachine : It is used when the volume of production is very high and it is therefore, appropriate to the design to the specialized equipment to the product very efficiently and high production cost.

2) Programmable Automation : It is used to when the volume of production is relatively low and there are a variety of products to be made. In this case the production equipment is designed to be adoptable to various in product configuration this adaptability features is accomplished by operating by the equipment under the control of a programme of instructions which has been prepared especially for the given product.

The relation b/w first two types is automachine as a function of product variety and production volume is illustrated.

Flexible Automachine: there is a third category b/w fixed automachine and programmable auto machine which is called flexible automachine other terms used for flexible automachine other include: flexible manufacturing systems (FMS) or computer integrated systems.

The concept of flexible automachine has:



Robotics: An industrial robot is reprogrammable & multi-functional manipulator designed to move materials, tools, special device through variable programmed motions for the performance of variety of task.

Robotics in science fiction: The limitation of the current day robotics machines. the popular concept of the robot is that it looks and acts like a human being.

The humanoid has been inspired and encouraged by a no. of science fiction stories.

One of the first works of relevance to a discussion of robotics and science fiction was a novel by Shelley published in England in 1817, titled Frankenstein.

Among science fiction writers, Isaac Asimov has contributed a no. of stories about robots starting in 1939 and indeed is credited with the term "Robotics".

The picture of robot that appears is that of a well designed, fail safe machine that performs according to the these principles, were called the law of "Robotics".

- 1) A robot may not injure a human being or through inaction, allow a human to be harmed.
- 2) A robot must obey orders given by humans except when that conflicts with the first law.
- 3) A robot must protect its own existence unless that conflicts with the first or second law.

End effectors:

For the industrial purpose the capability of the robot must be enhanced by means of additional devices we meet refers to these devices as the robots perifol. they include the tooling which attached to the robots and the cells or system which allow the robot to interact with its environment. the end effectors is used to describe the hand or tool that is attached the effectors represent the special tooling that permits the general purpose robot to perform of particular application the special tool in must usually be designed specifically for the application. these end effectors are classified into two categories.

1) Gripper

2) tool unit, pg-418

Robot Applications : Robots are employed in wide assortment of application in industry.

for the present most industrial applications of robots can be divided into -

⇒ material handling, machine loading and unloading applications.

In this applications the robots function is to move materials or parts from one location in the work cell to same other location.

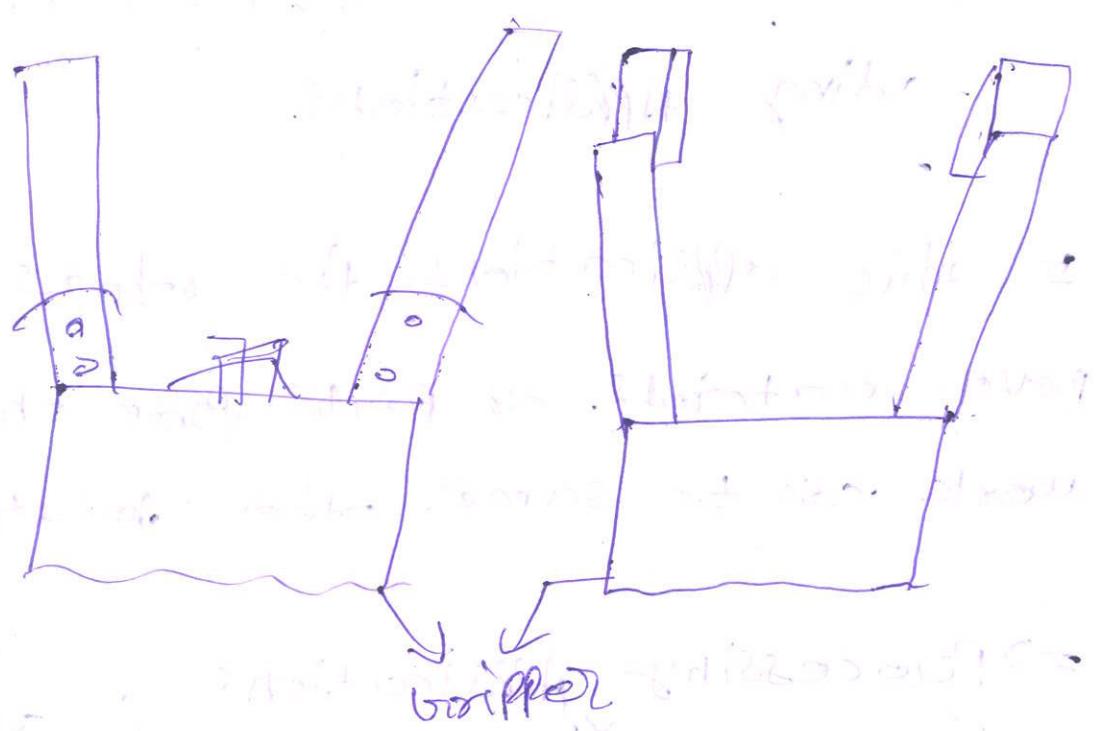
⇒ Processing Applications : these category includes spot welding, arc welding, spray painting and other operation of which the function of the robots of it manipulate a tool to accomplish some manufacturing process in the work cell. spot welding represents particular important application in processing category.

Assembling & inspection : these are two separate operation which will include together in this category in Robotic assembling is a field in which the industrial is show in great interest because of its economical.

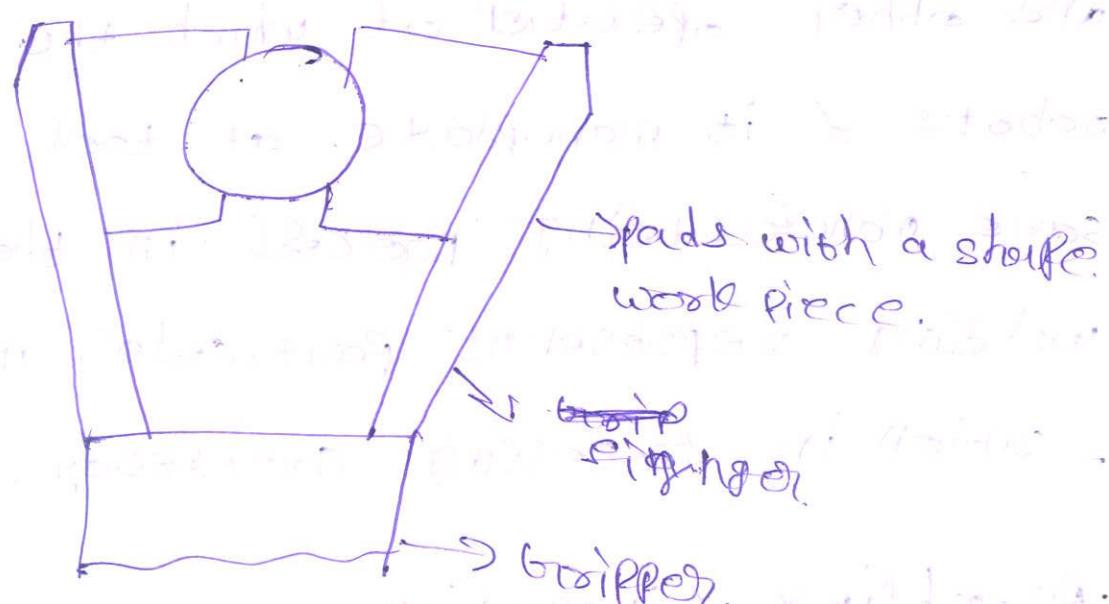
Advanced Applications of Rehabilitation outer space
pets, security

Grippers: A device used to hold or move objects.

i) mechanical grippers:



ii) interchangeable: can be used in the same
gripper mechanism.



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The function of gripper mechanism is to convert some form of power input into the grasping action of the fingers against the part.

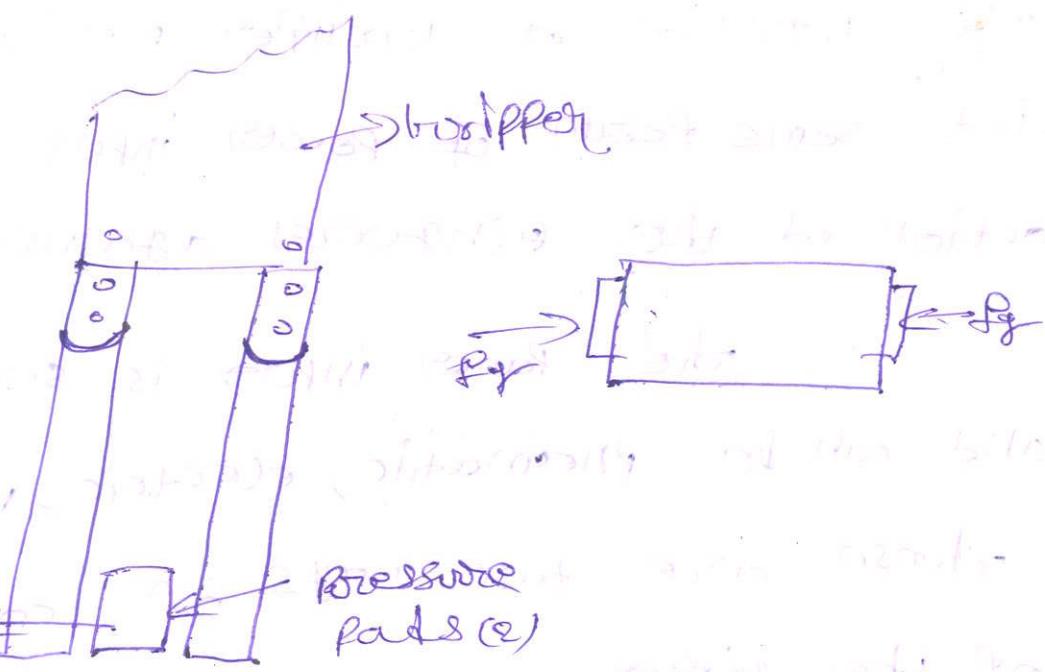
The power input is supplied from the robot and can be pneumatic, electric, mechanical.

These are two ways of combining the parts of the gripper.

i) Physical or the ~~feet~~ fingers with in the fingers or fingers in this approach the gripper fingers change the parts to be somewhat bent, these by constrained the motion of parts, this is usually accomplished designing and constraining the contacting surface of the fingers to be the approximate shape of the part to be gripped geometrically.

This bends to increase coefficient of friction of the contacting finger surface it is also serves to protect the part surface from scratching or other damage.

(ii) The frictional method of holding the part result in less complicated & therefore less expensive gripper design. It's tends to be ready.



$$\therefore \boxed{2\eta f F_g = w}$$

the equation covers the simplest case in which weight along force boundary. So because that part to slip out of the part.

$$\boxed{\eta f F_g = 0}$$

where

η = coefficient of friction of the finger contact surface against the foot surface.

N_f = no. of contacting finger.

F_g = gripper force

w = weight of the foot or object being gripped.

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