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Modern Machine Tools- Mechatronics

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ABSTRACT:-
Machine is a complex system and its learning is one of the application of artificial intelligence.Vehicles, automobiles, airplanes, sensors are the examples of modern machines.The introduction of machine and rapid growth of automobile industry has influences a lot in the scientific century.The construction and design of many machine tools based on the increasing use of tungsten carbide tool steel. The manufacturing sector is facing a challenge in this century to developing their business by applying new ideas and technology.This research paper will explore how modern equipments makes the work faster in this era compare to previous years.
KEYWORDS:- *Modern machine, Smart machines, skilled workers, increased production*

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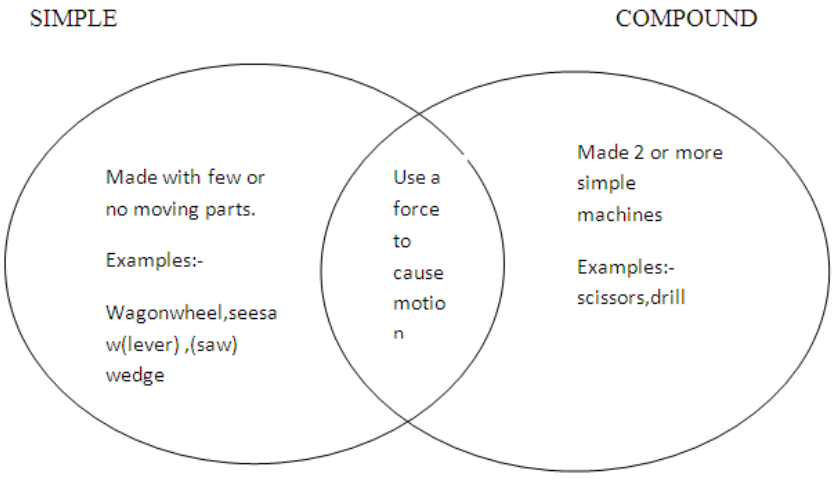
I. INTRODUCTION

On the daily basis it have been observed that use of machines plays a vital role in human's life. Discovery of machines rapidly increasing the tendency to minimize hand labour. Two million years ago homohabillus have been found the first stone tool-hand axes from rock as crude wedge,but the French tailor barthelemy Thimmonier invented the first functional sewing machine in 1830.Archemedes defined the idea ofsimple machine into the lever,pulley,screw .Simple machine uses a single applied force to do work against a single load force.Ignoring frictional loss, the work done on the load is equal to the work done by the applied force. The machine can increase the amount of the output force, at the cost of a proportional decrease in the distance moved by the load. The ratio of the output to the applied force is called the mechanical advantage.The mechanical advantage of a compound machine is just the product of the mechanical advantages of the simple machines of which it is composed.Archimedes discovered the principle of mechanical adavantage in the lever.Simple machines do not contain a source of energy, so they cannot do more work than they receive from the input force. A simple machine with no friction or elasticity is called an ideal machine. Due to conservation energy, in an ideal simple machine, the power output at any time is equal to the power input whereas the mechanical advantage of a compound machineis the ratio of the output force exerted by the lastmachine in the series divided by the input force applied to the first machine.Compound machine formed from a set of simple machines connected in series with the output force of one providing the input force to the next.

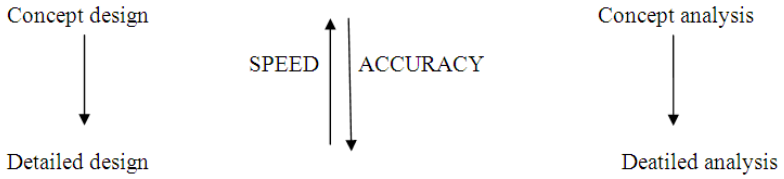
II. DIFFERENCE BETWEEN SIMPLE AND COMPOUND MACHINE



Difference between Simple and Compound Machine

III. SIMULATION OF COMPLEX STRUCTURE

Mechatronics is a methodology used for the optimal design of electromechanical products.The term was coined nearly 40 years ago,in 1969, when the engineer Tesuro Mori combined the words "mechanical" and "electronic" to describe the electronic control systems that Yaskawa Electric Corporation was building for the mechanical factory equipment.Mechatronics is a design philosophy, which is an integrating approach to an engineering design.Inorder to get a well balanced and controlled design on the basis of mechanical design, adaptation of mechatronic approachment in which structural and control design are integrated.So operational understanding and interactions of machine dynamics and basic control systems are required.Modelling and simulation are intended as a tool in the decision making process so it is essential that they are done simulteanously and that the type of simulation is adapted to the current phase in the development process.



During the design process, the amount of information and detail is growing constantly.Concurrently ,starting with very simple elementary models to support the selection of proper concept , the simulation models become more refined during this top down approach ,just like the product under development.The modeling process must be preceded by a proper specification phase, in which the functional machine specification are translated into servo-dynamic related specifications. The inventory machine and its complex system makes the human life easier and partially it causes destruction and wars. Increasing use of vehicles causes airpollution and it is badly affect human health. The radiation from the smartphones causes tumors and cancers in humans. Complex system enhances the industrial field aswell as professional life eventhough it has small impacts on human life. The other important thing is about the mechanism of car because nowadays everyone wants their own car so it is relevant to get more knowledge about the mechanism of car and its function . In future more ecofriendly machines are to be developed. Inorder to modify a system, first we need to know more about its efficiency and mechanism. In 1807,francois Issac de Rivaz designed the first car powered by an internal combustionengine fuelled by hydrogen. In 1886 first petrol or gasoline powered automobile the Benz Patent Motorwagen was invented by Karl Benz. This is also considered to be the first production vehicle as benz made several identical copies.In 20th century electrically powered automobiles appeared but only occupied in a niche market.

IV. ENGINE MECHANISM

Engine is the heart of automobile and car works on internal combustion engine.Internal combustion engine works on Otto cycle and diesel cycle. Petrol and gas is used as fuel in ottocycle engine and it is work in four stroke and two stroke engine.

The four stroke are

- Intake
- Compression

- Power
- Exhaust

INTAKE STROKE
1. Intake valve opens
2. Piston moves TDC to BDC
3. A vacuum is created inside the cylinder
4. Atmospheric pressure pushes the air/fuel into the cylinder.

COMPRESSION STROKE
1. Intake and exhaust valves close.
2. Piston moves up BDC to TDC.
3. Air/fuel mixture is compressed
4. Fuel starts to vaporize and heat and pressure begins

POWER STROKE
1. Spark plug fires igniting fuel mixture
2. Piston moves TDC to BDC
3. It is also called working stroke
4. Heat is expand the piston and converted to mechanical energy

EXHAUST STROKE
1. Exahust valve opens
2. Piston move BDC TO TDC
3. Exhaust gases are pushed out into the atmosphere

In future more concentration have to be focused on solar type machines instead of using fuels.

V.MACHINES THAT CHANGED THE WORLD

Important machines that helped to change the world.
Archimedes Screw (213BC)
The Printing Press (1455)
Guns (1000AD)
Calculator (1960s)
Pendulum Clock (1656)
Spinning Jenny(1765)
Cotton gin(1793)
Threshing machine(1786)
The Telescope(1668)
Steam engine(1712)
Steam Train(1804)
Internal combustion engine
Radio
TV
Enigma machine
Computer
Mobile Phone

SOME OF THE ADVANTAGES FROM THIS DISCUSSION

- Better understanding of Machines
- Helps to know more about Machine Tool structure.
- Helps to know more about Future Machine development.

VI. CONCLUSION:-

After the discovery of machine a lot of changes that occurred in all the field of human life. Our world is developing day by day due to the ideas and modern technologies. So this paper helped a lot to know how machine influenced human life and this world.

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