

Introduction to Machine Design and its classifications

● Introduction to Machine Design

Machine Design is the innovation of new and effective machines and improving the existing ones. A new or effective machine is one which is more economical in the overall cost of production and operation. The design is to formulate a plan for the satisfaction of a human need. In designing a machine component, it is necessary to have a good knowledge of many subjects such as Mathematics, Engineering Mechanics, Strength of Materials, Theory of Machines, Workshop Processes and Engineering Drawing.

● Classifications of Machine Design

The machine design may be classified as follows:

1. **Adaptive design:** In this the designer's work is concerned with adaptation of existing designs. The designer only makes minor alternation or modification in the existing designs of the product.
2. **Development design:** This type of design needs scientific training and design ability in order to modify the existing designs into a new idea by adopting a new material or different method of manufacture.
3. **New design:** This type of design needs lot of research, technical ability and creative thinking. Only those designers who have personal qualities of a sufficiently high order can take up the work of a new design.
4. **Rational design:** This type of design depends upon mathematical formulae of principle of mechanics.
5. **Empirical design:** This type of design depends upon empirical formulae based on the practice and past experience.
6. **Industrial design:** This type of design depends upon the production aspects to manufacture any machine component in the industry.
7. **Optimum design:** It is the best design for the given objective function under the specified constraints. It may be achieved by minimizing the undesirable effects.
8. **System design:** It is the design of any complex mechanical system like a motor car.
9. **Element design:** It is the design of any element of the mechanical system like piston, crankshaft, connecting rod, etc.
10. **Computer aided design:** This type of design depends upon the use of computer systems to assist in the creation, modification, analysis and optimization of a design.