

## UNIT-I Steady stresses and variable stresses in machine members.

### Machine Design:-

Machine design is the creation of new and better machines and improving the existing ones.

A new (or) better machine is one which is more economical in the overall cost of production and operation.

### Classification of machine design:-

#### 1. Adaptive design:-

The adaptive design needs no special knowledge or skill and can be attempted by designers of ordinary technical training.

#### Development design:-

The development design needs considerable knowledge and design ability in order to modify the existing designs into a new idea by adopting a new material (or) different method of manufacture.

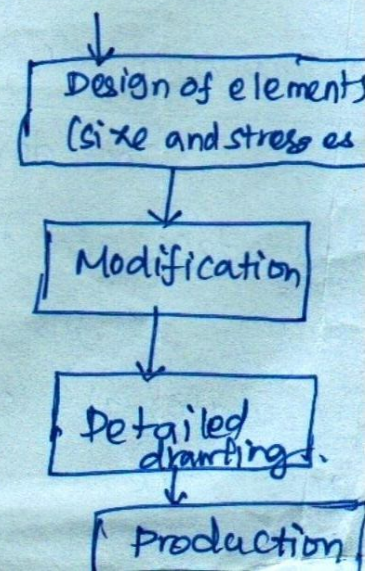
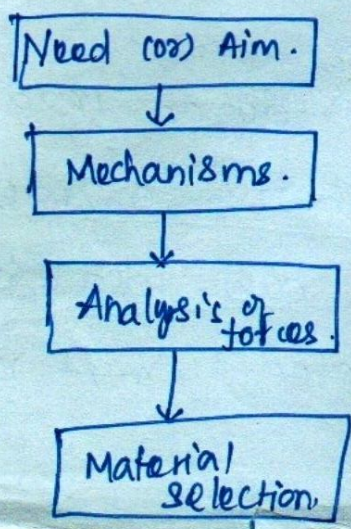
### 3. New design:-

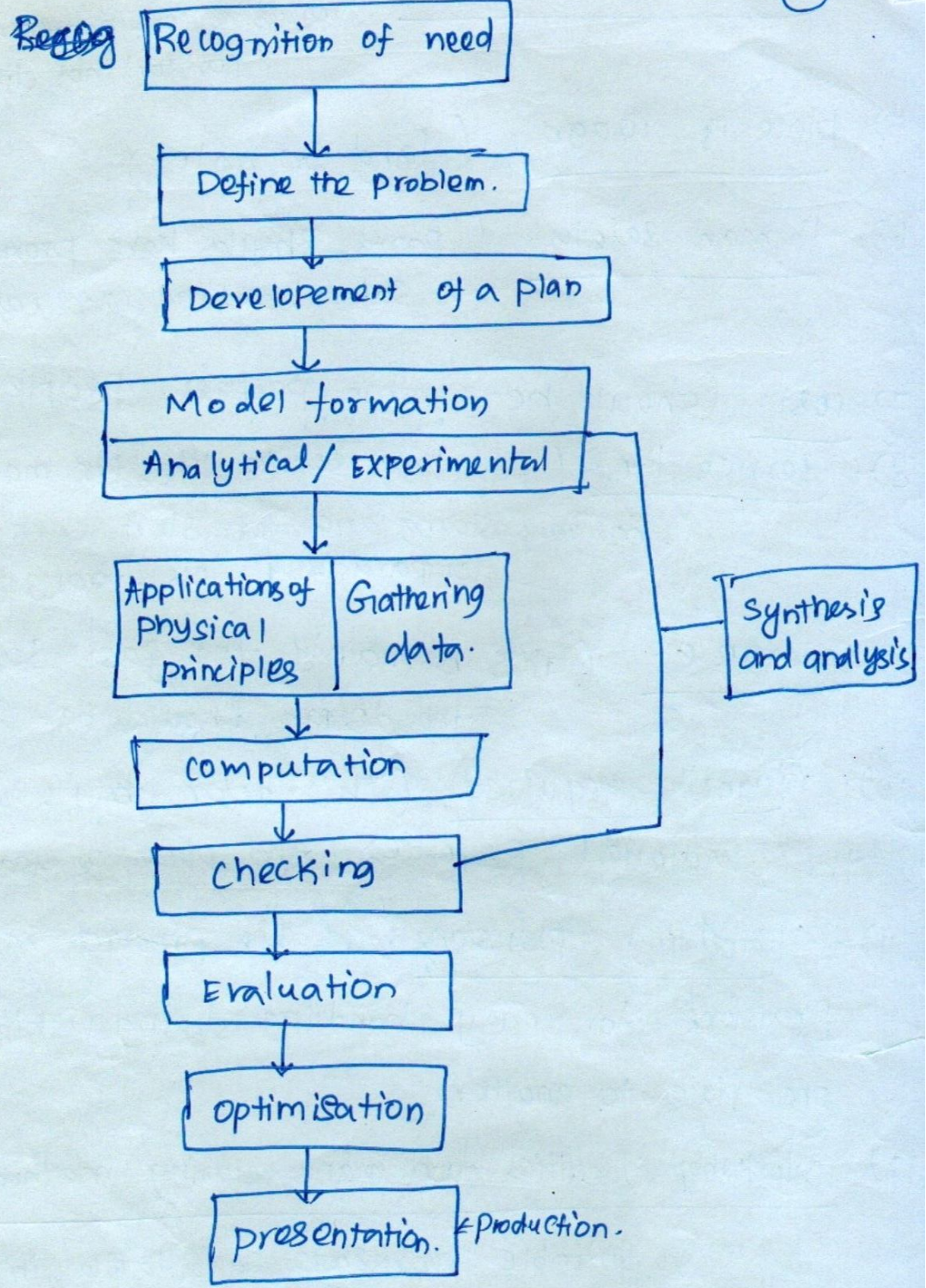
The new design needs lot of research, technical ability and creative thinking.

### General considerations in Machine design:-

- 1) Type of load and stresses caused by the load.
- 2) Motion of the ~~part~~ parts (or) kinematics of the machine.
- 3) Selection of materials.
- 4) Form and size of the parts.
- 5) Frictional resistance and lubrication.
- 6) Convenient and economical features.
- 7) Use of standard parts.
- 8) Safety of operation.
- 9) Workshop facilities.
- 10) Number of machines to be manufactured.
- 11) Cost of construction.
- 12) Assembling.

### General procedure in machine Design:-





Factors influencing machine design:-

- 1.) Type of loading. (steady load, dynamic load, <sup>← steeper</sup> impact load)
- 2.) Size and shape of the object. (small or big size).  
simple or intricate
- 3.) Material properties required. (hard, soft, rigid,  
ductile, brittle)

- 4) Environmental conditions. (Components to be operated in  
(corrosive or) non-corrosive atmosphere.  
cool or) hot climate conditions).
- 5) Place of usage. (land or) water).
- 6) Human safety. (Parts should have provisions for  
safe handling and easy maintenance).
- 7) Cost. (Should be within people's buying capacity).
- 8) Service life. (For long service life, the machine part should  
be very strong and for short service life,  
comparatively less strong item is sufficient).
- 9) Appearance. (This is mainly for fast sales promotion,  
the design should be looking nice).
- 10) Quantity required. (This factor is decided by  
the material properties and place of usage).
- 11) Handling provisions :- (The product must have some  
provisions for easy handling during shifting from  
one place to another).
- 12) Workshop facilities and manufacturing methods  
Suitable workshops available in the nearby  
places and proper manufacturing methods should be  
available.