



Bineswar Brahma Engineering College

Department of Mechanical Engineering

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Assistant Professor

Machine Design – II: ME181601

ME181601: Machine Design-II

Syllabus

Module-1: Design against static load, different types of loads and stresses – review, design against fluctuating load, stress concentration, fluctuating stresses, fatigue failure, endurance limit, notch sensitivity, cumulative damage in fatigue, Soderberg and Goodman diagrams, fatigue design under combined stresses.

Module-2: Design of mechanical springs – helical spring, gear: spur and helical gear.

Module-3: Design of friction clutches: single and multiple clutch, cone clutch, brakes – disc, cone, band and internal expanding shoes.

Module-4: Tribology, design of bearings – radial and thrust journal bearings, selection of rolling contact bearings.

Textbooks / Reference Books:

1. Design of machine elements by B V Bhandari (TMH)
2. Machine Design by Khurmi and Gupta
3. Machine Design by Bahl and Goel
4. Machine Design by Shigley
5. Machine Design by Hall
6. Machine Design by Black and Adams (TMH)
7. Design of machine elements by M F Spott
8. Design Data Handbook by Mahadevan and Reddy

❖ Introduction (Module-2):

- Spring: A spring is a machine element which is flexible and is primarily used to deflect under load with the ability to return to its original shape when unloaded.
- Applications: Springs have many applications, a few are given below:
 - Springs are used to absorb shocks and vibrations. For example, in vehicle suspension and buffer spring in elevators.



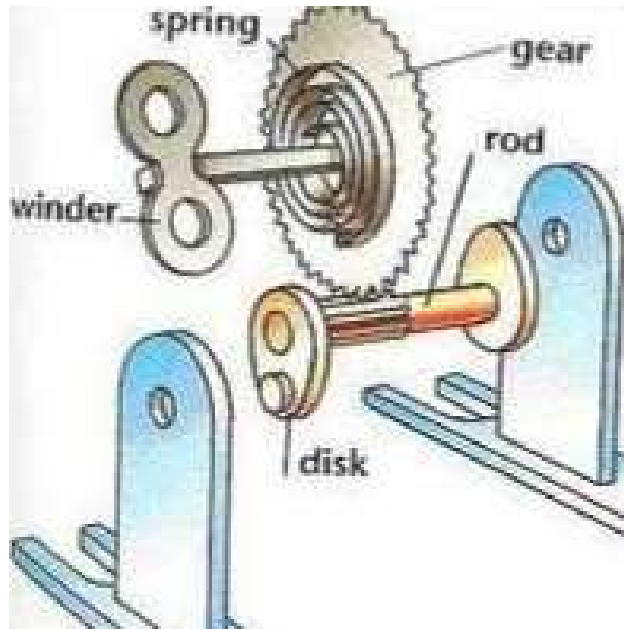
Spring used in vehicle suspension



Spring used in elevators

Introduction (Cont.)

- Springs are used to store energy. For example, springs used in clocks, toys and circuit breakers.



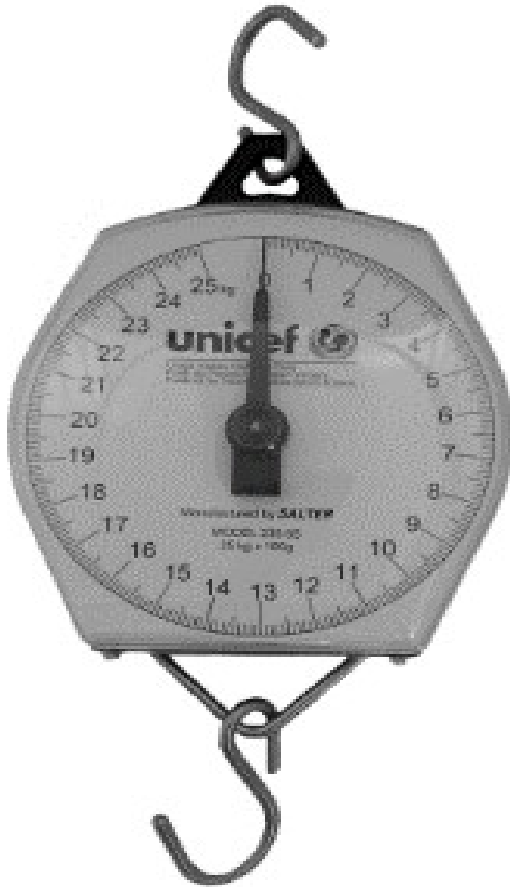
Spring used in toys to store energy



Spring used in circuit breaker

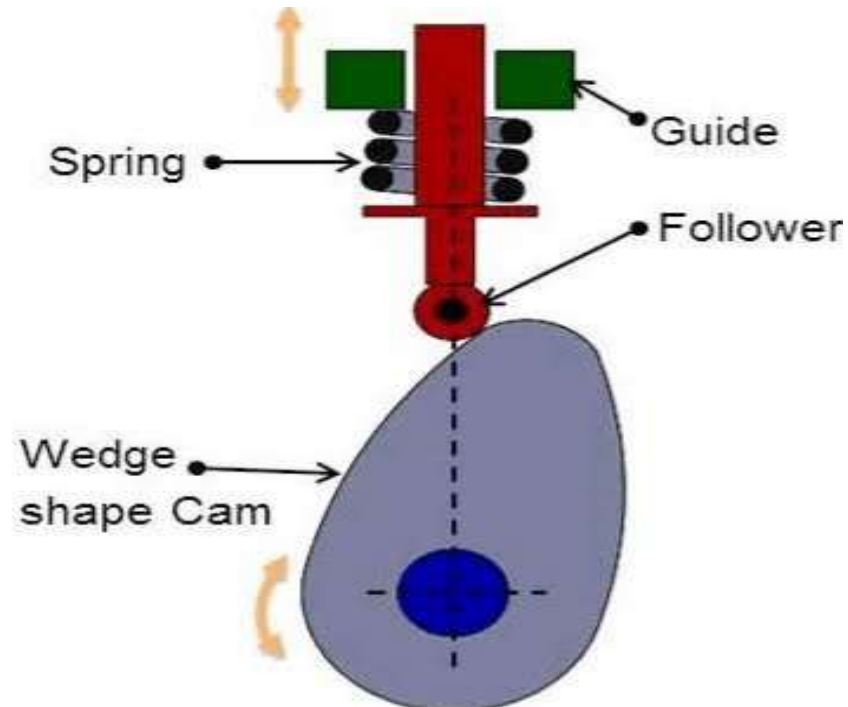
Introduction (Cont.)

- Springs are used to measure force.
For example, springs used in weighing balance and scales.



Introduction (Cont.)

- Springs are used to apply force and control motion. For example, springs are used in cam and follower mechanism to maintain the contact between the cam and follower.



Introduction (Cont.)

- Types of springs: Generally springs are classified according to their shape and the application of load or torque.
 - Helical: Having the shape of helical coil of a wire. The most popular type of spring is the helical spring.
 - Flat wound spring: In this spring flat strip is wounded up as shown in the following figure.
 - Compression helical spring: In this spring the external load tends to shorten the spring. It is also called as open-coiled spring.
 - Extension helical spring: In this spring the external load tends to lengthen the spring. It is also called as closely-coiled spring.
 - Helical torsion spring: Herein the spring is loaded by a torque about the axis of the coil.
 - Semi-elliptic leaf spring: It is a spring commonly used for the suspension in wheeled vehicles.



Flat wound spring

Introduction (Cont.)

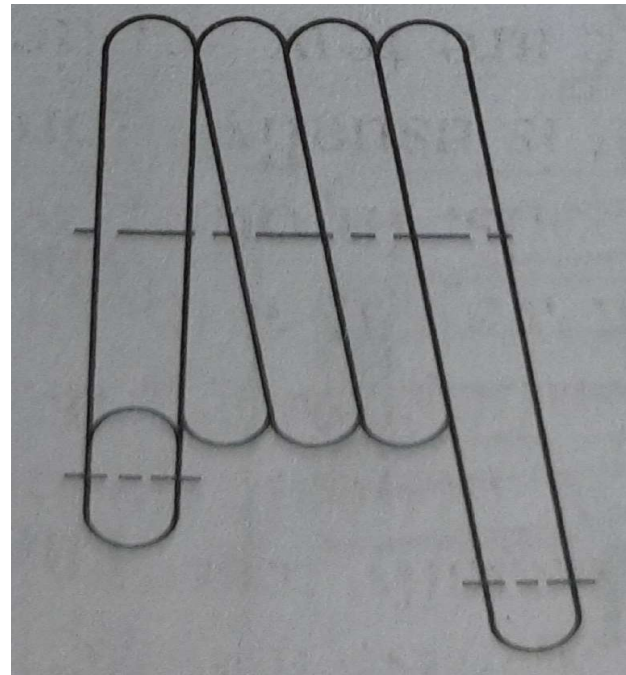
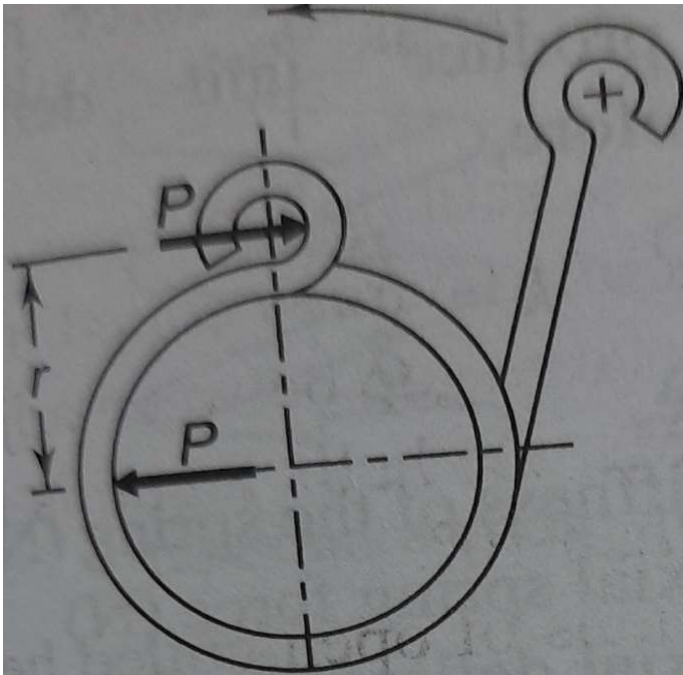


Helical compression spring



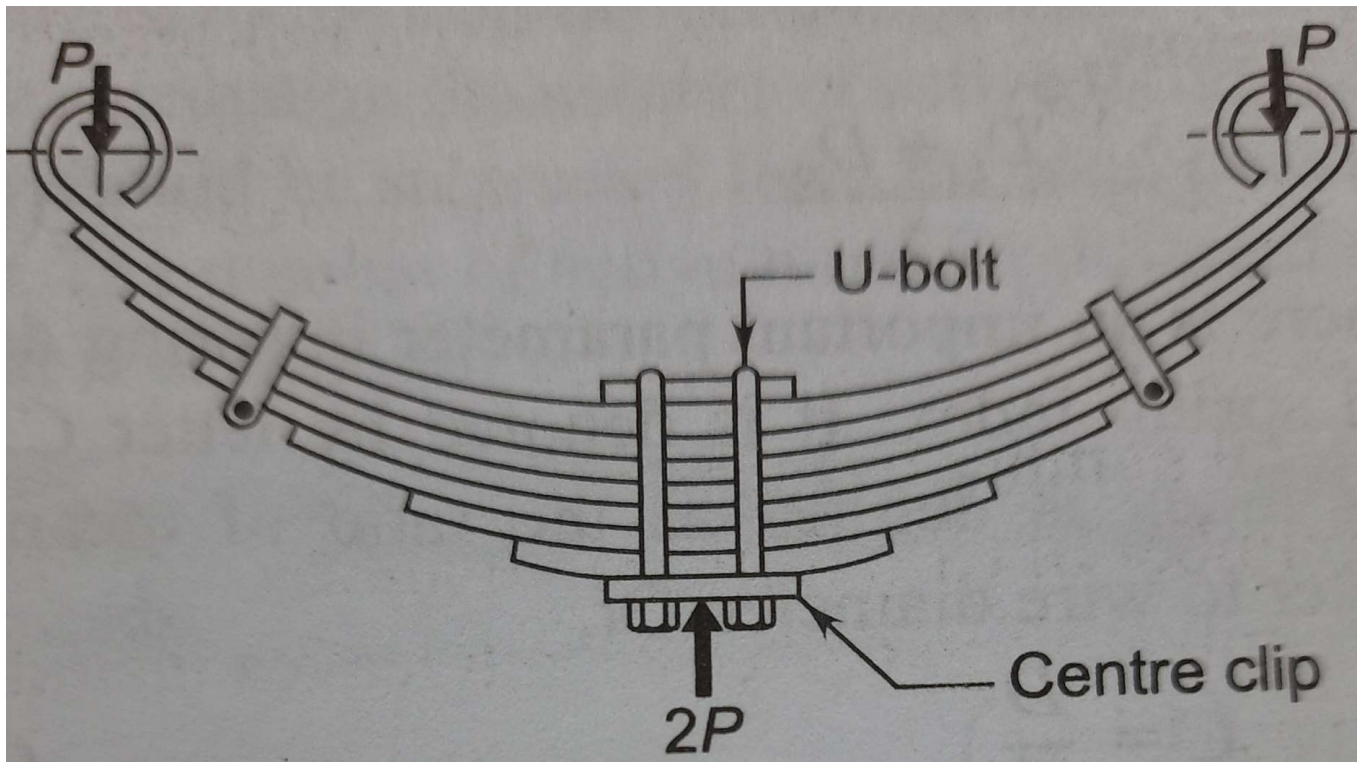
Helical extension spring

Introduction (Cont.)



Helical torsional spring

Introduction (Cont.)



Semi-elliptic leaf spring

Thank You