

## EXPERIMENT – 2

AIM: To design a Leaf Spring

SOFTWARE USED: Solidworks 2020

THEORY:

Leaf spring is a suspension system for vehicles that has been used as far back as medieval times.

The spring leaf is made up of an arc-shape, slender piece of steel that is stacked with the same material in smaller sizes and bolted together creating a reinforced bow-like item. It is then attached to the rear axle and the chassis providing support to any additional weight that is added to a vehicle, preventing the axle from buckling in and snapping from the pressure of an extreme amount of weight that it was not originally designed to carry.

Because of its benefits, leaf springs are in high demand. Casual transportation is just one of the ways leaf springs have contributed to our transportation industry. These days, leaf springs are more popular with heavy commercial vehicles like trucks, SUVs, and vans.

**Design of Leaf Spring:**

$$\delta = \frac{12PL^3}{Ebt^3(3n_f + 2n_g)}$$

$$(\sigma_b)_g = \frac{12PL}{(3n_f + 2n_g)bt^2}$$
$$(\sigma_b)_f = \frac{18PL}{(3n_f + 2n_g)bt^2}$$

Where:

$n_f$  = number of extra full-length leaves

$n_g$  = number of graduated-length leaves including master leaf

$b$  = width of each leaf (mm)

$t$  = thickness of each leaf (mm)

$\delta$  = Deflection at end of the spring(mm)

$(\sigma_b)_g$  = Bending stress in graduated length leaves

$(\sigma_b)_f$  = Bending stress in full length leaves

$L$  = length of the cantilever or half the length of semi-elliptic spring (mm)

$P$  = force applied at the end of the spring (N)

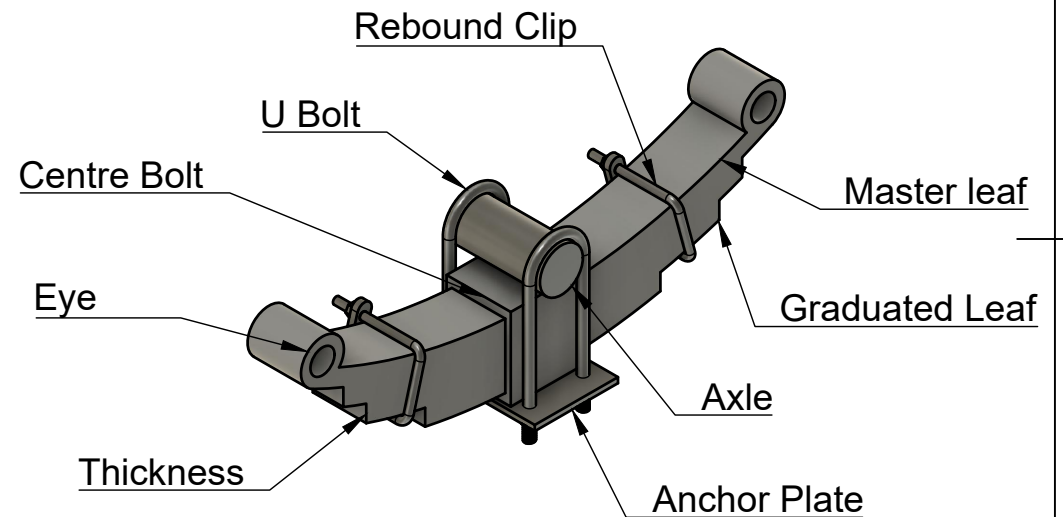
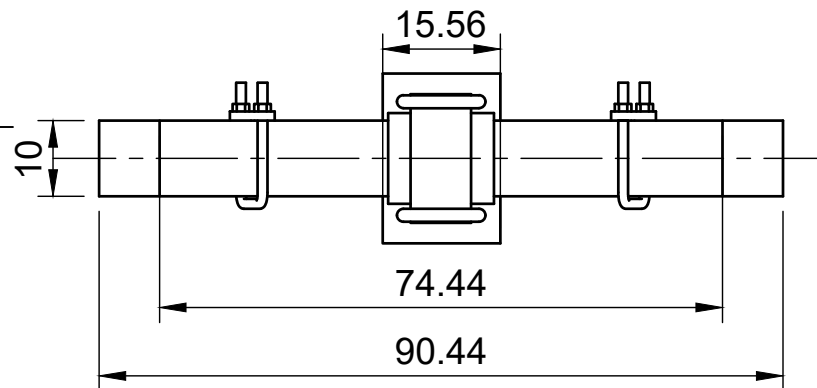
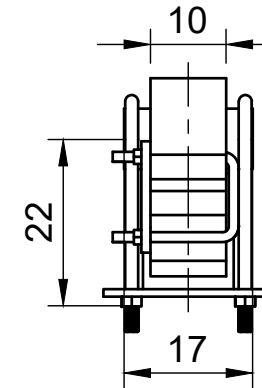
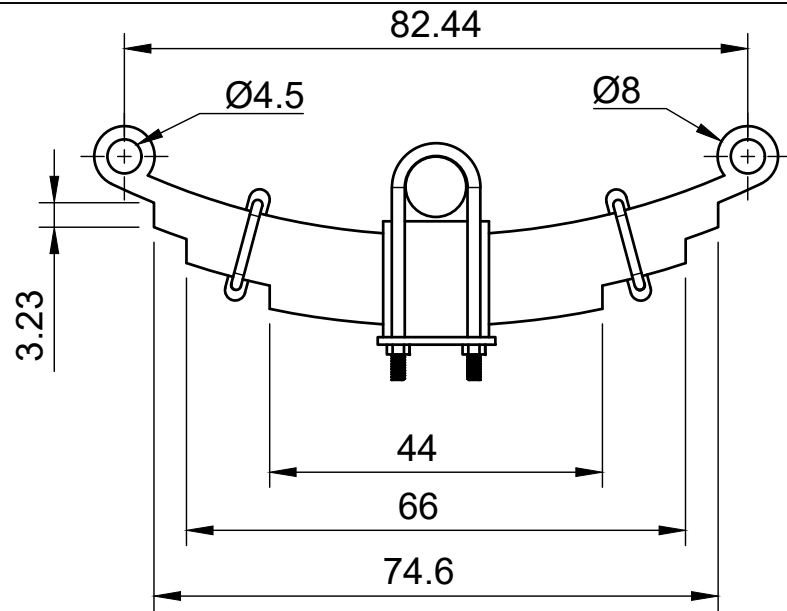
COMMANDS USED:

1. Sketch

2. Trim
3. Boss extrude
4. Mirror
5. Extruded Cut
6. Offset
7. Reference Geometry

PROCEDURE:

1. Select sketch and choose front plane
2. Draw two circles of 198 and 194 mm diameter
3. Draw another circle of 4.5 mm diameter for making eye
4. Trim the part of the circle over the new circle
5. Offset the circle of 198 mm dia, 4 times with offset distance of 3.23 mm
6. Mirror the left created entities
7. Box extrude the drawing 10 mm
8. Create a circle in the eye part and extrude cut(through all)



Dept.	Technical reference	Created by <b>Utsav Walia</b>	Approved by	
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