



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

AN AUTONOMOUS INSTITUTION



Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

UNIT – I PROPERTIES OF MATTER

TOPIC – VIII I SHAPED GIRDER

2.20 I SHAPE GIRDERS

Definition

The girders with upper and lower section broadened and the middle section tapered, so that it can withstand heavy loads over it is called as I shaped girders. Since the girder look like I and show it is named as I shape girders.

Explanation:

Girder is supported at its two ends as on the opposite walls of a room, bends under its own weight and a small depression is produced at the middle portion. This may also be caused when loads are applied to the beams. Due to the depression produced, the upper parts of the girder above the neutral axis contracts, while the lower parts below the neutral axis expands. The stresses have a maximum value at the top and bottom. The stress progressively decreases as it approaches towards the neutral axis. Therefore, the upper and lower surfaces of the girder must be stronger than the intervening part. Thus the girders are made of I shape and are called as I-Shape girders.

Minimisation of the Depression:

We know the depression produced in the case of a rectangular section.

The depression can be minimized by either decreasing the load (W) or the length of the girder (l) or by increasing the Young's modulus or the breadth or the thickness of the girder. Since the length of the beam l is the fixed quantity, It cannot be decreased. Therefore, the breadth and thickness may be adjusted by making the girder of large depth and small breadth. Thus the volume of the girder is increased and hence the depression produced is reduced. Therefore for stability, the upper part and the lower part are made broader than the centre part and hence

forming an I shape called as I shape girders. The depression can also be reduced by properly choosing the materials of high Young's modulus.

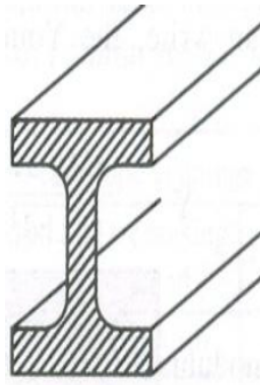


Fig 2.8

Applications of I- shape Girders:

- They are used in the construction of bridges over the rivers
- They are very much useful in the production of iron rails which are employed in railway tracks
- They are used as supporting beams for the ceiling in the construction of buildings.
- They are used in the construction of iron beams to support the bridges for the heavy vehicles and also in the construction of dams.

Advantages of I- Shape Girders:

- More stability
- More stronger
- High durability