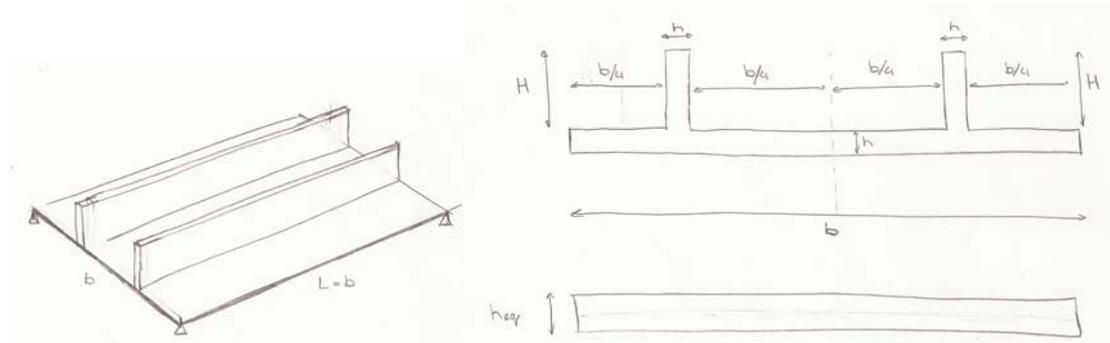


Lecture 7

Bending Response of Plates and Optimum Design

Problem 7-1:

Consider cylindrical bending of a wide beam (width 'b' and length 'L' = 'b') stiffened by two flat bar stiffeners. The cross section of the beam is sketched below.



- Find the thickness (h) of an equivalent monolithic plate that will have the same bending rigidity as the actual stiffened plate.
- Plot the relationship between the ratio H/b and the bending rigidity.
- Is there a limit on the height of the stiffeners (H) and what could happen if we bend the stiffened plate in a positive (smiling beam) vs. negative beam (sad beam)?
- How much is the rigidity of the beam reduced when we try to bend the beam in the direction perpendicular to the stiffeners?

Problem 7-2:

Another way of designing a weight-efficient structure is to replace the stiffened plate by a sandwich plate.

- Design the sandwich plate of an identical weight of a stiffened plate (determine the phase plate thickness (t) and the core thickness (T)).
- Compare the bending stiffness of the sandwich with that of the stiffened plate.

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