HYDROSTATIC STABILITY LAB

PURPOSE: The purpose is to check hydrostatic stability theory for a circular disk.

PROCEDURE: Make the measurements listed on the data sheet. Calculate the position of the metacenter above the deck of the disk. Put the center of the rod 2.5 cm above the metacenter and observe the stability of the disk. Put the center of the rod 2.5 cm below the metacenter and observe stability.

REPORT: Write the report as a standard lab report. Give the purpose and procedure. Attach the data sheet with calculations. Briefly describe the results of the tests. List sources of error in the tests.

BACKGROUND

The meta radius for a disk is

$$R = G^2/[4h]$$

where G is the radius of the disk and h is the draft or depth of submergence of the disk. Hydrostatics gives

$$h = [M/\rho]/[\pi G^2]$$

where M is the total mass supported by the disk and ρ is the density of water. Geometry gives for the freeboard

$$d = t - h$$

where d is the freeboard and t is the thickness of the disk. Geometry gives

$$D = R - d - h/2$$

MEASUREMENTS

DISK THICKNESS $t =$

DISK RADIUS $G =$

TOTAL MASS $M =$

CALCULATIONS

META RADIUS

$$R = G^2/[4h]$$

DRAFT

$$h = [M/\rho]/[\pi G^2]$$

FREEBOARD

$$d = t - h$$

DISTANCE ABOVE DECK

$$D = R - d - h/2$$


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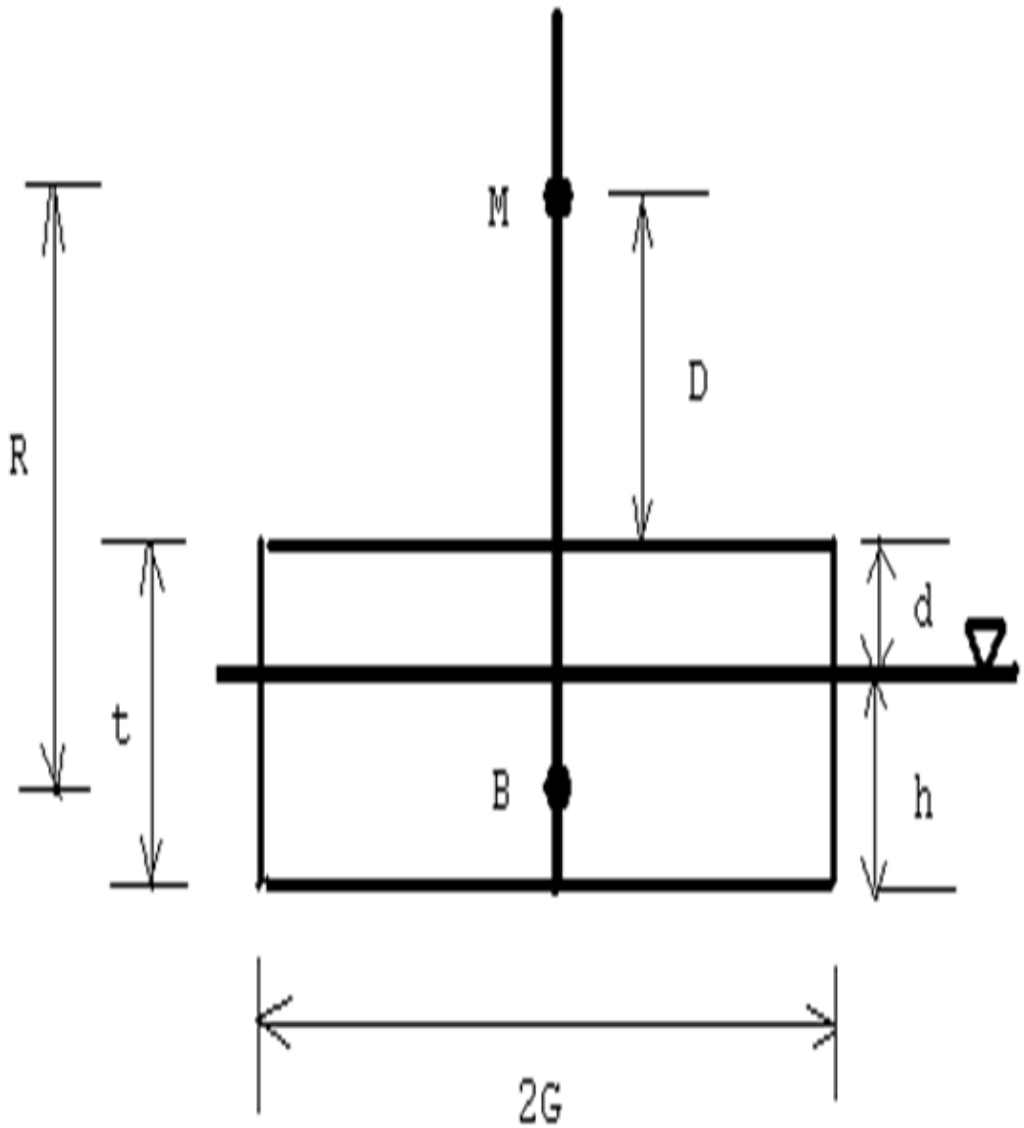
M
D
R
d
t
B
h
2G