



TECHNICAL DATA

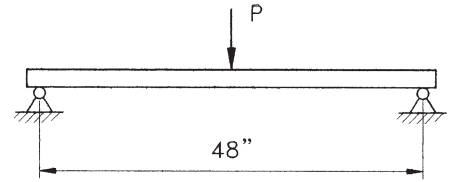
SAMPLE PROBLEMS

Problem 1

The Beam at right is a PHD 1001 Channel, simply supported. What is the maximum allowable load P? How much will the beam deflect under that load?

Answer

From the table of Beam and Column Loads for 1001 Channel, the load for this span is 851 lbs. and the deflection is .22". From the table of load factors above, the load conversion factor is .50 and the deflection factor is .80. Therefore the maximum load $P = 851 \times .50 = 425$ lbs., and the deflection is $.22" \times .80 = .176"$.

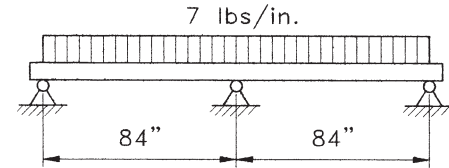


Problem 2

A PHD 1001 Channel is supported at 3 points as shown, making it a continuous beam with 2 spans. The required loading condition is a uniform load of 7 lbs. per inch over both spans. Is the Channel able to safely support this load?

Answer

The entire load on one span of this beam is $7 \text{ lbs./in} \times 84" = 588$ lbs. The allowable load is 486, and the load factor is 1.00, so the allowable load remains 486 lbs. Therefore the beam is not acceptable, since the required load exceeds the allowable load. A different PHD channel must be used, or the load must be decreased.



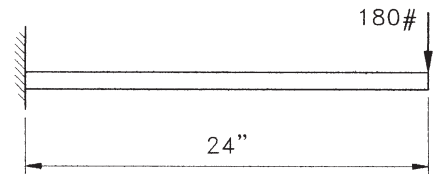
Problem 3

The cantilever beam shown at right carries a concentrated load of 180 lbs. at the end of the 24" PHD 1001 Channel. Is the load acceptable? Calculate the maximum bending moment and deflection.

Answer

The maximum load is 1702 lbs., and the load factor is .12, so the maximum load is $1702 \times .12 = 204$ lbs. The desired 180 lb. load is within the allowable.

From the table of beam formulas, the maximum bending moment for this support condition is $M = PL$. For the beam show, then, $M = 180 \text{ lb.} \times 24" = 4320$ inch-pounds. Deflection for this cantilever beam $= PL^3/3EI$. $E =$ modulus of elasticity, which is 30×10^6 for steel. I is the Moment of Inertia, listed in the channel information as $.189 \text{ in}^4$. The deflection then, is found by the equation $180(24)^3/3(30 \times 10^6)(.189) = .146"$.



Problem 4

Determine load and deflection of a PHD 1001 Channel fixed at both ends and carrying a uniform load over its entire 60" span.

Answer

Maximum load from the chart is 681 lbs., and the load factor is 1.50, so the load for this beam is $681 \times 1.50 = 1021.5$ lbs. Similarly, the deflection for this beam is .35" and the deflection factor is .30, so the deflection $= .35 \times .30 = .105"$.

