



JETS Challenge 119

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A Civil Engineering Scavenger Hunt

This week's JETS Challenge involves no calculations. Simply answer the questions below. Feel free to use the Internet, text books or library to find your answers:

The Challenge:

1. What is meant by honeycomb in concrete?
2. Why does the pressure increase under soil?
3. What is a kip?
4. Which is stronger solid steel rod or hollow steel pipe with the same cross sectional area? Why?
5. What is the "tensile strength" of wood? Find some samples of common values.
6. Define "moment of inertia" and explain its importance in civil engineering?

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1. An air pocket in the concrete or an a void
 2. Soil pressure increases with depth due to the overburden or self-weight of the soil and also loads imposed on the soil.
 3. 1 kip = 1000 lbs
 4. On a per pound basis, steel pipe is stronger in bending and is less likely to buckle in axial compression.
 5. The tensile strength of a material is the value at which the material fails when subjected to a tensile force. (Tensile means a force pulling the wood fibers lengthwise, as opposed to a compressive force.) There are a lot of different types and load cases for wood, so there is not one answer to this question. For example, wood used outside will fail at a lower load than wood inside. Wood is also anisotropic, i.e. it has different strength in different directions. Example values of tensile strength vary anywhere from 175 pounds per square inch for Utility Grade pine to 1400 psi for Dense Select Structural grade Douglas Fir. A good reference for material strength data for most species and grades of commercially available wood can be found in the American Institute of Timber Construction handbook.
 6. The moment of inertia (written I , with a note indicating the axis in which it is expressed) measures the opposition any kind of body will have against a certain momentum (along that same axis) trying to rotate that body

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