

VTC Technology - Engineered Composites from Plantation Timber

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Oregon **BEST FEST '09**
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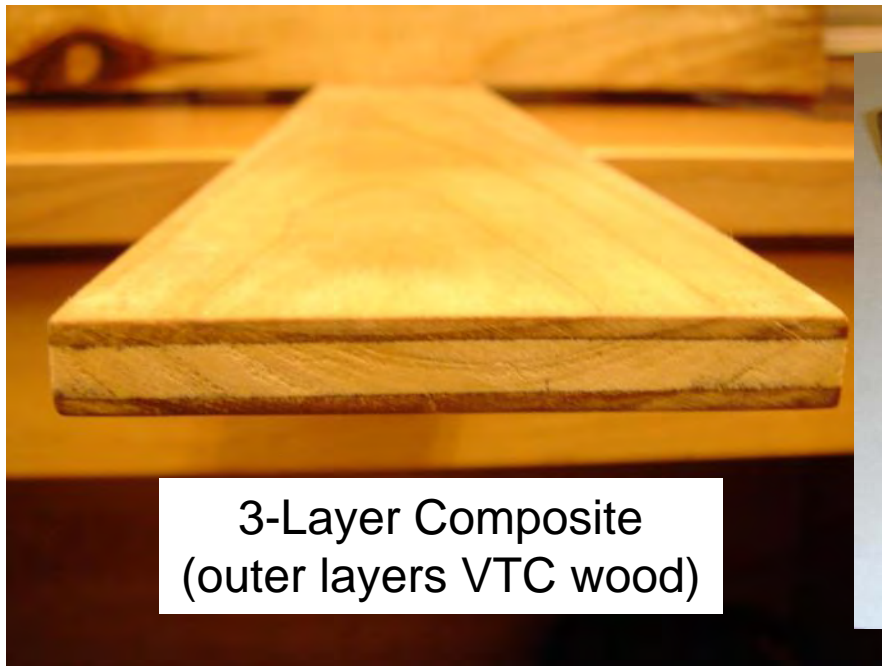
Viscoelastic Thermal Compression (VTC)

- Mechanical compression perpendicular to grain under conditions of elevated and dynamic steam pressure and temperature.
- Strength, stiffness, hardness, and moisture resistance improved.
- No chemical treatments.
- Has been demonstrated with many wood species.
- Intended as feedstock for composite products.

Goals of VTC Technology:

- Achieve a set of desirable properties that are not attainable from virgin wood.
- Increase value of low quality wood resources.
- Provide an incentive for intensive forest plantation management .
- Provide green building material choices.

What does it look like?



3-Layer Composite
(outer layers VTC wood)

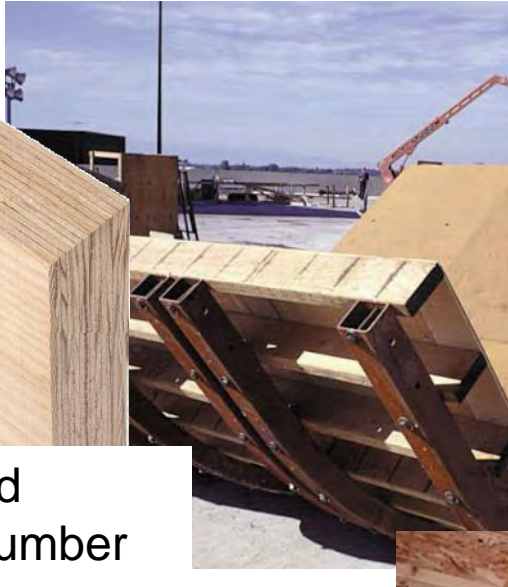


6-layer VTC Composite

Product Applications:



Laminated Veneer Lumber



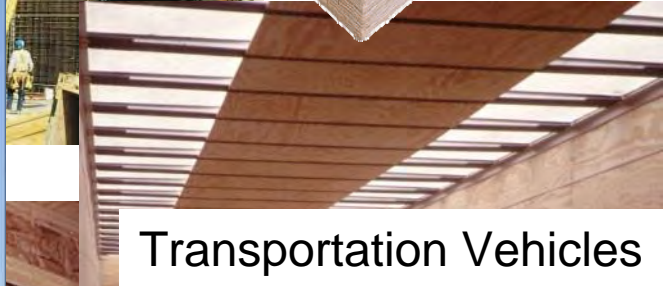
Building



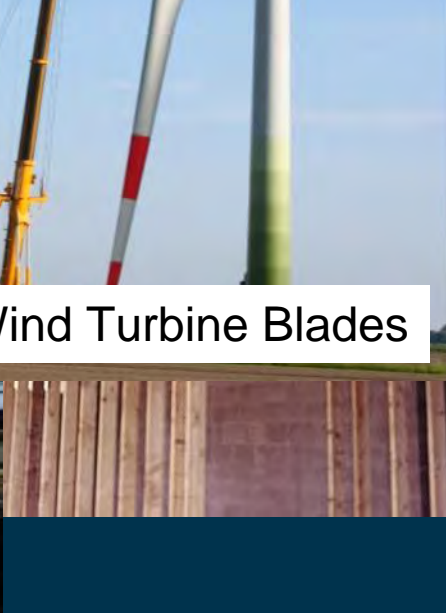
Wind Turbine Blades



I-Beams



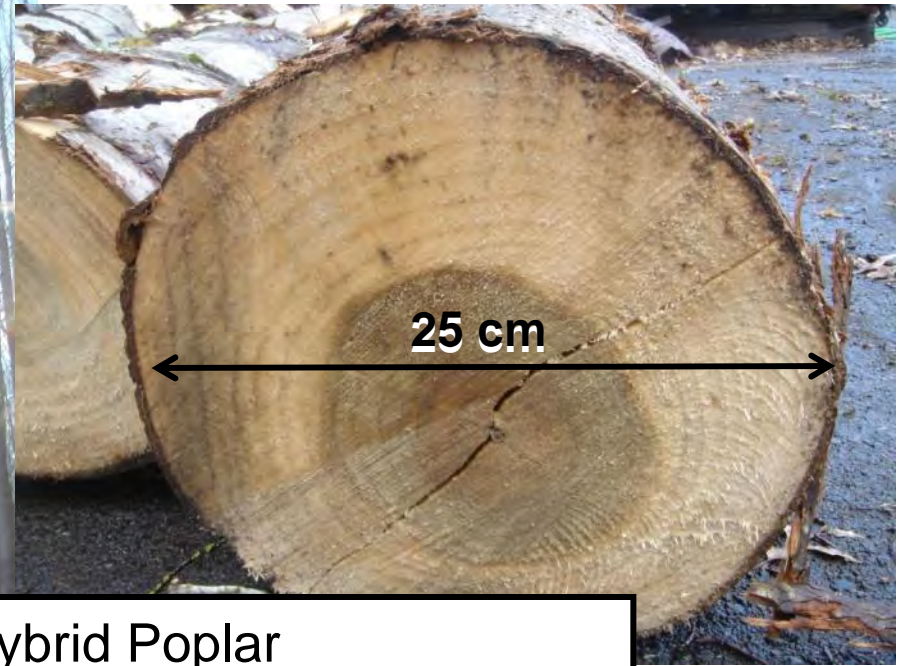
Transportation Vehicles



Hybrid Poplar



Boardman, Oregon
Stand age = 11 years



Hybrid Poplar

E ~ 7 to 10 GPa

Density ~ 320 to 400 kg/m³

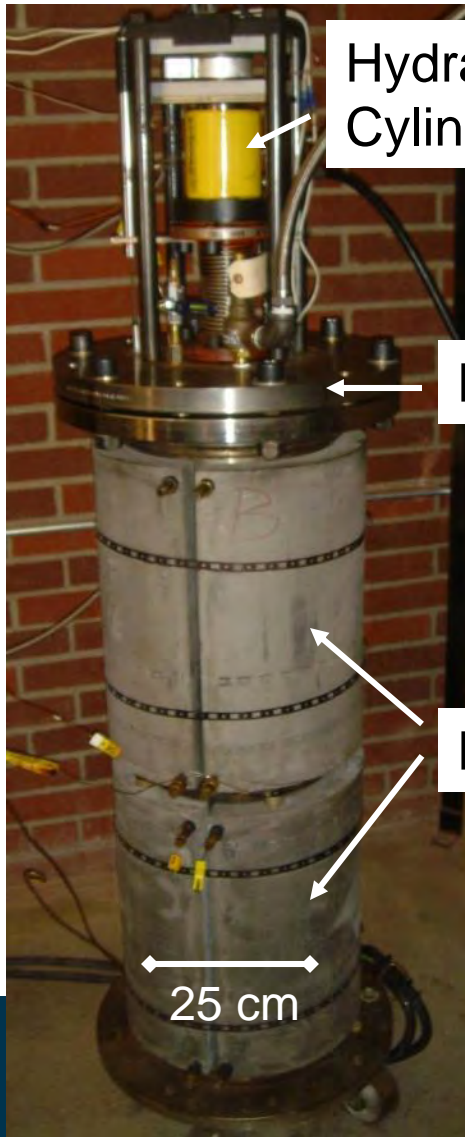
Hardness ~ 7 to 10 N/mm²

Douglas-fir

E ~ 12 to 19 GPa

Density ~ 420 to 500 kg/m³

Small VTC Device

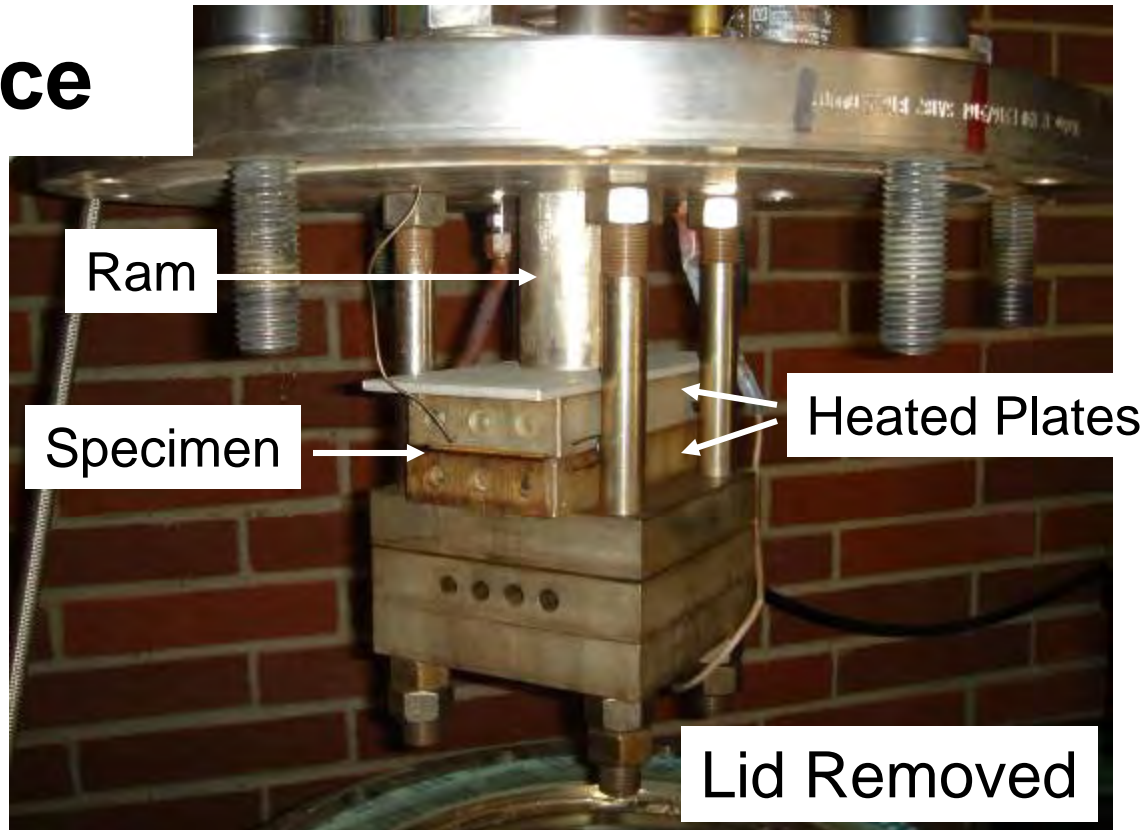


Hydraulic Cylinder

Lid

Heaters

25 cm



Ram

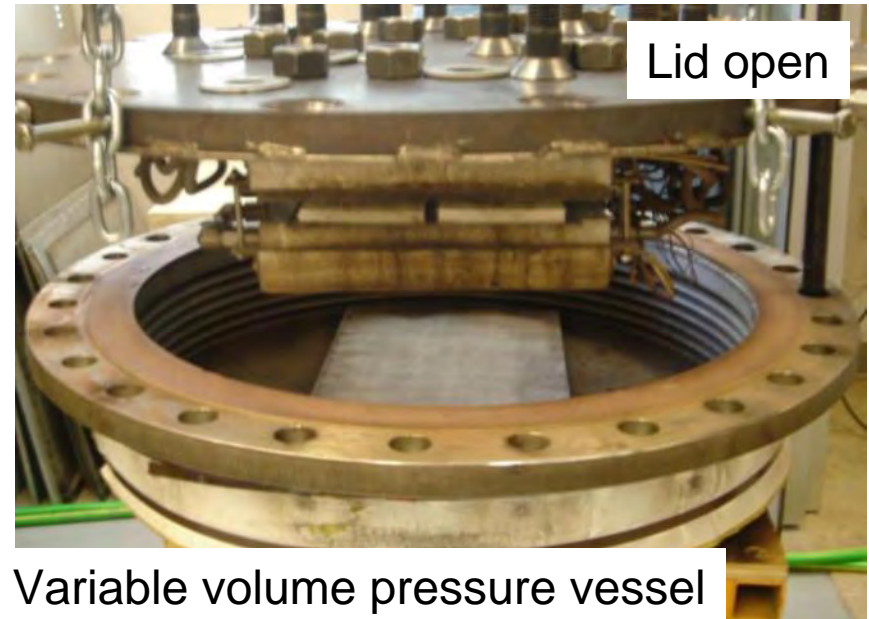
Specimen

Heated Plates

Lid Removed

Specimens up to 15 cm length

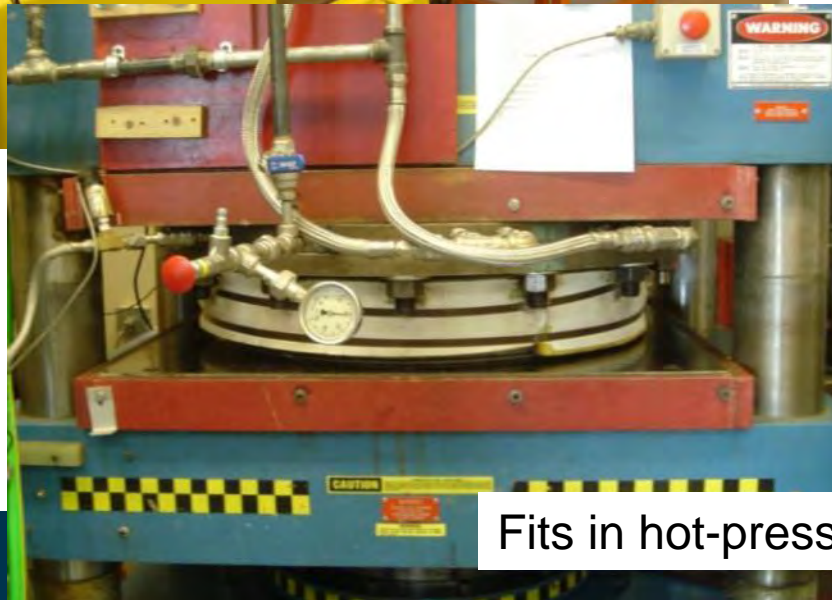
Large VTC Device



Variable volume pressure vessel

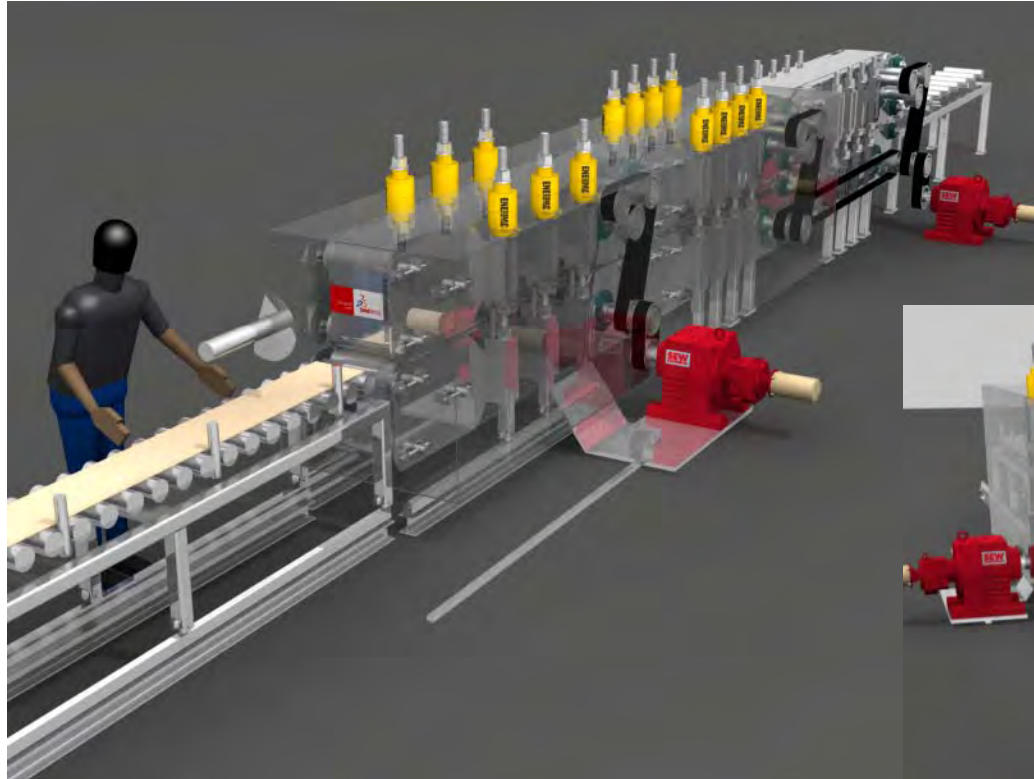
Specimens up to 60 cm length

To become part of Green
Building Materials Laboratory

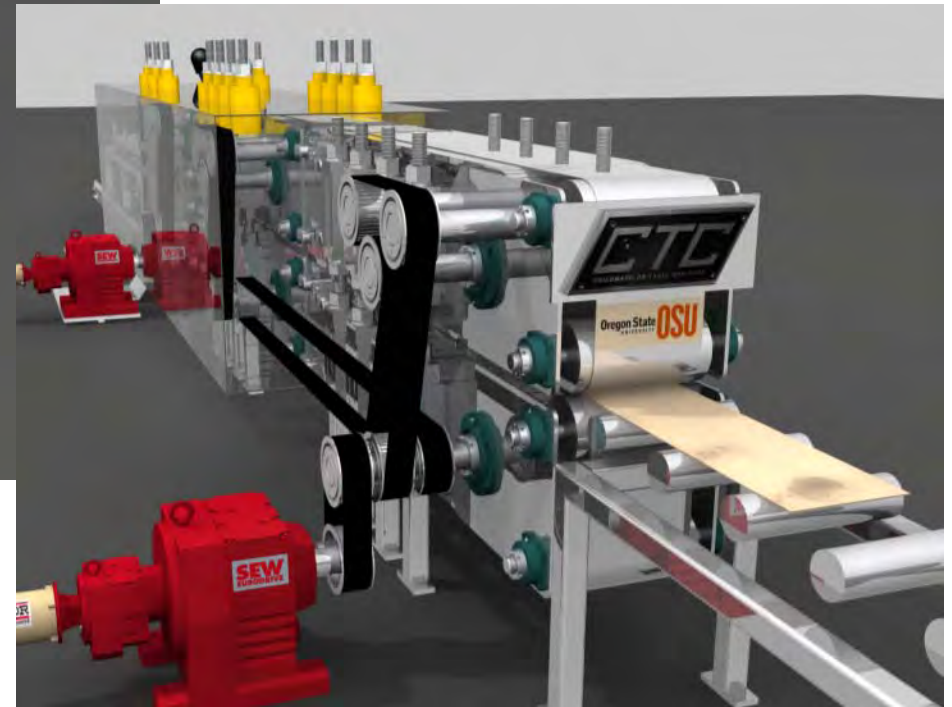


Fits in hot-press

Continuous VTC Device



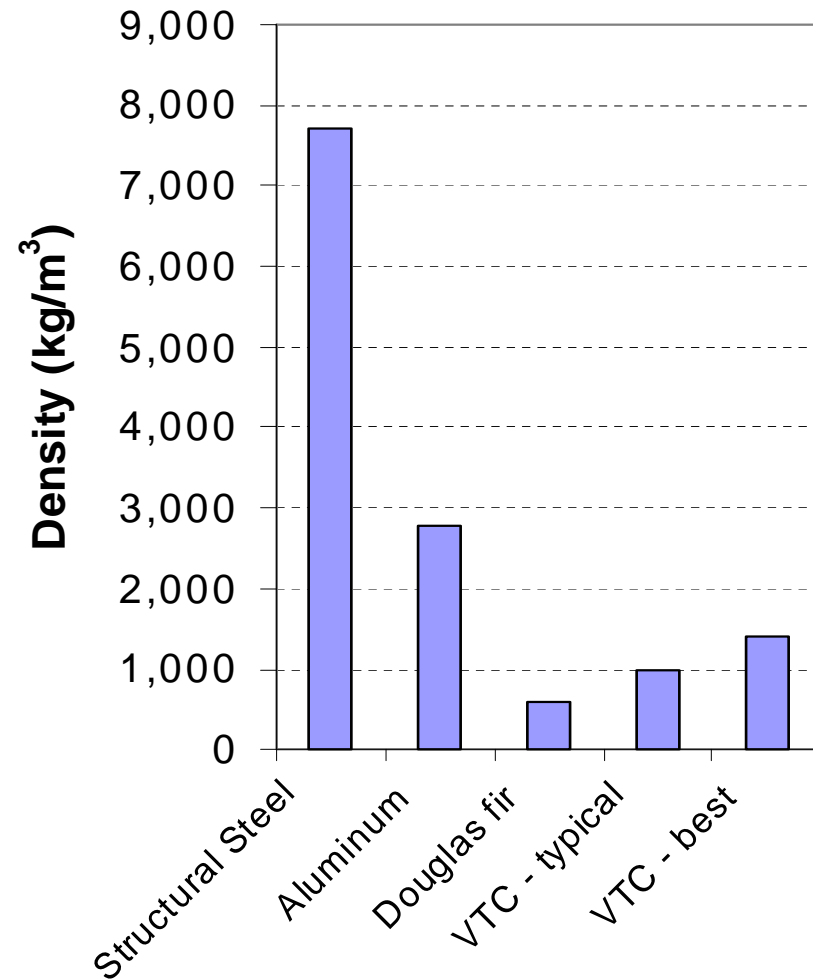
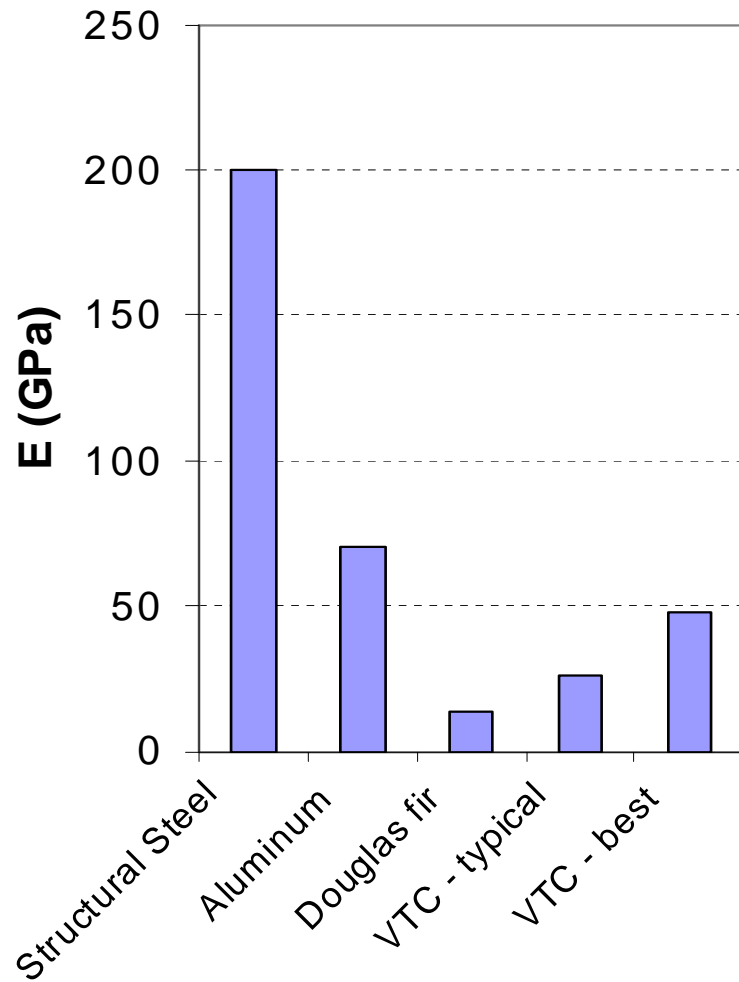
..... on the wish list.



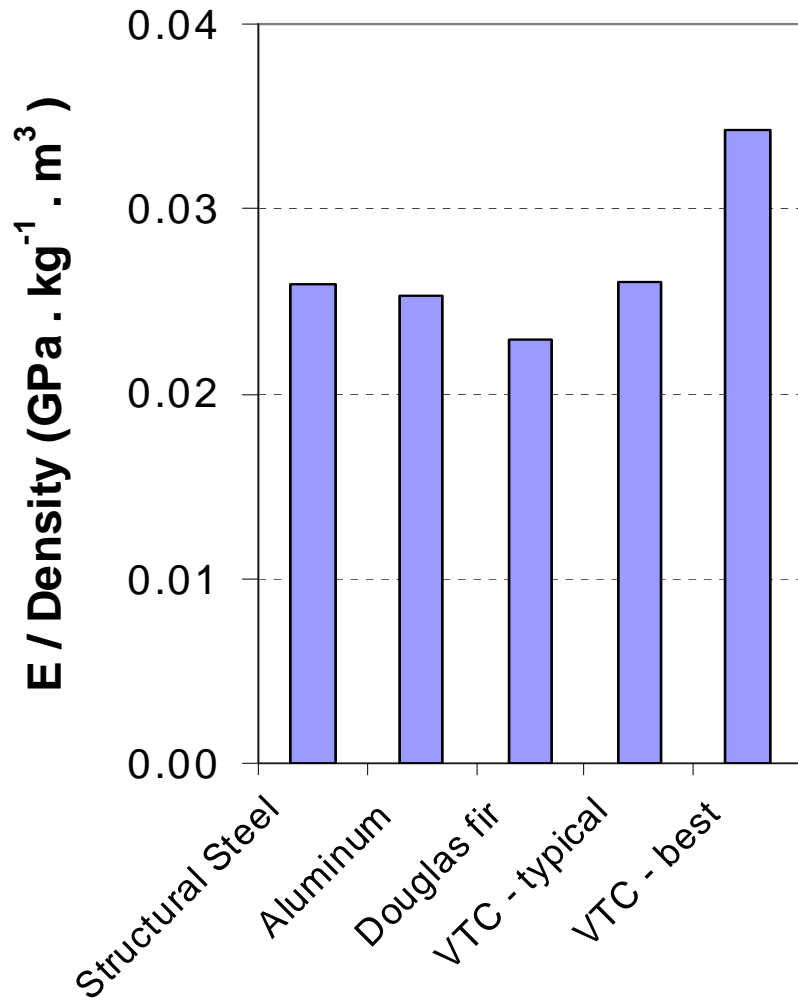
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Comparison to Steel & Aluminum



Comparison to Steel & Aluminum



Ratio of Modulus to Density

Questions?

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