

The Utilization of Industrial Hemp as a Structural Material



The need for alternative materials within the construction industry is increasing as more projects are undertaken. Various alternatives are being researched and applied to projects with the purpose of reducing construction waste. However, substitutes are needed especially when it comes to structural materials. Industrial hemp is a fast-growing fibrous plant that can be made into a variety of goods and has properties that give it a high enough strength to be fabricated into various robust products. Hemp is known to take up less land area, requires less water, is a resource that does not need to be mined out of the ground and is carbon negative. There is research and application of various products made of hemp but there are few for structural purposes. The purpose of this paper is to explore all the applications of hemp that have been researched and to analyze an experiment that tested structural hemp-based beams that can act as a substitute for various engineered wood products. Two beams, one made of hemp hurds and the other made of hemp fibers were fabricated and tested to see if hemp is a viable structural material. The hemp fiber-based beam proved to have more promising results.



Key Words: Industrial Hemp, Material, Resource, Structural, Construction

Hypothesis: The prediction for the outcome of the experiment was the beam made of the long thin fibers would prove to be better suited for use as a structural beam.

Description	Strength Values From Testing and Data Tables						
	Load (lbs)	Shear (lbs)	Moment (lb-in)	fv (psi)	fb (psi)	E (psi)	Max Deflection (in)
Beam #1 (Hemp Hurds)	2850.0	1425.0	21375.0	113.6	1268.3	122560	0.289
Beam #2 (Hemp Fibers)	6175.0	3087.5	46312.5	240.6	2624.6	149893	0.478
Control #1: DF-L #1	2352.8	2310.0	17645.8	180.0	1000.0	1700000	0.016
Control #2: GLB 20F-V3 DF	5000.0	3312.5	37500.0	265.0	2000.0	1600000	0.031



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