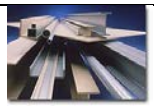
Cooling Tower Structures: FRP vs. Wood

Pultruded glass fiber reinforced structural shapes and plates have a number of significant advantages over timber in many structural applications. Pultruded fiberglass will not rot or decay and is not susceptible to insect attack.

Unlike wood, fiberglass requires no environmentally unfriendly preservatives or repellants, does not absorb any significant amount of water and is consistent in strength and appearance piece-to-piece (no culling). Pultruded fiberglass is stronger, more rigid and lighter weight than structural timber. Is pultruded fiberglass a better choice for your application? Consider the point-for-point comparison below.

Concern	 **FRP**	 **Douglas Fir**
CORROSION RESISTANCE	Pultrusions are available in either polyester or vinyl ester resin for resistance to a broad range of chemicals. Unaffected by moisture or immersion in water. Surfacing veil and UV additives create excellent weatherability.	Can warp, rot and decay from exposure to moisture, water and chemicals. Coatings or preservatives required to increase corrosion or rot resistance can create hazardous waste and/or high maintenance.
INSECT RESISTANCE	Unaffected by insects.	Susceptible to insect attack (marine borers, termites, etc.). Coatings to increase resistance to insects can be environmentally hazardous.
STRENGTH	Pultruded fiberglass is stronger, and has higher flexural strength than timber. Ultimate flexural strength (Fu) LW = 30,000 psi, CW = 10,000 psi. Compression strength is 30,000 psi.	Extreme fiber bending = up to 2800 psi. * Compression parallel to grain = up to 1800 psi.*
FLEXIBILITY	Pultruded fiberglass is approximately 1-1/2 times as rigid as wood. Modulus of elasticity LW = 2.5 x psi, CW = .8 x 10^6 psi.	Modulus of elasticity = up to 1.8 x 10^6 psi.*
ELECTRICAL CONDUCTIVITY	Non-conductive - high dielectric capability.	Timber can be conductive when it is wet.
WEIGHT	Specific gravity = 1.7 Pultruded fiberglass has significantly higher strength-to-weight ratio.	Specific gravity = .51 (oven dried).*
FINISHING AND COLOR	Pigments added to the resin provide color throughout the part. Special colors available. Composite design can be customized for required finishes.	Must be primed and painted for colors. To maintain color, repainting may be required.
COST	Lower maintenance, longer product life often equals lower overall costs.	Lower initial cost.

References: Pultrusion Industry Council

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