Cooling Tower Structures: Concrete vs. FRP

Subject	Fiberglass	Concrete
ERECTION	Designing and erecting a fiberglass cooling tower is much quicker and simpler than designing and erecting a comparably sized cast in place concrete cooling tower. Once the overall size is determined the detailed drafting can be completed and the structure can be put into production. Limited equipment and scaffolding is required as the fiberglass cooling tower is conveniently arranged to allow quick and simple erection of light weight components. The basic framework of the tower can be completed in days, not weeks.	Concrete cooling towers must be thoroughly engineered with a great deal of communication required between the cooling tower supplier and concrete supplier to size and locate all of the internal and external components. Large and expensive foundations are required to accommodate the weight of the tower structure and extensive scaffolding must be used to form the concrete. Erection progress slows as the poured concrete must be allowed to cure before further work can be performed.
STRENGTH AND FLEXIBILITY	Fiberglass is stronger and more flexible than concrete, a real concern for those cooling towers located in areas that suffer earthquakes. FRP is more resistant to earthquakes then concrete and any inspections done after an earthquake can be quickly performed without the need for specialists.	Concrete cooling towers utilize steel reinforcements bars to maintain their shape and strength. If the concrete tower is poorly supported or does not have ample reinforcement it can be easily damaged by even the smallest earthquake. After an earthquake, concrete cooling towers must be thoroughly inspected by qualified engineers looking for hidden areas of damage.
CLEANING	Any algae or bio-films that grow in a fiberglass cooling tower can be washed or brushed away rather than needing to be scrubbed away.	Concrete is porous and tends to hold dirt and bio-films more stubbornly than does fiberglass.
MAINTENANCE COSTS	Low maintenance FRP structure requires no special attention. If ever needed, damaged components can be fixed with a simple and quick replacement of the damaged member with commonly available parts. Repairs can be done in hours.	Concrete cooling towers have higher long term maintenance costs then fiberglass cooling towers. Concrete may crack or corrode over time and repairs can be difficult and expensive. Repairs must be given time to cure and can take days.

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QUALITY OF MATERIALS	All FRP structural components are factory produced and inspected prior to shipment. Inspection of the materials is performed prior to installation assuring the quality of the product. All structural components are predrilled and the overall dimensional accuracy of the tower is insured and easy to achieve.	Concrete is poured in place and poor quality concrete cannot be detected until the concrete has cured, if at all. Dimensional accuracy of the finished structure is difficult to hold with any precision. Elevations must be constantly checked and re-checked.
SAFETY	Stair, ladders and handrails can be provided in safety yellow or any other color and never requires painting. FRP decking is supplied with a non-skid surface that offers a safe walking surface in any condition.	Concrete cooling tower fan decks can be slippery when wet. Special colors must be painted on and additional maintenance is often required to be done as the paint begins to deteriorate.
FIRE PROTECTION	The FRP structure can be ordered with fire retardant additives designed to quickly extinguish a fire. Damaged components are easily identified and can be quickly replaced with commonly stocked and locally available shapes.	While concrete cooling tower structures can often survive a fire, the damage to the concrete must be carefully accessed. Effects of fire fighting may have cooled some areas of the structure quickly and a loss of ductility in the reinforcing steel often remains hidden from view.
PERMANENCE	FRP cooling towers can be disassembled and moved to another site if ever required. Cells can be expanded in 1.8m increments. Many possible upgrades are possible due to the flexible design of the cooling tower structure.	Concrete cooling towers become a permanent part of the facility where they are installed. Cell expansion or other upgrades are near impossible.

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