

**ABC-UTC 2022 In-Depth Web Training:
Non-Proprietary Ultra-High-Performance Concrete (UHPC)**

#	Questions	Responses
	Module 3: Corrosion Durability	
1	Can you comment on the required thickness of a cover layer in the case when reinforcing bars are also used in a structure?	In terms of service life with respect to corrosion durability, one can consider the concrete cover in regard to the time to corrosion initiation— that is the service time until a critical amount of chloride ions can penetrate through the cover depth and activate steel corrosion. UHPC is a low permeability material due to its low water-to-cement content, dense packing, and use of pozzolanic cement replacement. As such, the chloride ion diffusivity should be low on par with high performance concrete if not better, and it can be expected that the cover requirements can be reduced with expectation of similar service life.
2	Can you comment about UHPC structures being used to resist sea level rise?	There have been discussions concerning pre-existing reinforced concrete structures that were built with materials that did not have consideration for chloride environmental exposure. The periodic inundation associated with sea level rise, elevated king tides, and salt water intrusion can increase corrosion risk, especially for reinforced concrete structures with lower quality concrete. UHPC may be of interest for possible retrofitting applications.
	Questions during Module 3	
3	Would steel fibers affect the electrical properties of the concrete?	Ongoing research on UHPC at the ABC-UTC and elsewhere has shown that the presence of steel fibers can reduce the electrical resistivity of the concrete. This will be important for several reasons. Among those, application of surface resistivity measurements to assess concrete permeability and corrosion risk should be reviewed for concrete cast with fibers. Some preliminary findings are available on the ABC-UTC website: https://abc-utc.fiu.edu/research-projects/fiu-research-projects/field-demonstration-instrumentation-and-monitoring-of-accelerated-repair-using-uhpc-shell/

4	Do the steel fibers corrode in UHPC? How would corrosion of the steel fibers affect performance?	The steel fibers within the bulk UHPC should be well protected by the concrete matrix, and corrosion is not expected to be significant. I do not expect corrosion of fibers on the surface of the concrete to propagate further into the reinforced concrete member. There is ongoing work to identify the effect of fiber corrosion at joints prior to subsequent concrete casting.
5	Do de-icing salts damage the fibers?	Generally speaking, the chemical constituents of deicing salts can interact with the cement and cause degradation of the paste. After that damage, the steel fibers locally present at the defect locations can be susceptible to some extent of degradation. If the steel fibers are well embedded in the low permeability UHPC, I don't imagine significant corrosion to occur.