

PCI Transportation Research Needs List

June 2020

Category	Subject	Comments
Anchorage to Concrete	Effects of reinforcement in anchorage concrete breakout zones	
	Effect of reinforcement on side face anchorage breakout strength	Is shear friction strength provided by column ties at studs in column face plates effective in developing the anchorage strength across side face breakout failure planes?
	Simplification of anchorage calculations	Combine with a study of LW vs NW concrete
	Anchorage in lightweight concrete	
Component Design	Shear strength in end regions of pretensioned members	In particular, this should address anchorage of longitudinal reinforcement for reliable shear strength.
	Headed deformed bars as shear reinforcement	
	Effects of partial debonding of prestressing strands	Include consideration of lightweight concrete
	Release stresses in pretensioned members	Consider all sections where compression and tension must be considered
	Post cracking shear strength of bridge girders using self-consolidating concrete	
	Use of high strength reinforcement for spirals in prestressed concrete piles	Can allowable yield strength of spirals be increased to 120 or 150 ksi?
	Minimum spacing requirements for large prestressing strands	
	Detailing for durability	Girder to girder, girder to pier and girder to abutment recommended detailing to improve durability.
	Allowable compressive stress at release	Can the allowable compressive stress at release be increased from $0.6f'_{ci}$ to 0.7 or 0.75 and still be demonstrated to have reliable performance.
Materials	Cement replacement in concrete mixes	Sustainable concrete specific to precast
	Characteristics of SCC	Include creep, shrinkage, early age modulus and shear strength
	Structural design guidelines for sand lightweight concrete	
	Effects of elevated temperatures from fire on fiber reinforcement and FRP composites in precast concrete structural members	
	UHPC	Cast a prestressed pile jacket for the splash zone. This would be a 2" thick UHPC shell cast to the same outside dimensions as the pile, maybe 15 to 20 foot long. The reinforced concrete core and

		remainder of the pile would be a secondary casting. This could replace the use of SS or CF strand.
	Rate of tensile strength gain vs compressive strength gain in lightweight concrete	This information would contribute to knowledge on early age strength of anchorage in concrete
	100 year life for structure and repairs	Bridges and, eventually, parking structures will have requirements for a 100 year life. Materials and detailing need development to meet this requirement.
	Delayed ettringite formation (DEF)	This research will evaluate the use of the "delta ettringite" testing method, which was developed as part of a PCI funded study in the late 1990's. This proposed work will extend the scope to include measurements of concrete at later ages.