Request for Research Funding for FY 2024-2025			
Project Number (Research Center Use Only): SMO-25-02			
Requesting Office	**State Materials Office**	**Priority**	**2 of 15**
Proposed Title	**Development of Durable Auger-Cast Pile Grout Mix Designs Free of Early-Age Cracking.**		
Justification	Auger-cast piles (ACPs) for major bridge projects have experienced severe cracking that will result in a reduction of service life for these elements. The cracking has resulted in construction delays for production of EARs and subsequent crack repair procedures. One likely cause of the cracking problem is that ACP mixes are currently sand-cement grouts without any coarse aggregates. Another likely cause of the problem stems from a common misconception that high cementitious material (CM) contents provide high strengths and low permeabilities. Contrarily, the very high CM contents produce high temperatures and high shrinkage that greatly increase the probability of cracking and thereby increase the permeability. Research is needed to develop ACP mixes that meet strength and permeability requirements, but do not experience early-age cracking. The research will be used to improve specifications and guidance to contractors to utilize these lower CM-content mixes that include coarse aggregates. FDOT Compass: Resilience – elimination of early-age cracking improves the resilience of the concrete. Technology – design better concrete. Communities – reduction of construction delays reduces inconvenience to driving public.		
Impact	Properly designed ACP mixes will greatly reduce the instances of cracking and subsequent construction delays on construction projects. Not doing the research will ensure that the lifetime maintenance costs for these elements greatly exceeds expectations.		
Affected Offices/ Districts	State Materials Office State Specifications Office State Construction Office		
Existing Work	No relevant work was found.		
Keywords Used In Existing Work Search **(Cannot leave blank)**	Auger-cast piles, early-age cracking		
Related Contracts (Give contract numbers)	N/A		
Funding Request	$300,000	**Anticipated Duration**	30 months
Project Manager	PM: David Cerlanek Co-PM: Concrete Materials Engineer	**Contracting Method**	Direct contract with university
Equipment	N/A		
Urgency	1	Solutions to the cracking problem need to be found ASAP.	
Implementability	1	No barriers to implementation	

Project Benefits (Succinct, complete explanation)		Reduction or elimination of early-age cracking on major bridge projects. This will reduce construction delays due to cracking and enable the structures to perform satisfactorily for the intended service life. Results will also be applicable for other projects employing auger-cast piles.
Project Benefits (Select all that apply and explain)	**Quantifiable Benefits (units, dollars, etc, if applicable)**	**Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits**
o Materials Enhancement	TBD	ACP concrete mixes will be more durable.
o Financial Impact	TBD	Will significantly reduce lifetime maintenance costs and avoid construction delays due to cracking.
o Time Savings	TBD	Will reduce construction delays by minimizing cracking of concrete.
o Lives Saved/Injuries Prevented	N/A	
o Other (Explain)		Reduced construction and maintenance times will minimize inconvenience to the driving public.

*Comments should explain and support urgency, financial benefit, and implementability scores