

**Request for Research Funding for FY 2022-2023**

**SPR Subpart B Project: SMO-23-07**

<b>Requesting Office</b>	SMO	<b>Priority</b>	7 of 10
<b>Proposed Title</b>	Acid- and Water-Soluble Chloride Content in Concrete Structures		
<b>Justification</b>	Conduct literature review on acid and water-soluble chloride content in concrete. This information will be used to evaluate chloride threshold requirements, potential service life, and update Department Specifications and Standards.		
<b>Impact</b>	Support - Because most institutions worldwide may use water-soluble chloride contents as a criterion for corrosion of steel reinforcement, and Florida DOT has historically used acid-soluble chloride contents, there is concern from industry about the potential overly conservative threshold established. Water-soluble chlorides react with steel, causing corrosion. Bound chloride does not. Acid chloride measures both water and bound chlorides. If the Florida DOT does not investigate the differences between water and acid-soluble chlorides in concrete, we will not have a definitive answer to the industry's concerns. Pending the results of the literature review, further research may be necessary.		
<b>Affected Offices</b>	Construction (David Wagner), Materials (Jose Armenteros), Design (Steven Nolan)		
<b>Existing Work</b>	Significant work has been performed on this topic worldwide. However, there is not adequate information with plant and laboratory produced mixes with Florida materials.		
<b>Keywords Used In Existing Work Search</b> <b>(Cannot leave blank)</b>	Chloride ions; Steel corrosion; Bound chlorides; Chloride test		
<b>Related Contracts</b> <b>(Give contract numbers)</b>	NA		
<b>Funding Request</b>	\$75,000	<b>Anticipated Duration</b>	12 months
<b>Project Manager</b>	Rodrigo Antunes	<b>Contracting Method</b>	RFP to all registered vendors
<b>Equipment</b>	NA	NA	
<b>Urgency</b>	3	There is an industry concern that FDOT is very conservative, allowing chloride levels much lower than what is considered harmful to steel worldwide. It is paramount to understand the potential reasons other countries consider water-soluble instead of soluble acid chlorides and the effects on steel corrosion.	
<b>Implementability</b>	2	The results are fully implementable within one year and use minimal FDOT resources because there is a possibility that some of the chlorides in concrete do not cause corrosion. Therefore, it should not be specified. Such changes can optimize materials, design, and construction, which the industry is expected to support.	

**Project Benefits**

The potential financial benefit of understanding which chloride content threshold in cement & concrete materials and aggressive coastal environment can cause steel corrosion. An optimal chloride content can be lower than previously thought and help FDOT optimize the efforts to mitigate corrosion.

<b>Project Benefits</b> (Select all that apply and explain)	<b>Quantifiable Benefits</b> (units, dollars, etc...if applicable)	<b>Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits</b>
○ Materials Enhancement	Increase in allowable chloride content in concrete	Chloride testing with and without acids to dissolve chloride ions in mortar and concrete. Accelerated corrosion testing to identify corrosion at different chloride contents.
○ Materials Savings	NA	
○ Time Savings	NA	
○ Lives Saved/Injuries Prevented	NA	
○ Other (Explain)		

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