Request for Research Funding for FY 2021-2022			
Requesting Office	CO Structures Design	**Priority**	2 of 5
Proposed Title	Bond Performance of Post-tensioning Tendons with Corrosion Inhibitor		
Justification	Corrosion issues have continued to occur with post-tensioning tendons filled with cementitious grout. Repair techniques have been developed and implemented to resolve these corrosion issues. For bonded tendons, the drying technique followed by the impregnation of a corrosion inhibitor has been performed on at least one bridge. Concern that bond between the grout and tendon could be compromised due to the corrosion inhibitor caused the State Materials Office to perform a small-scale bond test to better understand the effect of the corrosion inhibitor. Based on the preliminary testing of a single strand, the bond capacity was reduced by 40-50%. With that level of reduction, the behavior of the bridge as intended with a bonded strand could be compromised, thus possibly resulting in a reduction in overall capacity or different performance behavior. The reduction in bond limits the usage to external tendons only and minimizes the confidence in mitigating the corrosion of internal bonded tendons. This research is planned to perform larger scale testing with an actual stressed tendon to better understand if the small-scale testing can be extrapolated to full-scale. There is potential that the stressed, multi-strand tendon could perform better than the smaller-scale unstressed bond tests. This research will evaluate the different variables involved (tendon size, grout type, etc.) to fully evaluate the flexural bond behavior with and without the corrosion inhibitor.		
Impact	If positive results occur, this would allow the usage of the corrosion inhibitor on bonded tendons for future repairs, which would provide further confidence at minimizes future corrosion, thus improving the safety and minimizing the cost of continued repairs.		
Affected Offices	State Materials Office (Patrick Upshaw), Maintenance Office (Felix Padilla), Structures Design		
Existing Work	Marti. P et al., 2008, Temporary Corrosion Protection and Bond of Prestressing Steel, ACI Structural Journal Vol. 105 No. 1. pages 51-59. Laco, Jan., 2015, Bond Behavior of Prestressing Strands Coated with Corrosion Protection Emulsifiable Oil, 11th CCC Congress Hainburg.		
Keywords Used In Existing Work Search **(Cannot leave blank)**	corrosion inhibitor, bond, post-tensioning, strand		
Related Contracts (Give contract numbers)			
Funding Request	$400k	**Anticipated Duration**	3.5 years
Project Manager	Will Potter	**Contracting Method**	Direct Contract with University
Urgency	2	This project scored second in a rating of research ideas by FDOT's Central and District Structures Design Offices.	
Implementability	1	The implementation would either to allow the corrosion inhibitor for bonded tendons or not. Bond testing requirements for product allowance may be necessary.	

Project Benefits (Succinct, complete explanation)

This research will provide an assessment of the flexural behavior and bond of post-tensioned elements when treated with corrosion inhibitor to protect the strands. The corrosion inhibitor can provide more confidence in the repair strategies for compromised post-tensioned members. Ensuring the bond between the tendon and grout is adequate after the inhibitor application is necessary prior to implementing this product on future bridges. The Roosevelt Bridge in D4 is an example of a bridge which would benefit from the application of corrosion inhibitor.

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		This would enhance the corrosion protection methods for compromised post-tensioning tendons.
o Materials Savings		
o Time Savings		If positive results, this could allow the use of the corrosion inhibitor which could minimize further maintenance and repairs to post-tensioning tendons.
o Lives Saved/Injuries Prevented		
o Other (Explain)		

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