

**Request for Research Funding for FY 2021-2022**

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| <b>Requesting Office</b>                                             | SMO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Priority</b>                                                                                                                                                                                                              | # 1 of # 10 |
| <b>Proposed Title</b>                                                | Evaluation of Corrosion Inhibiting Materials Applied by Impregnation (Pressure Injection) Methods to Prevent Corrosion of Post-Tensioned Tendons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                              |             |
| <b>Justification</b>                                                 | The findings of BDV25 977 TWO 35 identified chloride intrusion as a possible mechanism that may compromise the corrosion mitigating abilities of injected fluids. In addition, impregnated tendon samples showed significant reductions in pullout capacity, which may have consequences for grouted internal tendon applications. Monitoring mock up tendons is required to determine the effective service period of fluid and to assess the feasibility of reimpregnation if required. There is also a need to understand the mechanism of bond strength reduction caused by the fluid and the implication to structural durability for both internally bonded tendons and external tendons that pass through deviator blocks or expansion joints. |                                                                                                                                                                                                                              |             |
| <b>Impact</b>                                                        | Injection of corrosion inhibiting fluids is currently the only practical method of inhibiting corrosion of PT tendons and has shown promise on pilot projects. More understanding of the mechanisms and effects of the fluid is required for the Department to make decisions considering the conditions under which this technique/material will be effective for increasing the service life of structures.                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                              |             |
| <b>Affected Offices</b>                                              | Materials, Design, Maintenance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                              |             |
| <b>Existing Work</b>                                                 | BDV25 977 TWO 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                              |             |
| <b>Keywords Used In Existing Work Search</b><br>(Cannot leave blank) | Post Tension Tendon Impregnation Injection Corrosion Inhibitor Fluid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                              |             |
| <b>Related Contracts (Give contract numbers)</b>                     | BDV25 977 TWO 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                              |             |
| <b>Funding Request</b>                                               | \$325,000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Anticipated Duration</b>                                                                                                                                                                                                  | 36 months   |
| <b>Project Manager</b>                                               | Chase Knight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Contracting Method</b>                                                                                                                                                                                                    | Direct-USF  |
| <b>Urgency</b>                                                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Corrosion of PT strands remains a persistent problem in past and current bridge construction. Injection of corrosion inhibitors is likely to be a cost-effective and efficient solution in reducing corrosion of PT strands. |             |
| <b>Implementability</b>                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The sole restraints to implementability would include modifying our current Standard Specifications and identifying methods of approval for injectable corrosion inhibiting products.                                        |             |

**Project Benefits (Succinct, complete explanation)**

Injectable corrosion inhibitors will greatly reduce cost to the Department by increasing design service life and preventing persistent corrosion of PT strands that would otherwise require repair and replacement.

| <b>Project Benefits<br/>(Select all that apply and explain)</b> | <b>Quantifiable Benefits<br/>(units, dollars, etc...if applicable)</b> | <b>Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits</b>                   |
|-----------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ○ Materials Enhancement                                         | PT Grout                                                               | Injectable corrosion inhibitors will enhance the durability of the strands encased in the PT grout.                                                            |
| ○ Materials Savings                                             | None                                                                   |                                                                                                                                                                |
| ○ Time Savings                                                  | Months                                                                 | Injecting corrosion inhibitors will be much faster than replacing tendons.                                                                                     |
| ○ Lives Saved/Injuries Prevented                                | Potential                                                              | PT strands protected by corrosion inhibitors may potentially save lives that may have been lost in the event of a tendon failure resulting in bridge collapse. |
| ○ Other (Explain)                                               | None                                                                   |                                                                                                                                                                |

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