

## Stainless Steel Coated Rebar for Chloride Resistant Concrete Highway and Bridges

### PROJECT TITLE

Stainless Steel Coated Rebar for Chloride Resistant Highway and Bridges

### STUDY TIMELINE

April 2022 – June 2023

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### KEYWORDS

Steel Reinforcement, Corrosion, Cold Spray, Manufacturing

### FUNDING

National Cooperative Highway Research Program (NCHRP) IDEA

More information about the VTrans Research Program, including additional Fact Sheets, can be found at:  
<http://vtrans.vermont.gov/planning/research>

### Introduction or Problem Statement

Concrete is ubiquitous throughout transportation infrastructure. Most concrete contains steel reinforcing bars (rebar) which gives the concrete tensile strength. Over time, the steel within concrete suffers corrosion, especially in environments with high chloride content, such as coastal areas or roads where deicing salts are used. The oxide corrosion products cause an expansion in volume, which slowly breaks up the concrete from within over time, causing necessary maintenance and eventual replacement. This corrosion-driven degradation can also lead to catastrophic collapse of concrete structures when left unaddressed. The product developed in this project aims to mitigate this corrosion challenge and increase the lifetime of concrete structures by a factor of 3 or 4 at a minimum.



### Methodology or Action Taken

Rebar prototypes coated with several different commercial stainless steels were fabricated using cold spray. 75% reduction in corrosion was achieved, corresponding to a 4-fold expected lifetime increase. In addition, the ability to bend the rebar was achieved after an annealing heat treatment, shown below:



### Conclusions or Next Steps

Corrosion resistance and fabricability have been demonstrated using this approach. Future work includes testing the rebar within concrete including pilot installations in partnership with VTrans.

### Potential Impacts and VTrans Benefits

If VTrans adopts this product, there is potential for safer infrastructure with reduced costs to VT taxpayers through lower infrastructure maintenance, repair, and replacement costs for critical concrete transportation infrastructure.