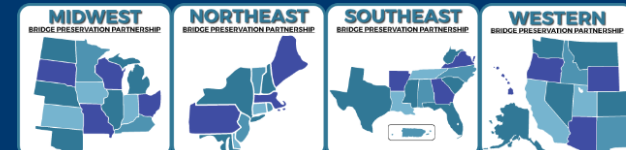


Epoxy/Silane Multi-Coat System for the Reduction of Chloride Intrusion



Partners

- Tim Woolery – Advanced Chemical Technologies
- Ben Foster – MaineDOT
- Joe Prescott - MaineDOT

Material

- DECK-SIL 1700 System
 - Silane
 - 2 Part Epoxy
 - Aggregate
 - Slag Blasting Grit

DECK-Sil System

- Waterproofing and Crack Healing
- One Day Operation
- Two Stage Technology
- Three Person Crew

Milford, Maine



Bridge Location

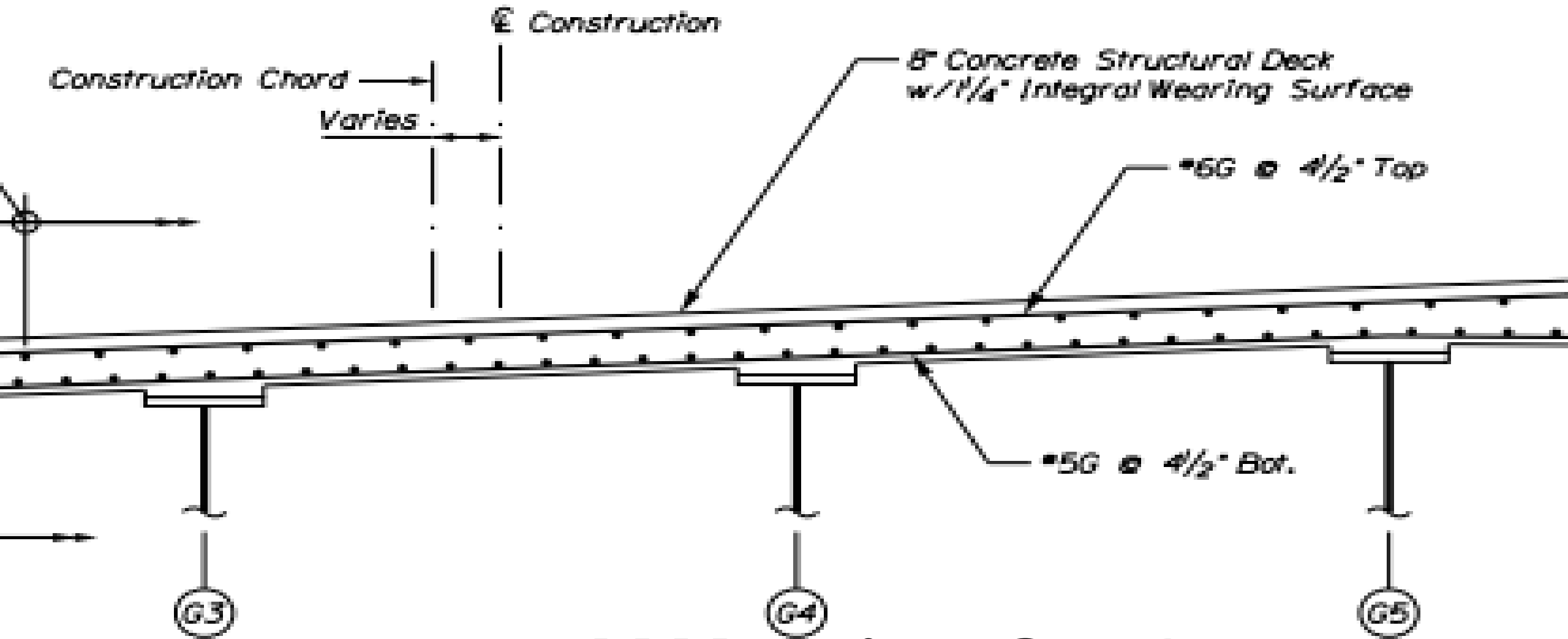


Bridge #3535

- Built in 2017
- Concrete Deck on Steel Girders
- Integral Abutments
- 130' long, 36' curb-to-curb

Bridge #2825

- Built in 2017
- Concrete Deck on Steel Girders
- Integral Abutments
- 100' long, 36' curb-to-curb



Integral Wearing Surface





Wearing Surface Condition



Wearing Surface Condition



Prepare Surface



Clean Surface



Apply Silane

Spray Bar



Quality Tracking # 12539

SIL-ACT[®]

DECK-SIL[®] EP 1700

PART B Hardener

Step 2

The DECK-SIL[®] system provides a dual layer of protection that heals and waterproofs. DECK-SIL[®] EP 1700 is step 2 of the DECK-SIL[®] system, that causes concrete to become repellent to water, chloride, waterborne contaminants and other weathering elements, preventing the premature deterioration of concrete and masonry structures.

	NET WEIGHT	NET VOLUME
<input type="checkbox"/>	473.2 lbs (214.6 kg)	52 gal (196.82 L)
<input type="checkbox"/>	45.5 lbs (20.5 kg)	5 gal (18.9 L)

COMPONENT Solvent Naphtha
CAS# 64710-91-6

Corrosive liquid/acid
(N-aminoethylpiperazine)
8, UN1760, PG III
NFPA: Health 3, Flammability 2, Instability/Reactivity 0
Transportation Description Required: Flammable and Corrosive Liquid



ADVANCED CHEMICAL TECHNOLOGIES, Inc.
Oklahoma City, Oklahoma 73114

Lot # 061615

WARNING!



HAZARD STATEMENTS

Extremely flammable liquid. Toxic if swallowed. Causes skin irritation. May cause eye damage. May cause an allergic skin reaction. Suspected of causing genetic defects. Suspected of causing cancer. Suspected of damaging health of the unborn child. May cause respiratory irritation. May cause drowsiness or dizziness. Causes damage to organs through prolonged or repeated exposure.

PRECAUTIONARY STATEMENTS

Keep away from heat, sparks, open flames, hot surfaces. Do not spray on an open flame or ignition source. Keep away from combustible materials. Take any precaution to avoid mixing with combustibles. Wear flame/heat resistant clothing in case of fire, eliminate all ignition sources and stop work if safe to do so. Avoid contact during pregnancy/while nursing.

FIRST AID

Inhalation: Immediately with plenty of water for at least 15 minutes, when possible breathing apparatus. Inhalation: remove person to fresh air and contact person who spilled with area of contact thoroughly with soap and water. In case of eye contact, flush with water. Wash clothing before re-use. Destroy contents when necessary. Do NOT induce vomiting unless directed to do so by a medical professional. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting, call a physician immediately. Give plenty of water.

SPILL CLEAN UP

Remove any liquid spill. Avoid breathing vapor. Avoid contact with spilled material. Remove any appropriate containment to avoid environmental contamination. For small liquid spills, transfer to mechanical means to a labeled container for proper recovery or safe disposal. Allow residues to evaporate in well-ventilated area. Never burn or incinerate. Remove contaminated soil. Dispose of it according with applicable local, state and federal regulations.

MIXING INSTRUCTIONS

In case of mixing temperature need be 40°F (4°C) or above, for each component thoroughly before mixing. Mix Part B into Part A at a 1:1 ratio by volume for 2 minutes with 20% water at 600 rpm or until completely mixed. Store mixture safe to Product Data/Label Specifications.

APPLICATION

Apply DECK-SIL[®] EP 1700 to the concrete surface as soon as the DECK-SIL[®] Part A has been applied. Mix Part B into Part A and apply to the surface. Apply to the surface in a thin layer. Do not apply to wet concrete. Do not apply to "green" concrete. Do not apply to concrete during construction. Refer to Product Data/Label Specifications.

FOR ADDITIONAL INFORMATION READ SAFETY DATA SHEET (SDS).

PRINT PENDING

This label is for informational purposes only. The price of the product is subject to change without notice. The price of the product is subject to change without notice. The price of the product is subject to change without notice. The price of the product is subject to change without notice.



NATIONAL BRIDGE PRESERVATION CONFERENCE 2024
Innovation for Infrastructure Resiliency

Mix Epoxy



Optimized System





Apply Epoxy

Spread Aggregate

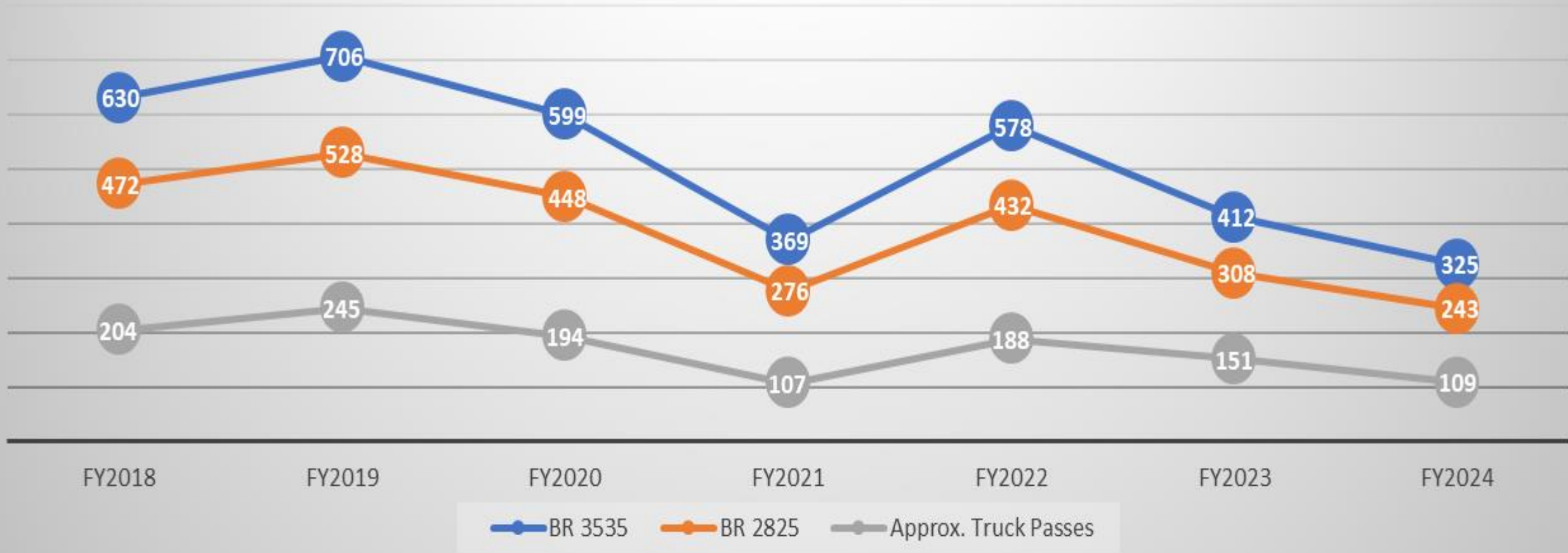


August 2020



Approx. Salt Applied

Per Winter, Per Bridge (lbs)



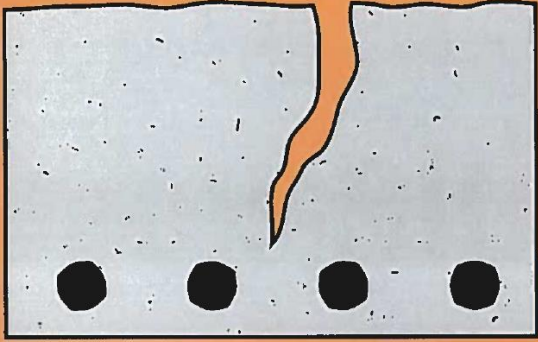


November 2021

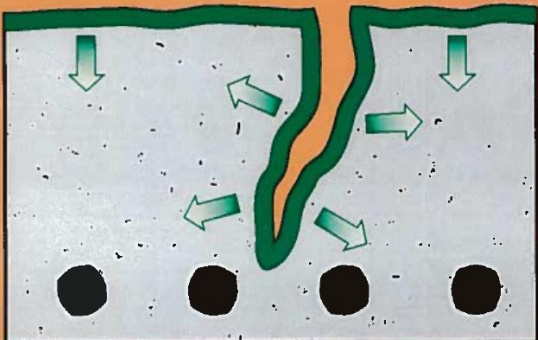


November 2022

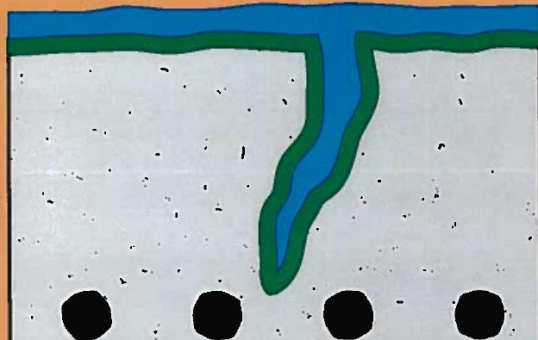
Deck-SIL System



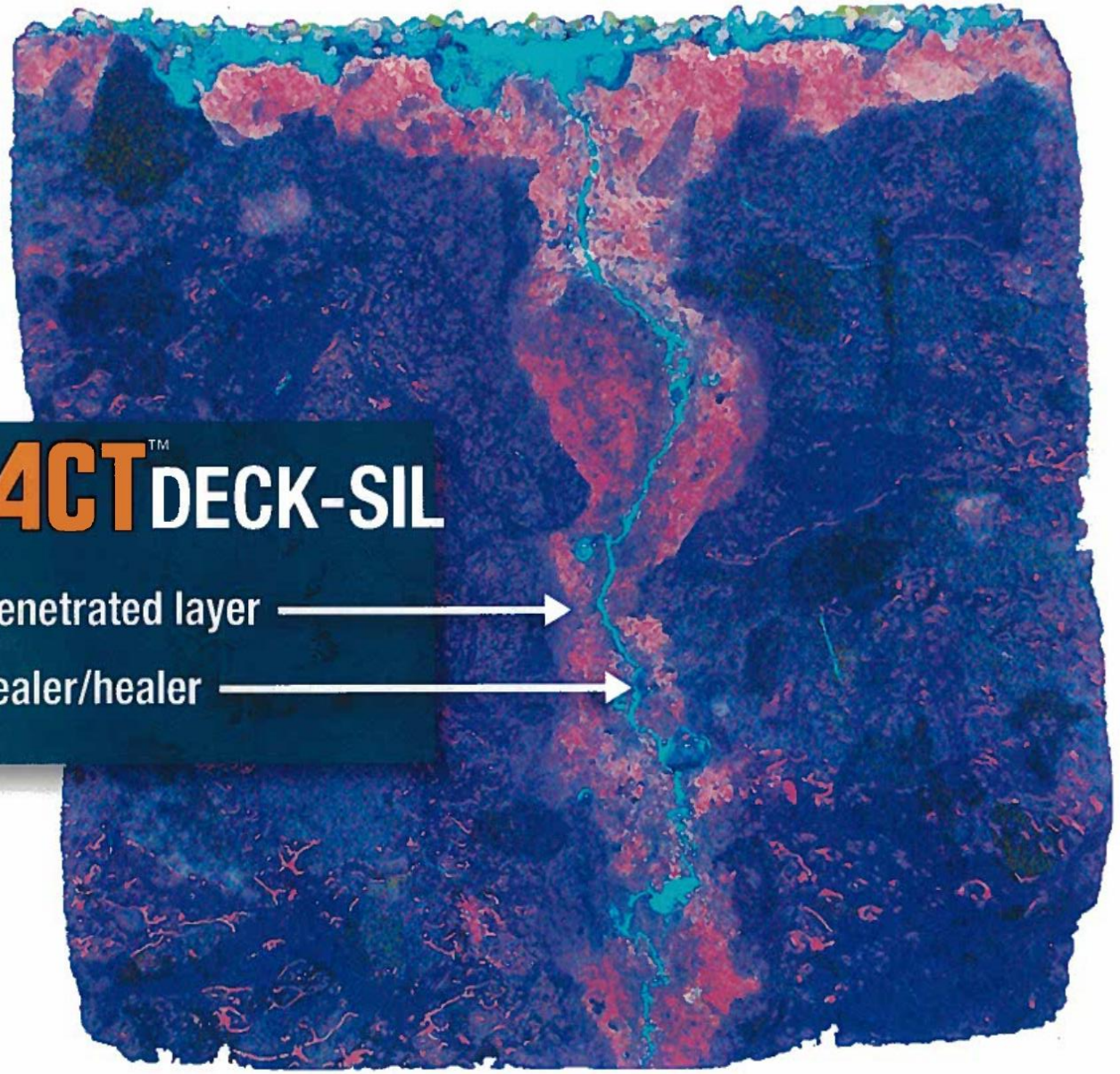
Cracking concrete surfaces require repair before major damage occurs.



Step 1. Apply SIL-ACT PS1700 treatment which penetrates into the concrete.



Step 2. Apply SIL-ACT EP1700 treatment to heal and seal surface.



SIL-ACTTM DECK-SIL

Silane penetrated layer →

Epoxy sealer/healer →

Penetration Results for ACT's Deck-Sil™ 1700 Series



Mirror image of a split core sample shows the deep penetration of Sil-Act Deck-Sil™ EP-1700 crack healing epoxy.

HISTORY



Bridge 3535



Bridge 2825

[2017]
Maine DOT built
bridges 3535 and
2825.

[2020]
Bridge 2825 was
given the Deck-Sil
Treatment.

[2020]
Core
samples
were taken
from each
bridge.

[2021]
Core
samples
were taken
from each
bridge.

[2022]
Core
samples
were taken
from each
bridge.

[2023]
Core
samples
were taken
from each
bridge.





- Bridge 2825 had Deck-Sil applied 3 years ago
- Aggregate has mostly worn off in travel lanes
- Received roughly 0.58 pounds of salt per square foot since 2018

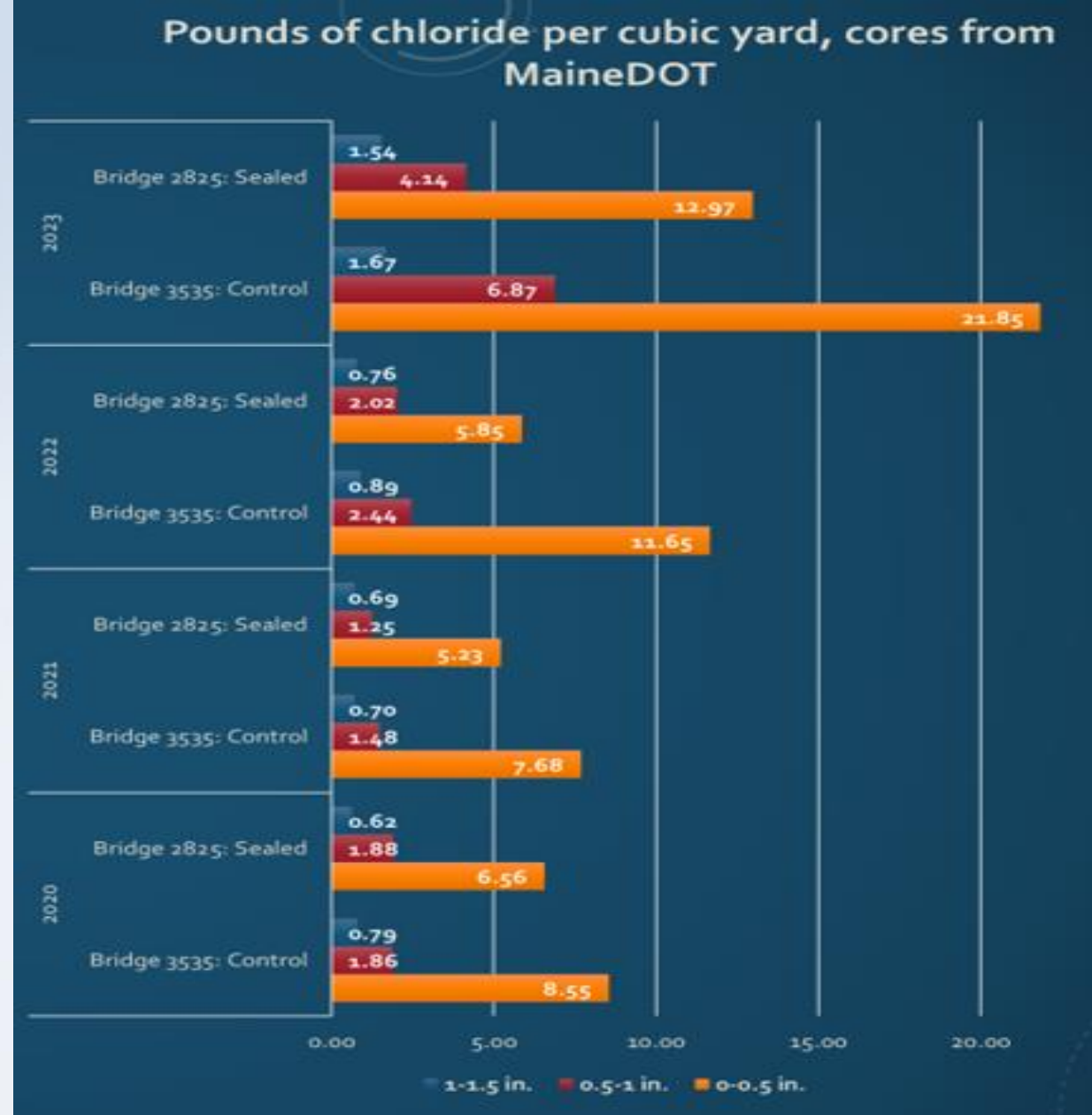
Image Captured July 2023



- Bridge 3535 had no Deck-Sil treatment
- Bright white concrete, could be curing compound
- Received roughly 0.58 pounds of salt per square foot since 2018

Results of Deck-Sil System for Bridges #2825 and #3535

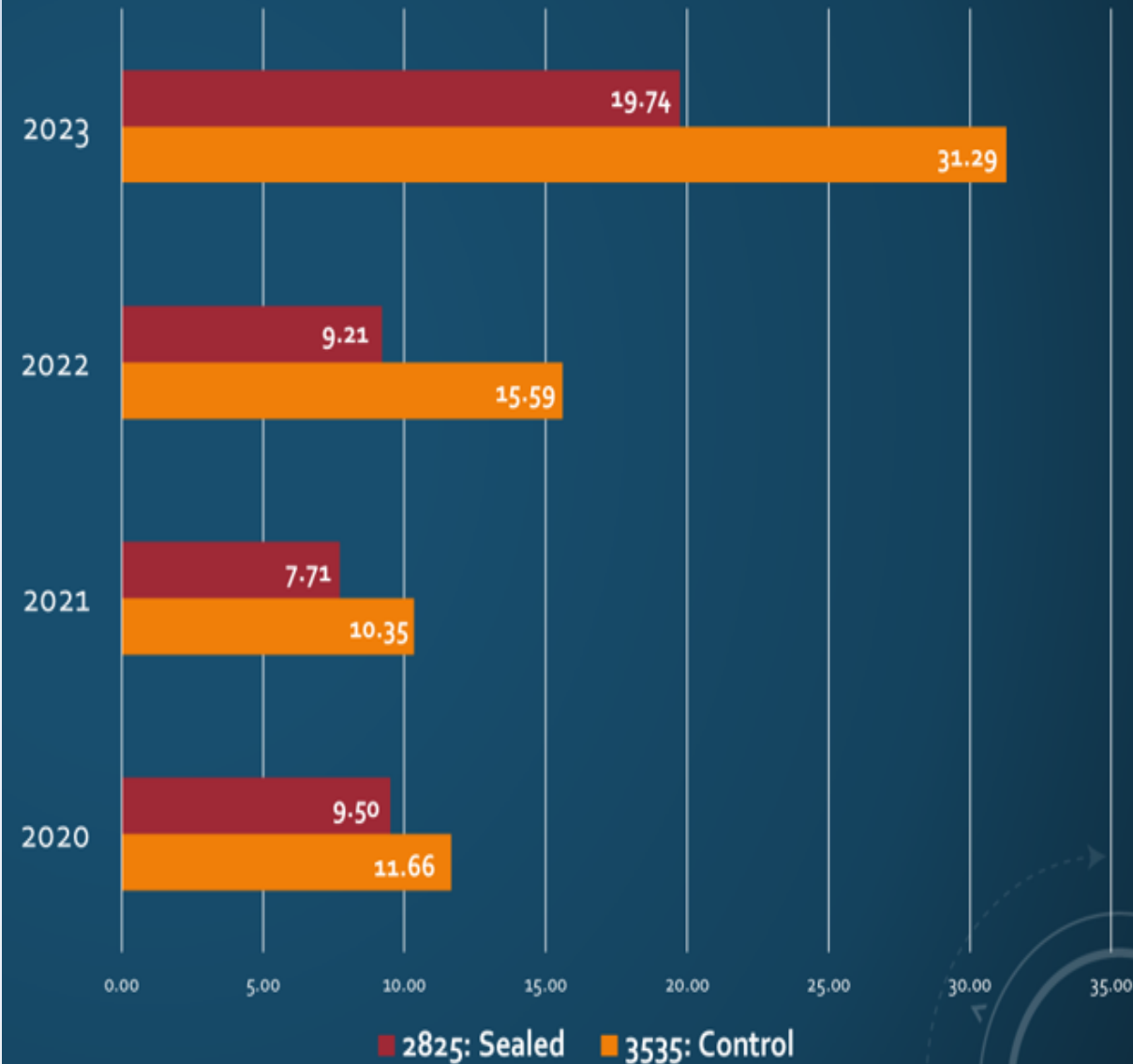
- Data is shown for chloride measured between 0 and 2 inches, at every half inch
- Both bridges were salted at 0.58 pounds of salt per square foot, but control bridge has consistently more chloride than sealed bridge year after year
- Most significant reduction of chloride is at the top levels of concrete



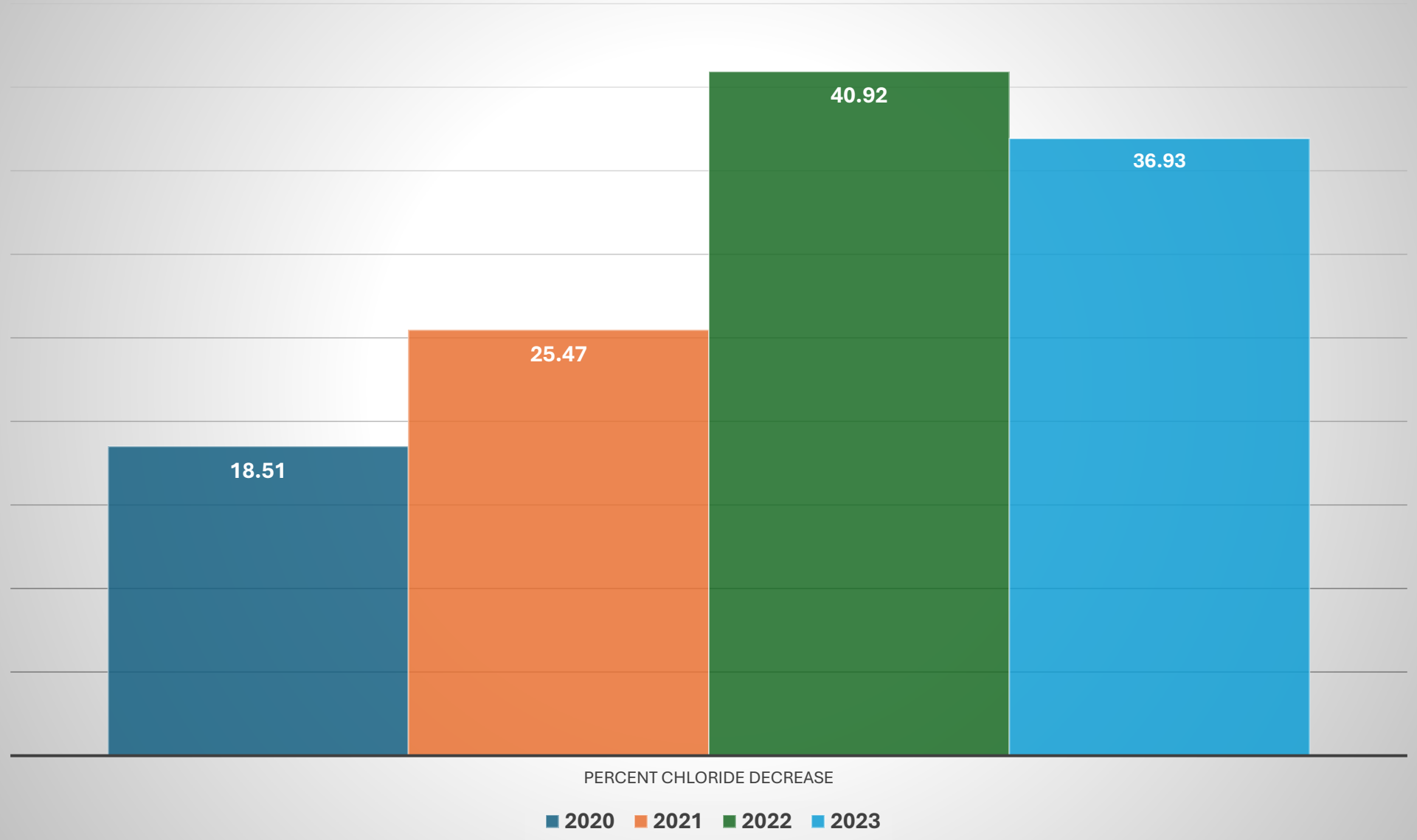
Results of Deck-Sil System for Bridges #2825 and #3535

- Data is shown for chloride measured between 0 and 2 inches, combined
- Chloride reduction was seen in the same year as treatment
- In 2021, chloride was reduced at a faster rate in sealed bridge vs in control bridge
- Over time, Deck-Sil keeps out larger fractions of chloride

Pounds of chloride per cubic yard, cores from MaineDOT



Bridge 2825 had how much less Cl- than bridge 3535?



Influences and Conclusions

- On Maine DOT bridges, Deck-Sil reduced chloride ingress by up to 36%, and that reduction is expected to continue improving with time.
- Future research will include continued bridge inspections, salt records, and core sampling.
- Use a harder aggregate to withstand the plow abrasion.

Acknowledgements

- Nelson Testing Laboratories, for UV images of Deck-Sil in concrete.

