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RESEARCH UPDATE

U97-12

TYFO S FIBERWRAP

References:

Report WP 94-R-7, U96-27

Introduction:

Bridge #60 in Williston underwent rehabilitation in June, 1994 to repair damage from salt intrusion in the columns and piers. Rather than employ a standard concrete encasement, TYFO S Fiberwrap was applied to the columns of Pier #1 of Bridge #60. These columns are located close to the travel lanes and become coated with salt impregnated slush cast by high speed traffic. The TYFO S Fiberwrap was selected in order to prevent further damage from the salt spray, along with providing structural reinforcement for the patched concrete members. If successful, the TYFO S Fiberwrap process could prove to be a cost effective alternative to rehabilitation through concrete encasement.

Product Description:

The TYFO S Fiberwrap system employs a fiberglass fabric impregnated with a two part epoxy resin. The fabric is wrapped with tension rollers around a concrete structure and then painted. The distributor, R.J. Watson, Inc., claims that the resulting column wrap is resistant to salt, soil, and UV radiation and offers increased shear and flexural strength.

Evaluation:

The TYFO material on Bridge #60 was inspected by Research and Development personnel on August 22, 1997. After 3 years and 2 months of service all three columns of Pier #1 were examined and found to be in excellent condition. The fiberwrap material shows no signs of cracking or discoloration.

During the August 1997 inspection several air pockets were discovered, showing up as bulges in the material ranging from approximately 20 to 60 mm in diameter. The paint covering the TYFO was intact. Since the paint is non-ductile, it would have cracked if the air pockets had developed after the paint had dried. Therefore, it is most likely that the air pockets have been there since the material was applied and were overlooked on previous inspections. Therefore, the bulges in the material are not considered an indication of material failure.

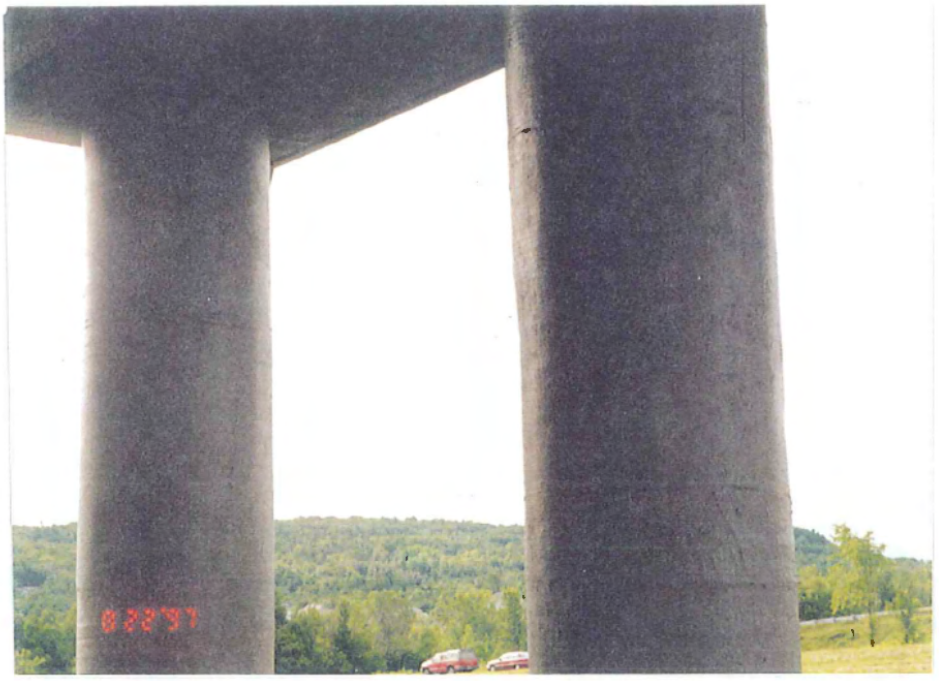
In order to determine if the TYFO S Fiberwrap is successfully preventing damage from salt intrusion, the columns were cored on September 24 of this year and samples were examined. Care was taken not to core areas which were patched with concrete during the rehabilitation. A total of four 2" cores were taken, two from sun exposed areas and two in the shade. All were taken from areas subject to salt spray.

There was no break in bond between the concrete and the TYFO material nor evidence of salt intrusion on any of the cores.

Although it is not certain if the product has increased the structural integrity of the column, it is clear from the condition of the material's exterior and from the good condition of the cores that further chloride contamination from road spray has been greatly reduced, if not totally abated.

Follow Up:

The long term durability of TYFO S Fiberwrap will continue to be evaluated through periodic inspections.



TYFO S Fiberwrap
Bridge 60, Pier #1
I-89 Williston, VT

Travel lane side of column,
typical condition