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DEMONSTRATION
PROJECT REPORT
ON
CRF & RECLAMITE
SURFACE TREATMENTS

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DEMONSTRATION PROJECT REPORT

This demonstration project was performed by Gene Bridges of Bridges Asphalt Products, Inc. and Bridges Application Service, Inc. of Garland, Texas and the Texas Department of Transportation (TxDOT) Marlin Area Office and Limestone County Maintenance Section. Bridges Asphalt is a distributor for the WITCO Corporation. The WITCO products available are Reclamite, CRF, CRF Crack Filter, Cyclogen, and Coherax Dust Retardant. The products demonstrated on this project were Reclamite and CRF.

The demonstration project was conducted in Limestone County on SH 14, on the south bound lanes, between SH 171 and the north city limit of Mexia. The existing surface was 3" CMHB constructed in the late fall of 1995. The existing roadway surface of this section of roadway has been subject to failures suspected to have been caused by water passing through the open hot mix to the flexible base below. The area selected for the demonstration was one where it was suspected that if water were allowed to continue to penetrate the hot mix, the roadway would eventually fail.

This demonstration project was conducted in two phases. The first phase, constructed on October 1, 1997, consisted of three small (approximately 9' x 21') test sections, two of which were treated with CRF and Reclamite applied with a hand sprayer. The second phase, constructed on June 10, 1998, consisted of three larger (approximately 14' x 800') test sections, two of which were treated with CRF and Reclamite applied with a conventional distributor. The larger test sections are located on the inside lane, just south of the original, small test sections. Both phases of the demonstration project were witnessed by Jerry Kindred, Darrell Wells, Jeff Kennedy, Richard Stimmel, and David Bitner of TxDOT, Gene Bridges of Bridges Asphalt, and Ron Pruitt of Golden Bear Products. Traffic control was handled by the Limestone County Maintenance Section.

PHASE I

The sequence of the first phase of the demonstration project is as described below and as shown in the attached set of photographs.

1. Seven 6" diameter test spots were set up using the following products, solutions, and application rates:

A.	Reclamite	diluted 2:1	@ 0.10 GSY
B.	Reclamite	diluted 2:1	@ 0.20 GSY
C.	Reclamite	diluted 2:1	@ 0.15 GSY
D.	Reclamite	diluted 1:1	@ 0.10 GSY
E.	Reclamite	diluted 1:1	@ 0.20 GSY
F.	CRF	diluted 1:1	@ 0.10 GSY
G.	CRF	diluted 1:1	@ 0.20 GSY

2. The test spots were allowed approximately 30 minutes to cure and were then sanded and swept.

3. The test spots were inspected to determine an estimate of the optimum product, dilution, and application rate for the existing surface.
4. CRF diluted at 2:1 and applied at 0.07 GSY was determined to be the required treatment. Reclamite diluted at 2:1 and applied at 0.07 GSY was also determined to be included in the demonstration.
5. Two demonstration areas were marked. Each was 3 yards long by 7 yards wide, and extended from the centerline of the roadway across the center lane and partially across the outside lane.
6. The products were applied with a hand sprayer at the dilution and application rates shown above.
7. After the areas were allowed to cure for 30 - 60 minutes, they were sanded and opened to traffic.
8. The demonstration areas were inspected and photographed the day after application.

PHASE II

The sequence of the second phase of the demonstration project is as described below and as shown in the attached set of photographs:

1. The three test sections were laid out as follows:
 - A. Untreated section just south of the Phase I area
 - B. CRF section, 14' wide by 800' long, in the south bound inside lane
 - C. Reclamite section, 14' wide by 675' long, in the south bound inside lane.
2. The CRF section was sprayed with 0.15 GSY, allowed to cure for 30-45 minutes, sanded with approximately 3 lbs/sy of dry washed crusher screenings, drag broomed, rolled three passes with a pneumatic roller, swept, and opened to traffic.
3. The Reclamite section was sprayed with 0.20 GSY of Reclamite, allowed to cure for 30-45 minutes, sanded with approximately 3 lbs/sy of dry washed crusher screenings, drag broomed, rolled three passes with a pneumatic roller, swept, and opened to traffic.

On July 21, 1998 two complete sets of cores were taken from each of the three Phase II test sections (untreated, CRF, Reclamite). Each set of cores consisted of one core from the left wheel path, one core from the right wheel path, and two cores from between the wheel paths. One complete set of cores was sent to TxDOT - Materials and Test Division for testing. The other set was sent to Golden Bear for asphalt content, viscosity, and penetration tests to be performed by a private lab. The set of cores sent to TxDOT – Materials and Test Division were not subjected to testing and were eventually discarded.

On January 25, 1999 an additional set of cores was taken from each of the three Phase II test sections. These cores were taken to Texas Transportation Institute (TTI) Materials and Pavements Division test laboratory in College Station, Texas for permeability and asphalt content, viscosity, and penetration tests. This work was performed by an interagency contract between TxDOT and TTI. The cutting and laboratory testing of this set of cores was supervised by Joe W. Button, P. E., Senior Research Engineer, TTI.

A summary of the test results are as shown below:

Cores Tested by Golden Bear	Permeability	% Asphalt	Viscosity	Penetration
Untreated	N/A	4.60	28070	15
CRF	N/A	4.80	8467	25
Reclamited	N/A	4.90	3882	37
Cores Tested by TTI				
Cores Tested by TTI	Permeability*	% Asphalt	Viscosity	Penetration
Untreated	2.1×10^{-4}	3.85	87980	15
CRF	8.6×10^{-5}	4.49	10470	32
Reclamited	9.9×10^{-6}	4.39	7414	36

* The measurement for permeability is in cm/sec and is the average of four cores. TTI stated in their report technical memorandum that “although CRF and Reclamite are shown to reduce permeability of the pavement at the surface, the differences between their average permeabilities and that of the untreated cores are not statistically significant.” This conclusion was based on a statistical analysis of the test data which showed “considerable variability (more than one order of magnitude) in the measurement of permeability of any one type of material.”

Based on a review of the applicable prices and procedures, it is estimated that the total cost for one application of CRF or Reclamite would be about 40-60% of that of a conventional chip seal.

CONCLUSION:

The following conclusions are based on consideration of the laboratory test results and visual examination of the treated surfaces:

- The CRF and Reclamite treatments appear to provide some sealing effect to the surface of the roadway. This sealing effect appears to last, under traffic, for at least six months.
- This sealing effect cannot be quantified with currently available test procedures but is visually obvious.
- The difference in sealing effect between the CRF and Reclamite is minimal.

- The CRF and Reclamite treatments appear to lower the viscosity and increase the penetration of the material at the surface of the roadway. This effect is probably present in only the top ½ inch of the surface.
- Because the CRF and Reclamite treatments appear to be so effective at changing the surface texture from rough and open to smooth and tight, the possible reduction in skid resistance should be determined before use in a travel lane.
- Depending on the condition and intended use of the existing roadway, the application of these products has the potential of being a cost effective surface rehabilitation technique.



In Phase I, the appropriate rate of CRF or Reclamite required for the desired effect was determined using 6" diameter test spots



Application of Reclamite for Phase II Test Section.



Photos showing the difference in surface texture one month after treatment. (Reclamite – right; Untreated – left)



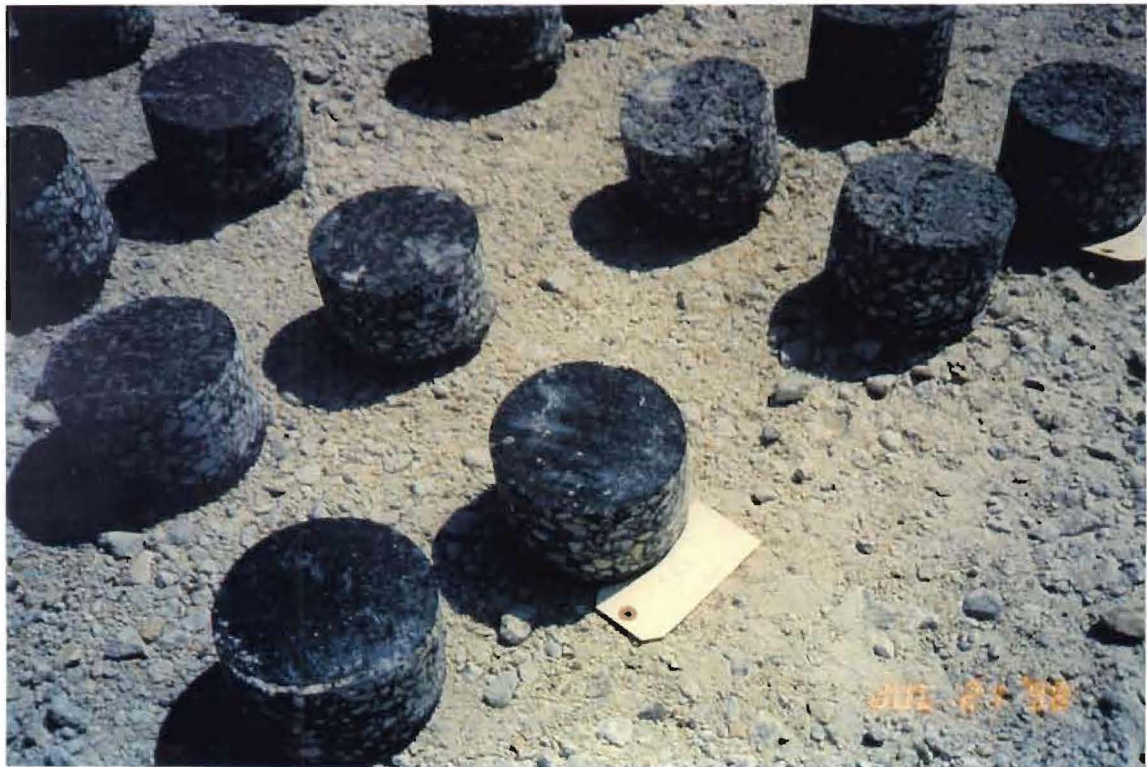
Photos showing the difference in surface texture one month after treatment. (Reclamite)



Photos showing the difference in surface texture one month after treatment. (CRF – back; Untreated – middle; Reclamite – front)



Photos showing the difference in surface texture one month after treatment.



Photos showing the difference in surface texture one month after treatment. (CRF – left; Untreated - right)



Photos showing the difference in surface texture one month after treatment. (Untreated)



Photos showing the difference in surface texture one month after treatment. (CRF – left; Untreated – middle; Reclamite - right)



Photos showing the difference in surface texture one month after treatment. (CRF - left; Untreated -right)



Photos showing the difference in surface texture six months after treatment (untreated - back; CRF - middle; Reclamite - front)



Photos showing the difference in surface texture six months after treatment (untreated – back; CRF – middle; Reclamite – front)