

MATERIALS & RESEARCH DIVISION

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RESEARCH UPDATE

Number U93-7

PERFORMED THERMOPLASTIC DEMONSTRATION

Purpose: To demonstrate the proper application of Pavemark preformed thermoplastic letters and symbols and to test the effectiveness of various forms of skid resistant materials and determine how such materials would affect the markings retroreflectivity. Three "stop" symbols and two "only" symbols were applied.

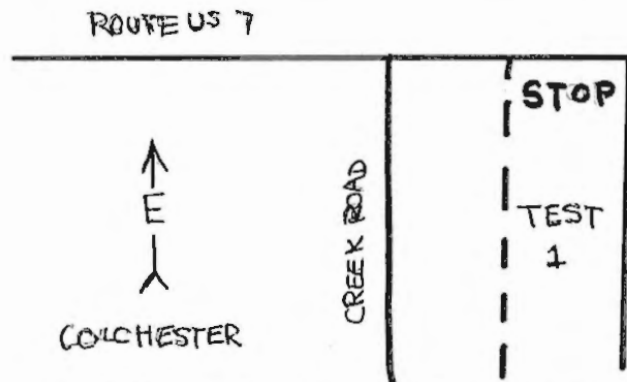
Location: The demonstration was held on Tuesday September 14, 1993, in the village of Colchester, VT at the intersection of US 7 and VT 2A.

Equipment: Tennent Rotary Drum Grinder fitted with special thermoplastic grinding teeth
Air compressor
Push broom, chalk line, tape measure, lumber crayon
RIPACK 2000 hand held propane fired heat shrink gun
Putty knife, small wooden roller
Crescent wrench, measuring spoon
Plastic shaker jars with perforated covers

<u>Materials & Cost:</u>	Thermoplastic letters	\$650.00 (for five words)
	Liquid propane	12.50
	Glass beads	.40
	Crushed glass	.40
	Colchester quartzite	.40

Application: The weather condition was sunny, warm and very windy.

Test 1:



The existing one year old thermoplastic symbol was in poor condition. The one year old pavement was in good condition. The existing thermo letters (STOP) were ground off with a Tennent Rotary Drum Grinder with special grinding teeth made for thermoplastic removal. The area was swept with a push broom. The removal took approximately 25 minutes.

Measurements were made on the pavement and a chalk line was used to line up letters according to directions with the thermo package. The product used was 8 foot PREMARK PREFORMED THERMOPLASTIC LETTERS.

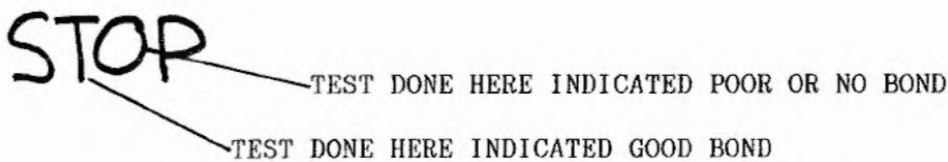
The pavement was then dried by using a RIPACK 2000 HELD PROPANE FIRED HEAT SHRINK GUN. The gun was held 4"-6" from the pavement and moved in a sweeping motion over the area. The heat turned the pavement to very dark gray or black. The procedure took about 20 minutes.

Next, the new letters were lined up on the clean, dry surface according to directions on the thermo package. This took approximately 20 minutes.

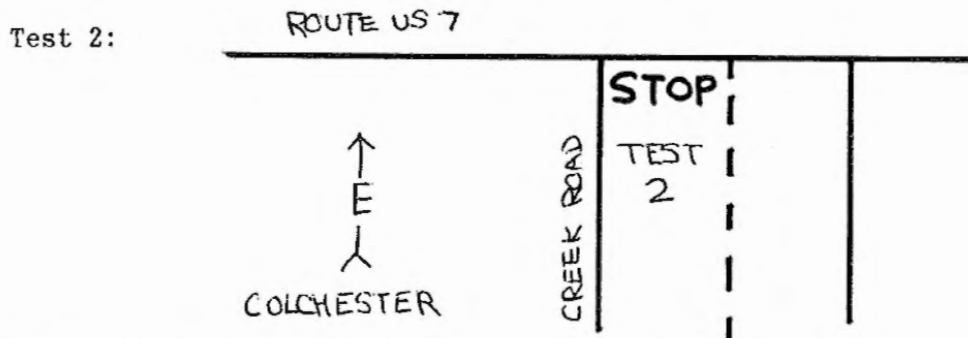
The new thermoplastic letters were heated with the heat gun, using a sweeping motion 4"-6" from the surface. The thermo turned gray/black. Bubbles of oil rose to the surface and the material actually caught on fire occasionally but the flames went out immediately. A fairly heavy application of glass beads were sprinkled on the letters as they were being heated. The joints did not melt together very smoothly. The hot plastic at the bottom of the letters was drawn down with a putty knife to provide a tapered edge. Hopefully this will prevent chipping from the snow plow blade.

The procedure was repeated for each letter. Someone stepped on the "P" and left a dirty spot of asphalt from his shoe. The spot was patched with a small piece of extra thermo melted over the area. During this process, some dirt and dust were blowing onto the site and it is probable that there is a layer of dust between the dried surface and the new thermo. Each letter took about 8 minutes to heat and apply beads.

Two bonding tests were done with a putty knife.



The area with the poor bond was reheated to improve the bond.



The pre-existing conditions were the same as Test site 1.

The old letters were ground off as in Test 1 and area swept with a push broom. This time compressed air was also used to clean the area and all dust and loose material was removed.

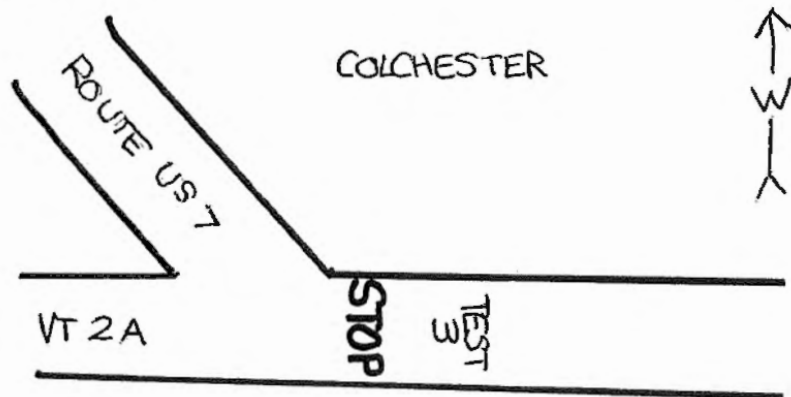
Measurements were made and area dried as in Test 1. Thermo letters were placed according to directions and heated with the shrink gun.

On Test 2 the heated letters were sprinkled with a mixture of 1/2 glass beads and 1/2 crushed glass. A small wooden wheel was used to taper bottom edges of the letters. This resulted in a very neat taper.

The joints did not melt together smoothly and the letter "P" was not heated as much as the other three letters.

No bonding test was performed.

Test 3:



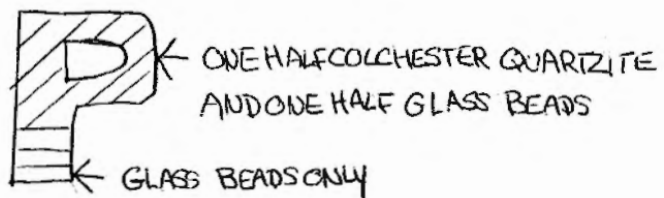
Conditions were the same as in Test 1 and 2. Existing thermo letters were ground off and area was cleaned with a push broom and compressed air. Pavement was dried with the shrink gun and letters placed according to directions.

Glass beads were sprinkled on the letters S T & O. On the "P" a mixture of 1/2 Colchester Quartzite (Whitcomb Quarry, Colchester) and 1/2 glass beads were applied on the upper 2/3 of the letter and glass beads only on the lower 1/3.

The quartzite mixture made the thermo appear very dirty.

The bottom of the letters was tapered with a putty knife.

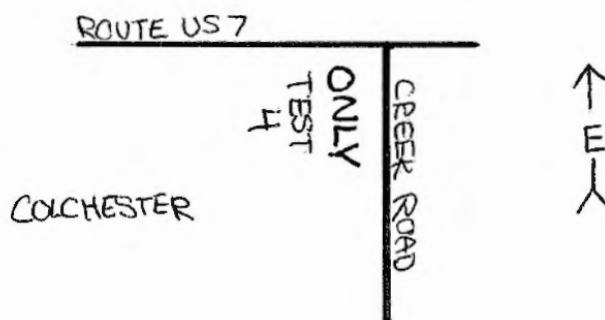
No bonding test was performed.



Test 4:

The existing one year old thermo letters were in fair condition, the one year old pavement was in good condition.

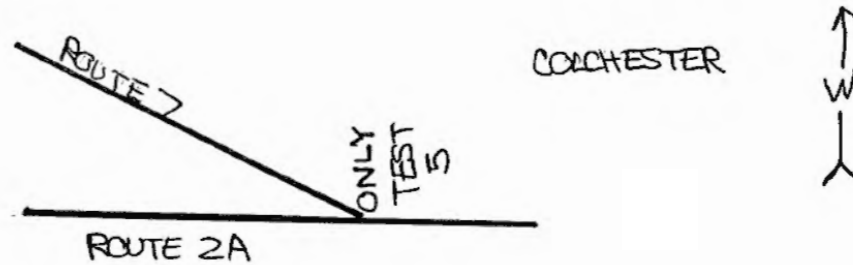
The area was cleaned with compressed air and the old letters were heated with the shrink gun. The old thermo bubbled up and turned light brown.



New letters were placed directly over the clean, heated, old letters, one letter at a time. The heated surfaces were sprinkled with glass beads and the letters were tapered with a putty knife.

Bonding test indicated good bond.

Test 5:



The same procedure was used as in Test 2 except that only glass beads were used.

No bonding test was performed.

Follow-up: Performance monitoring will continue with emphasis on skid resistance, reflectivity, and durability of the preformed thermoplastic symbols applied in the demonstration described in this Research Update.

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