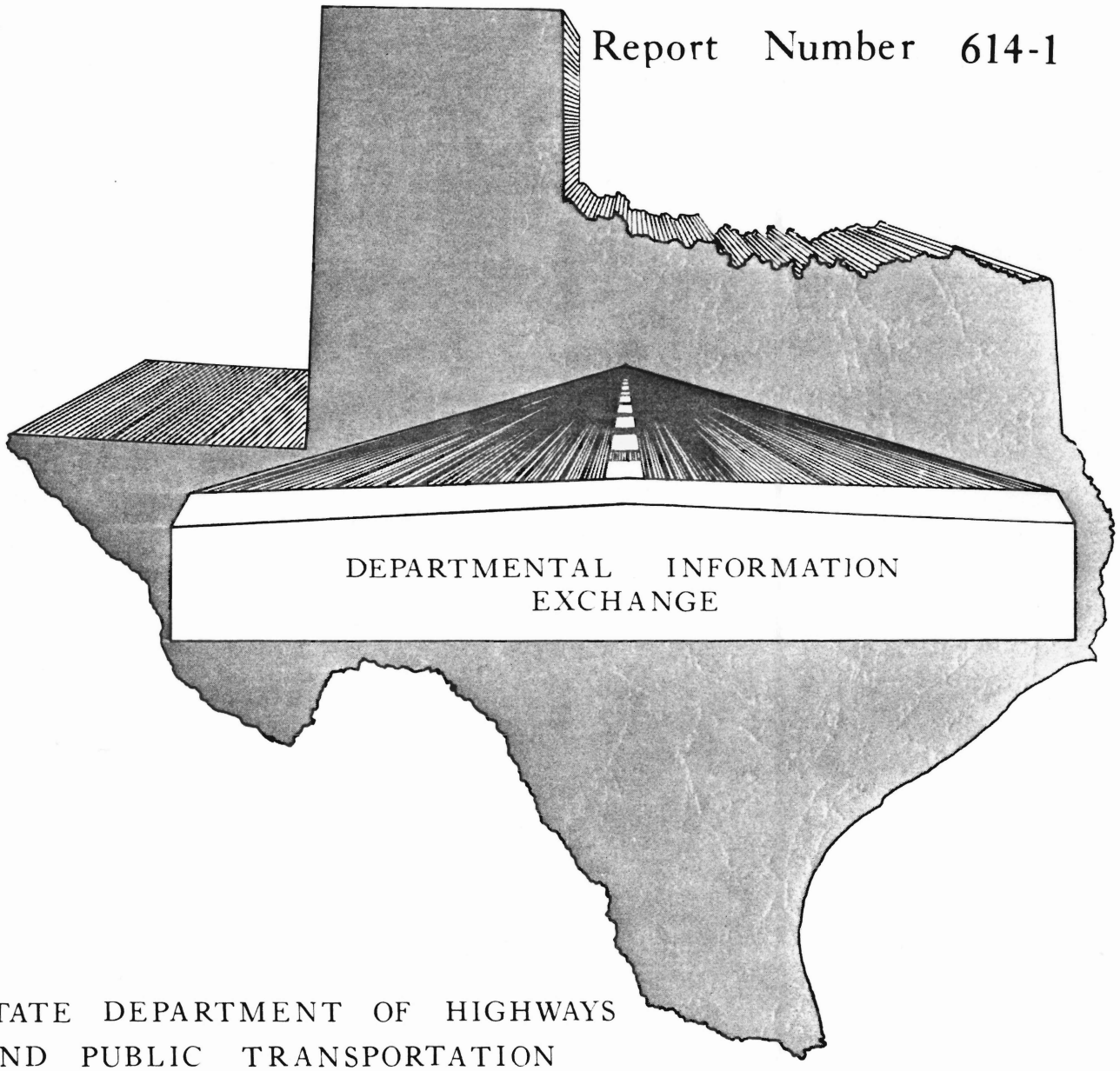
EXPERIMENTAL PROJECTS

POLYMER CONCRETE PAVEMENT REPAIR



Report Number 614-1

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

POLYMER CONCRETE PAVEMENT REPAIR

Report No. 614-1

A Narrative Report

by

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District 12

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POLYMER CONCRETE PAVEMENT REPAIR

On February 20, 1975, District 12 and the Center for Highway Research under Cooperative Research Study No. 114 conducted a demonstration of repairing concrete pavement by the use of polymer. The location of this demonstration is on IH 10 eastbound just east of SH 6. The average daily traffic at this location is 26,000 vehicles. The damaged area (as shown in Figure No. 1) was about 5 square feet in area and was located adjacent to a contraction joint. Most of the concrete could not be removed because of the steel in the pavement.

Figure 1 - Damaged Area of Concrete Pavement

The repair began at 9:00 a.m. A portable, butane-fired infra-red heater (Figure No. 2) was used to dry out the area for about one hour.

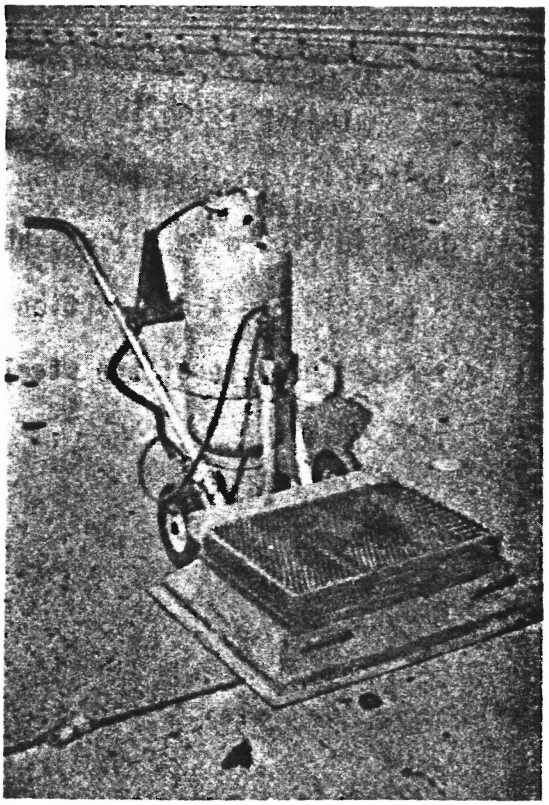

Figure 2 - Portable Butane-Fired Infra-Red Heater

After drying, a monomer solution of MMA, 4% (wt.) lauroyl peroxide and 2% (wt.) N, N-dimethyl-p-toluidine was poured into the bottom of the hole. The monomer soaked into the base and ran down the contraction joint. The minimize the loss, heat was applied to induce polymerization and seal the bottom of the repair. Due care was exercised to prevent over-heating of the monomer which could have resulted in combustion. Clean, dry sand was used to fill the repair. A piece of sheet metal was placed at the contraction joint (Figure No. 3) to minimize the monomer contact with the bituminous joint filler.

Figure 3 - Placing of Sand

The sand was tamped down and monomer was applied to fill the voids. The repair was covered with a metal pan and heat was applied to accelerate polymerization since the temperature was in the range of 50 to 60° F. The temperature of the repaired material was measured with a thermocouple to determine when polymerization began. The repair was completed by 2:00 p.m. and the lane was opened to traffic. A slightly glossy surface was left on approximately one-half of the surface of this patch because of excess

monomer that was polymerized on the surface. Approximately one gallon of this material was used in the repair, which was excessive for the size of the repair, but resulted from the loss through the bottom and down the contraction joint. By sealing the bottom of the hole and the joint with a viscous monomer solution or other material, such as plaster of paris, the amount of monomer can be significantly reduced.

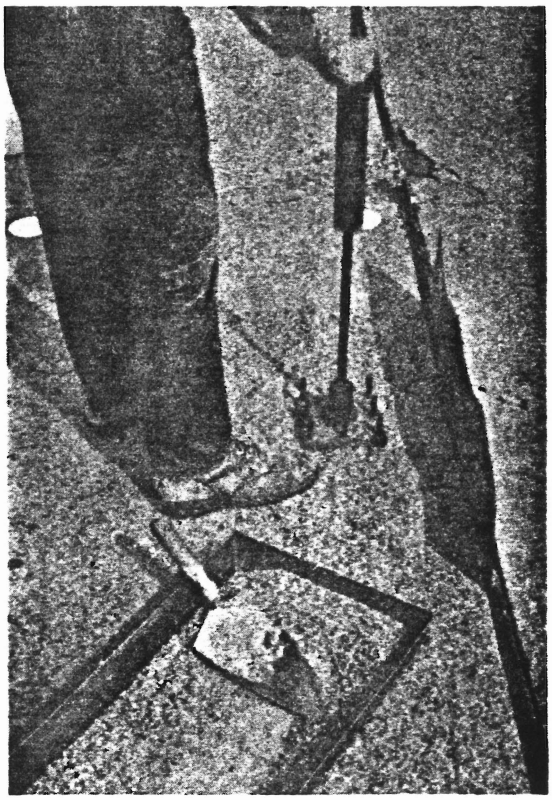

Figure 4 - Tamping of Sand

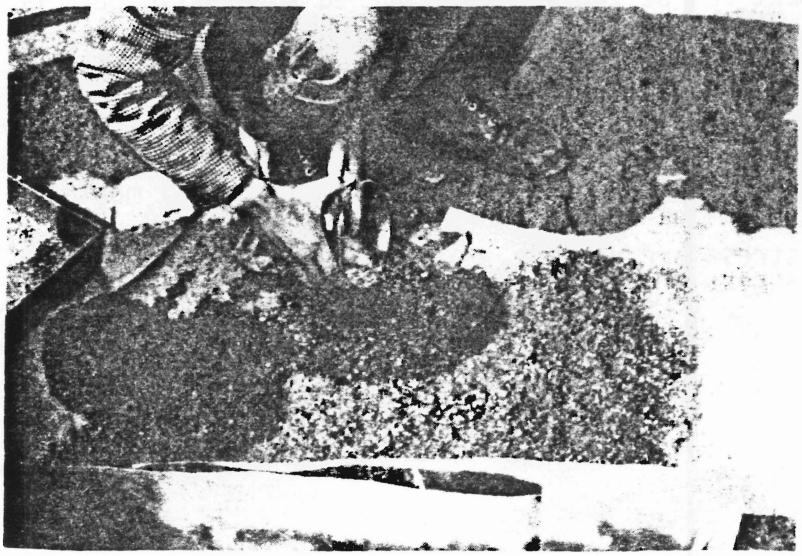

Figure 5 - Applying Monomer

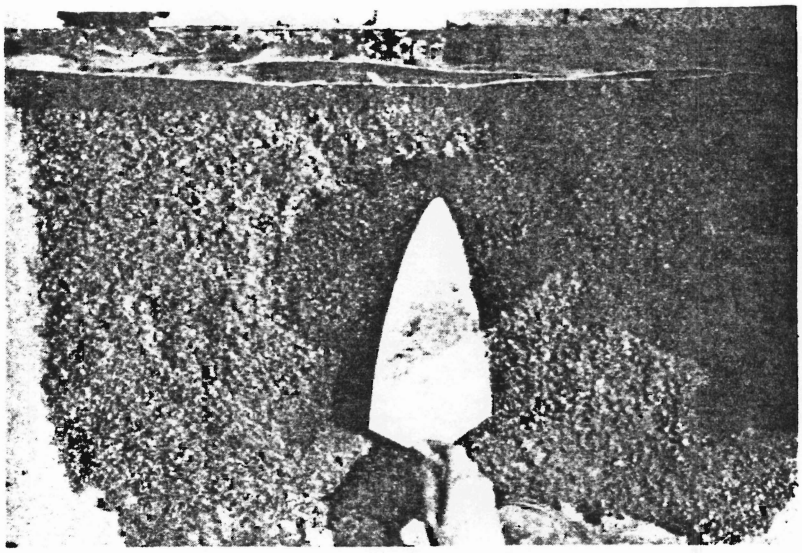

Figure 6 - Finishing Patch

COMMENTS

1. The important feature of this procedure is that the concrete pavement can be repaired and opened to traffic between the morning and afternoon peak traffic periods.
2. The total lapsed time for the repair was only five hours.
3. The subject patch has been in place eight (8) months. No signs of distress are visible.