

# OFFICE MEMORANDUM

MICHIGAN

STATE HIGHWAY DEPARTMENT

68

January 30, 1967

To: E. A. Finney, Director  
Research Laboratory Division

From: H. L. Patterson

Subject: Investigation of Pavement Damage Caused by Gasoline Truck Fire  
on Northbound US 23 near Fenton (Construction Project 25031, C2).  
Research Project 66 B-83. Research Report No. R-622.

The following inspection and report is in accordance with an oral request of R. L. Greenman on December 30, 1966.

## Details of Fire

On December 30, 1966, at about 12:30 p.m., Research Laboratory personnel arrived at the site where a gasoline truck caught fire and burned on northbound US 23 near Fenton. At this time Fenton firemen already had the fire extinguished and removal of truck wreckage had begun. L. D. Abbey, District 6 Assistant Maintenance Engineer, was at the site.

From firemen it was learned that the truckdriver noticed his trailer was on fire, slowed the truck to less than 25 mph, jumped from the cab, and escaped without injury. The truck ran onto the right shoulder, struck a speed limit sign which deflected it back onto the roadway, ran diagonally down the roadway, and stopped near the median shoulder where the overturned trailer continued to pour out gasoline and burn. Firemen said that when they arrived concrete fragments were flying up from the pavement surface in the burning area. They fought the fire with foam and water for 3 hr before extinguishing it.

## Damage to Concrete

Upon close examination, the damage was found to begin on the northbound roadway at the east side of the pavement at about Station 147+00. From there a damaged strip about 5 ft wide ran diagonally across the pavement to about Station 148+80 at the west side of the road. At this point the major damaged area began and ran for 70 ft to Station 149+50. The severest damage occurred between a heavy crack at Station 148+90 and an expansion joint at Station 149+40. The damaged area is shown schematically in Figure 1.

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The nature of the damage resembled severe weathering or deep scaling. The sudden intense heat caused a rapid thermal expansion at the surface, producing a horizontal shear plane at a depth of about 1 in. Most concrete above this shear plane dynamically "popped out," resembling popcorn jumping out of a skillet. The tractor and trailer and extent of damage are shown in Figures 2 through 4, in photographs taken the day of the accident. The concrete was placed late in 1957.

#### Recommendations for Repair

On January 18, 1967, pavement condition in this area was discussed by telephone with R. J. Gleason, District 6 Maintenance Engineer. He stated that on the day of the accident they had a load of bituminous patching material on hand and were ready to apply it after the accident. However, after driving over the area and noting some roughness but no bumps, he decided that there would be little if any hazard to traffic in leaving the roadway in its present condition until spring.

Next spring, after weather moderates, the best and probably the cheapest long-range solution would be to remove and completely replace the damaged concrete from northbound Station 148+80 to Station 149+50. Mr. Gleason said that when doing this work, he would prefer to remove pavement back to an existing construction joint or established transverse crack. This would re-establish the smooth continuity of the original roadway.

This particular area is ideally situated for this type of repair, since traffic can again be detoured over a service road that parallels the northbound roadway, as it was on the day of the accident. Then with the use of high-early-strength concrete, the full 24 ft width of the roadway can be repaired and reopened to traffic after the concrete has cured for seven days.

OFFICE OF TESTING AND RESEARCH

*Harry L. Patterson*

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HLP:js

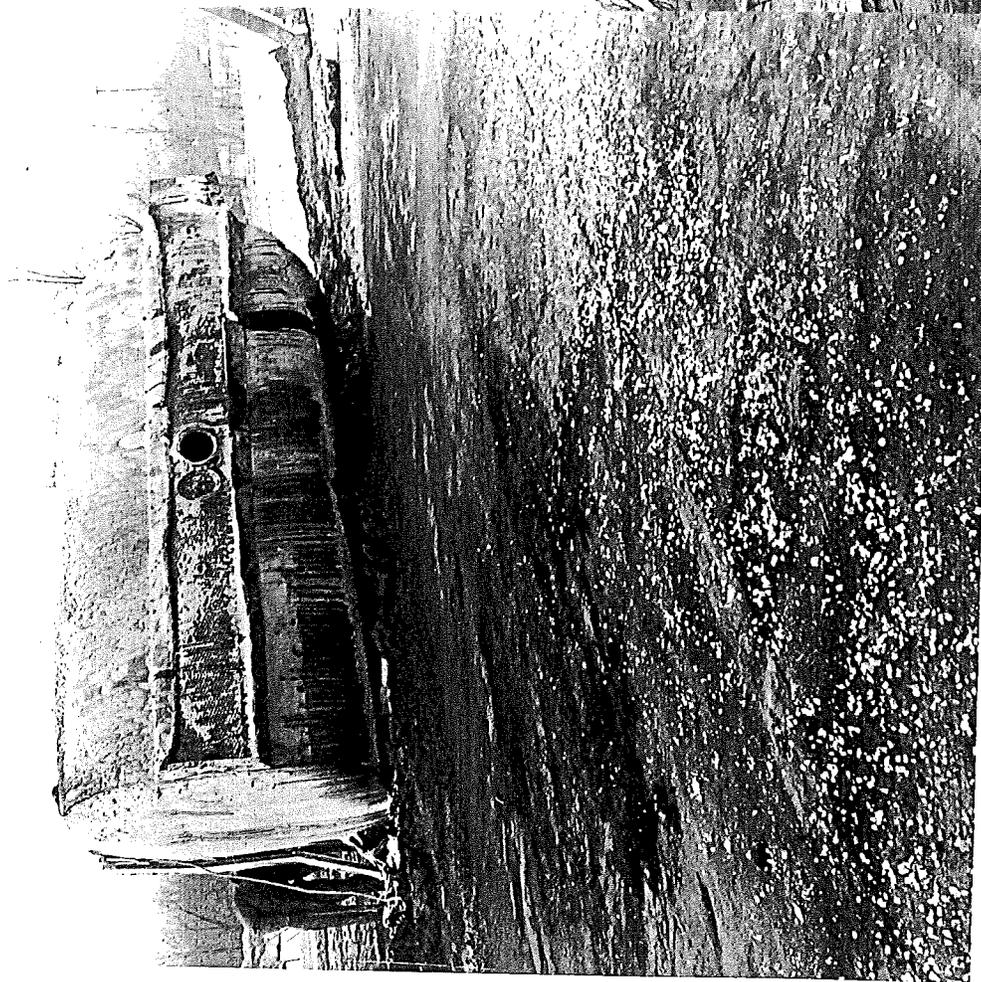
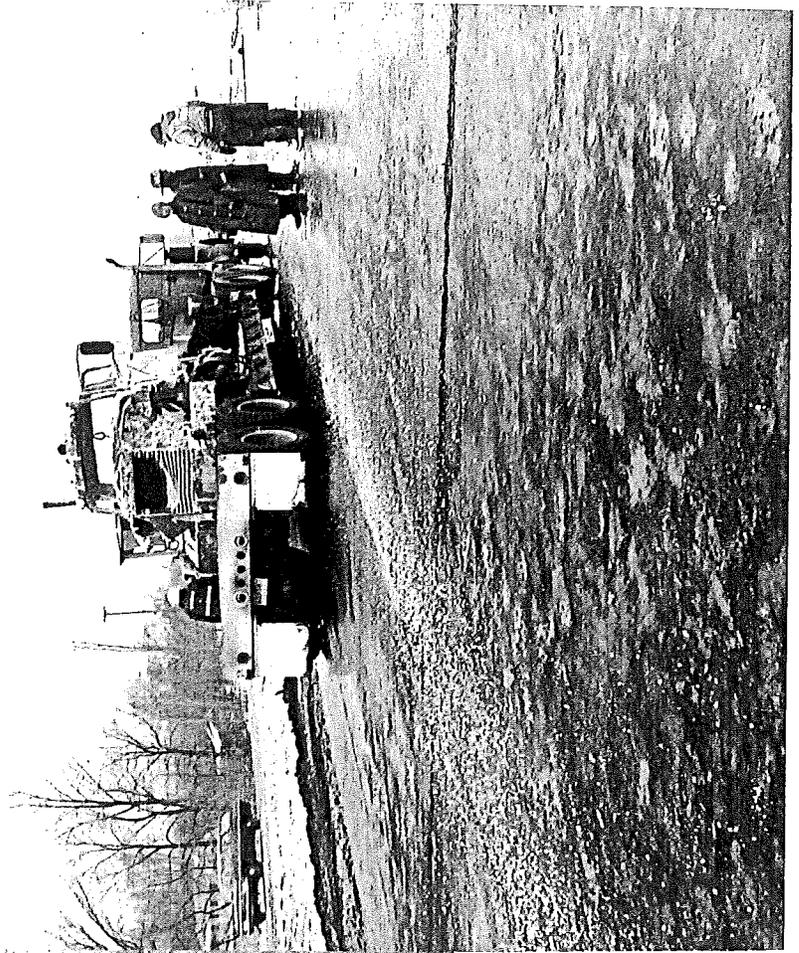


Figure 2. Overturned trailer is shown in area of severe damage (left). Truck tractor was loaded on lowboy for removal from site (right). Rock salt crystals were spread to prevent ice formation.



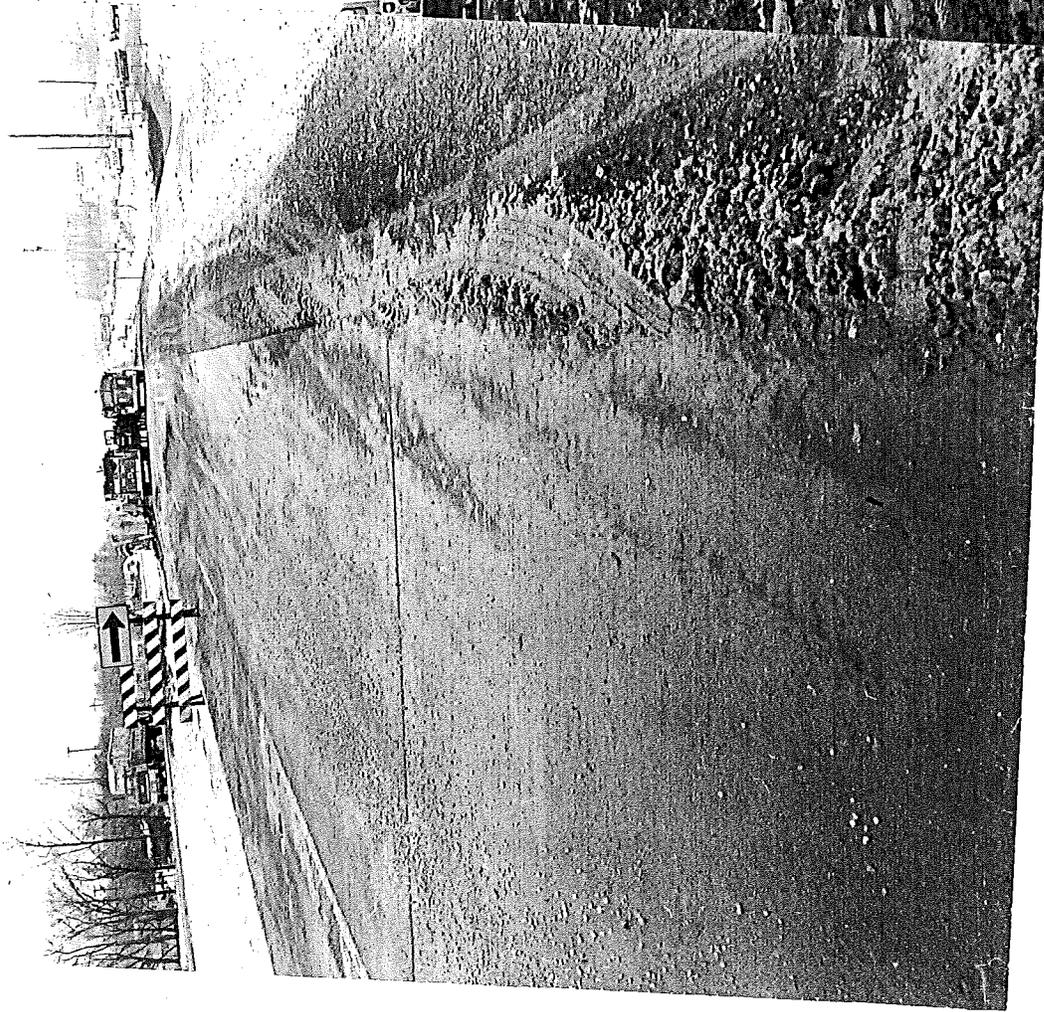
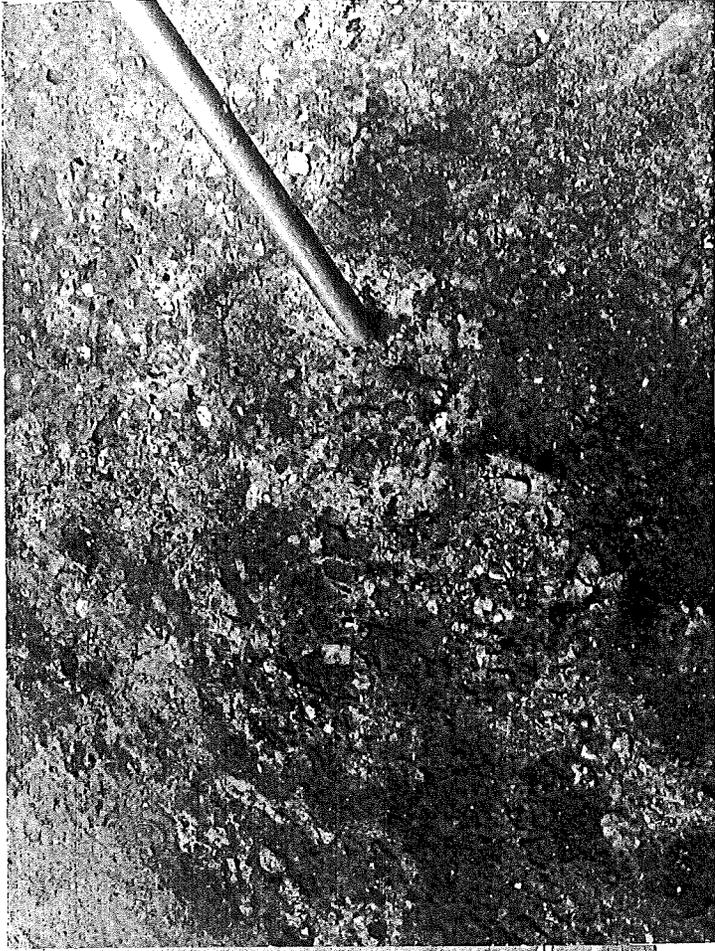


Figure 3. Path of vehicle is indicated (looking northwest) by burned strip running diagonally across pavement (left). Area of severest damage is shown at right (looking north). Note service road in background at right, used for detour.





Station 148 + 90



Station 149 + 00



Station 149 + 40

Figure 4. In area of severest damage, crack across pavement (upper left) was caused by heat of fire, concrete fused in spalled area (indicated at upper right by broomstick), and hammer was used to dig out fractured concrete at pavement edge and filling material from expansion joint (lower right).