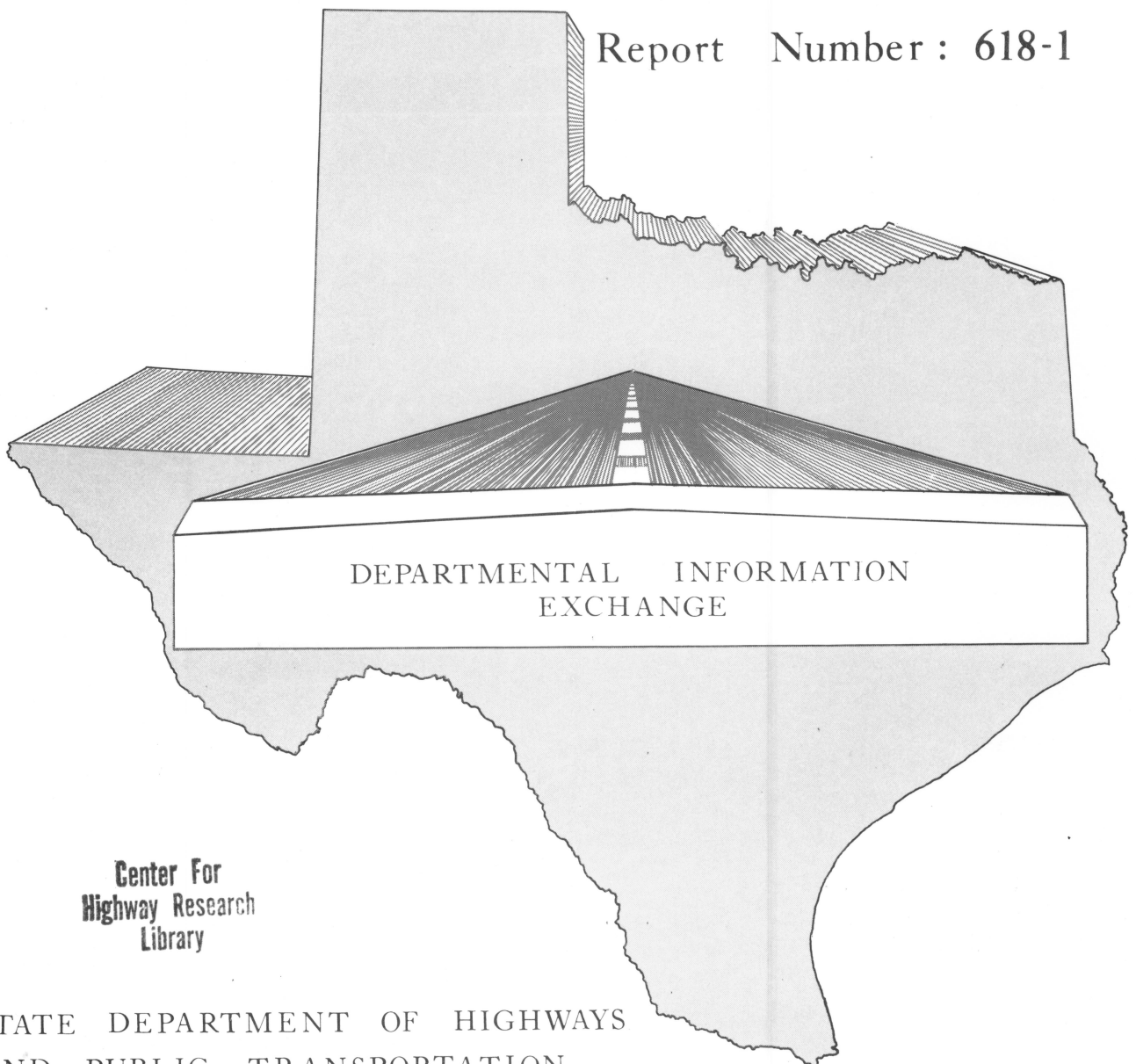


EXPERIMENTAL PROJECTS

INCREASED SKID RESISTANCE THROUGH THE UTILIZATION OF A HEATER-PLANER

Report Number : 618-1



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INCREASED SKID RESISTANCE THROUGH
THE UTILIZATION OF A HEATER-PLANER

TECHNICAL STATEMENT

by

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Report 618-1

State Department of Highways
And Public Transportation

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DISCLAIMER STATEMENT

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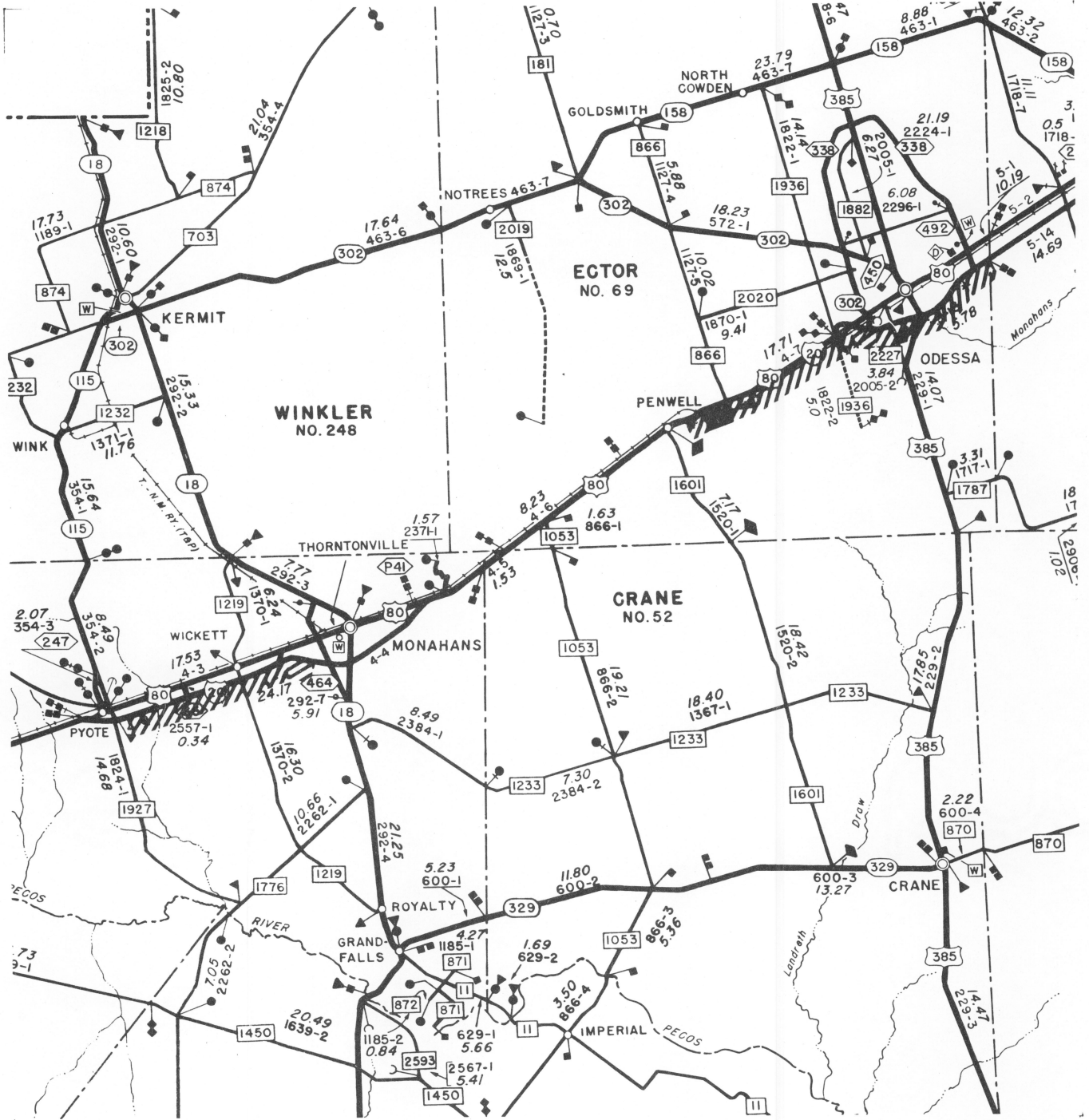
PREFACE

An awareness of safety and the additional liabilities required for safety, as imposed upon the Department and its personnel by the Torts Claim Act, make it imperative upon each person involved in the design, construction and maintenance of our highway system, to strive for increased skid resistance. This report concerns itself with a project which utilized a heater-planer on sections of Interstate 20 in Ector and Ward Counties, in District 6.

ABSTRACT

Some areas of completed asphaltic pavement projects in District 6 had flushed to such an extent, that a very small amount of rainfall would cause a large increase in the number of skidding incidents. At fifteen separate locations in Ector County and at ten locations in Ward County, along these sections of Interstate Highway 20, it was determined to add some additional aggregate, heat this aggregate and the surface of the roadway and to attempt to imbed this heated aggregate into the heated surface in an effort to regain or increase skid resistance on these certain sections.

HEATER-PLANER WORK



▨ IMPROVED SKID RESISTANCE WORK AREAS

■ RESECTIONING DEMONSTRATION AREA

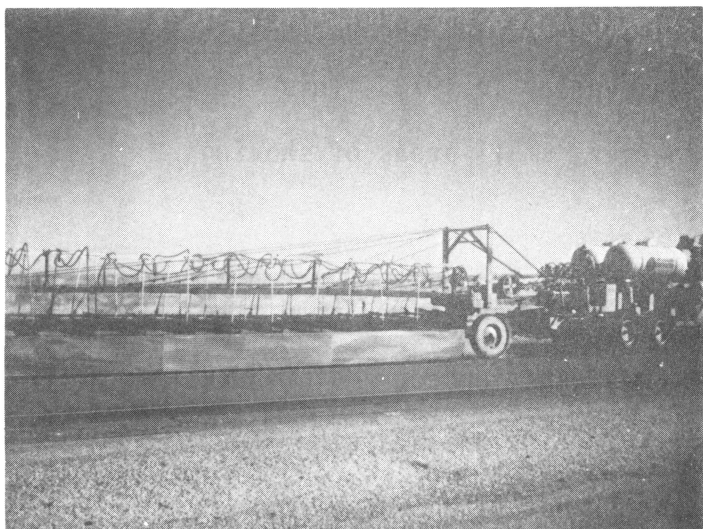
HEATER-PLANER PROJECT

Portions of Interstate Highway 20 in Ector and Ward Counties received an asphaltic concrete pavement overlay, with underseal, in the first part of 1975. During the summer months of 1975, heat and traffic combined to cause quite a bit of flushing of the pavement surface. Another section of Interstate Highway 20 in Ector County had received an overlay in 1973. This particular section of highway did not flush; however, small areas of shoving occurred, and some rutting was prevalent.

During the summer of 1975, a number of light rains fell, and every time it showered, a major increase in sliding accidents was experienced. Maintenance forces attempted to remedy the flushed pavement simply by the addition of aggregate. The flushing was so widespread and deep that fine aggregate (Grade 6 - which would cause a minimum amount of damage to windshields) was rapidly absorbed; larger aggregate increased windshield damage, as well as presenting the problem of embedding the aggregate into the asphaltic concrete pavement. It was decided to add additional aggregate, utilize a large heater, and roll the aggregate into the surface.

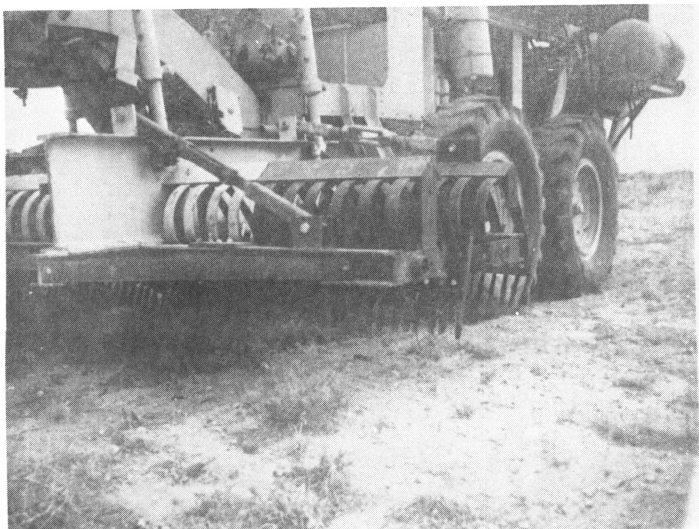
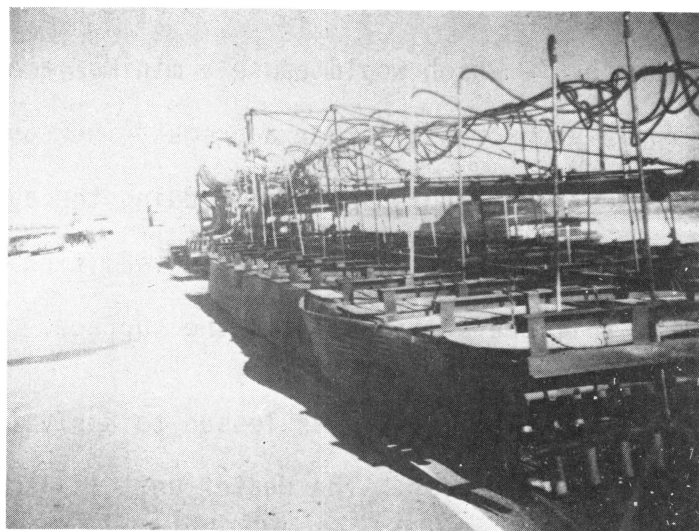
A Heater-Planer unit was leased to apply the heat. This machine is a modified motor-grader. The Heater unit is 12 feet wide and 36 feet long and is composed of 13 rows of burners mounted at three-foot centers. Each row of burners has 24 orifices spaced at 6" centers. Each orifice opens into a 2" pipe, which is 6" in length. The lower ends of these pipes are suspended approximately 8" above the pavement. Fifteen feet behind the heater are two rows of "spring-loaded" scarifier teeth. These rows are spaced 26" apart, with the scarifier teeth located 2" apart.

The machine also has an hydraulically powered screed which was utilized most of the time. See photos #1, 2 and 3 for the modified motor-grader, burners and scarifiers.



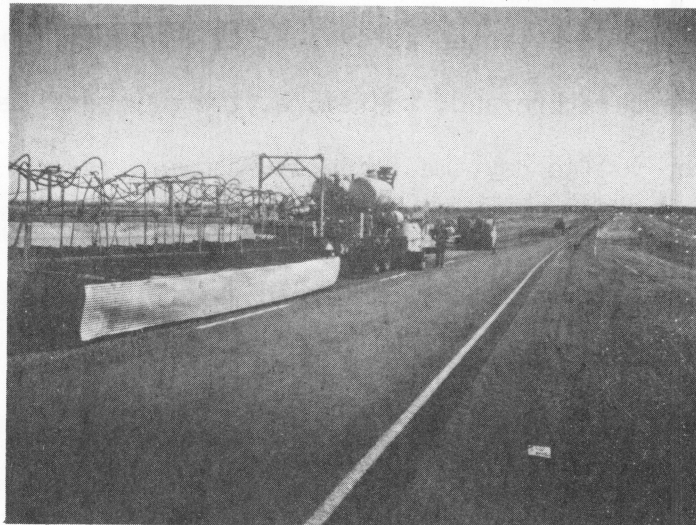
#1 - Modified Motor-Grader

#2 - Heater Unit



#3 - Scarifier

Aggregate was applied at a rate varying from 1 cubic yard per 200 square yards to 1 cubic yard per 300 square yards. The average for the entire project was 1 cubic yard to 230 square yards. A self-propelled spreader-box was used to apply a grade 4 aggregate which has good wearing qualities. The aggregate was spread ahead of the heater, in order that the raw aggregate might be heated, as well as to heat the existing surface; two 8-ton flat-wheeled rollers immediately followed the heaters and immediately following the flat-wheeled rollers were 2 pneumatic rollers. After the rolling operation was completed, the treated surface was allowed to cure, for a while, then the surface was lightly broomed to remove the excess aggregate from the roadway. The travel speed of the heater was maintained at approximately 1800 LF per hour (See photo #4 for equipment "train").



#4 - Equipment Train

There were some locations (those that had severe flushing) where a large percentage of aggregate was embedded. At other locations, very little "new aggregate was embedded in the existing surface. Altogether, this treatment

was applied to approximately 7 3/4 miles

The longest continuous section which received treatment was 9,065' in length. This section was in Ector County, adjacent to the Ector/Midland County Line and had the worst history of being "slick when wet". The shortest sections were 125' in length. The shortest sections were locations where shoving had occurred. This shoving was in the ACP overlay which was applied in 1973.

In Ward County, the longest section of roadway was 5,780' in length, and the shortest section was 170' in length.

The shorter lengths of roadway, of course, are time consuming in getting ready to work, setting up barricades, warning signs, cones, etc., as well as the moving required in getting from one work location to another.

From the extreme west end of work to the extreme east end was approximately 52 miles. Since the work was done in the early part of November (November 3,4,5,6, 7,10 and 12), the air temperature and, therefore, the pavement temperature had already started to "drop". The daytime temperatures were in the 70⁰'s and 80⁰'s. The last two nights worked, the temperature was in the mid-to upper-30⁰'s. During the day it was approximately 65⁰. No roadway operations were started until the air temperature had reached 50⁰. One morning, work was held off until 9:30; another morning it was 11:00 o'clock.

There were some areas of work where, even after having added aggregate ahead of the heater, the roadway still looked "rich". (See photo #5). On these areas, the surface was hand-sprinkled with additional, cold aggregate.



#5 Note Rich Spots

On some areas both the scarifier and screed attachments were used. The operation yielded a very nice looking finished project; also, all of the aggregate "sticks". On other areas, only the scarifier was utilized. The latter procedure helps to stick more aggregate, but it has the disadvantage of tending to leave slight streaks in the surface. This creates some discomfort in steering a motor vehicle and tends to make a car "weave". (See photo #6).



#6 Scarification Only

At a few locations, aggregate was applied ahead of the heater, the aggregate and the pavement surface were heated and rolled. These areas, of course, had some aggregate which did not stick. However, on all locations, the skid resistance was increased and that was the entire purpose of the project. The average cost of this work was 37½ cents per square yard which includes both leased and State owned equipment, traffic control, labor and materials.

After completion of the proposed work, the owner of the Heater-Planer wanted to demonstrate the machines capabilities to re-section a road which has some "rutting". The rutting, on the 1973 overlay, was in the neighborhood of a quarter of an inch. However, the rutting in conjunction with shoving, yielded effective depressions of 5/8 of an inch to 3/4 of an inch in depth. The area chosen for demonstration purposes was an 800' section, approximately 12 miles west of Odessa. In the demonstration area, aggregate was applied ahead of the heater for 400'. On the remaining 400', no aggregate was pre-applied. On half of each of these two sections (200') a sprinkle treatment was applied, following the machine operations. The remaining 200' in each section had no sprinkle treatment. The demonstration area received heat, scarification, and screeding over the entire 800'. Where aggregate was pre-applied, it was applied at a rate of 1:150. The temperature the night before the demonstration was 30⁰. During the day, the temperature only rose to 63⁰ accompanied by a 15-25 mile per hour cross-wind. Work did not start on the demonstration area until approximately 2:30 in the afternoon, when the temperature reached 60⁰. The machine did a good job of resectioning this surfacing. No appreciable difference was noted in the 4-200' demonstration sections. The demonstration area is specifically located immediately west of the FM 866 Interchange on Interstate 20, in Ector County.