

MICHIGAN  
STATE HIGHWAY DEPARTMENT  
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PERFORMANCE OF HOT-POUR AND COLD-APPLIED  
JOINT SEAL MATERIALS

Projects 30-31, C2; 38-7, C5; 46-3, C8  
US-127, Relocation South of Jackson

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Highway Research Project 53 G-71 (2)

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## PERFORMANCE OF HOT-POUR AND COLD-APPLIED JOINT SEAL MATERIALS

On February 3, 1956, a joint seal condition survey was made on the new US-127 re-location south of Jackson. This pavement includes projects 30-31, C2, 38-7, C5 and 46-3, C8.

About half of the transverse joints in this pavement were sealed with hot-pour and half with cold-applied sealer. Most of the joints were formed with a mandrel in the usual manner, a few were sawed on the same day the concrete was poured and several were formed by the use of styrofoam or corrugated paper strips. Where styrofoam or paper was used, it was removed just prior to sealing the joint. About four-fifths of the mandrel-formed joints had been caulked with jute rove as soon as the concrete had hardened and the jute was left in place until just prior to sealing. The various combinations of type of transverse joint and type of sealer, together with their locations, are listed in Table I.

All of the hot-pour joint seal had lost adhesion to the joint faces even though some joints appeared well sealed at the surface, (Figure 1-C and 1-D). In mandrel-formed joints that had not been protected with jute rove before sealing there was a considerable amount of sand under the sealer (Figure 1) but in those protected with jute rove before sealing (Figure 2) and in the sawed joints (Figure 3), little or no sand was found.

Joints in which cold-applied sealer had been used appeared to contain only a small amount of the sealer in the bottom of the joint groove while the remainder of the groove was filled to pavement level with sand. This condition existed in both mandrel-formed joints (Figure 4) and in styrofoam or paper formed joints (Figure 5).

The sand in the mandrel-formed joints where jute had not been used before sealing with hot-pour joint seal had apparently been there before the joints were sealed. Examination of Figure 1-C and 1-D will indicate that sufficient sealing material is in the joint to form a mechanical seal by compaction from traffic. This joint was opened close to maximum on the day the picture was taken since the temperature on that day was below freezing. Even at this near maximum opening there is no space through which sand could enter the joint. It is therefore probable that these joints had not been cleaned out before the sealer was poured.

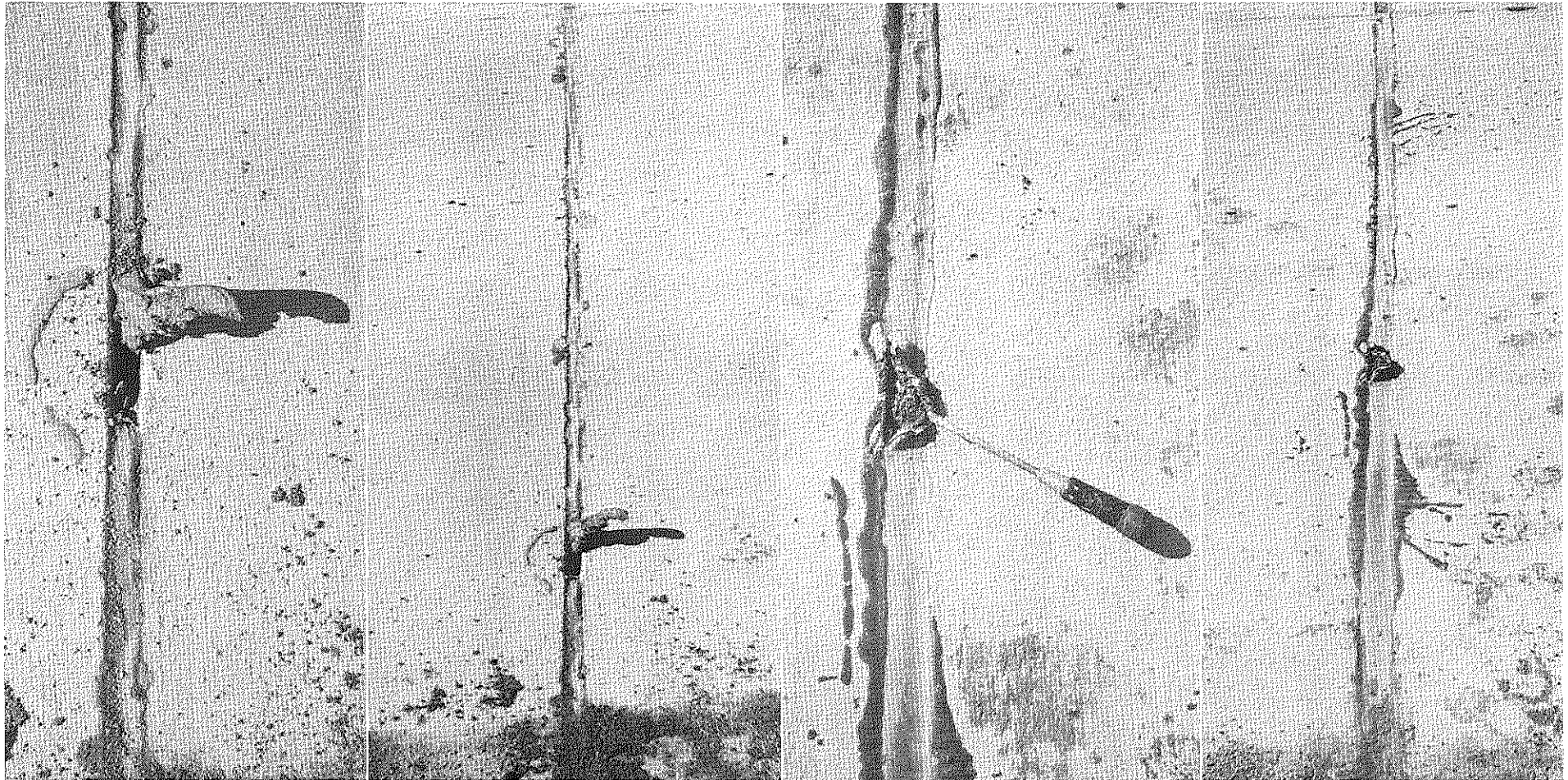
The small quantity of cold-applied sealer found in the joints sealed with that material could be due to loss of sealer through the crack below the joint groove or to insufficient filling of the joint grooves at the time they were sealed.

TABLE I

TYPE OF TRANSVERSE JOINT AND JOINT SEAL IN PROJECTS  
30-31, C2, 38-7, C5 and 46-3, C8

US-127 SOUTH OF JACKSON

Joint Feature	Type of Sealer	Location
Formed	Hot-Pour	76+19 to 83+15
Formed	Cold-Applied	83+15 to 92+35
Formed	Hot-Pour	92+35 to 169+12
Formed - Jute Packed	Hot-Pour	169+12 to 316+20
Sawed	Hot-Pour	316+20 to 325+11
Formed - Jute Packed	Hot-Pour	325+11 to 365+00
Formed - Jute Packed	Cold-Applied	365+00 to 546+45
Alternate Styrofoam & Paper	Cold-Applied	546+45 to 564+78
Formed - Jute Packed	Cold-Applied	564+78 to 625+00



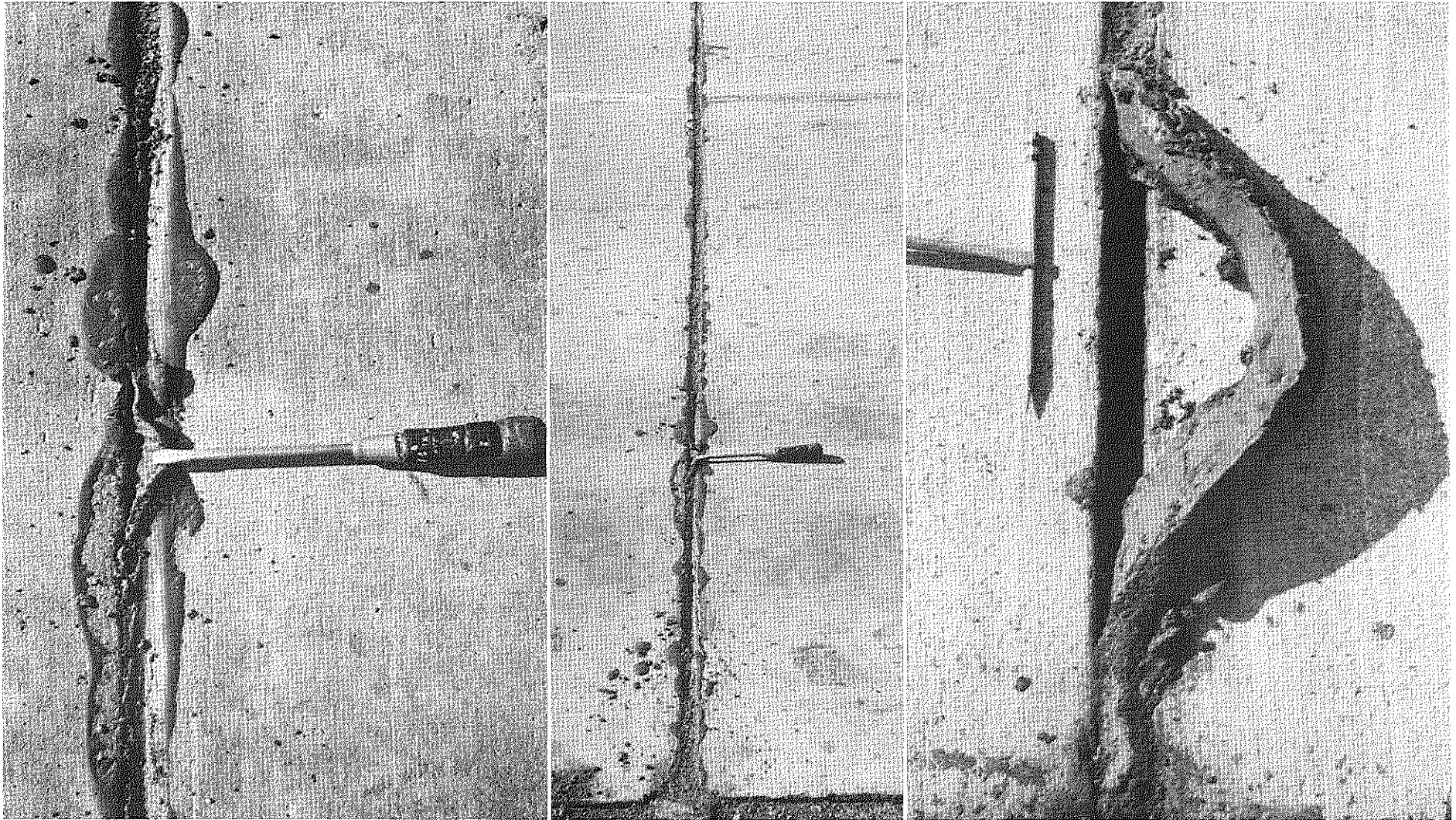
A. STATION 78 + 20 CLOSE - UP.

B. STATION 78 + 20 OVERALL VIEW.

C. STATION 92 + 35 CLOSE - UP  
APPEARS SEALED AT SURFACE.

D. STATION 92 + 35 OVERALL VIEW.

FIGURE I. FORMED CONTRACTION JOINTS IN WHICH JUTE ROVE WAS NOT USED PRIOR TO SEALING WITH HOT-POUR RUBBER-ASPHALT JOINT SEAL. SEALER LACKED ADHESION AND A CONSIDERABLE AMOUNT OF SAND WAS FOUND UNDER JOINT SEAL.

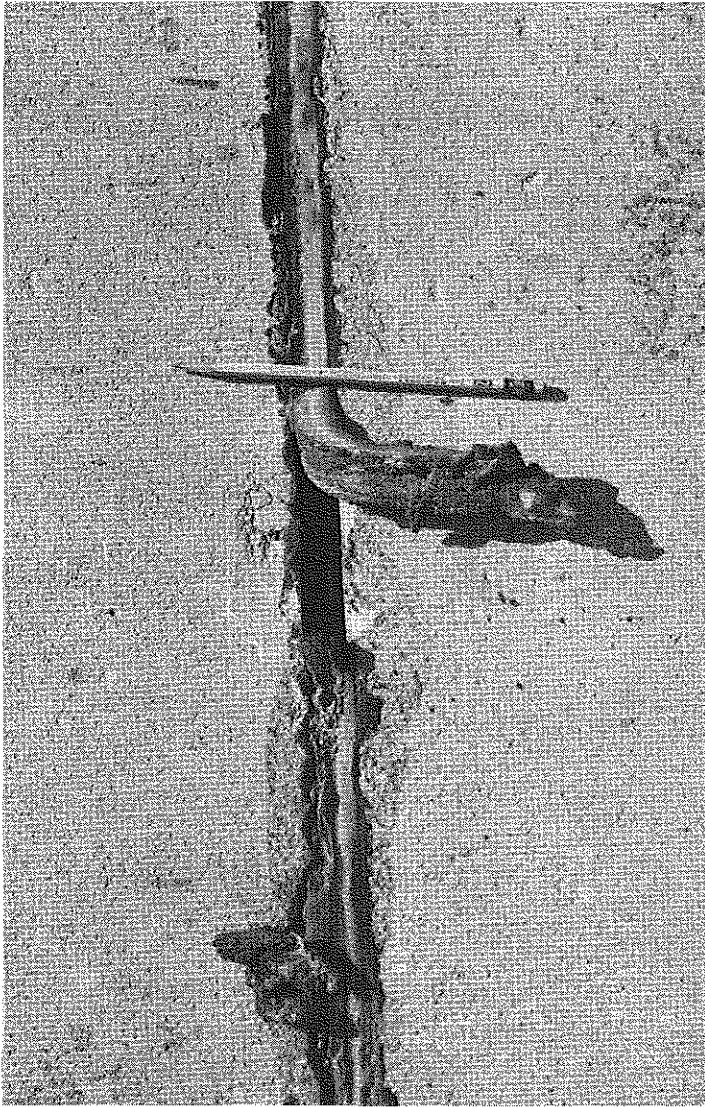


A. STATION 170 + 10 CLOSE - UP.

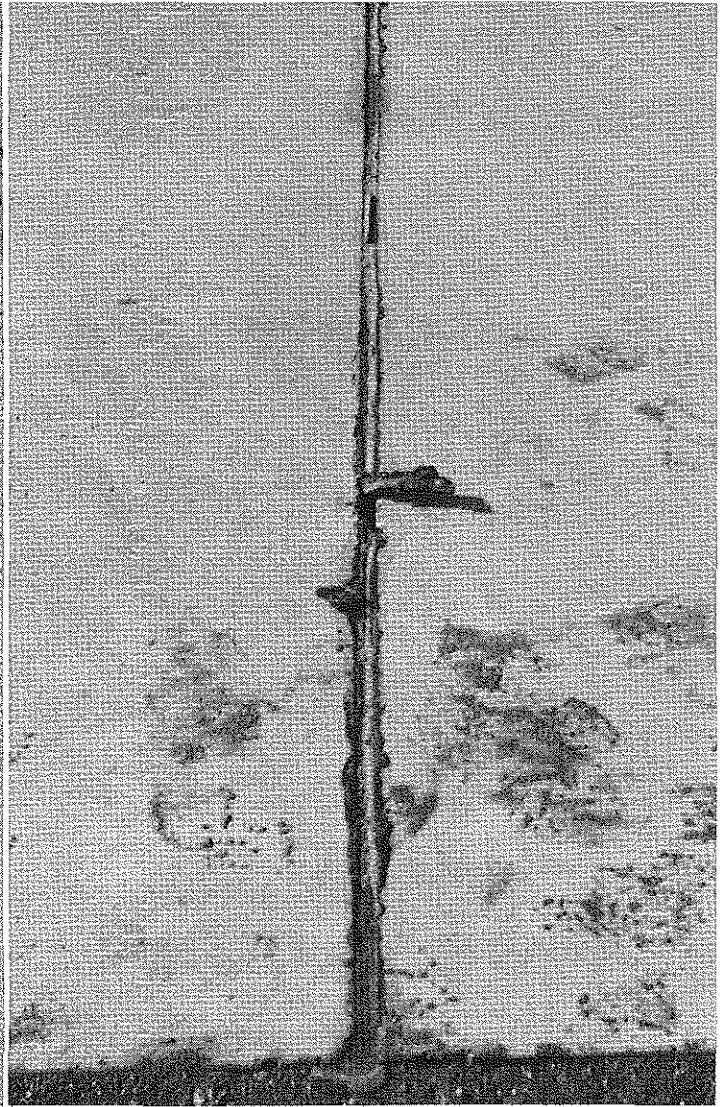
B. STATION 170 + 10 OVERALL VIEW.

C. STATION 328 + 10 EXTREME ADHESION LOSS.

FIGURE 2. FORMED CONTRACTION JOINTS PROTECTED WITH JUTE ROVE PRIOR TO SEALING WITH HOT-POUR RUBBER-TYPE JOINT SEAL. SEALER LACKS ADHESION BUT LITTLE OR NO SAND WAS FOUND UNDER JOINT SEAL.

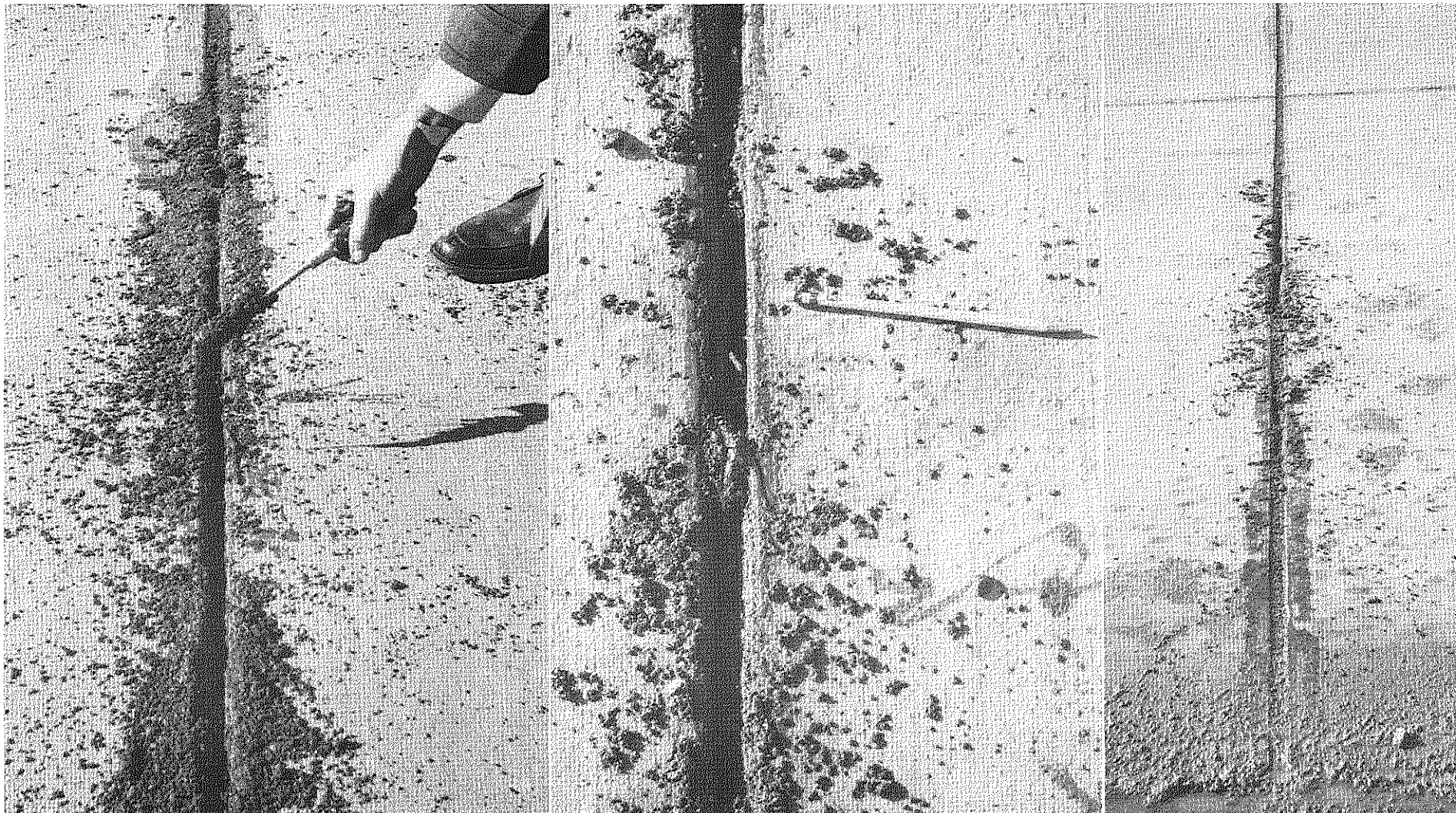


A. CLOSE - UP.



B. OVERALL VIEW.

FIGURE 3. STATION 316 + 20 SAWED CONTRACTION JOINTS SEALED WITH HOT-POUR RUBBER-TYPE JOINT SEAL SEALER LACKED ADHESION BUT LITTLE OR NO SAND WAS FOUND UNDER JOINT SEAL.

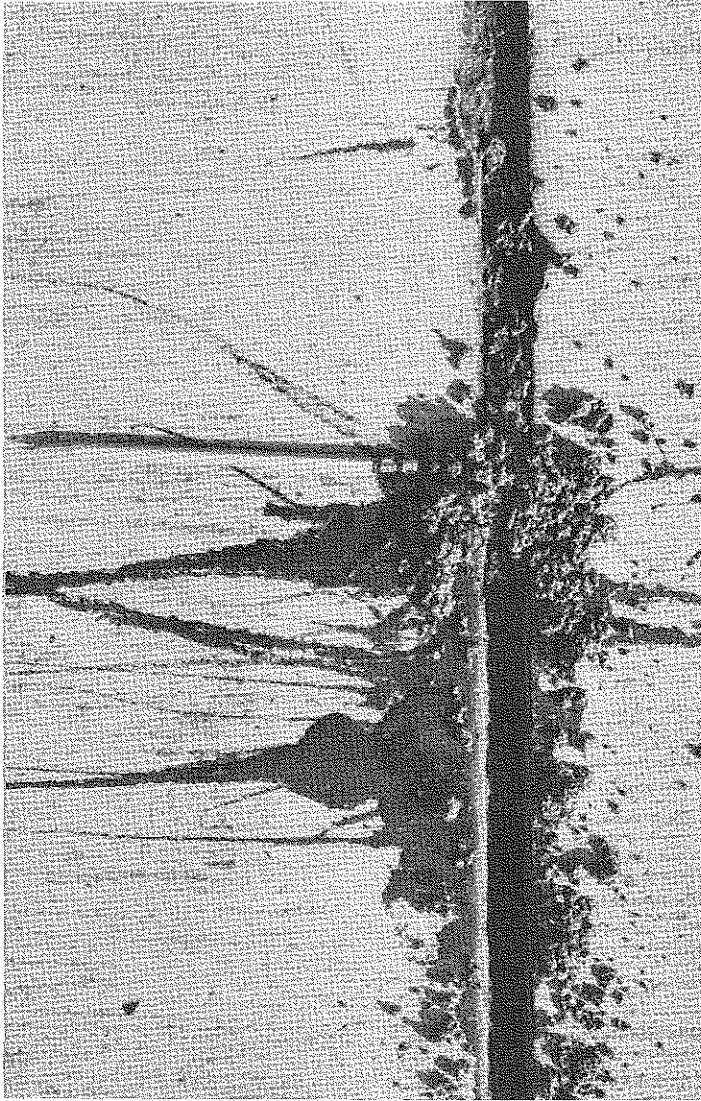


A. STATION 83 + 15 NO JUTE ROVE  
USED PRIOR TO SEALING.

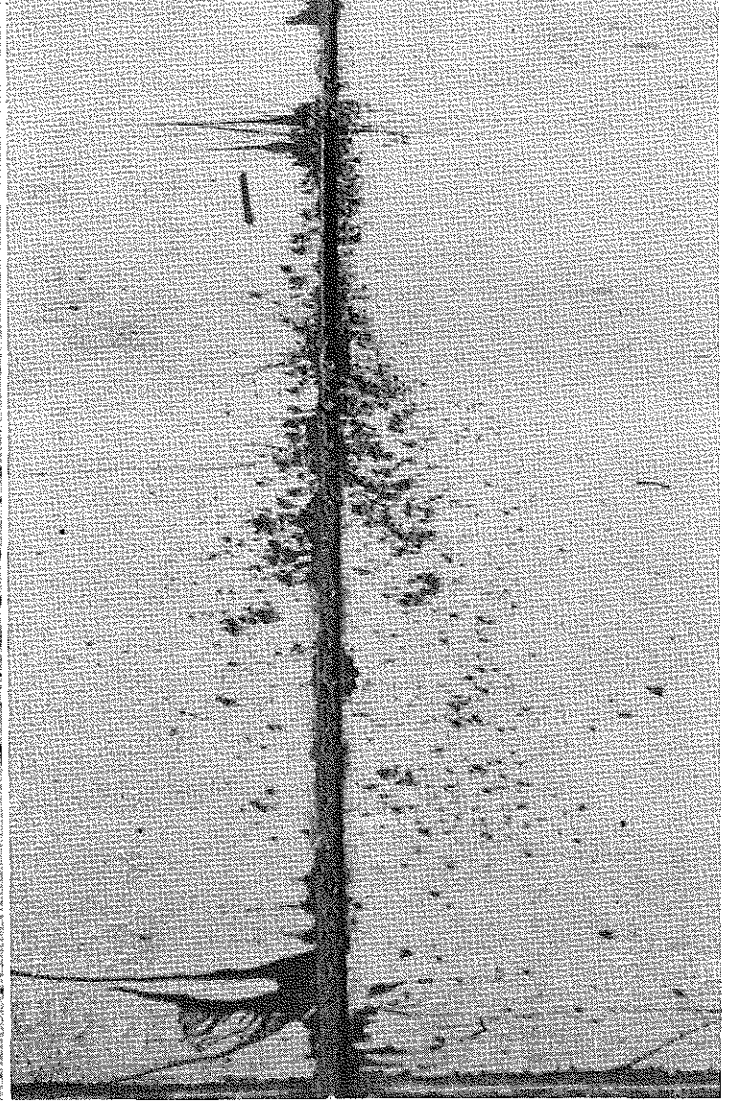
B. STATION 366 + 85 JUTE ROVE USED  
TO PROTECT JOINT PRIOR TO  
SEALING.

C. STATION 366 + 85 OVERALL VIEW.

FIGURE 4. FORMED CONTRACTION JOINTS SEALED WITH COLD-APPLIED JOINT SEAL.  
A SMALL AMOUNT OF SEALER WAS FOUND IN THE BOTTOM OF THESE JOINT  
GROOVES AND THE REMAINING SPACE WAS FILLED WITH SAND.



A. CLOSE - UP.



B. OVERALL VIEW.

FIGURE 5. STATION 547 + 45 STYROFOAM CONTRACTION JOINT SEALED WITH COLD-APPLIED JOINT SEAL. A SMALL AMOUNT OF SEALER WAS FOUND IN THE BOTTOM OF THE JOINT GROOVE AND THE REMAINING SPACE WAS FILLED WITH SAND.