RESEARCH REPORT
UKTRP-81-12

Evaluation of Watertight Bridge Expansion Joints

by

Wm. Vernon Azevedo
Research Engineer Principal

Kentucky Transportation Research Program
College of Engineering
University of Kentucky
Lexington, Kentucky

in cooperation with
Department of Transportation
Commonwealth of Kentucky

July 1981

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle

Evaluation of Watertight Bridge Expansion Joints

5. Report Date

July 1981

6. Performing Organization Code

7. Author(s)

Wm. Vernon Azevedo

8. Performing Organization Report No.

UKTRP-81-12

9. Performing Organization Name and Address

Kentucky Transportation Research Program
College of Engineering
University of Kentucky
Lexington, Kentucky 40506

10. Work Unit No. (TRAIS)

11. Contract or Grant No.

KYP-71-25

12. Sponsoring Agency Name and Address

Kentucky Department of Transportation
State Office Building
Frankfort, Kentucky 40622

13. Type of Report and Period Covered

Final

14. Sponsoring Agency Code

15. Supplementary Notes

Study Title: Experimental Use of Modular Expansion System In Bridges

16. Abstract

Engineers have long recognized the importance of bridge expansion joints. The inadequacy in design of such joints has also been realized. Proprietary products are now available which may eliminate well-documented problems associated with bridge expansion.

The objective of this study was to evaluate the field performance of such products.

17. Key Words

Expansion Joint
Modular Expansion Joint
Scratch Gage
Linear Displacement Transducer

18. Distribution Statement

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

Table of Contents

List of Figures

List of Figures *(Continued)*

List of Tables

Introduction

Bridges expand and contract, and bow and warp, in ways which are not altogether expected or predictable. Wide variations in temperatures, live-loads, and winds induce complex forces. Lengthwise expansions and contractions of long bridges are the most predictable. Many bridges are supported on roller-type bearings at an end to facilitate the movement. Gaps are provided between the span and the abutment to accommodate movement. A jointing-device covers the gap and enables the traffic to move across on a smooth floor or deck and prevents unwanted leakage of water. Historically, jointing-devices have not proven to be durable and leak-proof.

Recent trends in bridge design toward longer spans with a minimum of expansion joints and the need for improved performance of joints have forced industry and transportation agencies to conceive and evaluate new designs. Strip seals, joint sealants, sliding plates, and finger-joints are now being replaced by various proprietary products introduced in the last decade. Molded, neoprene rubber body joints are being used for movements up to 4 inches (102 mm). Modular expansion joints utilizing multiples of compartmental, neoprene rubber seals and steel channels are now available for movements in excess of 50 inches (1.27 m).

The objective of this study was to monitor the performance of several expansion joints. Although the systems evaluated are of a proprietary nature, it is not the intent of this report to rate one product above another, but to evaluate new concepts in the design of expansion joints.

Structure Selection

The bridges and the types of joints selected were designated by the Division of Bridges of the Kentucky Department of Transportation. To ensure a broad range of conditions to which joints are exposed, the structures were chosen randomly throughout the state (Figure 1). Highways ranged from rural secondary to interstate facilities, and traffic volumes varied greatly. Locations were both rural and urban.

Simple span continuous, truss, steel deck girders, and reinforced concrete deck girders were incorporated into this study. Span length and width and skew angle varied.

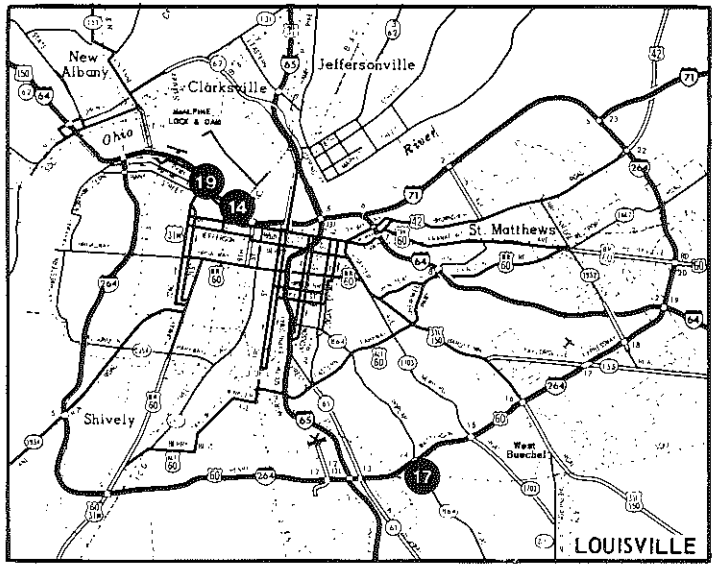
As is standard on all structures constructed by the Kentucky Department of Transportation, the contractor was allowed to choose from an approved list of alternates.

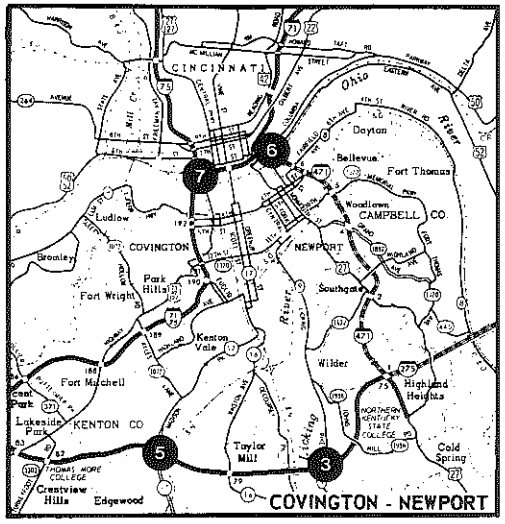
Inspection Procedure

Periodic field inspections were made to detect distress in the abutting concrete attributable to an improperly functioning joint, any apparent leakage, accumulation of debris, ride quality, and noise generation. A photographic record was made. Bridge type and dimensions, environmental conditions, joint model and installation costs, and traffic volumes are also indicated on the inspection forms. A summary of individual inspections for each structure is presented in the APPENDIX.

BRIDGE LOCATION KEY

1. US 27 over Kentucky River; Garrard-Jessamine Counties
2. I 24 over Cumberland River; Livingston-Lyon Counties
3. I 275 over Licking River; Campbell County
4. I 275 over Ohio River; Campbell County
5. I 275 Over KY 17, Banlick Creek, and L&N RR; Kenton County
6. I 471 over Ohio River; Campbell County
7. US 25-US 42 over Ohio River; Kenton County
8. US 421 over Martins Fork and L&N RR, Stations 221+13.96 and 238+82.44; Harlan County
9. Elmdale Road over I 24; McCracken County
10. KY 770 over Laurel River, I 75 and KY 312 Connector Road; Laurel County
11. Prestonsburg-Pikeville Road Bridge Carrying Access Road to KY 1426 over Levisa Fork of Island Creek, Pike County
12. Louisa-Fort Gay Bridge over Tug Fork; Lawrence County
13. Relocated Ky 225 over Cumberland River, Barbourville-Artemus Road; Knox County
14. Riverside Parkway, 13th to 17th Streets; Jefferson County
15. Jefferson Freeway over Ramp 6, Jefferson Freeway-Kentucky Turnpike Interchange, Station 652+89.62; Jefferson County
16. Ramp 2 over Jefferson Freeway and Preston Street, Jefferson Freeway-Preston Street Interchange, Station 227+82.34; Jefferson County
17. Popular Level Road over Southern RR; Jefferson County
18. South Park Road over Kentucky Turnpike, Station 189+60; Jefferson County
19. US 31 over Ohio River, Clark Memorial Bridge; Jefferson County





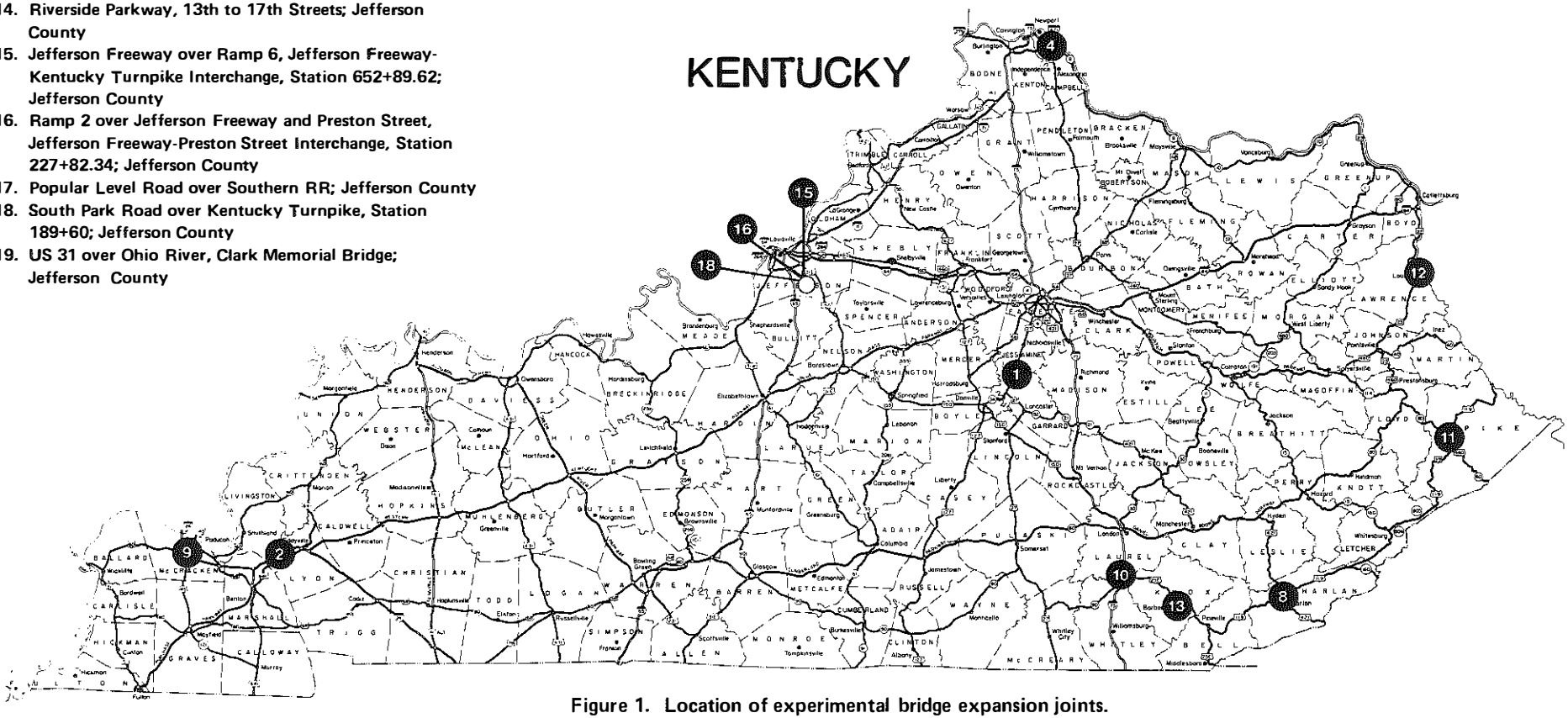


Figure 1. Location of experimental bridge expansion joints.

Prewitt Gages

From 1973 to 1975, attempts were made to measure joint movement with a mechanical-type strain gage (Figure 2) made by Prewitt Associates of Lexington, Kentucky. The device consisted of a Prewitt scratch gage, Model SSR, attached to U-shaped aluminum sheet metal. Each leg was attached to a girder below each side of a joint (Figure 3). As the joint expanded or contracted, the U flexed and the bending strain in the U was measured by the Prewitt scratch gage on a small brass disc. With each reversal of strain, the gage scratches the disc proportionally to the movement and advances the disc (Figure 2).

Problems with this system were encountered from the outset. Initially, records indicated other than horizontal movement of the bridge; the problem was attributed to wind vibration. Wind shields were installed; however, erroneous data were still obtained. While attempting to recalibrate the scratch mechanisms, the gages were found to be improperly attached to the sheet metal. After this problem was corrected, gage assemblies were reinstalled. Further study of the gages revealed the sheet metal was not of adequate stiffness. A nonproportional strain of the scratch gage was observed for movements of less than two inches (51 mm). Stiffners were attached (Figure 4); however, this failed to increase the sensitivity of the gages so this equipment was abandoned and other methods of measuring movement were sought.

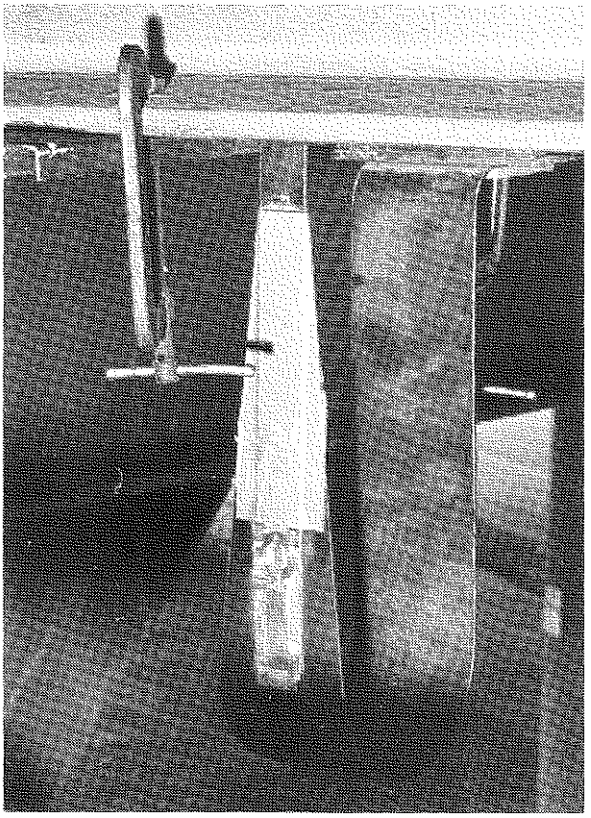


Figure 3. Scratch gage frame attached to bridge expansion joint.

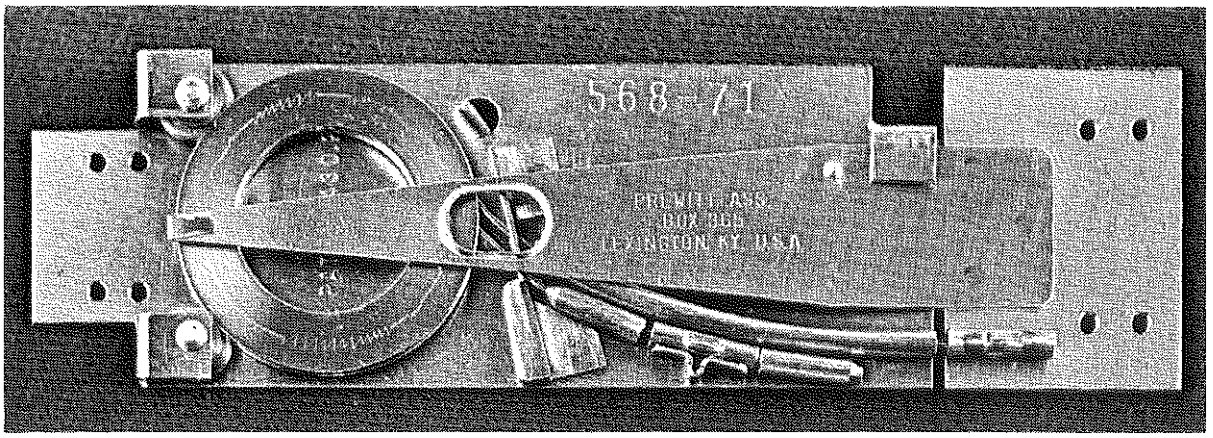


Figure 2. Prewitt scratch strain gage model SSR.

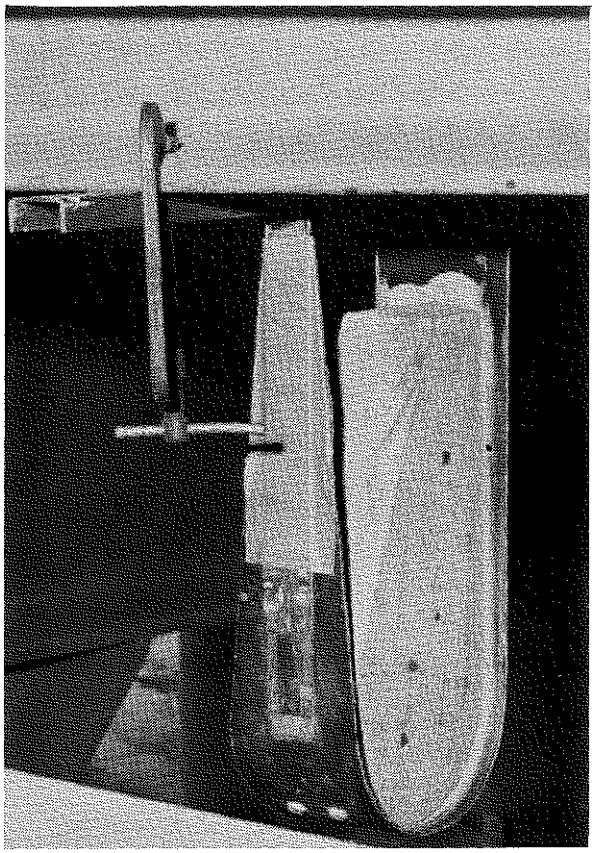


Figure 4. Scratch gage frame with stiffners.

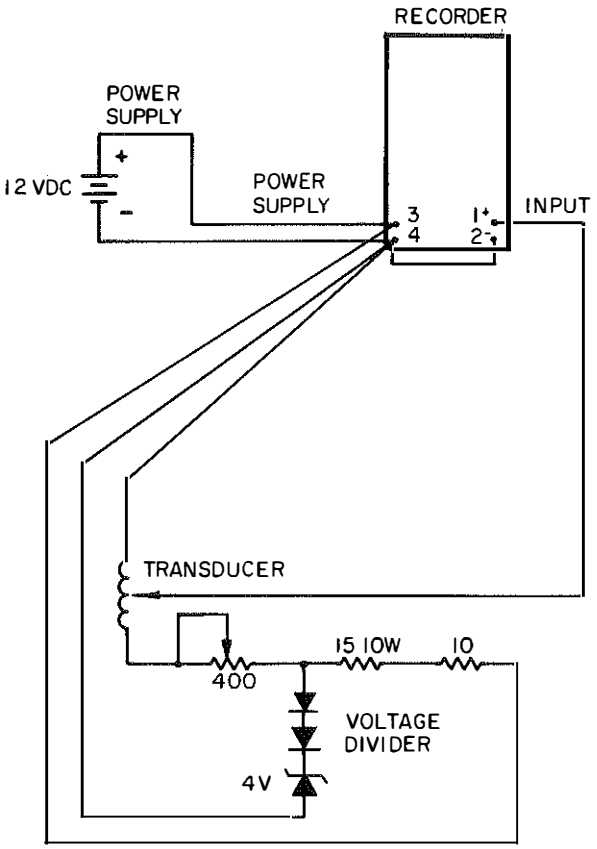


Figure 5. Schematic of the motion recorder.

Displacement Transducers

A displacement transducer is basically a rotary potentiometer driven by the displacement of an extending cable. The resistance in the potentiometer is linear with respect to the cable displacement. A strip-chart recorder produces a permanent record of movement. The system adapted to this study was powered by a heavy duty automotive battery. A schematic of the system is shown in Figure 5 and specifications of the displacement transducer and power supply are listed in Table 1.

Measurements were made on four joints of two bridges selected for accessibility rather than structure or joint type. Table 2 identifies those bridges and joints. A displacement transducer system was attached to the transverse girders below the expansion joint. The

Table 1. Displacement Transducer Assembly Specifications.

Displacement Transducer:	Model 4040-2 Manufactured by: Research Incorporated, Minneapolis, Minnesota Displacement Range: 0-24 in. (0-610 mm) Resistance: 1,000 ohms
Strip-Chart Recorder:	Rustrak Model 288 Manufactured by: Gulton Industries, East Greenwich, Rhode Island Writing Speed: 1 strike/8 seconds Chart Speed: 1 in./hr. (25 mm/hr.) Chart Duration: 1 month
Power Supply:	Hester Automotive Battery (12 volt)

Table 2. Expansion Joint Data

Bridge Identification: US 25 and US 42 over the Ohio River
Bridge Type: Combination five-span, continuous, welded-steel, plate girder and three-span cantilever truss
Location: Urban
Traffic Data: ADDT - 13,900
Percent Trucks - 10
Environmental Conditions: Yearly Temperature Range: -18° to 94°F (-28° to 34°C)
Average Annual Precipitation: 39.04 in. (992 mm)
Theoretical Movement:
Small Joint: Wabo-Maurer D520
Range: 5.3 - 10.5 in. (135 - 267 mm)
Large Joint: Wabo-Maurer D1300
Range: 14.2 - 27.2 in. (360 -690 mm)

Bridge Identification: I 471 over the Ohio River
Bridge Type: Twin Bridges - Two combination continuous, welded-steel, plate girder units and tied arch
Location: Urban
Traffic Data: ADDT - 81,800
Percent Trucks - 8
Environmental Conditions: Yearly Temperature Range: -18° to 94°F (-28° to 34°C)
Average Annual Precipitation: 39.04 in. (992 mm)
Theoretical Movement:
Small Joint: Wabo-Maurer D520
Range: 5.3- 10.5 in. (135 -267 mm)
Large Joint: Wabo-Maurer D1560
Range: 17.1 - 32.7 in. (435 - 831 mm)

transducer was attached to one side of the joint and the cable extended to attach to the opposite side (Figure 6).

Figures 7 through 10 are records of movement plotted against temperature for specified periods of time. The points are a calibrated measurement of the displacement of the transducer for every three-hour period plotted against the corresponding temperature as recorded by the National Oceanic and Atmospheric Administration (NOAA). The theoretical range of movement for the specific joint and the recorded range of movement are compared in Table 3. Examination of the data in Table 3 reveals that the recorded movement range of the Wabo-Maurer D520 joint on the I-471 bridge over the Ohio River exceeded the theoretical movement of the joint. All other recorded movements were well within the theoretical prediction. A line of regression is plotted by the least-squares method for each set of values. The lines of regression very closely approximate a linear relationship; the greatest separation occurred at the coldest temperatures, and the smallest separation occurred at the hottest temperatures. The recording system measured movement only in a horizontal plane. No attempt was made to account for vertical or rotational movements.

The power supply was subject to variation over a long period of time, creating a drift in reading actual movement. The battery was replaced every two weeks in an effort to alleviate this problem. All of the instrumentation was vandalized from time to time.

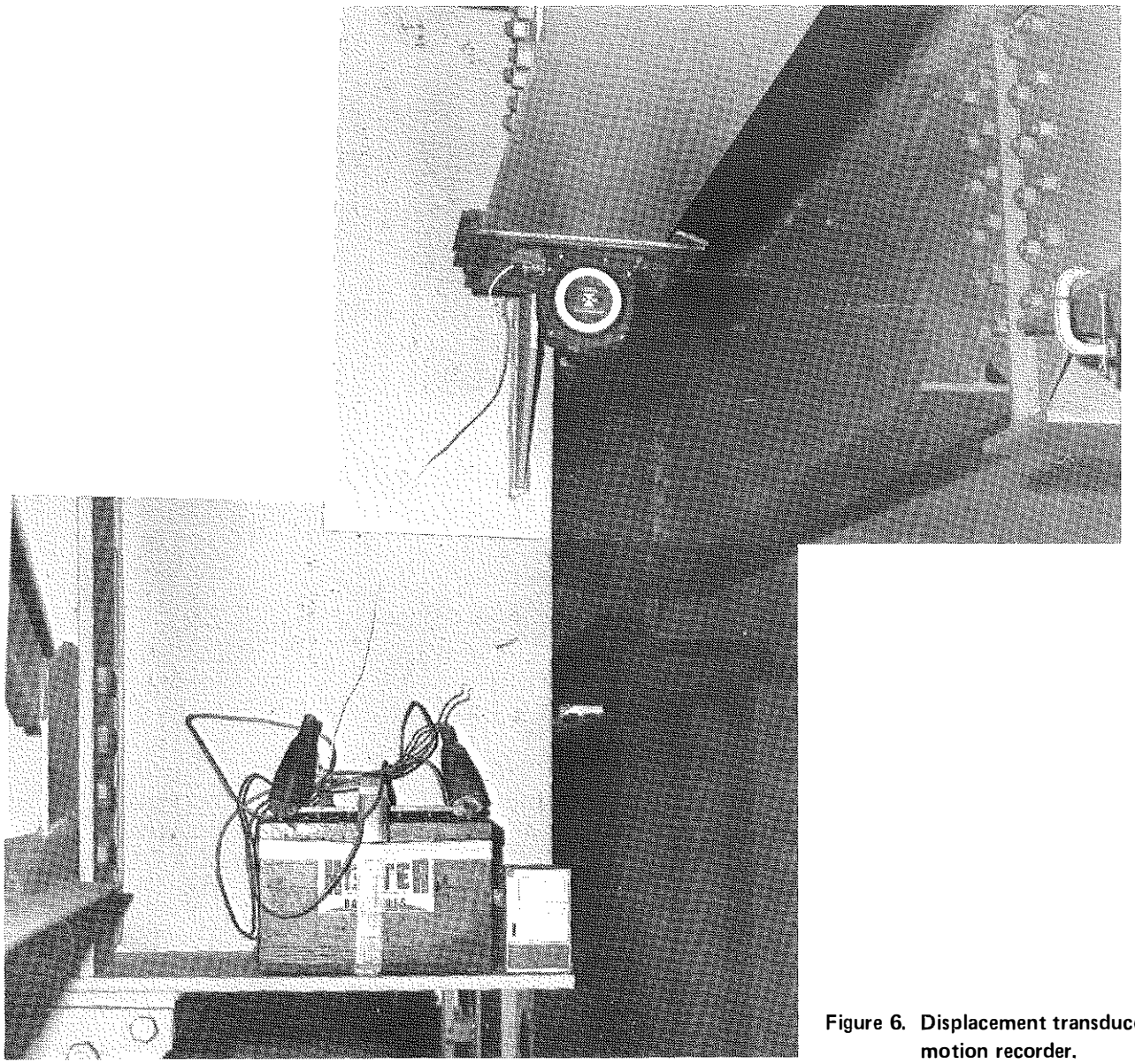


Figure 6. Displacement transducer motion recorder.

Table 3. Theoretical Movement vs Recorded Movement.

Bridge Identification: US 25 and US 42 over the Ohio River		
Joint	Theoretical Movement	Recorded Movement Range
Wabo-Maurer D520	5.2 in. (132 mm)	3.3 in. (83.5 mm)
Wabo-Maurer D1300	13.0 in. (330 mm)	5.8 in. (148 mm)
Bridge Identification: I-471 over the Ohio River		
Joint	Theoretical Movement	Recorded Movement Range
Wabo-Maurer D520	5.2 in. (132 mm)	5.7 in (145 mm)
Wabo-Maurer D1560	15.6 in. (396 mm)	10.4 in (264 mm)

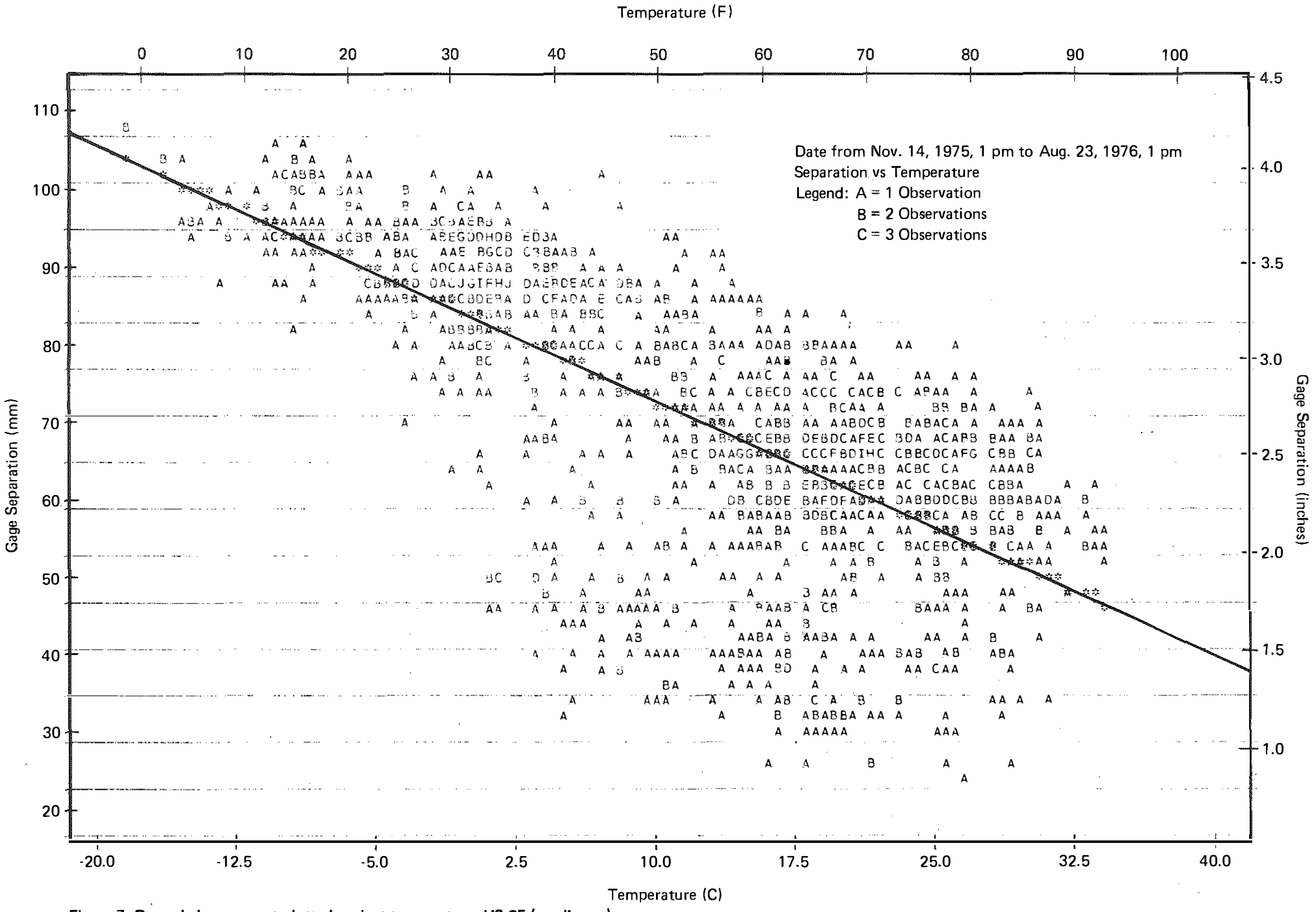


Figure 7. Recorded movement plotted against temperature, US 25 (small gage).

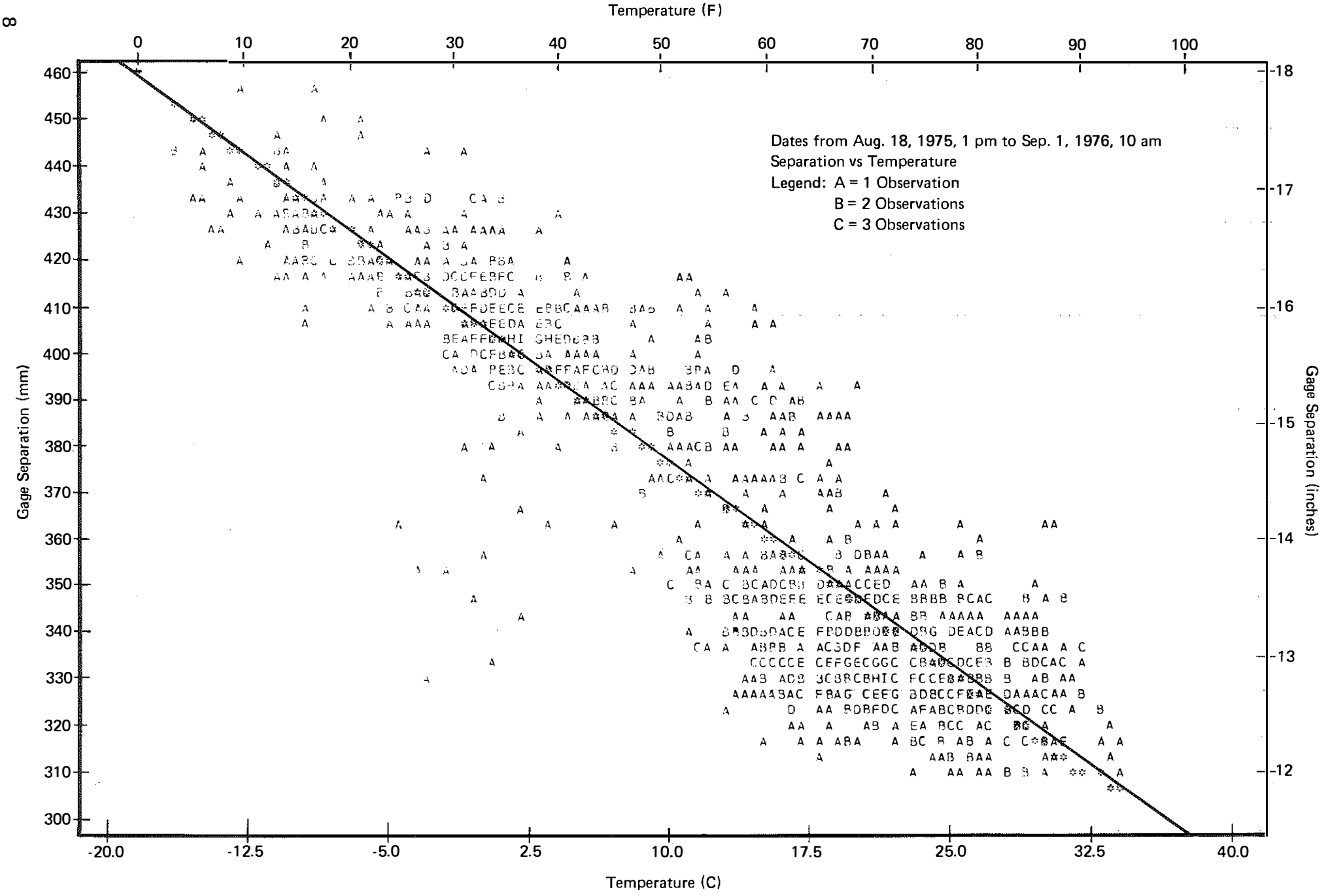


Figure 8. Recorded movement plotted against temperature, US 25 (large gage).

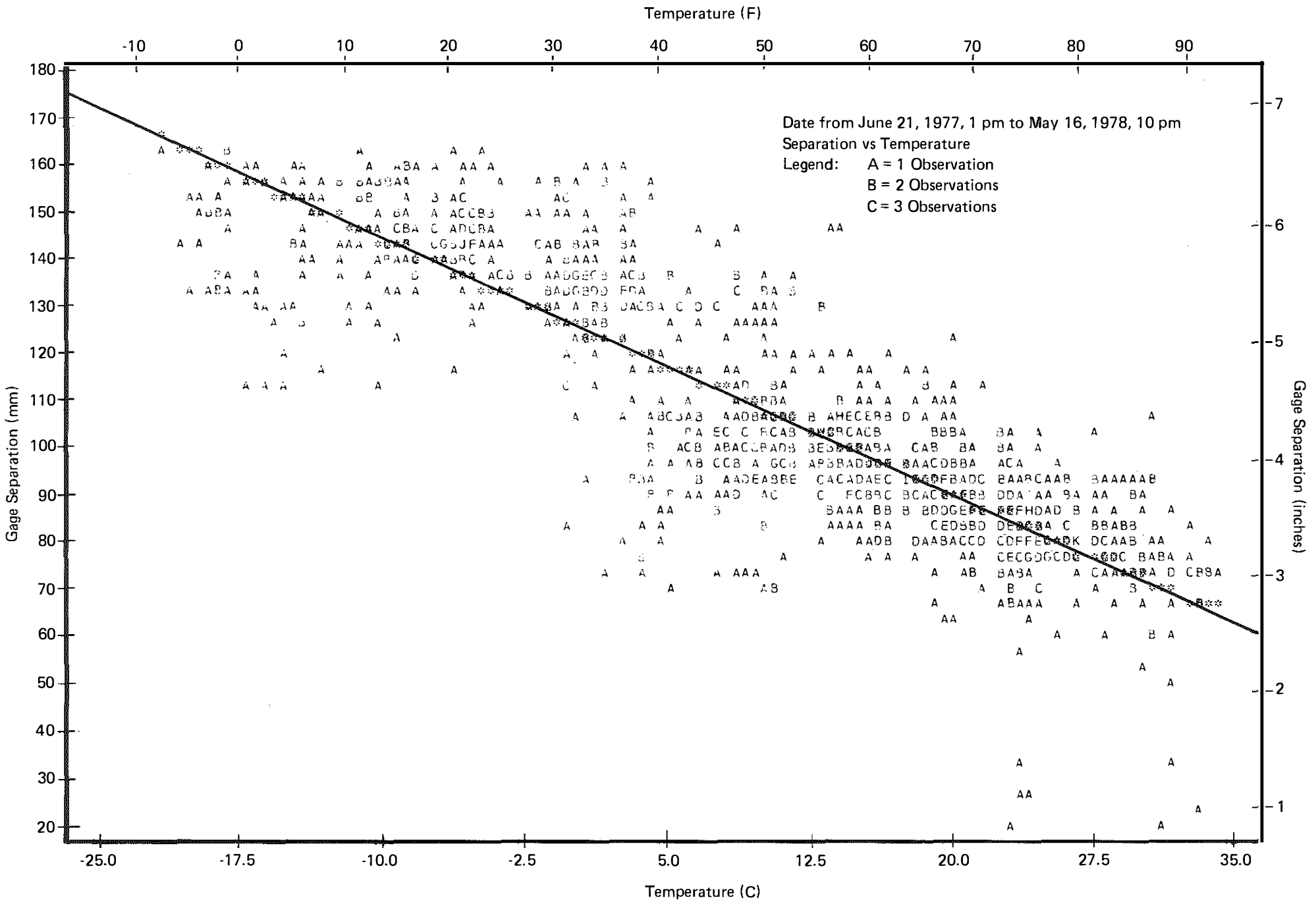


Figure 9. Recorded movement plotted against temperature, I-471 (small gage).

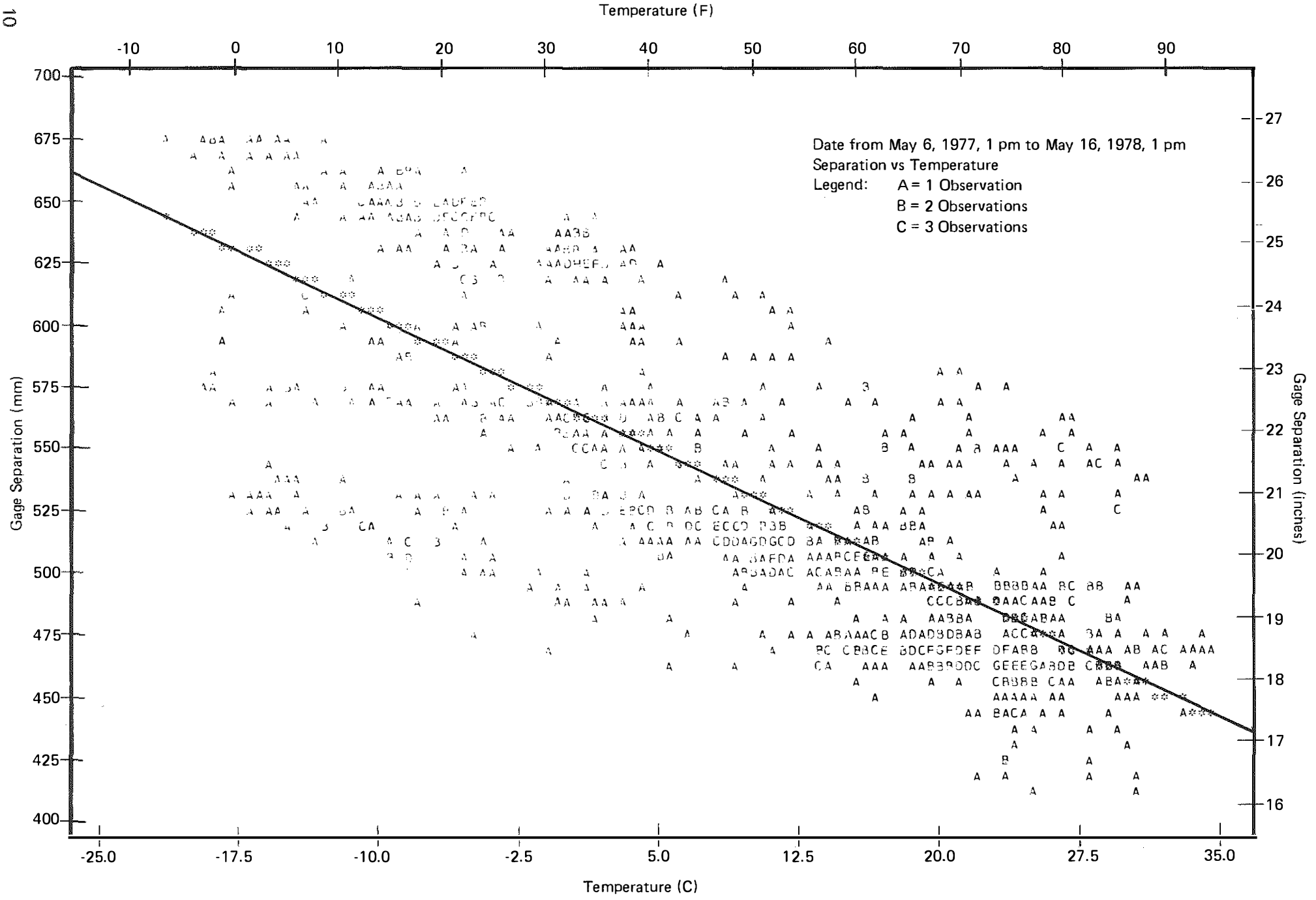


Figure 10. Recorded movement plotted against temperature, I-471 (large gage).

Joint Models

Transflex 200A

Six joints of this type are included in this evaluation. Two of the six are installed on a structure not open to traffic while the remainder have been in service for 12 years on a heavily traveled urban structure. Problems with these joints can be traced to both faulty installation and the design of the joint. Concrete abutting these joints is severely distressed. Joint performance is poor and there is much intrusion of water and debris. The sections are misaligned both horizontally and vertically; virtually no edge sealant remains, and all sections are subject to loss of stud-hole plugs. Replacement sections have not performed satisfactorily. The sectional makeup of this and other Transflex joints appears to create problems inherent in the design. Abutting of sections creates extra surfaces that must be watertight.

Transflex 250

One joint of this type was evaluated. The joint is on a rural, two-lane bridge that has been in service for four years. The joint has performed well to date. Some gouges and tears were noted and were probably caused by snowplows. Neither leakage nor loss of edge sealant has been a problem, hole plugs are showing signs of wear and becoming loose.

Transflex 400A

Two of the three joints of this type that were evalauted are installed on a structure not open to traffic while the other is on a rural, two-lane facility that has been in service four years. The joint has performed well. There is some evidence of snowplow damage. As with other Transflex models, hole plugs are becoming loose and will probably be lost in the future. There is no evidence of leakage nor loss of edge sealant.

Transflex 650

Seven joints of this type were included in this evaluation. Five have been in service for three years on a primary route in a rural area, while the other two are on a rural, secondary route and have been in service for four years. The joints have tears and/or blemishes, probably caused by snowplows. There is evidence of leakage through the 4-year-old joints, primarily where the sections are abutted. Some large-size debris is lodged in these joints in the driving lanes. The edge sealant is in good condition. The five joints in service for three years are performing satisfactorily.

Transflex 400

The two joints of this type have been in service 12 years on a heavily traveled urban facility. The open grid configuration becomes filled with all types of debris inhibiting the function of the joint. As with other Transflex models, the loss of hole plugs and edge sealant makes leaking inevitable.

Wabo-Maurer D260

Five joints of this type were installed in 1974 and 1975. All are on an interstate facility in an urban area. Accumulation of debris across the entire joint is a problem with this and other Wabo-Maurer joints. The upper surface of the neoprene seal is generally one inch (25 mm) below the joint and pavement surface, creating a cavity for debris, i.e., sand and gravel, to accumulate. This increases the probability of the module being punctured and possibly interferes with the joint functioning properly. However, none of the five joints appear to be leaking, and all are providing satisfactory performance.

Wabo-Maurer D520

Twenty-two of these joints were installed in 1974 and 1975; four were installed in 1976; one in 1979. All but one are on interstate facilities; the other is on a heavily traveled urban-primary bridge. Accumulation of debris above the neoprene seal across the entire joint is a problem caused by the depression of the seal below the surface. There has been no distress around any joint nor evidence of a joint leaking. These joints are providing satisfactory performance.

Wabo-Maurer D780

Twenty-two of these joints were installed in 1974 and 1975; one was installed in 1976. All but three of the joints are on interstate facilities, while the remaining three are installed on a heavily traveled urban bridge. Accumulation of debris above the neoprene seal is a problem common to all Wabo-Maurer joints; however, there is no evidence that the function of these joints has been impaired. Water was detected in the interior cavity of several D780 joints, indicating the upper surface of the seal had been punctured. Modules that were added to the Wabo-Maurer system to increase the size and movement have created additional problems. Vertical misalignment of the support bars became a problem typical of the D780 joint. Vertical misalignment of the support bars may

produce some noise and ride discomfort. Uneven compression of the neoprene modules is also evident. No distress in the concrete attributable to joint performance, and no leakage has been detected with this joint type. The D780 is providing satisfactory performance.

Wabo-Maurer D1040

Nine joints were installed in 1974 and 1975. Five are in urban areas and are on interstate or primary routes. The remaining four are on rural primary routes. Accumulation of debris above the neoprene seal across the entire joint is a problem as with other Wabo-Maurer joints. Uneven compression of the modules was noted on several joints; however, vertical misalignment of the support bars did not appear to be a problem. There has been no distress around any joint nor any evidence of leaking. These joints are providing satisfactory performance.

Wabo-Maurer D1300

Three joints of this type were evaluated: one installed in 1974, is on a heavily traveled primary facility in an urban area and the other two are on a rural interstate facility that has been open to traffic since the fall of 1979. The joint in service since 1974 is subject to problems common to other Wabo-Maurer joints - - that of accumulation of debris across the joint and uneven compression of the modules. However, no leaking has been detected, and the joint is performing satisfactorily.

Wabo-Maurer D1560

Four joints of this type were evaluated: one was installed in 1975, two in 1976, and one in 1979. Two are on a rural interstate facility and two are on an urban interstate facility. The two on the rural facility have been exposed to traffic since the fall of 1979 and are in excellent condition. The other two are subject to problems common to other Wabo-Maurer joints -- accumulation of debris above the seal and uneven compression of the modules. Water was detected in the interior of the modules, indicating the top surface of the neoprene module had been punctured or that water was entering the module from the end. There has been no evidence that the bottom sides of these modules are leaking. No distress on these decks was noted that is attributable to joint performance.

Acme, Acma Modular II 2M400

Four joints of this type were evaluated. All are installed on a rural interstate facility and have been in service for four years. This joint is similar to the Wabo-Maurer and thus experiences the same basic problems. Debris accumulates above the neoprene modules across the entire joint. Uneven compression and twisting of the modules were common. Stains on piers indicated leakage. Some noise was noted at one joint, but this was not throught to be offensive to the traveling public.

Acme, Acma Modular II 3M600

Six of ten joints have been in service for five years; the remaining four have been in service for four years. All are installed on rural interstate facilities. Uneven compression of the modules, accumulation of debris above the modules, and leakage indicated by stains on the piers are problems evident with this type of joint.

Acme, Acma Modular II 6M1200

Two joints have been in service for five years on a rural interstate facility. The problems associated with other Acme Modular systems are also associated with the 6M1200. Accumulation of debris across the entire joint, uneven compression of the modules, and leakage as evidenced by stains on the piers are present. In addition, some horizontal misalignment was noted in the steel members of the joint.

Acme, Beta B780, B1040, B1300

Twin structures utilizing one each of the above joints were constructed as part of a rural interstate facility. The structures were opened to traffic in December 1979. These joints are a refinement of the Acma Modular II systems. Performance expected of these joints should be comparable to that of the Acma Modular II and Wabo-Maurer systems.

Fel-Span T20

The bridge containing the only T20 joints included in this evaluation was constructed in 1977; however, the bridge has not been opened to traffic. The bridge is a two-lane facility in an urban area. Although no traffic has been allowed on the bridge, the edge sealant has become brittle and has lost adhesion to the joint and concrete surfaces. There has been no evidence of leaking, and the two joints appear to be functioning satisfactorily.

Fel-Span T40

Two joints are in a rural area on a state secondary road and have been in service for two years. Accumulation of debris, as with all joint types, is a problem in the gutter areas. Hole plugs are becoming loose and some are missing. There is no evidence of leaking. They are providing satisfactory performance.

General Observations and Conclusions

Virtually all of the joints inspected were filled to some degree with incompressible debris in the traveling lanes; and all were full of debris in the gutter area. Any type of recess in the surface of the joint provides a place for debris to accumulate. Accumulation is more of a problem for the modular-type joints than the molded rubber joints. Accumulation of debris above the modules could inhibit the function of the joint and(or) puncture the seal, allowing water to enter.

Joints installed as one continuous unit have several advantages over those that are sectionalized. Joints such as Wabo-Maurer, Acma Modular, and Acme Beta are welded to anchor bolts and thus become an integral part of the bridge deck; this is in opposition to units bolted to the deck. Continuous units eliminate possible points of leakage by having no surfaces that have to be abutted and sealed. By virtue that no edge sealant is required, this again improves the watertightness of the joint and can eliminate future cleaning and replacing cracked and brittle edge sealant.

Both the molded neoprene rubber joints and the modular joints appear to be improvements over the sliding plate and finger dams. Construction and installation problems were not addressed in this report. The final report on the National Experimental and Evaluation Program (NEEP) Project No. 11 relates that several states have recommended not using joint systems that require segmental installation for reasons similar to those problems experienced in Kentucky. The high installation costs of the modular systems may be negated by improved performance and reduced future maintenance needs.

References

1. *Watertight Bridge Deck Joint Seals,* National Experimental and Evaluation Program, Project No. 11, Final Report, July 1977.
2. *Bridge Deck Joint-Sealing Systems, Evaluation and Performance Specification,* National Cooperative Highway Research Program Report 204, Transportation Research Board, June 1979.
3. Finchner, H. E.; *Sixth Annual Progress Report for Evaluation of Rubber Expansion Joints for Bridges,* Indiana State Highway Commission, June 1978.
4. Bashore, F. J.; *Evaluation of Various Bridge Deck Joint Sealing Systems,* Michigan State Highway Commission, August 1975.
5. Canfield, J. H.; and Cramer, C. L.; *Development of Watertight Bridge Deck Joint Seals,* California Department of Transportation, July 1975.
6. Kozlov, G. S.; and Mehalchick, G. J.; *Field Evaluation of Various Bridge Deck Joint Sealing Systems,* New Jersey Department of Transportation, March 1976.
7. Thornton, J. B.; *Evaluation of Existing Bridge Expansion Joints,* Georgia Department of Transportation, October 1973.

Appendix

SUMMARY OF
EXPANSION JOINT INSPECTIONS

EXPANSION JOINT EVALUATION

Bridge Identification: US 27, Kentucky River
County: Garrard-Jessamine
Project Number: F 525(16)

BRIDGE DESCRIPTION

Type: Twin bridges, welded steel plate girder, continuous
Length: 1,105 ft(337 m)
Width: 39 ft(12 m)
Span Length Contributing to Joint Movement: One @ 1,105 ft(337 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -8° to 96°F(-22° to 36°C)
Average Annual Precipitation: 45.03 in. (1,144mm)
Location: Rural

JOINT DATA

Joint Type and Model: Four Wabo-Maurer D1040
Installation Date: Not Available
Installation Cost: 4 @ $12,000 each
Theoretical Movement of Joint Type: D1040: 10.4 in. (264mm)

TRAFFIC DATA

AADT: 7,000
Percent Trucks: 10

INSPECTION DATA

Ride Quality: Good
Noise Generation: Good
Accummulation of Debris: Heavy in gutter areas, light in traffic lanes

Joint Leaking: No evidence of leaking
Distress around Joint: None

Comments: Joints are in excellent condition
Compression of modules is very even
No apparent vertical or horizontal misalignment of joint

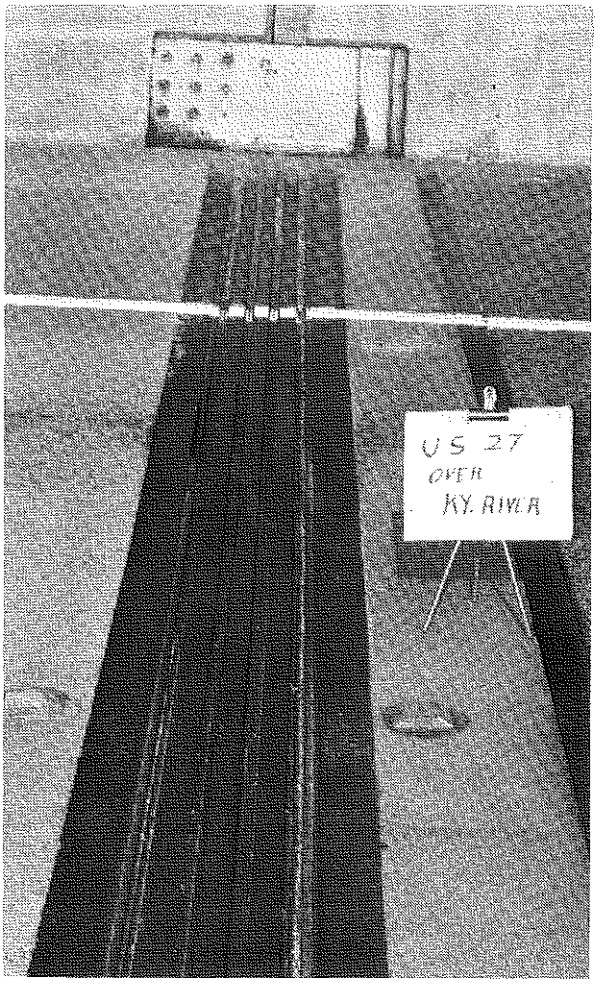


Figure A1. Wabo-Maurer D1040; joint in excellent condition.

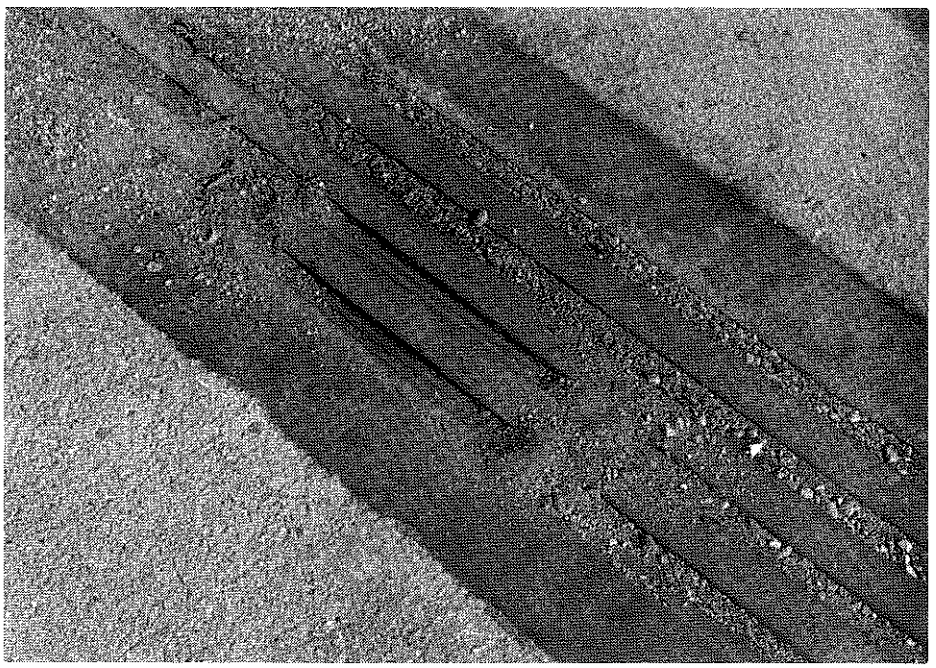


Figure A2. Wabo-Maurer D1040; debris in gutter area.

EXPANSION JOINT EVALUATION

Bridge Identification: I 24, Cumberland River
County: Livingston-Lyon
Project Number: I 24-2(26)33

BRIDGE DESCRIPTION
Type: Twin bridges -- Two combination welded-steel plate-girder units, continuous
Length: 1,740 ft (530 m)
Width: 38 ft (12 m)
Span Length Contributing to Joint Movement : Two @ 655 ft (200 m), 1,027 ft (313 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -4° to 102°F (-29° to 39°C)
Average Annual Precipitation: 45.69 in. (1,161 mm)
Location: Rural

JOINT DATA
Joint Type and Model: Two Acme Beta B780, two Acme Beta B1040, two Acme Beta B1300
Installation Date: B780: 2-79; B1040: 6,8-79; B1300: 2, 9-79
Installation Cost: B780: $26,000 each; B1040: $35,000 each; B1300: $30,000 each
Theoretical Movement of Joint Type: B780: 7.8 in. (198 mm); B1040: 10.40 in. (264 mm); B1300: 13.00 in. (330 mm)

TRAFFIC DATA
AADT: 10,600
Percent Trucks: 17

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: None

Joint Leaking: No
Distress around Joint: None

Comments: Opened to traffic December 1979
Joints in excellent condition

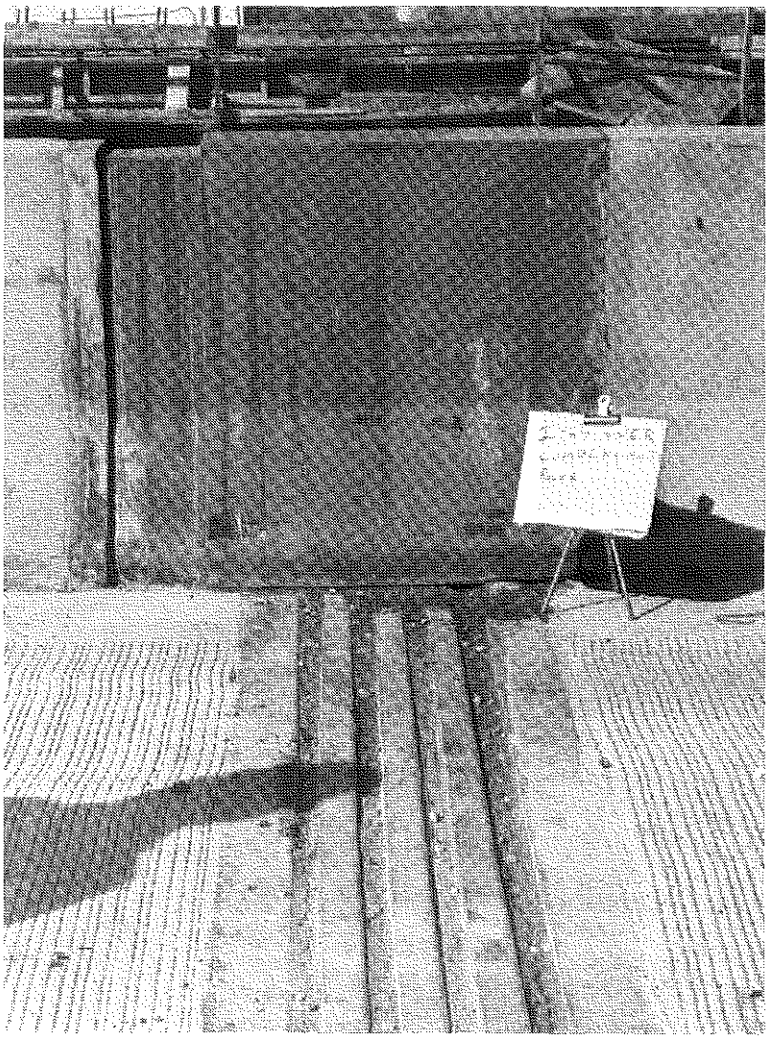


Figure A3. Acme Beta B1300; joint in excellent condition; note debris above neoprene seals.

EXPANSION JOINT EVALUATION

Bridge Identification: I 275, Licking River
County: Kenton-Campbell
Project Number: I 275-9(35)19

BRIDGE DESCRIPTION
Type: Twin bridges, welded-steel plate girder - - simple-continuous-simple
Length: 1,535 ft (468 m)
Width: 50 ft (15 m)
Span Length Contributing to Joint Movement: Three @ 515 ft (160 m), 795 ft (242 m), 150 ft (46 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: - 18° to 94° F (-28° to 34° C)
Average Annual Precipitation: 39.04 in. (992 mm)
Location: Rural

JOINT DATA
Joint Type and Model: Six Acme, Acma Modular II 3M600 and two Acme, Acma Modular II 6M1 200
Installation Date: 1974
Installation Cost: 8 @ $15,000 each
Theoretical Movement of Joint Type: 3M600: 6.00 in. (1 52 mm); 6M1 200: 12.00 in. (305 mm)

TRAFFIC DATA
AADT: 75,900
Percent Trucks: 10

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: All across joints above modules

Joint Leaking: Piers beneath joints stained -- evidence of leaking
Distress around Joint: None

Comments: Uneven compression of modules evident
Some horizontal misalignment of channels

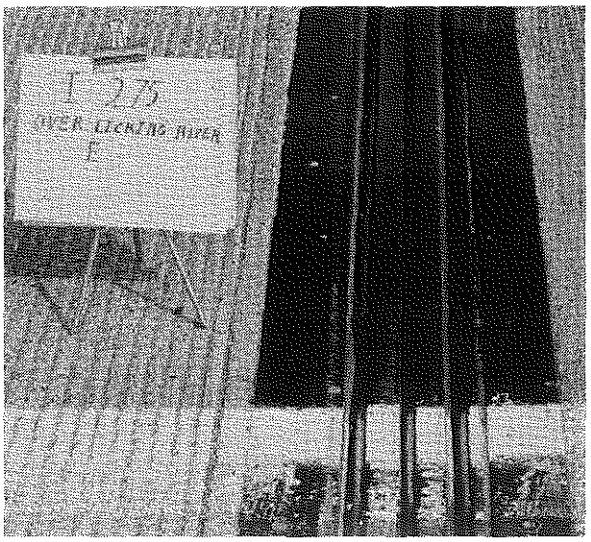


Figure A4. Acme, Acma Modular II 3M600; joint in excellent condition; note irregularity in neoprene seal.

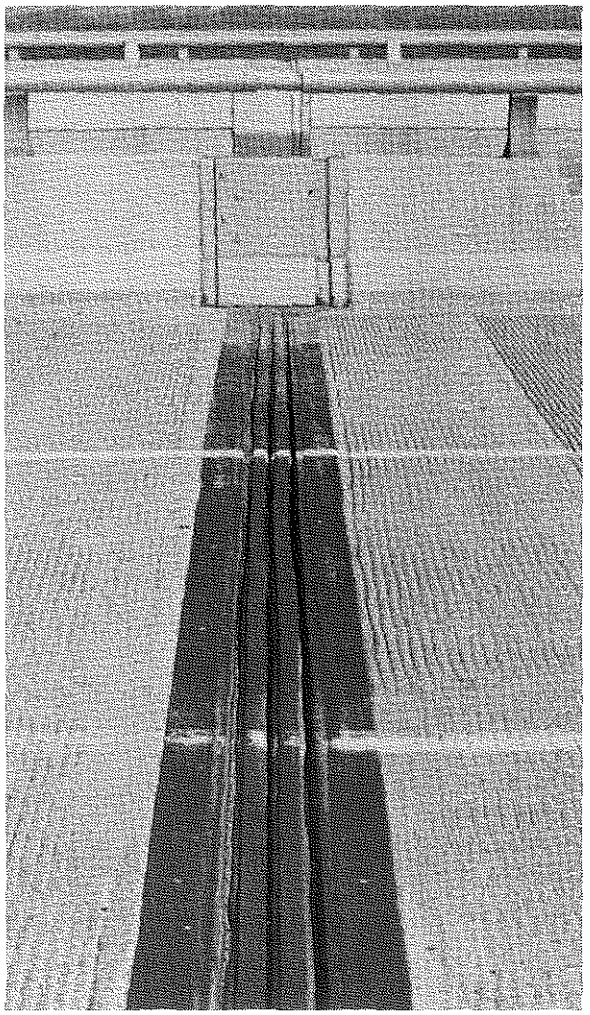


Figure A5. Acme, Acma Modular II 3M600; note uneven compression of neoprene seals and horizontal misalignment of seals and support bars.

EXPANSION JOINT EVALUATION

Bridge Identification: I 275, Ohio River
County: Campbell
Project Number: I 275-9(48)23, I 275-9(40)22

BRIDGE DESCRIPTION

Type: Twin Bridges, two combination welded-steel plate-girder units, continuous and continuous through truss
Lenght: 2,820 ft (860 m)
Width: 50 ft (15 m)
Span Length Contributing to Joint Movement: Three @ 570 ft (174 m), 1,440 ft (439 m) , 810 ft (247 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -18° to 94°F (-28° to 34°C)
Average Annual Precipitation: 39.04 in. (992 mm)
Location: Rural

JOINT DATA

Joint Type and Model: Two Wabo-Maurer D1560, two Wabo-Maurer D1300, two Wabo-Maurer D520
Installation Date: Fall 1976 and Fall 1979
Installation Cost: D1560: $50,440 each; D1300: $39,205 each; D520: $31,340 each
Theoretical Movement of Joint Type: D1560: 15.6 in. (396 mm); D1300: 13.0 in. (330 mm); D520: 5.2 in. (132 mm)

TRAFFIC DATA

AADT: 50,200
Percent of Trucks: 10

INSPECTION DATA

Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: None

Joint Leaking: No
Distress around Joint: None

Comments: All joints in excellent condition
Bridge open to traffic for only one month as of last inspection

Figure A6. Wabo-Maurer D1300; note uneven compression of seals.

EXPANSION JOINT EVALUATION

Bridge Identification: I 275, KY 17, L&N Railroad, and Banlick Creek
County: Kenton
Project Number: I 275-9(35)17

BRIDGE DESCRIPTION

Type: Twin Bridges, welded-steel plate girder: two simple span units, three continuous units
Length: 1,667 ft (508 m)
Width: 65 ft (20 m)
Span Length Contributing to Joint Movement: Four @ 244 ft (74 m), 554 ft (169 m), 479 ft (146 m), 390 ft (119 m)
Skew: 30°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -18° to 94° F (-28° to 34° C)
Average Annual Precipitation: 39.04 in. (992 mm)
Location: Rural

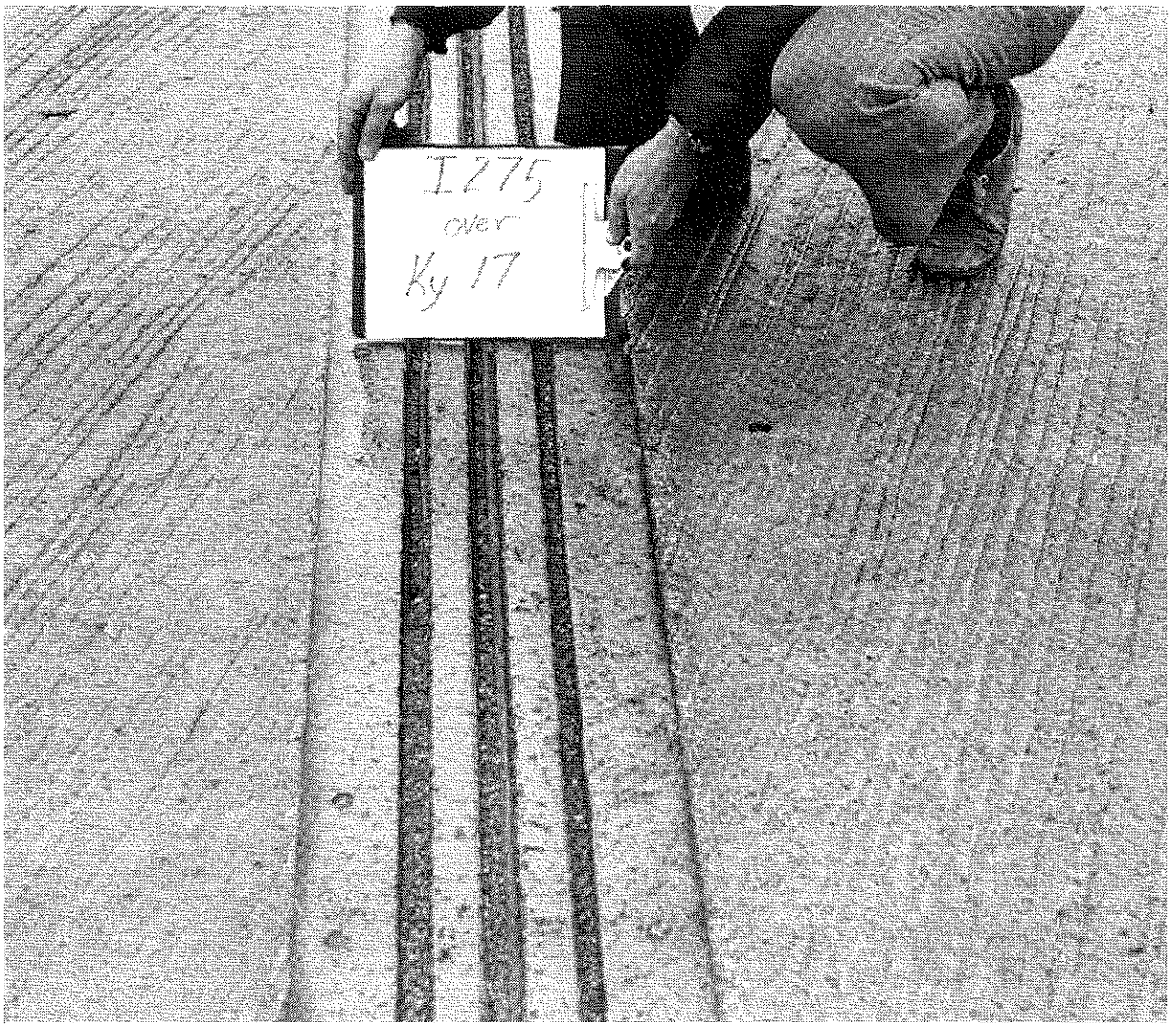


Figure A7. Acme, Acma Modular II 3M600; note debris above seals.

JOINT DATA
Joint Type and Model: Four Acme, Acma Modular II 2M400; four Acme, Acma Modular II 3M6 00
Installation Date: 1975
Installation Cost: Not Available
Theoretical Movement of Joint Type: 2M400: 4.0 in. (1 02 mm); 3M6 00: 6.0 in. (152 mm)

TRAFFIC DATA
AADT: 75,900
Percent Trucks: 10

INSPECTION DATA
Ride Quality: Good
Noise Generation: Some noise in first joint of eastbound lane
Accumulation of Debris: All across joints above modules

Joint Leaking: Stains on piers indicate leaking
Distress around Joint: None

Comments: Compression of modules uneven
Modules twisting in place, steel channels possibly rotating under traffic
Modules cut where turned up into barrier walls

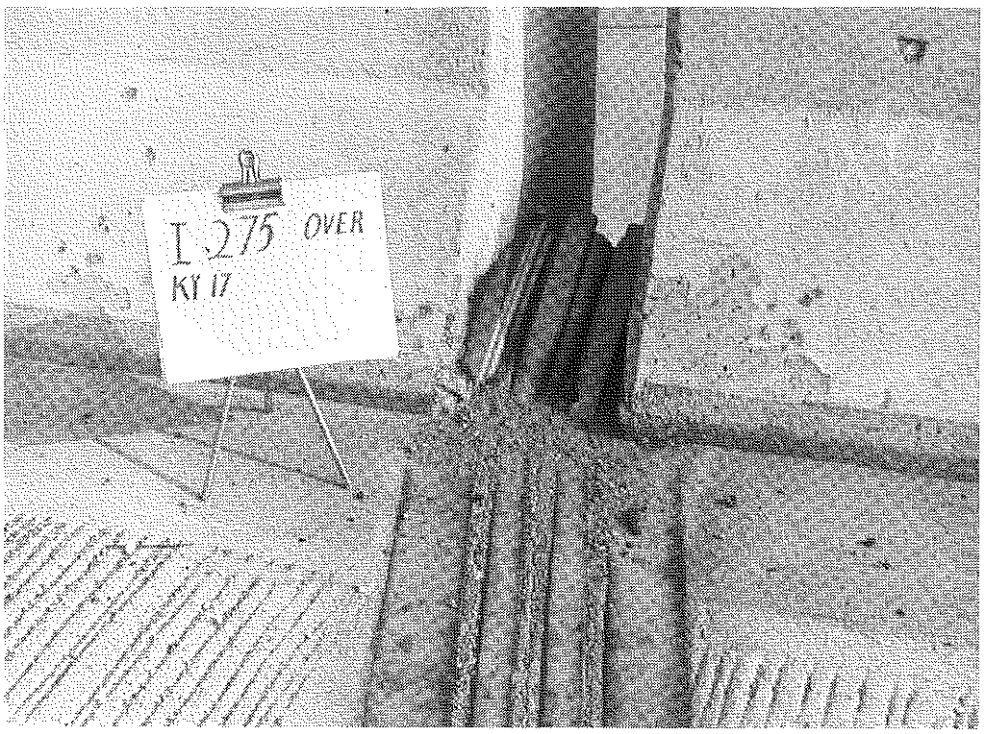


Figure A8. Acme, Acma Modular II 3M600; note debris in gutter area.

EXPANSION JOINT EVALUATION

Bridge Identification: I 471, Ohio River
County: Campbell
Project Number: I 471-4(7)4 "B"

BRIDGE DESCRIPTION

Type: Twin Bridges, combination: two welded-steel plate-girder units, continuous and tied arch
Length: 2,547 ft (776 m)
Width: 55 ft (17 m)
Span Length Contributing to Joint Movement: Six @ 50 ft (15 m), 388 ft (118 m), 540 ft (165 m), 759 ft (231 m), 355 ft (108 m), 415 ft (126 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -18° to 94°F (-28° to 34°C)
Average Annual Precipitation: 39.04 in. (992 mm)
Location: Urban

JOINT DATA

Joint Type and Model: Six Wabo-Maurer D520; two Wabo-Maurer D780; two Wabo-Maurer D1560
Installation Date: Not available
Installation Cost: Not available
Theoretical Movement of Joint Type: D520: 5.2 in. (132 mm); D780: 7.8 in. (198 mm); D1560: 15.6 in. (396 mm)

TRAFFIC DATA

AADT: 81,800
Percent Trucks: 8

Figure A9. Wabo-Maurer D1560; note cavity above seal and pavement surface and accumulation of debris.

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: All across joints above modules -- debris 1 in. (25 mm) deep

Joint Leaking: No evidence of leaking
Distress around Joint: None

Comments: Compression of modules uneven
Water present in the interior of compression module evidence that the module has been punctured or water is infiltrating from the end of the module

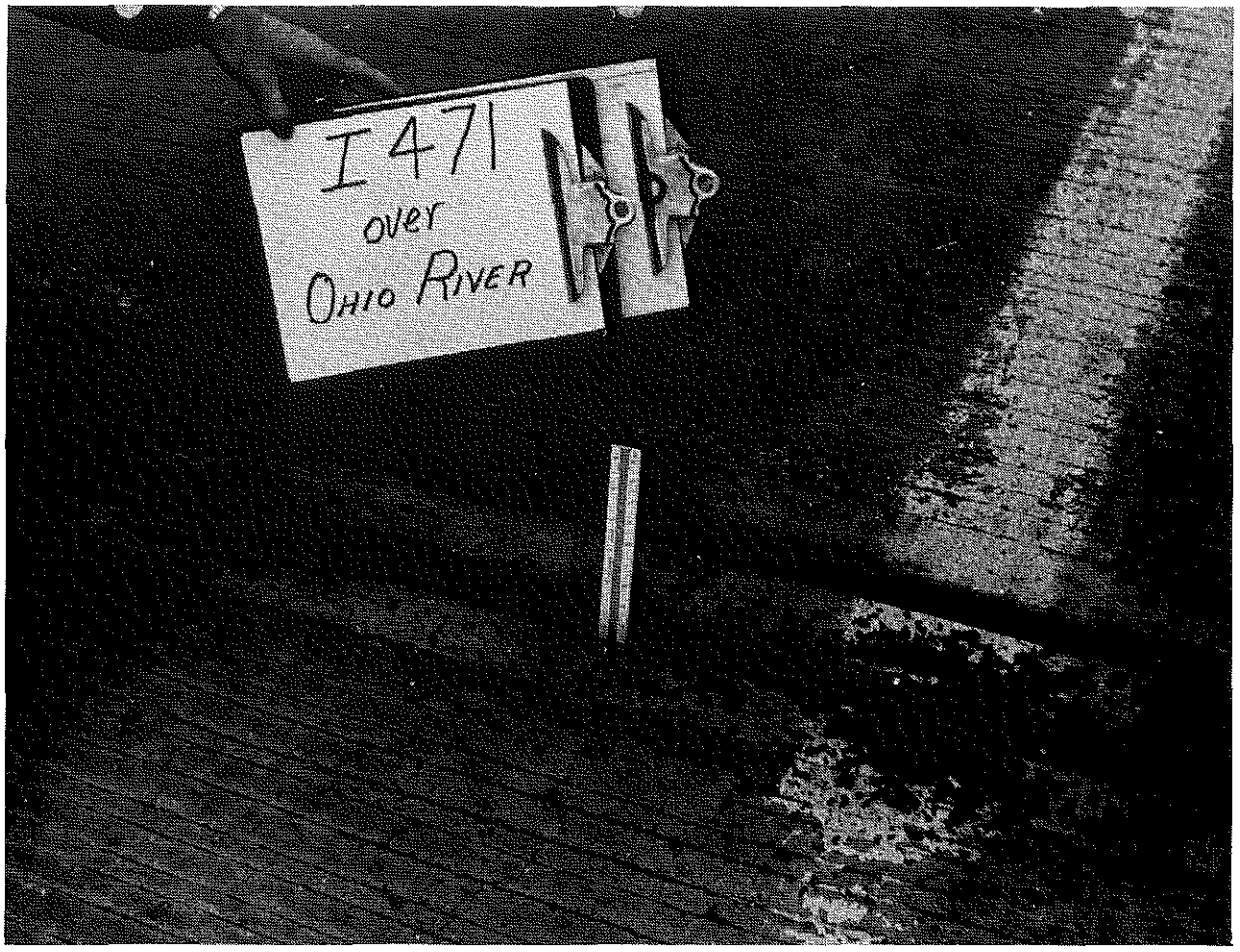


Figure A10. Wabo-Maurer D520; note debris above seal which is depressed below pavement surface.

EXPANSION JOINT EVALUATION

Bridge Identification: US 25 - US 42, Ohio River
County: Kenton
Project Number: ER 141(7) "B" & "C"

BRIDGE DESCRIPTION

Type: Combination: Five-span, continuous, welded-steel plate-girder; three-span cantilever truss
Length: 3650 ft (1,113 m)
Width: 43 ft (13 m)
Span Length Contributing to Joint Movement: Eight @ 179 ft (55 m) 565 ft (172 m), 573 ft (175 m), 908 ft (277 m), 350 ft (107 m), 372 ft (113 m), 425 ft (130 m), 278 ft (85 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -18° to 94° F (-28° to 34° C)
Average Annual Precipitation: 39.04 in. (992 mm)
Location: Urban

JOINT DATA

Joint Type and Model: One Wabo-Maurer D520; three Wabo-Maurer D780; two Wabo-Maurer D1040; one Wabo-Maurer D1300
Installation Date: Not available
Installation Cost: Not available
Theoretical Movement of Joint Type: D520: 5.2 in. (132 mm); D780: 7.8 in. (198 mm); D1040: 10.4 in. (264 mm); D1300: 13.0 in. (330 mm)

TRAFFIC DATA

AADT: 13,900
Percent Trucks: 10

Figure A11. Wabo-Maurer D1300; note debris above seal which is depressed below the pavement surface.

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: All across joint -- approximately 2 in. (51 mm) above neoprene seal

Joint Leaking: No apparent leaking -- end of joint showing signs of weathering (i.e, rust)
Distress around Joint: None

Comments: Neoprene approximately 2 in. (51 mm) below surface
Compression of modules uneven

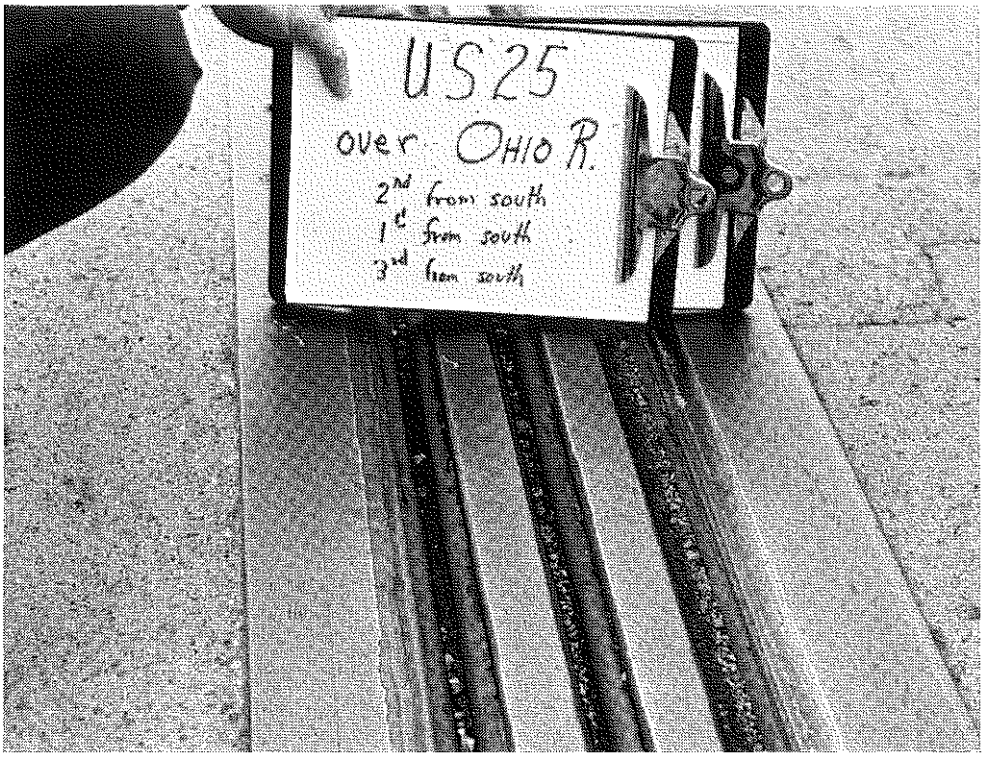


Figure A12. Wabo-Maurer D780; accumulation of debris above the seals.

EXPANSION JOINT EVALUATION

Bridge Identification: US 421, Martins Fork and L&N Railroad
County: Harlan
Project Number: F 151(31) Bridge One

BRIDGE DESCRIPTION
Type: Welded-steel plate-girder, continuous
Length: 556 ft (170 m)
Width: 75 ft (23 m)
Spans: One
Skew: 45°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -10° to 94° F (-23° to 34° C)
Average Annual Precipitation: 46.78 in. (1,188 mm)
Location: Rural

JOINT DATA
Joint Type and Model: Two Transflex 650
Installation Date: 10-77
Installation Cost: $13,440
Theoretical Movement of Joint Type: Transflex 650: 6.5 in. (165 mm)

TRAFFIC DATA
AADT: 9,700
Percent Trucks: 6

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: In gutter areas only -- some large debris lodged in joint

Joint Leaking: None
Distress around Joint: Minor chipping of abutting concrete due to construction not function of joint

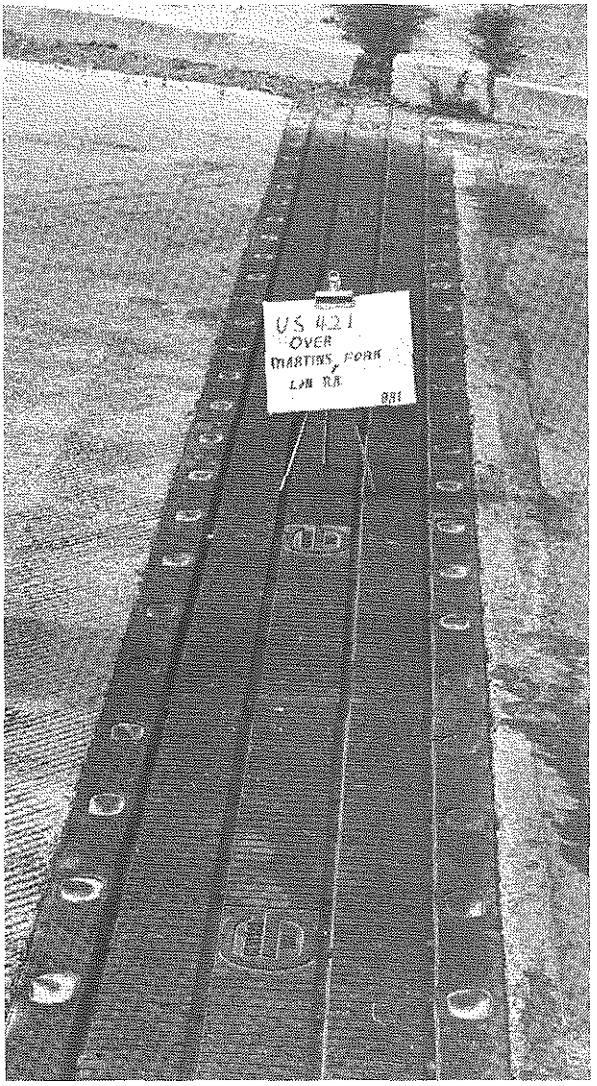


Figure A13. Transflex 650; joint in excellent condition.

Comments: Joints in very good condition
Some blemishes or tears in rubber

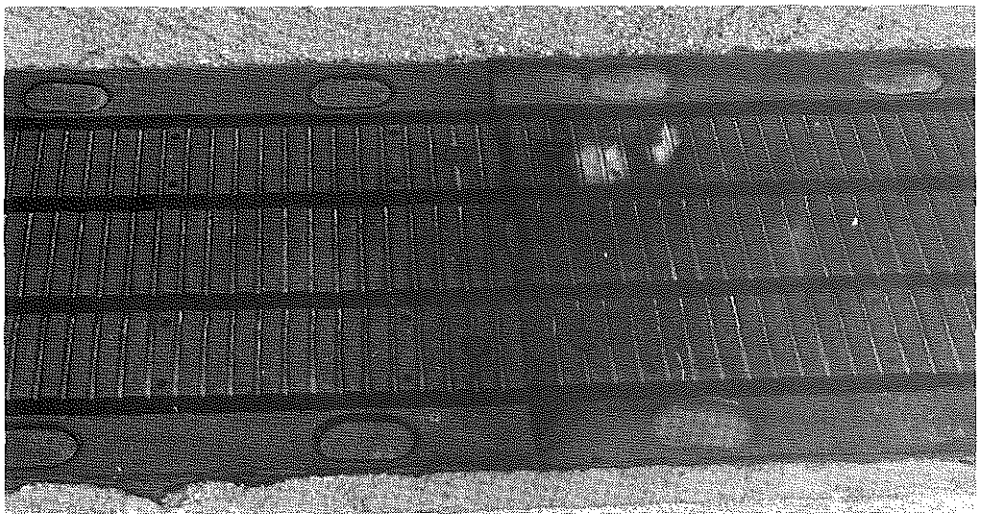


Figure A14. Transflex 650; abutted sections, US 421 over Martins Fork.

EXPANSION JOINT EVALUATION

Bridge Identification: US 421, Martins Fork and L&N Railroad
County: Harlan
Project Number: F 151(33) Bridge 2

BRIDGE DESCRIPTION
Type: Welded-steel plate-girder -- three continuous units
Length: 722 ft (220 m)
Width: 75 ft (23 m)
Span Length Contributing to Joint Movement : Three @ 347 ft (106 m), 79 ft (24 m), 296 ft (90 m)
Skew: Two @ 30°, one @ 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -10° to 94° F (-23° to 34° C)
Average Annual Precipitation: 46.78 in. (1,188 mm)
Location: Rural

JOINT DATA
Joint Type and Model: Three Transflex 650
Installation Date: 7-77
Installation Cost: Not available
Theoretical Movement of Joint Type: Transflex 650: 6.5 in. (165 mm)

TRAFFIC DATA
AADT: 9,700
Percent Trucks: 6

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: In gutter areas only -- some large debris lodged in joint

Joint Leaking: None
Distress around Joint: None

Comments: Joints in very good condition
Some blemishes in rubber

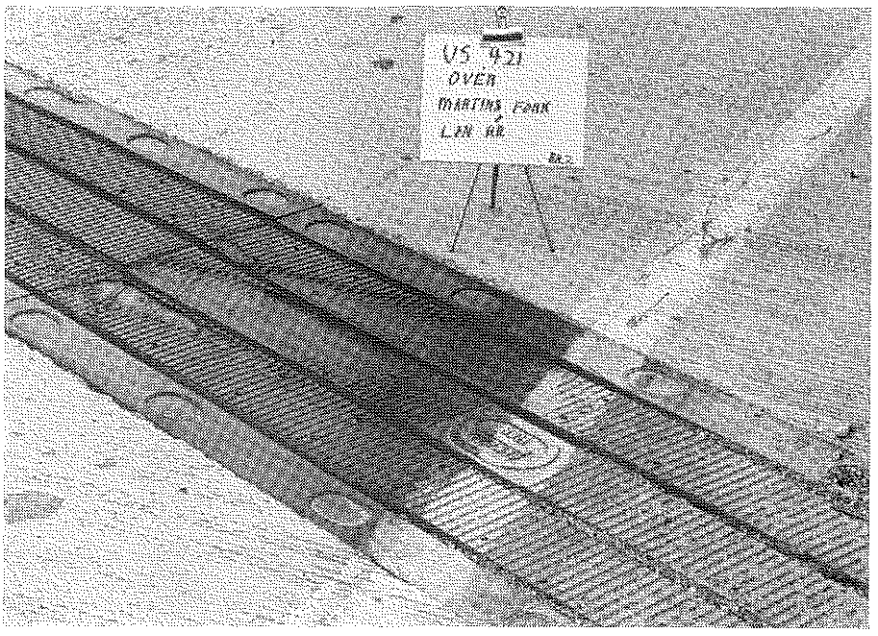


Figure A15. Transflex 650; note blemishes in the surface of the joint.

EXPANSION JOINT EVALUATION

Bridge Identification: Elmdale Road over I 24
County: McCracken
Project Number: I 24-1(33)4

BRIDGE DESCRIPTION
Type: Reinforced concrete deck-girder, continuous
Length: 333 ft (102 m)
Width: 43 ft (13 m)
Span : One
Skew: 30°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -2° to 100° F (-19° to 38° C)
Average Annual Precipitation: 45.69 in. (1,161 mm)
Location: Urban

JOINT DATA
Joint Type and Model: Two Fel Span T20
Installation Date: 8-77
Installation Cost: Total for two joints - $6,720
Theoretical Movement of Joint Type: T20 Fel Span: 2.0 in. (51 mm)

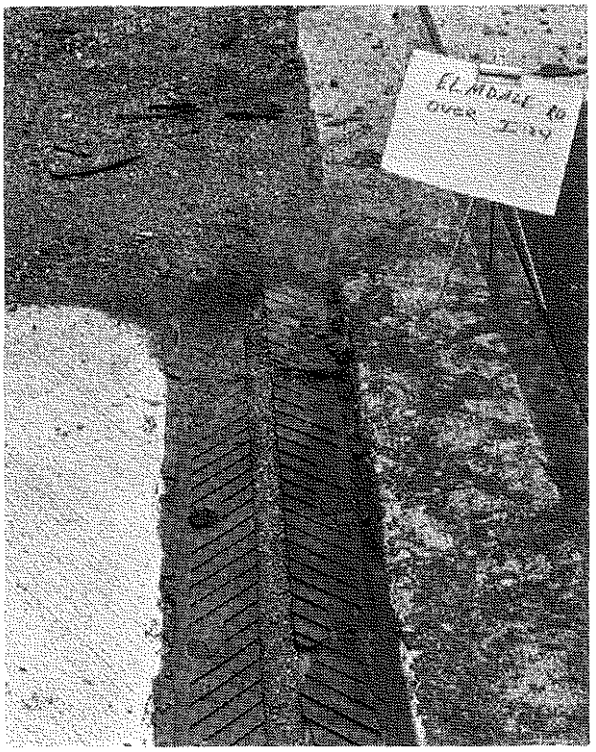


Figure A16. Fel Span T20; note edge sealant and deterioration of the hole plugs.

TRAFFIC DATA
AADT: Not available
Percent Trucks: Not available

INSPECTION DATA
Ride Quality: Not available
Noise Generation: Not available
Accumulation of Debris: See comments below

Joint Leaking: No apparent leakage
Distress around Joint: None

Comments: Bridge not open to traffic
Sealant between joint and concrete wearing, i.e, not functioning properly -- sealant is brittle and is pulling from surface
Much debris on bridge as the result of bridge not being open to traffic – no apparent problems from debris

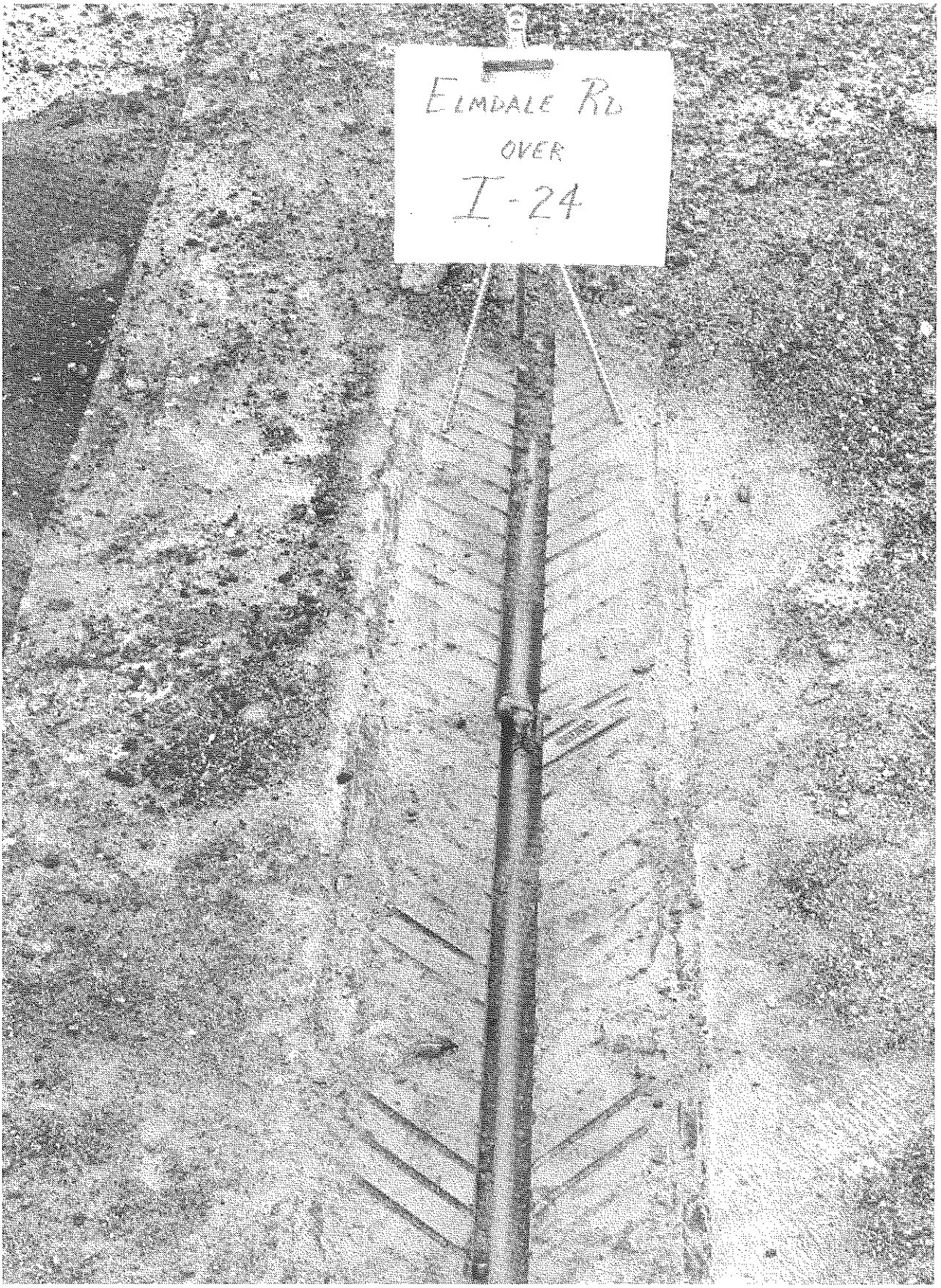


Figure A17. Fel Span T20; abutted sections.

EXPANSION JOINT EVALUATION

Bridge Identification: KY 770, Laurel River, I 75, and KY 312 Connector
County: Laurel
Project Number: RS 152 (5)

BRIDGE DESCRIPTION

Type: Welded-steel plate-girder, continuous
Length: 566 ft (172 m)
Width: 29 ft (9 m)
Spans: One
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -12° to 96° F (-24° to 36° C)
Average Annual Precipitation: 47.53 in. (1,207 mm)
Location: Rural

JOINT DATA

Joint Type and Model: Two Transflex 650
Installation Date: 9/76
Installation Cost: Total for both, $13,200
Theoretical Movement of Joint Type: Transflex 650: 6.5 in. (165 mm)

TRAFFIC DATA

AADT: 3,100
Percent Trucks: 8

INSPECTION DATA

Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: Debris in gutter areas -- light in driving lanes

Joint Leaking: Stains on abutments indicate leakage -- possibly leaking is joint sealant
Distress around Joint: None

Comments: Some tears noted in rubber
Leaks could possibly occur where sections are put together
Joints appear in good condition except for tears noted in rubber

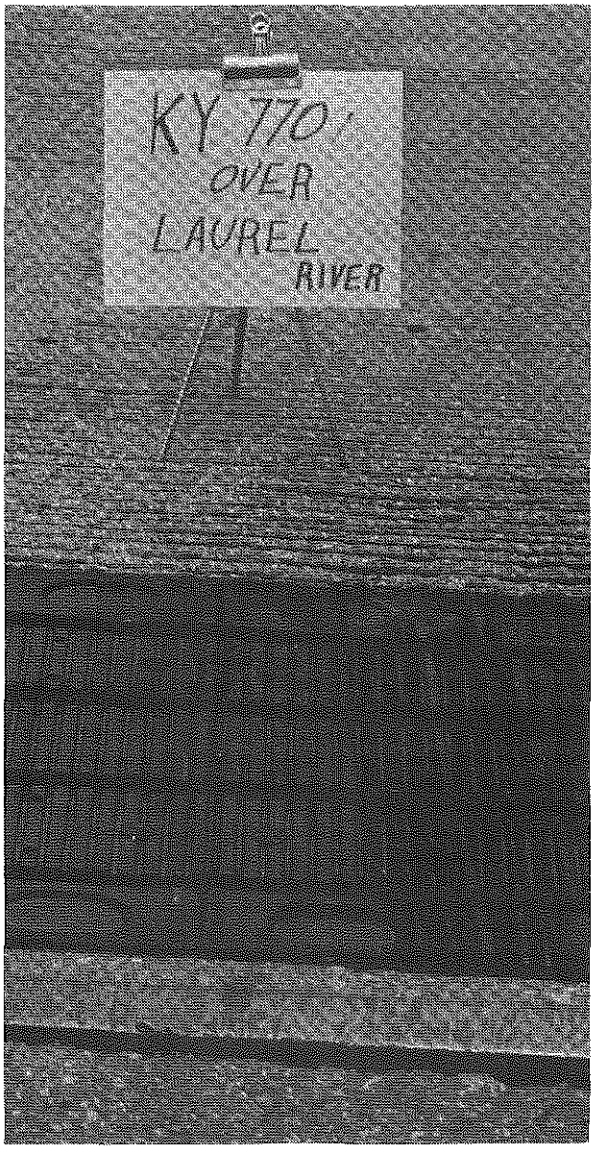


Figure A18. Transflex 650; abutted section.

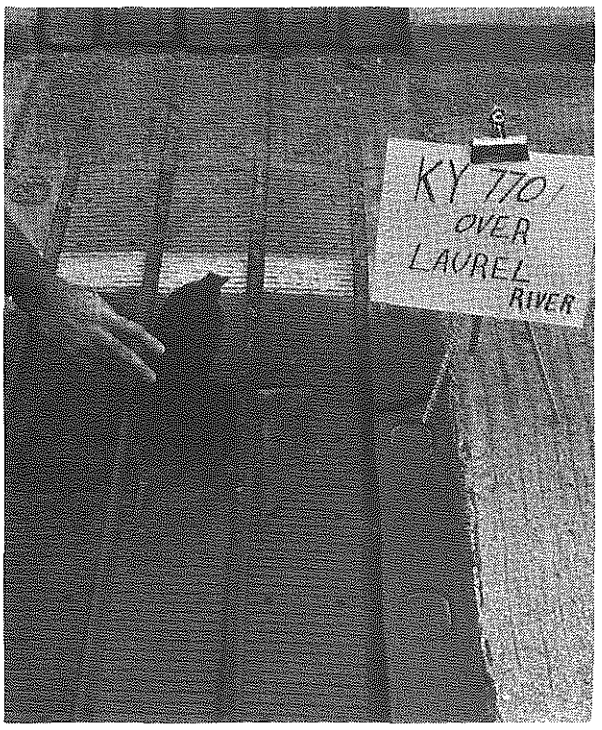


Figure A19. Transflex 650; note tears in the surface of the joint.

EXPANSION JOINT EVALUATION

Bridge Identification: Prestonsburg-Pikeville Road, Access Road to KY 1426 over Levisa Fork of Island Creek
County: Pike
Project Number: APD 127 (65)

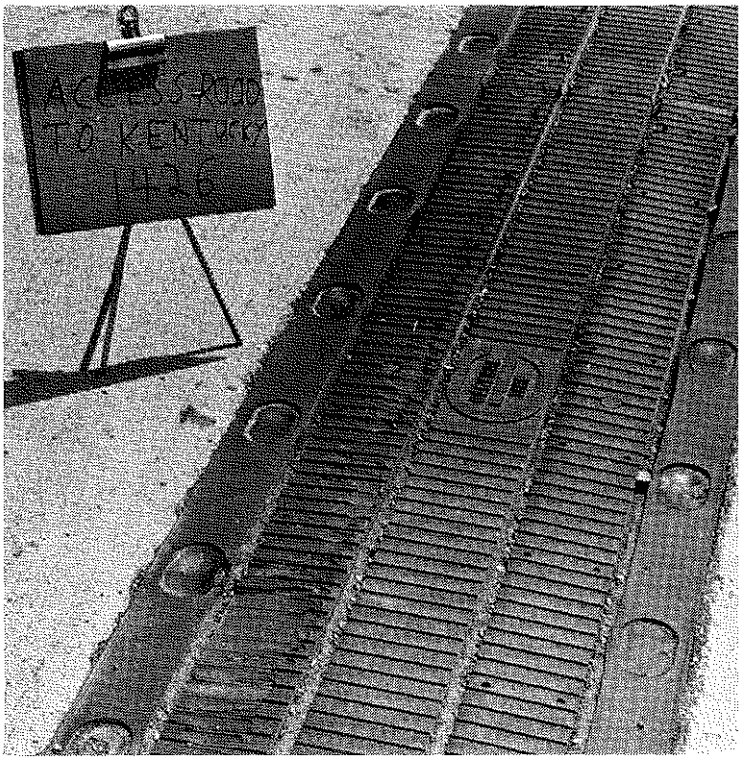
BRIDGE DESCRIPTION
Type: Welded-steel plate-girder, continuous
Length: 395 ft (120 m)
Width: 44 ft (13 m)
Spans: One
Skew: 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -6° to 98°F (-21° to 37°C)
Average Annual Precipitation: 43.21 in. (1,098 mm)
Location: Rural

JOINT DATA
Joint Type and Model: One Transflex 250; One Transflex 400A
Installation Date: 9-75
Installation Cost: 250 : $7,500; 400A: $10,000
Theoretical Movement of Joint Type: 250: 2.5 in. (64 mm); 400A: 4.0 in. (102 mm)

TRAFFIC DATA
AADT: Not available
Percent Trucks: Not available

INSPECTION DATA
Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: Much debris in joint



Joint Leaking: Not apparent
Distress around Joint: None

Comments: Sections show signs of wear
Some tears noted
Plug covers becoming loose, coming out, and tearing

Figure A20. Transflex 400A; note blemishes in the surface of the joint.

Figure A21. Transflex 400A; note accumulation of debris and initial deterioration of the hole plugs.

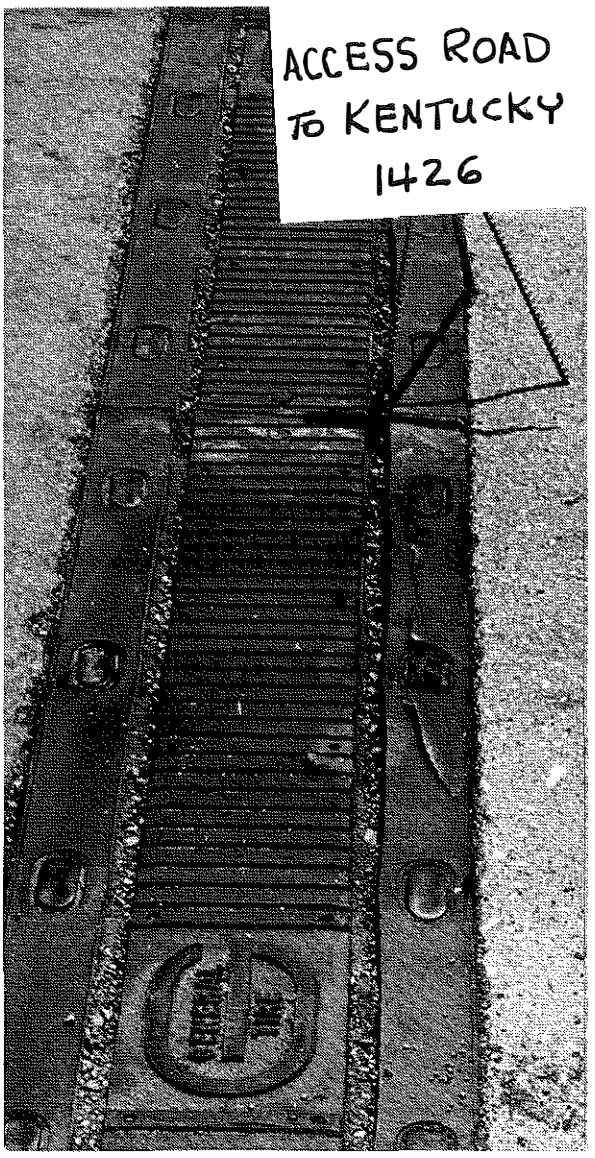


Figure A22. Transflex 250; note tears in the surface of the joint.

EXPANSION JOINT EVALUATION

Bridge Identification: Louisa - Fort Gay Bridge over Tug Fork
County: Lawrence
Project Number: BRS 5331-4, SP 64-33-14L

BRIDGE DESCRIPTION
Type: Welded-steel plate-girder, concrete deck-girder; combination simple span and continuous span
Length: 1,238 ft (377 m)
Width: 32 ft (10 m)
Span Length Contributing to Joint Movement: Five @ 78 ft (24 m), 320 ft (98 m), 245 ft (75 m), 420 ft (128 m), 175 ft (53 m)
Skew: Joints 1 & 2 -- 20°; 3 & 4 - 10°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -13° to 98°F (-25° to 37° C)
Average Annual Precipitation: 39.83 in. (1,012 mm)
Location: Urban

JOINT DATA
Joint Type and Model: Two Transflex 200A; two Transflex 400A

Installation Date: 1979
Installation Cost: Total $16,223
Theoretical Movement of Joint Type: 200A: 2.0 in. (51 mm): 400A: 4.0 in. (102 mm)

TRAFFIC DATA
AADT: 6,300 (estimated)
Percent Trucks: 5 (estimated)

INSPECTION DATA
Ride Quality: Not applicable
Noise Generation: Not applicable
Accumulation of Debris: None

Joint Leaking: Not apparent
Distress around Joint: None

Comments: Bridge not open to traffic

Figure A23. Transflex 200A; note loss of edge sealant and horizontal misalignment.

EXPANSION JOINT EVALUATION

Bridge Identification: KY 225, Cumberland River
County: Knox
Project Number: RS 355(4), SP 61-130-11L

BRIDGE DESCRIPTION

Type: Reinforced concrete deck-girder; simple span - continuous - simple span

Length: 510 ft (155 m)
Width: 34 ft (10 m)
Span Length Contributing to Joint Movement: Three @ 52 ft (16 m), 406 ft (124 m), 52 ft (16 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -8° to 96° F (-22° to 35° C)
Average Annual Precipitation: 47.53 in. (1, 207 mm)
Location: Rural

JOINT DATA

Joint Type and Model: Two Fel Span T40
Installation Date: 7-78
Installation Cost: $4,875
Theoretical Movement of Joint Type: T40: 4.0 in. (102 mm)

TRAFFIC DATA

AADT: 2,300
Percent Trucks: 11

INSPECTION DATA

Ride Quality: Good
Noise Generation: Good
Accumulation of Debris: Clear in driving lanes, some debris in gutter areas

Joint Leaking: No evidence of leaking
Distress around Joint: Some minor distress around joint, possibly due to problems in construction

Comments: Plugs covering bolts are loose or missing
Joint approximately 3/8 in. (10 mm) lower than deck

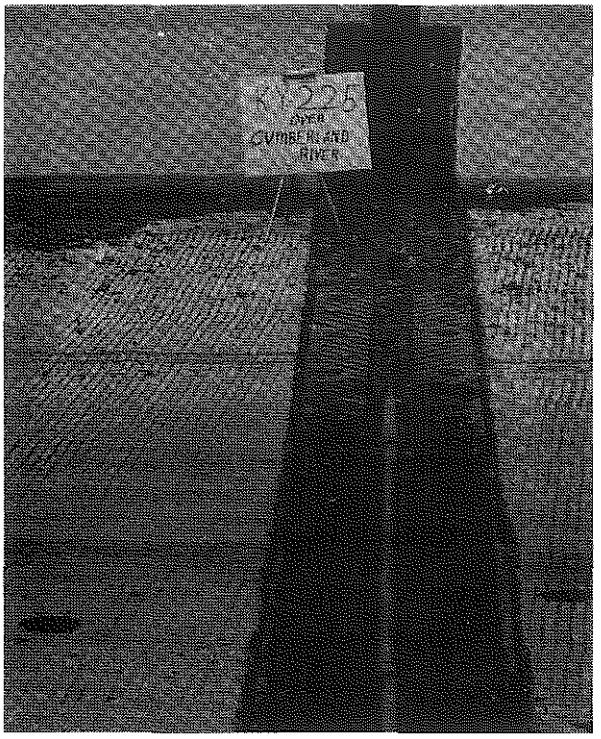


Figure A24. Fel Span T40; note deterioration of the hole plugs and accumulation of debris in the gutter area.

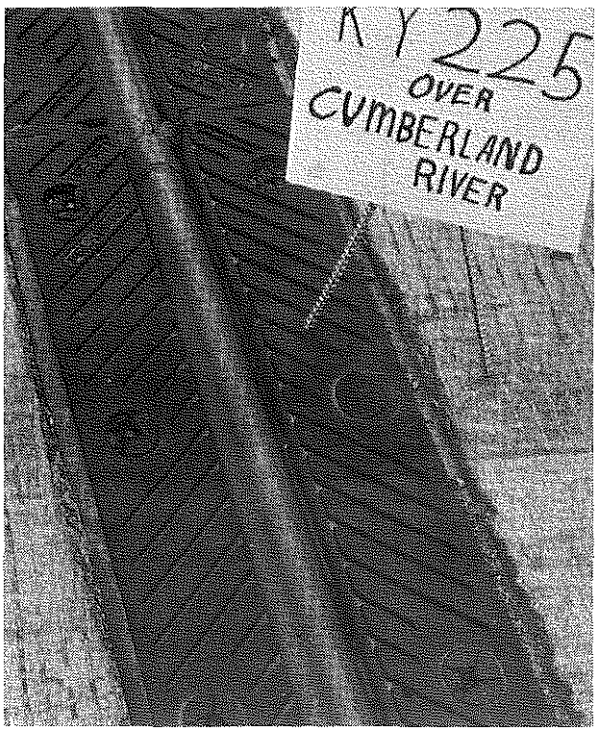


Figure A25. Fel Span T40; note deterioration of the hole plugs.

EXPANSION JOINT EVALUATION

Bridge Identification: Riverside Parkway - 13th to 17th Streets
County: Jefferson
Project Number: I 64-2(87)3

BRIDGE DESCRIPTION

Type: Welded-steel plate girder, continuous units
Length: 10,419 ft (3,176 m)
Width: Varies 22 to 52 ft (7 to 16 m)
Span Length Contributing to Joint Movement: 41 spans of varing lengths from 110 ft (34 m) to 495 ft (151 m)
Skew: Varies

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -7° to 98°F (-22° to 37°C)
Average Annual Precipitation: 43.11 in. (1,095 mm)
Location: Urban

JOINT DATA

Joint Type and Model: Five Wabo-Maurer D260; 18 Wabo-Maurer D520; 18 Wabo-Maurer D780; three Wabo-Maurer D1040
Installation Date: 1974 and 1975
Installation Cost: $600,000 total
Theoretical Movement of Joint Type: D260: 2.6 in. (66 mm); D520: 5.2 in. (132 mm); D780: 7.8 in. (198 mm); D1040: 10.4 in. (264 mm)

TRAFFIC DATA

AADT: 63,600
Percent Trucks: 10

INSPECTION DATA

Ride Quality: Good
Noise Generation: See below
Accumulation of Debris: Excessive in gutter area, all across joint

Joint Leaking: Not evident
Distress Around Joint: None

COMMENTS

Several joints loud under traffic as a result of steel channels moving under traffic and plates becoming loose.
Vertical misalignment between channels noted on several joints.

Figure A26. Wabo-Maurer D1040; note vertical misalignment across the joint.

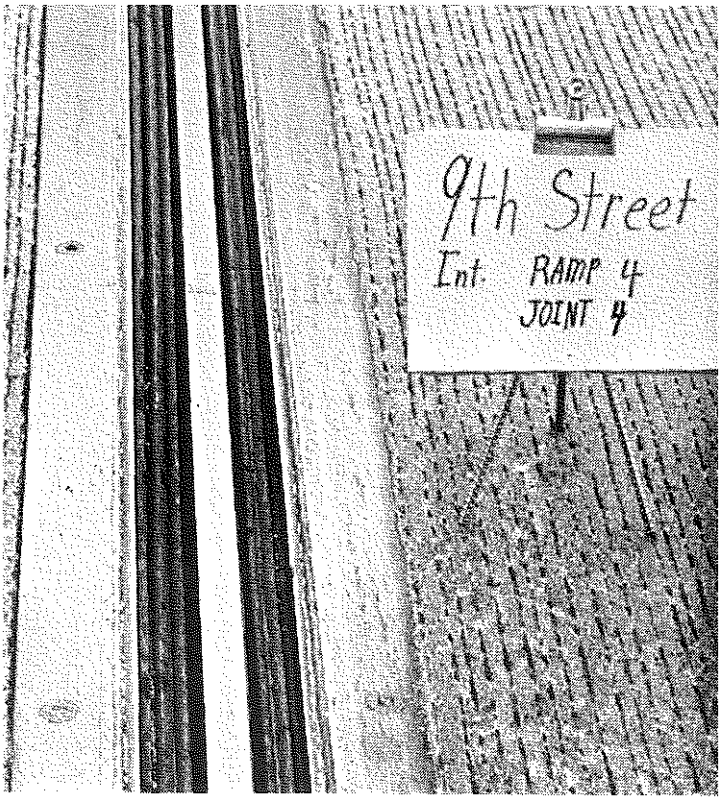


Figure A27. Wabo-Maurer D520; joint in excellent condition.

EXPANSION JOINT EVALUATION

Bridge Identification: Jefferson Freeway over Ramp 6: Jefferson Freeway
County: Jefferson Kentucky Turnpike Interchange
Project Number: F 552(12); SP56-468-15L

BRIDGE DESCRIPTION
Type: Continuous, welded-steel plate-girder
Length: 200 ft (61 m)
Width: 40 ft (12 m)
Span Length Contributing to Joint Movement: One @ 200 ft (61 m)
Skew: 3°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -7° to 98° F (-22° to 37° C)
Annual Precipitation: 43.11 in. (1,095 mm)
Location: Rural

JOINT DATA
Joint Type and Model:
Installation Date:
Installation Cost:
Theoretical Movement of Joint Type:

TRAFFIC DATA
AADT: 53,600 (estimated)
Percent Trucks: 10 (estimated)

INSPECTION DATA
Ride Quality:
Noise Generation:
Accumulation of Debris:

Joint Leaking:
Distress around Joint:

Comments: Contract has not been let

EXPANSION JOINT EVALUATION

Bridge Identification: Poplar Level Road over Southern Railroad
County: Jefferson
Project Number: U 553 (3)

BRIDGE DESCRIPTION
Type: 17-span, precast, prestressed concrete I-beam
Length: 1,143 ft (348 m)
Width: 68 ft (21 m)
Spans: 17
Skew: 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -7° to 98°F (-22° to 37°C)
Average Annual Precipitation: 43.11 in. (1,095 mm)
Location: Urban

JOINT DATA
Joint Type and Model:
Installlation Date:
Installation Cost:
Theoretical Movement of Joint Type:

TRAFFIC DATA
AADT: 39,700
Percent Trucks: 11

INSPECTION DATA
Ride Quality:
Noise Generation:
Accumulation of Debris:

Joint Leaking:
Distress around Joint:

Comments: Contract has not been let

EXPANSION JOINT EVALUATION

Bridge Identification: Southpark Road over Kentucky Turnpike
County: Jefferson
Project Number: F 552(12); SP 56-468-15L

BRIDGE DESCRIPTION
Type: Combination simple span -- continuous span -- simple span; welded-steel plate-girder
Length: 377 ft (115 m)
Width: 44 ft (13 m)
Span Length Contributing to Joint Movement: Three @ 43 ft (13 m), 291 ft (89 m), 43 ft (13 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -7° to 98°F (-22° to 37°C)
Average Annual Precipitation: 43.11 in. (1,095 mm)
Location: Rural

JOINT DATA
Joint Type and Model:
Installation Date:
Installation Cost:
Theoretical Movement of Joint Type

TRAFFIC DATA
AADT: 9,700
Percent Trucks: 3

INSPECTION DATA
Ride Quality
Noise Generation:
Accumulation of Debris:

Joint Leaking:
Distress around Joint:

Comments: Contract has not been let

EXPANSION JOINT EVALUATION

Bridge Identification: US 31, Ohio River: Clark Memorial Bridge
County: Jefferson
Project Number: SP 56-8118-7

BRIDGE DESCRIPTION

Type: Combination -- plate-girder and cantilever truss
Length: 6,363 ft (1,939 m)
Width: 37 ft (11 m)
Span Length Contributing to Joint Movement: Thirteen @ 476 ft (145 m), 60 ft (18 m), 240 ft (73 m), 1,514 ft (461 m), 375 ft (114 m), 734 ft (224 m), 731 ft (223 m), 381 ft (116 m), 594 ft (181 m), 379 ft (116 m), 163 ft (50 m), 126 ft (38 m), 590 ft (180 m)
Skew: 0°

ENVIRONMENTAL CONDITIONS

Yearly Temperature Range: -7° to 98° F (- 22° to 37 ° C)
Average Annual Precipitation: 43.11 in. (1,095 mm)
Location: Urban

JOINT DATA

Joint Type and Model: Two Reynolds Aluminum, four Transflex 200A, two Transflex 400
Installation Date: 1967
Installation Cost: Not available
Theoretical Movement of Joint Type: Reynolds Aluminum: movement not available; Transflex 200A: 2.0 in. (51 mm); Transflex 400: 4.0 in (102 mm)

Figure A28. Transflex 200A; note vertical misalignment of the abutted sections, loss of edge sealant, and loss of the hole plugs.

TRAFFIC DATA
AADT: 19,600 (estimated)
Percent Trucks: 4 (estimated)

INSPECTION DATA
Ride Quality: Poor -- due to distress around joints and joints being loose
Noise Generation: Poor -- due to distress around joints and joints being loose
Accumulation of Debris: Much debris

Joint Leaking: All joints -- due to distress and lack of sealant
Distress around Joint: Severe

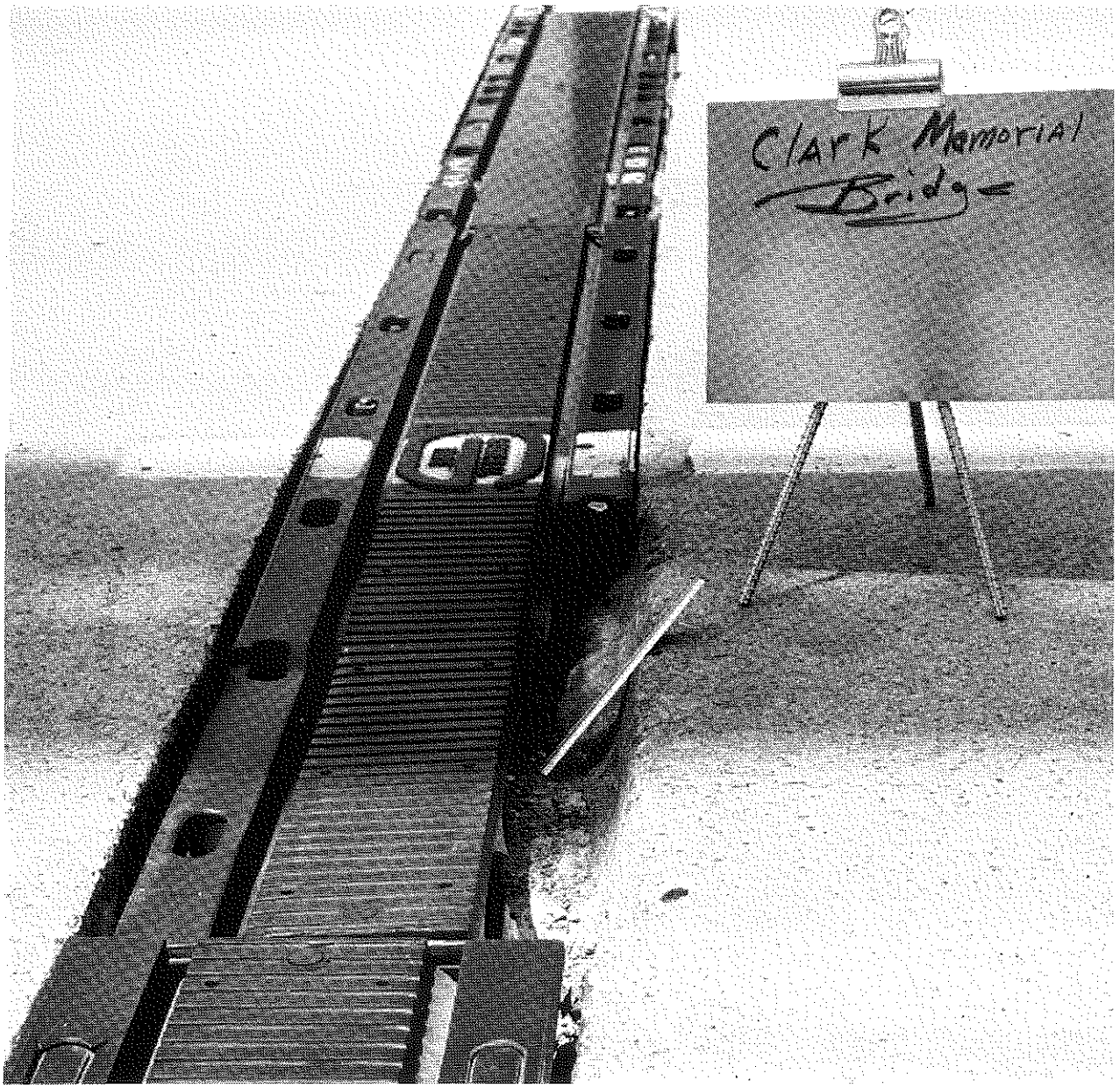


Figure A29. Transflex 200A; total deterioration of the joint.

Comments: Reynolds Aluminum joint -- distress severe around joint -- noise due to contact of aluminum plates

Transflex 200A -- loss of plug covers, sections of joint not properly installed, edges have little or no sealant, intrusion of debris and water, leakage severe due to poor joint and pavement performance, sections misaligned both vertically and horizontally, partial sections missing

Transflex 400 -- waffle design fills with debris, loss of plug covers, loss of joint sealant, deterioration around joints, leaking inevitable

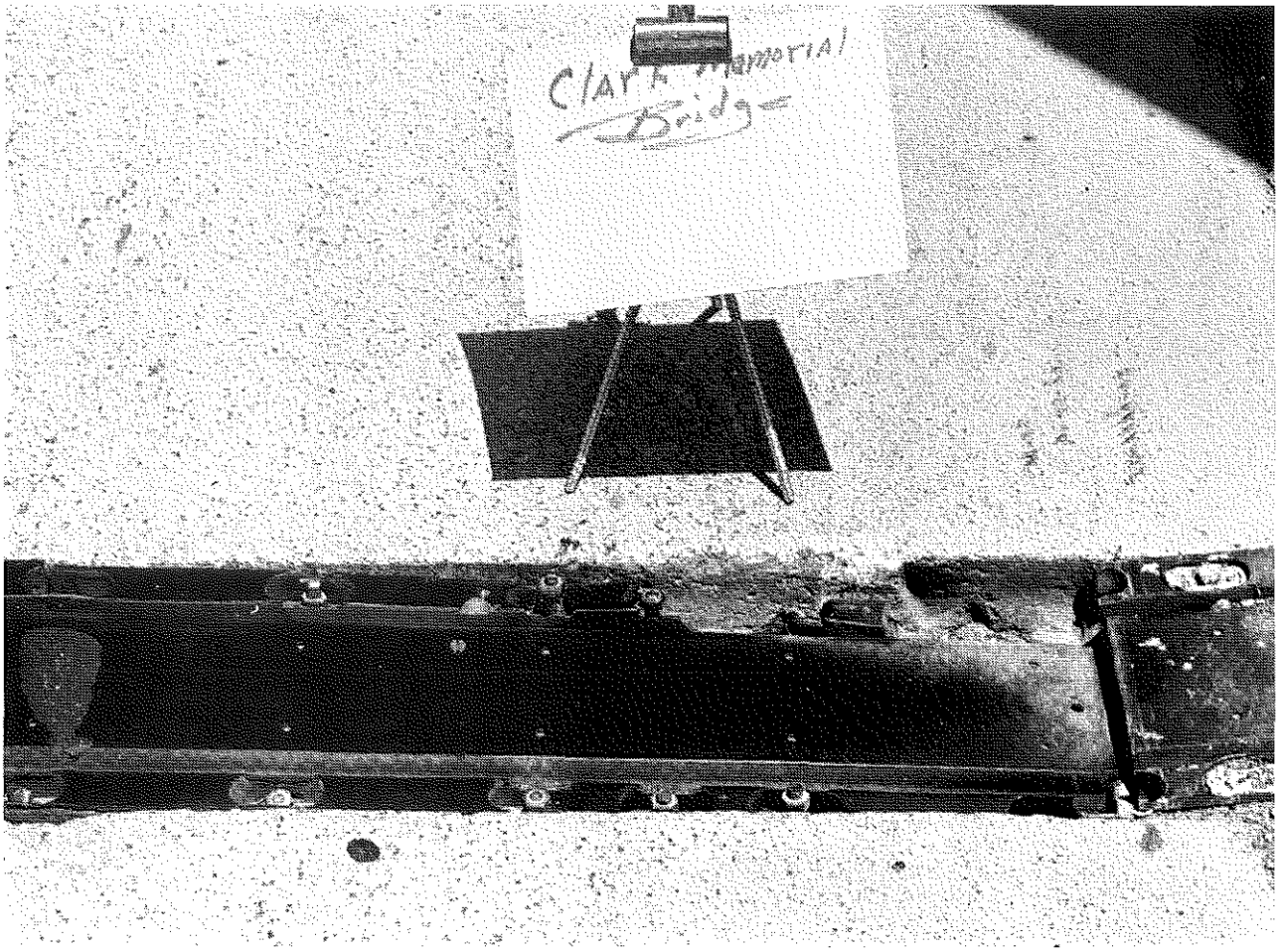


Figure A30. Transflex 200A; total deterioration of the joint.

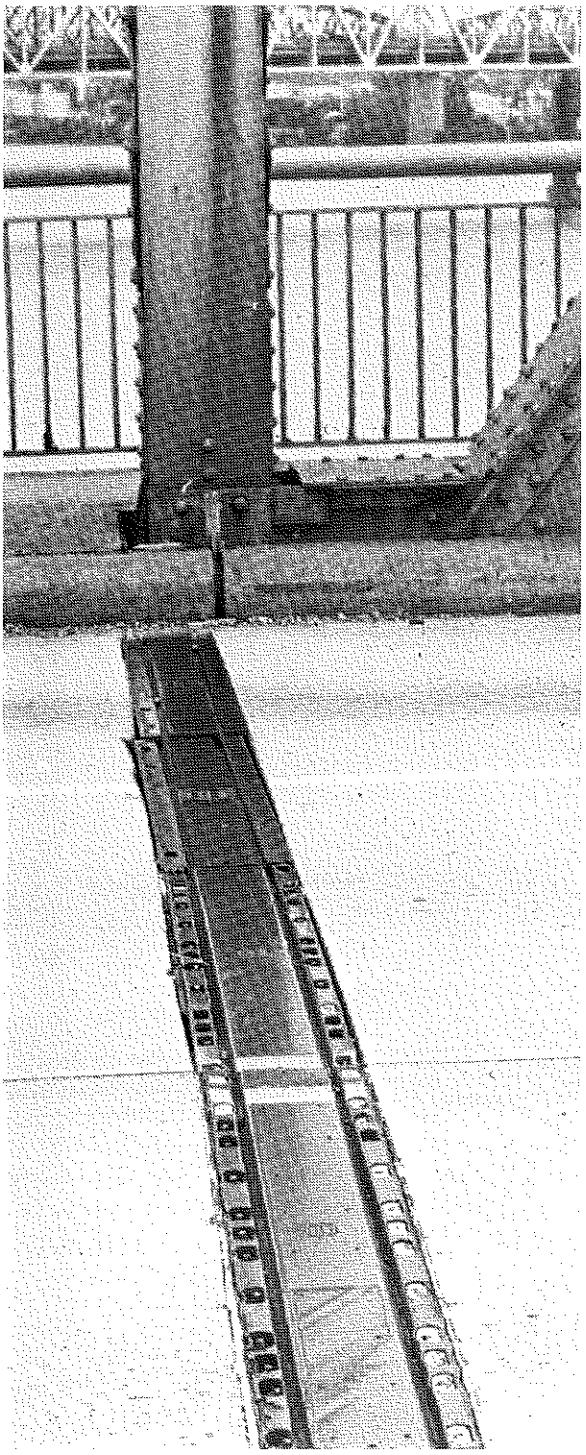


Figure A31. Transflex 200A; misalignment of the abutted sections, loss of edge sealant, loss of the hole plugs, and poor construction of concrete blockout.

Figure A32. Transflex 200A; no edge sealant, loss of the hole plugs, and total deterioration of the joint.

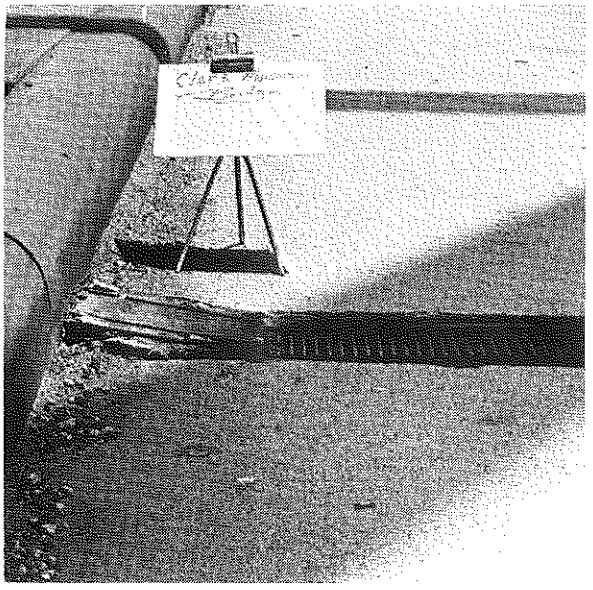


Figure A33. Transflex 200A; total deterioration of the joint.

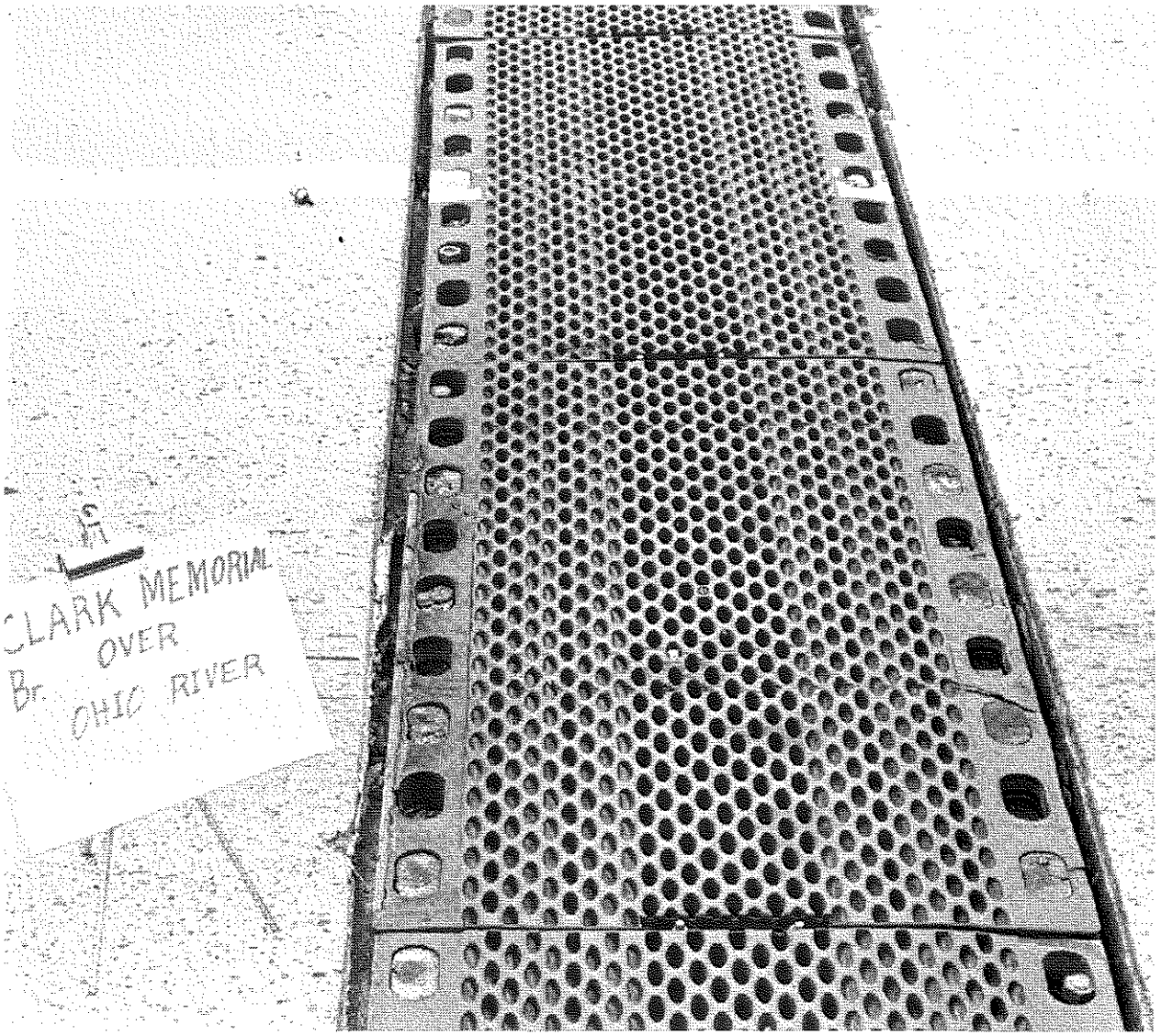


Figure A34. Transflex 400; no edge sealant, no hole plugs, misalignment of the abutted sections, open grid system collects debris.

EXPANSION JOINT EVALUATION

Bridge Identification: Ramp 2 over Jefferson Freeway and Preston Street
County: Jefferson
Project Number: F 552(12) **SP**56-468-15**L**

BRIDGE DESCRIPTION
Type: Continuous, welded-steel plate-girder
Length: 366 ft (112 m)
Width: 38 ft (12 m)
Span Length Contributing to Movement: One @ 366 ft (112 m)
Skew: Varies

ENVIRONMENTAL CONDITIONS
Yearly Temperature Range: -7° to 98°F (-22° to 37°C)
Average Annual Precipitation: 43.11 in. (1,095 mm)
Location: Urban

JOINT DATA
Joint Type and Model:
Installation Date:
Installation Cost:
Theoretical Movement of Joint Type:

TRAFFIC DATA
AADT:
Percent of Trucks:

INSPECTION DATA
Ride Quality:
Noise Generation:
Accumulation of Debris:

Joint Leaking:
Distress around Joint:

Comments: Contract has not been let