R-TR-76-005

MEASUREMENT OF THE STATIC INFLUENCE COEFFICIENT OF THE AH-1G COBRA FUSELAGE

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RESEARCH DIRECTORATE

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
An AH-1G Cobra Helicopter (minus the tailsection) was mounted in a vertical position by personnel at the Ware Simulation Center, Rock Island Arsenal, and the response of the fuselage to various applied loads was then measured. The response, measured as deflections in the direction of applied load, will be used by Bell Helicopter Company for the validation of their NASTRAN math model of the Cobra Helicopter. Initial results of the test indicate good agreement between the experimentally measured deflections and the math model predicted deflections.

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ABSTRACT

An AH-1G Cobra Helicopter (minus the tailsection) was mounted in a vertical position by personnel at the Ware Simulation Center, Rock Island Arsenal, and the response of the fuselage to various applied loads was then measured. The response, measured as deflections in the direction of applied load, will be used by Bell Helicopter Company for the validation of their NASTRAN math model of the Cobra Helicopter. Initial results of the test indicate good agreement between the experimentally measured deflections and the math model predicted deflections.

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TABULAR DATA

I. OBJECTIVE

The joint test conducted by Rock Island Arsenal and Bell Helicopter Company, and sponsored by AMRDL, Langley AFB, entailed the measurement of the static influence coefficients of the AH-1G airframe to validate a NASTRAN math model of the airframe developed by Bell Helicopter Company personnel.

The Ware Simulation Center was responsible for preparation of the AH-1G Cobra Helicopter, Serial No. 68-15048, for testing, mounting of the helicopter on the test bed, installation of the instrumentation to measure the required parameters, application of the loads to deflect the helicopter, reduction of the data to engineering units, and preparation of a technical note on the test setup to present the data.

The Bell Helicopter Company was responsible for repair of the Cobra hull to correct some existing fire damage, writing the test plan, and supplying technical guidance pertaining to expected deflections, helicopter structural requirements, and transducer locations.

USA-AMRDL, Langley AFB, supplied the required funding and had overall test control and responsibility.

II. CONDUCT OF THE TEST

General. The AH-1G Cobra Helicopter, Serial No. 68-15048, with the tailboom removed was mounted on a large steel bedplate, Figures 1 and 2. The bedplate on which the airframe rested measured 16 feet by 4 feet by 8 inches thick, and weighed approximately 16,000 pounds. T-slots in the bedplate were used to fasten an adapter plate between the Cobra fuselage at the tailboom bulkhead, Station 300.68, and the bedplate. Aircraft bolts identical to those used to fasten the tailboom to the fuselage were used to fasten the fuselage to the adaptor plate.

By applying forces at appropriate points on the airframe, and by measuring the corresponding displacements, the static influence coefficients of the structure can be determined. Bell Helicopter Company provided a work statement which defined the application points for forces, and the measurement points for displacement so that the static influence coefficients

used in their NASTRAN model could be checked. (See Appendix A)

Preparation of Helicopter. The Cobra Helicopter, Serial No. 68-15048, was obtained by Rock Island Arsenal from the Corpus Christi Helicopter Repair Facility in 1972. The fuselage of the helicopter had been damaged by fire prior to acquisition by Rock Island. Bell Helicopter Company representatives visited Rock Island during October 1974 to inspect the fuselage and to determine what repairs should be made to ensure that the fuselage is structurally sound. As a result of their evaluation, Bell Helicopter Company recommended that several load-bearing panels be replaced and that several other portions of the helicopter be stiffened. Bell Helicopter Company designed the repairs and provided a structural engineer to supervise the installation of the recommended repairs. The Rock Island Arsenal Prototype Branch provided two machinists to install the panels and stiffeners. The majority of the repairs are shown in the photographs of Figures 4 to 9, and are documented in Bell Inter-Office Memo, dated 17 April 1975, and included in Appendix A.

Instrumentation. The deflections at the designated locations were measured with Linear Variable Differential Transformers (LVDT's), manufactured by Trans-Tek Corporation. The LVDT is an electromechanical transducer that produces an electrical output proportional to the displacement of a separate, movable core. The device combines accuracy with reliability in the measurement of linear displacement. The measurement ranges of the transducers required were determined from a computer run of the expected displacements from the Bell math model. A typical LVDT is shown in Figure 10 as mounted to measure displacement of the AH-1G Cobra fuselage.

Honeywell Model 119B1 Carrier Amplifiers were used as signal-conditioning equipment for most of the LVDT's. But, amplifiers manufactured by Daytronic Corporation were used as signal-conditioning equipment for the most sensitive LVDT's, i.e., those measuring 0.050 inch or less.

Force washers, Model 216A, manufactured by PCB Corporation, were inserted between the tailboom interface and the adaptor plate mounting surfaces. The force washers were preloaded to approximately 10,000 pounds; thus, the measurement of both tension and compression loading was possible.

The output of the transducers was recorded on analog magnetic tape with a 28-channel, SABRE V Sangamo tape recorder. The tape deck, and associated signal conditioning equipment are shown in Figure 11. The recorded data were then reduced to engineering units by use of the automated data reduction system located in the Ware Simulation Center. The complete list of equipment used is shown in Table 1.

The drawing of the adaptor plate is shown in Figure 3. The four mounting surfaces are machined at 3½ degrees which allows the fuselage to stand plumb.

Figure 2 shows the fuselage mounted toward one end of the long axis of the bedplate; thus, stability is provided when the vertical load and the wing loads are applied. The fuselage was rotated 90 degrees for the lateral pull test to provide the same stability to the test setup.

Hydraulic cylinders, pressurized by hand pumps, were used to apply the prescribed loads. Each cylinder and pump combination was equipped with a load cell in series; thus, the magnetic tape recording of the applied load was possible. A parallel output from the load cell was used to monitor the incremental loading by means of a digital voltmeter for each test run. The combination of the load cell and the hydraulic cylinder was calibrated with a dynamometer, and the output voltage of the load cell versus load was recorded.

Mobile cranes were used as anchor points for the vertical loading, torsional loading of the nose, beamwise loading on the wings, and lateral loading of the structure. Anchor points for the application of torsional loads to the wings consisted of weights on the floor and bars across the overhead scaffolding.

Each test requested in the Bell work statement was run three times to check reproducibility of data. After each test run, a preliminary check of the data was made before that test setup was disassembled. The ammunition doors of the AH-1G were blocked open during the entire test program to eliminate any influence on the structural stiffness due to binding of the doors.

III. TEST LOAD APPLICATIONS

Vertical Pull. The response of the AH-1G Cobra Helicopter fuselage to a 1,000 pound vertical load applied at fuselage Station 74.50 was obtained by measuring the vertical deflections at selected locations along the underside of the helicopter. The locations monitored were identical to the fuselage stations specified in the test plan prepared by Bell Helicopter Company which is included in Appendix A of this report.

Some of the transducers located along the underside of the helicopter are shown in the photograph of Figure 12. This photograph shows the transducer, the method of attachment to the fuselage, and the relative location of the transducer along the fuselage of the helicopter. The channel number of the transducer as recorded on the analog tape, the parameter measured by the transducer, and the station number location of the transducer are listed in Table 2.

The 1,000-pound load was applied with a hydraulic cylinder attached to the loading fixture. A detailed drawing of the vertical and nose-torsion loading fixture is shown in Figure 13. The Bell Helicopter representative believed that the illustrated "six holes to be located and drilled at assembly" would be insufficient to adequately distribute the vertical or torsional loads over the turret base. The fixture was therefore modified as shown by the sketch in Figure 14. The modified fixture can also be seen in the photograph of Figure 15 - note the vertical gussets and extended backplate. A mobile crane was used as the load reaction mass. The load was applied in increments of 100 pounds by a hand pump to retract the cylinder rod. This arrangement is shown in the photograph of Figure 16. The 100-pound plateaus were then held constant for approximately 30 seconds before the next 100-pound increment of load was applied.

The base rotation was recorded by measurement of the vertical displacement of the tailboom interface relative to ground. A typical base-rotation transducer is shown in the photograph of Figure 17. A detailed sketch showing the transducer locations for measurement of base rotation is shown in Figure 18. Thus, the effect of base rotation can be subtracted from the displacements at the appropriate station locations.

The data plots, showing displacement versus applied load, are included as Appendix B of this report.

Torsional Loading at Nose. The response of the AH-1G Cobra Helicopter fuselage to a 20,000 in-lb torque applied about the longitudinal axis of the fuselage at the nose section was measured. The torque application fixture was bolted to the turret interface. The vertical deflections at the locations specified in the test plan prepared by Bell Helicopter Company, and included as part of Appendix A, were monitored.

The transducers for the nose-torsion test were located in the same plane as those used in the vertical pull test. The same transducers were utilized, and eight of the same positions were monitored. Three transducers were relocated to different positions on the underside of the fuselage. The base-rotation tranducers were added to measure torsion at the base. The vertical pull transducers, and the majority of the nose-torsion transducers are shown in the photograph of Figure 12. This photograph shows the transducers, the method of attachment to the fuselage, and the relative location of the transducer along the fuselage of the helicopter. The list in Table 3 shows the channel number of the transducer as recorded on the analog tape, the parameter measured by the transducer, and the station number location of the transducer.

The 20,000 in-lb torque was applied through the loading fixture with the test setup shown in Figure 19. One hydraulic pump, with a manifold to two hydraulic cylinders, was used to apply the loads. Mobile cranes were used as the load reaction masses. The load was applied in increments of 100 pounds to the torque arms by a hand pump to retract the cylinder rod. The torque levels were held constant for approximately 30 seconds before the next 100-pound increment was applied to the torque arm. A plot of the left load being applied, versus the right load being applied, shows a 1:1 ratio of loads, i.e., identical loads were applied to the torque arms. This relationship is shown in Figure 20.

The resultant base rotation was measured so that appropriate correction factors could be applied to the measured displacements. The transducer setup for measurement of base rotation is shown in Figure 21.

The data plots showing displacement, versus applied load on the torque arm, are included as Appendix C of this report.

Wing Beamwise Loading. The response of the AH-1G Cobra Helicopter fuselage to a 1,000-pound load applied perpendicular to the stub wings was measured. The load application fixture was bolted to the wing tip as shown in the photograph of Figure 22. The deflections specified in the test plan prepared by Bell Helicopter Company, and included as part of Appendix A, were monitored.

The transducers are shown in the photograph of Figure 23. This photograph shows the transducer, the method of attachment to the wing section, and the relative location of the transducers along the wing section. Table 4 lists the channel number of the transducer as recorded on the analog tape, the parameter measured by the transducer, and the station number location of the transducer.

The transducers were attached to an arm arrangement that was fastened to the pylon structure of the fuselage. Measurements of wing deflections were made relative to this arm arrangement, which is shown in Figure 23. No relative motion exists between the helicopter fuselage and the pylon structure as the load is applied to the wing tips. The deflection of the arm arrangement was measured relative to ground. The displacement of the wing relative to the fuselage could be calculated from these measurements.

The load was applied through the loading fixture as shown in Figure 24.

One hydraulic pump with a manifold to two hydraulic cylinders was used to apply the loads. Mobile cranes were used as the load-reaction mass for application of the loads. The loads were applied in increments of 100 pounds by use of the hand pump to retract the cylinder rod. The load plateaus were held constant for approximately 30 seconds before the next 100-pound increment of load was applied.

Deflections at the stub-wing root, adjacent to the fuselage, were measured so that wing slope and fuselage slope could be calculated. Typical transducers for these measurements are shown in the photographs of

Figures 25 and 26. Thus, the effects of wing root and fuselage rotation could be accommodated in the math model.

Wing Torsional Loading. The response of the AH-1G Cobra Helicopter fuselage to a 20,000 in-lb torsion load applied to the stub-wing tips was measured. The vertical deflections along selected locations of the wing spars were monitored. The locations monitored were identical to the wing stations specified in the test plan prepared by Bell Helicopter Company. The test plan is included as part of Appendix A.

The transducers are shown in the photographs of Figures 27 and 28. These figures show the transducers, the method of attachment to the wing, and the relative location of the transducer along the wing of the helicopter. The arm arrangement attached to the pylon structure, and the transducers that measure displacement of the arm arrangement relative to ground are shown in Figure 29. The channel number of the transducer (as recorded on the analog tape), the parameter measured by the transducer, and the wing station/fuselage station location of the transducer are listed in Table 5.

The torsional load was applied to the fixture shown in the photograph of Figure 30. This photograph shows the loading fixture mounted to the stub wing. Four hydraulic cylinder and pump assemblies were used for applying the loads to the fixtures. The cylinder ends were attached to the scaffolding for upward loading reaction points and to heavy weights as load reaction points for downward loading. The load was applied to the torque arms in increments of 100 pounds until the required 20,000 in-lb torque level was reached. The load was held constant for approximately 30 seconds at each load plateau.

Wing rotation, relative to the fuselage at the wing root, was measured so that appropriate corrections could be made in the computer model. A detailed sketch of the wing root and fuselage rotation transducer is shown as Figure 31.

The load as applied to the loading fixture on the left side of the helicopter was not applied as a true couple. An error in calibrating the load readout on the left, upward load, resulted in this load being

twice the value of the downward load. Thus, an imbalanced couple was applied to the left wing tip. This effect can be seen from a comparison of the data plate in Figures 32 and 33 that show the loads applied to the left wing fixture.

The data graphs showing displacement versus applied load are included as Appendix E.

Lateral Loading. The response of the AH-1G Cobra Helicopter fuselage to a 1,000-pound lateral load applied at fuselage Station 74.50 was measured. The lateral deflections along the left side of the helicopter were monitored. The locations monitored were identical to the locations specified in the test plan prepared by Bell Helicopter Company. The test plan is included as part of Appendix A of this report.

Typical transducers are shown in Figures 34, 35, and 36. These photographs show the transducers, the method of attachment to the fuselage, and the relative location of the transducer along the side of the fuselage. The channel number of the transducer as recorded on the analog tape, the parameter measured by the transducer, and the station number location of the transducer are listed in Table 6.

The 1,000-pound load was applied with a hydraulic cylinder attached to the loading fixture. A mobile crane was used as the load reaction mass. The load was applied in increments of 100 pounds by use of a hand pump to retract the cylinder rod. This arrangement is shown in the photograph of Figure 37. The reduced size sketch of the modified loading fixture shown in Figure 14 illustrates the same fixture that was used to apply the vertical load. Each 100-pound plateau was held constant for approximately 30 seconds before the next 100-pound increment of load was applied. Base rotation was measured by the monitoring of the vertical displacement of the tailboom bulkhead relative to ground. The transducer arrangement for measurement of base rotation is shown in the photograph of Figure 38. Thus, effects of base rotation can be compensated for in the computer model.

The data graphs showing displacement versus load applied are included as Appendix F.

Two problems appeared during the data analysis phase of the lateral-loading test. First, the transducer specified as being located at Station 213.9 was incorrectly located at Station 186.25. Secondly, the lateral deflection at the tailboom interface was not measured. These measurements would also give an indication of the torsional load applied because of the load application being applied off the neutral axis of the helicopter.

The missing data discussed above was recovered by rerunning the lateral loading test with dial indicators to measure the deflections as the load was applied. Dial indicators were installed, and the deflections were measured at the following locations: Station 93, Station 98.96, Station 186.25, Station 213.94, and Station 300.68. These tests were run with the ammunition doors closed to determine if binding of the ammunition doors had any effect on the results. The results of these tests are given in Table 7.

IV. CONCLUSIONS

This unique test provided experimental verification of values for the structural compliance of the AH-1G Cobra Helicopter that have been only estimates to this time. Also, the results have verified that - by proper application, the NASTRAN program may be used for analysis of complex helicopter structures. The math model was validated by the assurance that - with respect to the test setup and the model, the same boundry conditions and load application points were considered. Initial results have indicated excellent agreement between the measured deflections and the model calculations.

Major problems were not encountered during performance of the test. However, because of the novel nature of the test, the change from one test setup to another (i.e., the change from the vertical loading to the nose torsion loading) required more time than was originally estimated.

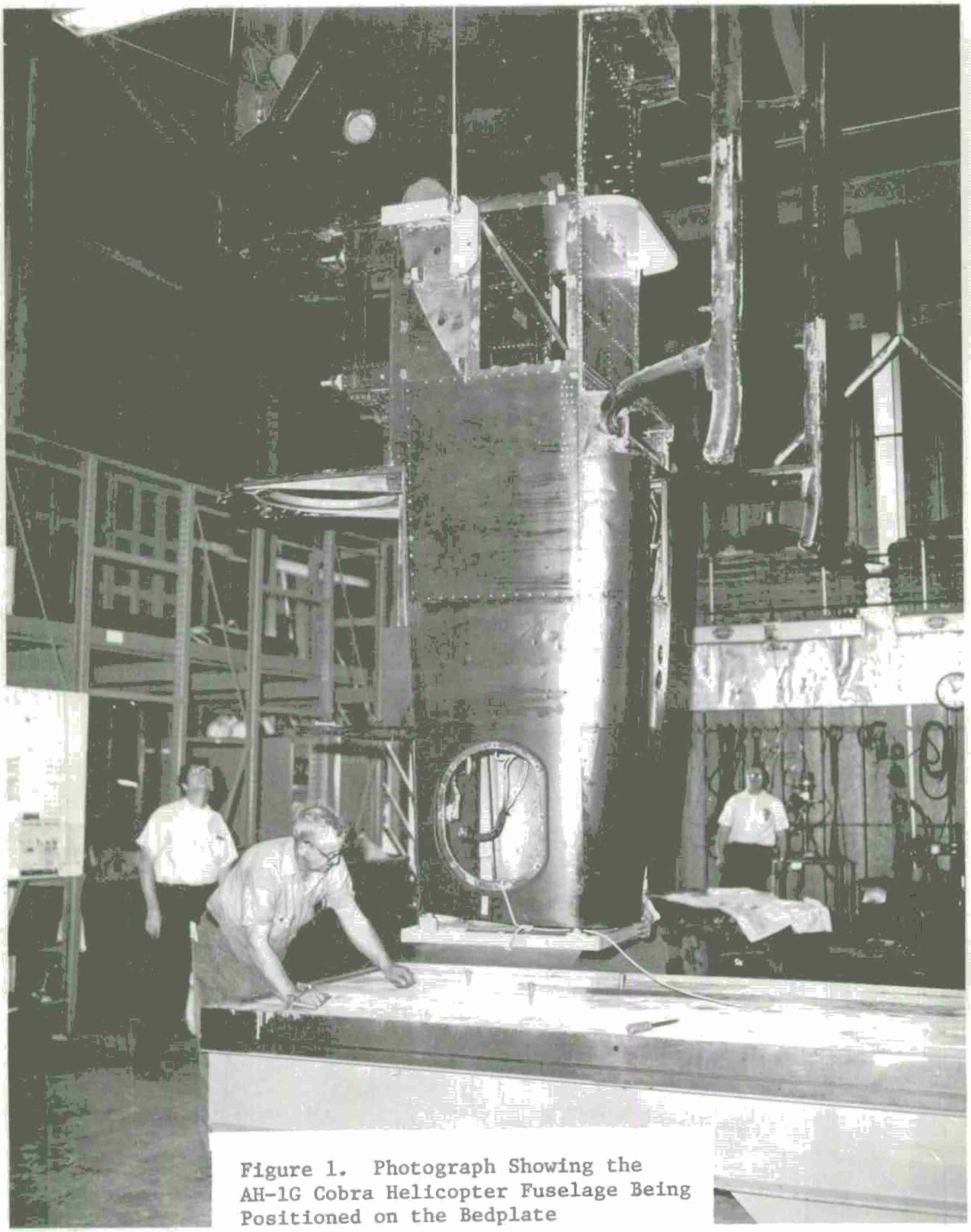

Figure 1. Photograph Showing the AH-1G Cobra Helicopter Fuselage Being Positioned on the Bedplate

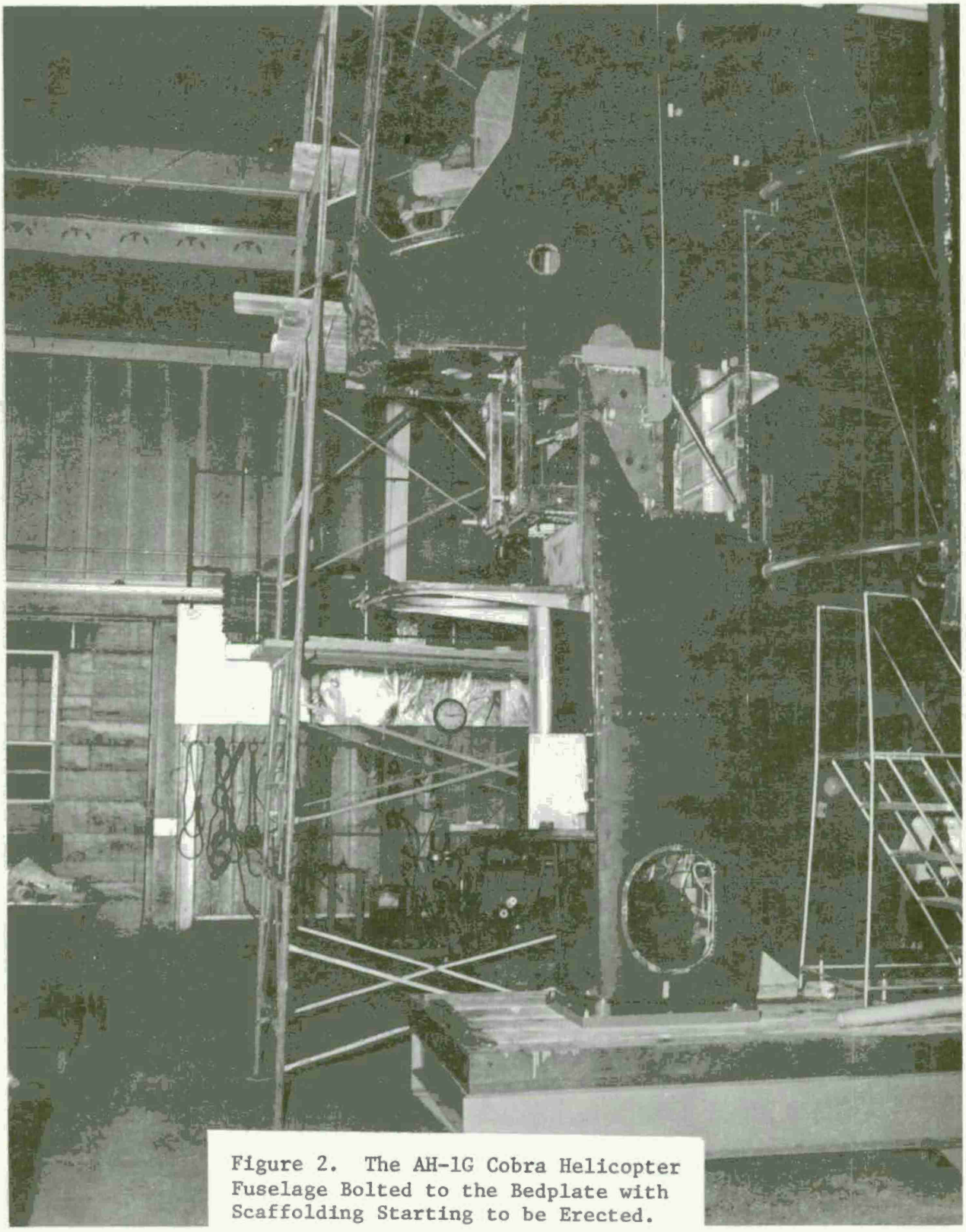

Figure 2. The AH-1G Cobra Helicopter Fuselage Bolted to the Bedplate with Scaffolding Starting to be Erected.

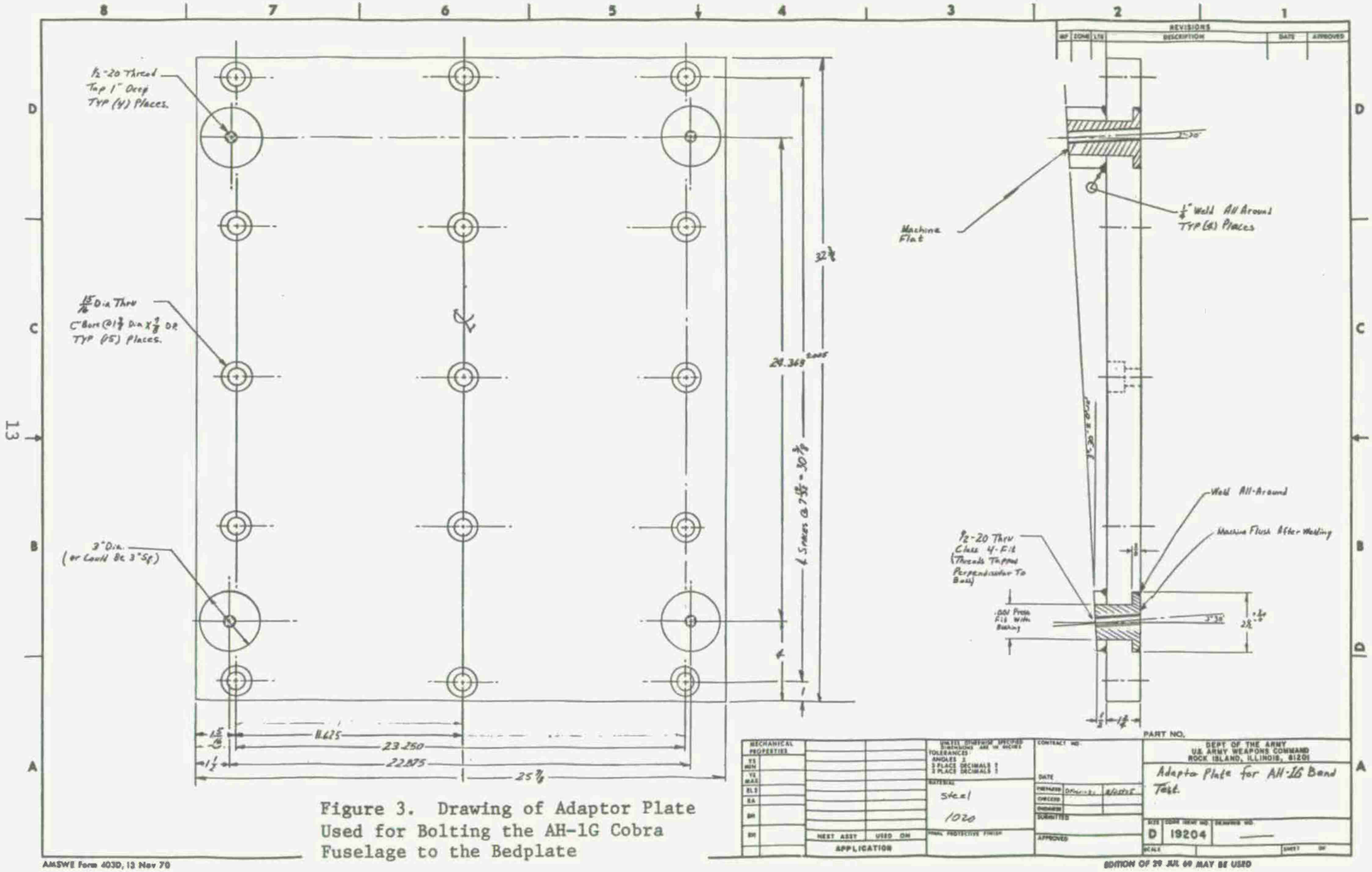

Figure 3. Drawing of Adaptor Plate Used for Bolting the AH-1G Cobra Fuselage to the Bedplate

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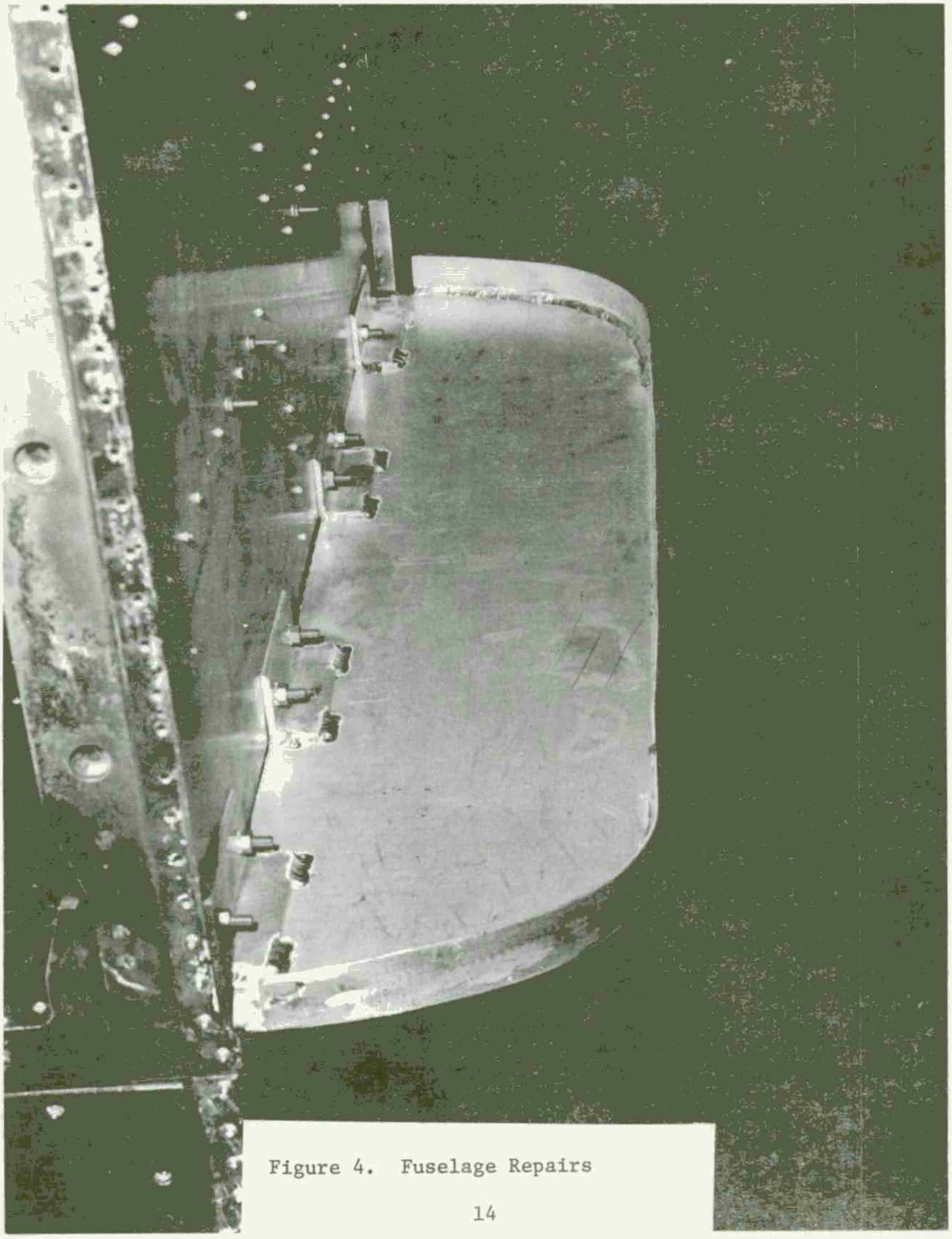


Figure 4. Fuselage Repairs

Figure 5. Fuselage Repairs

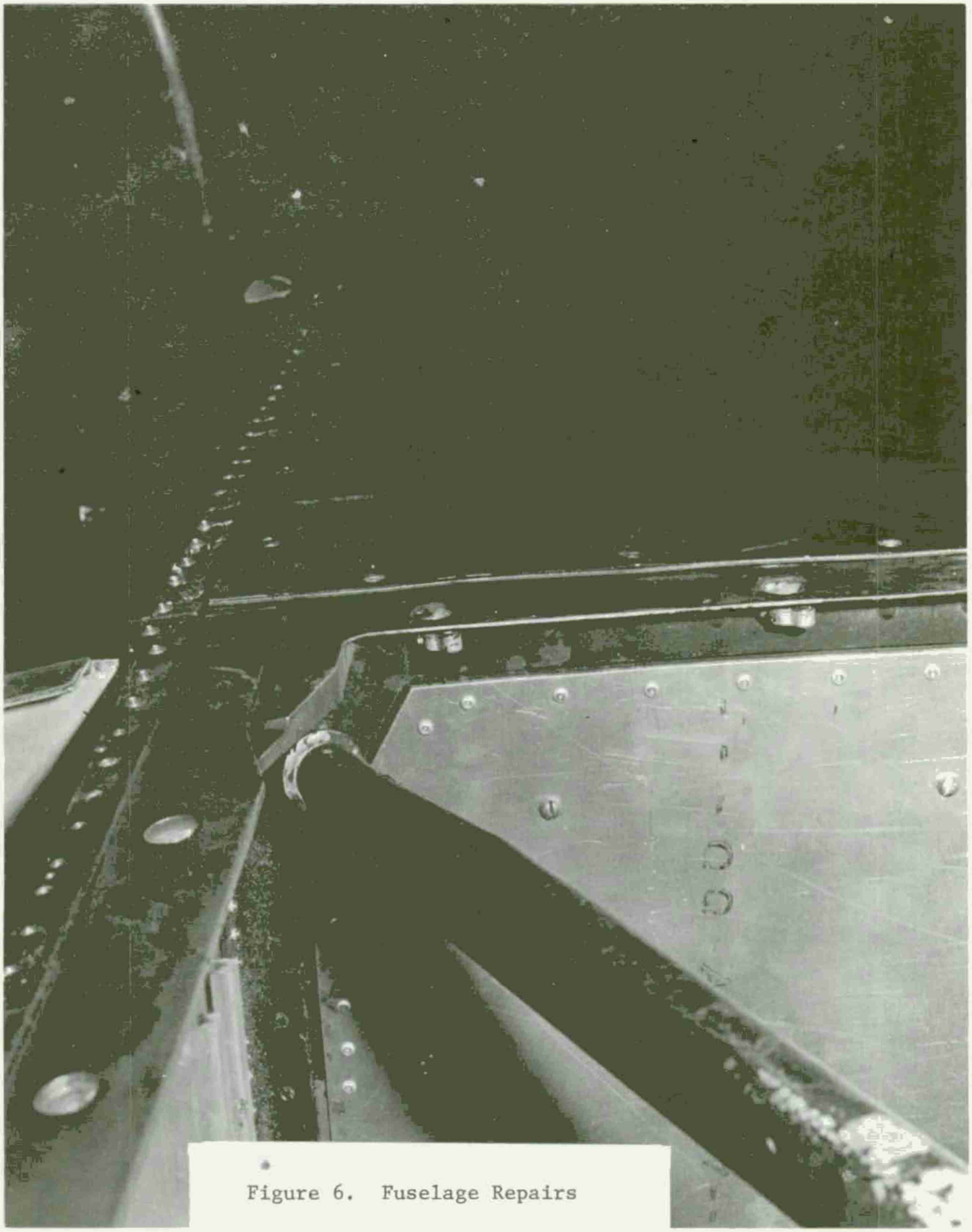


Figure 6. Fuselage Repairs

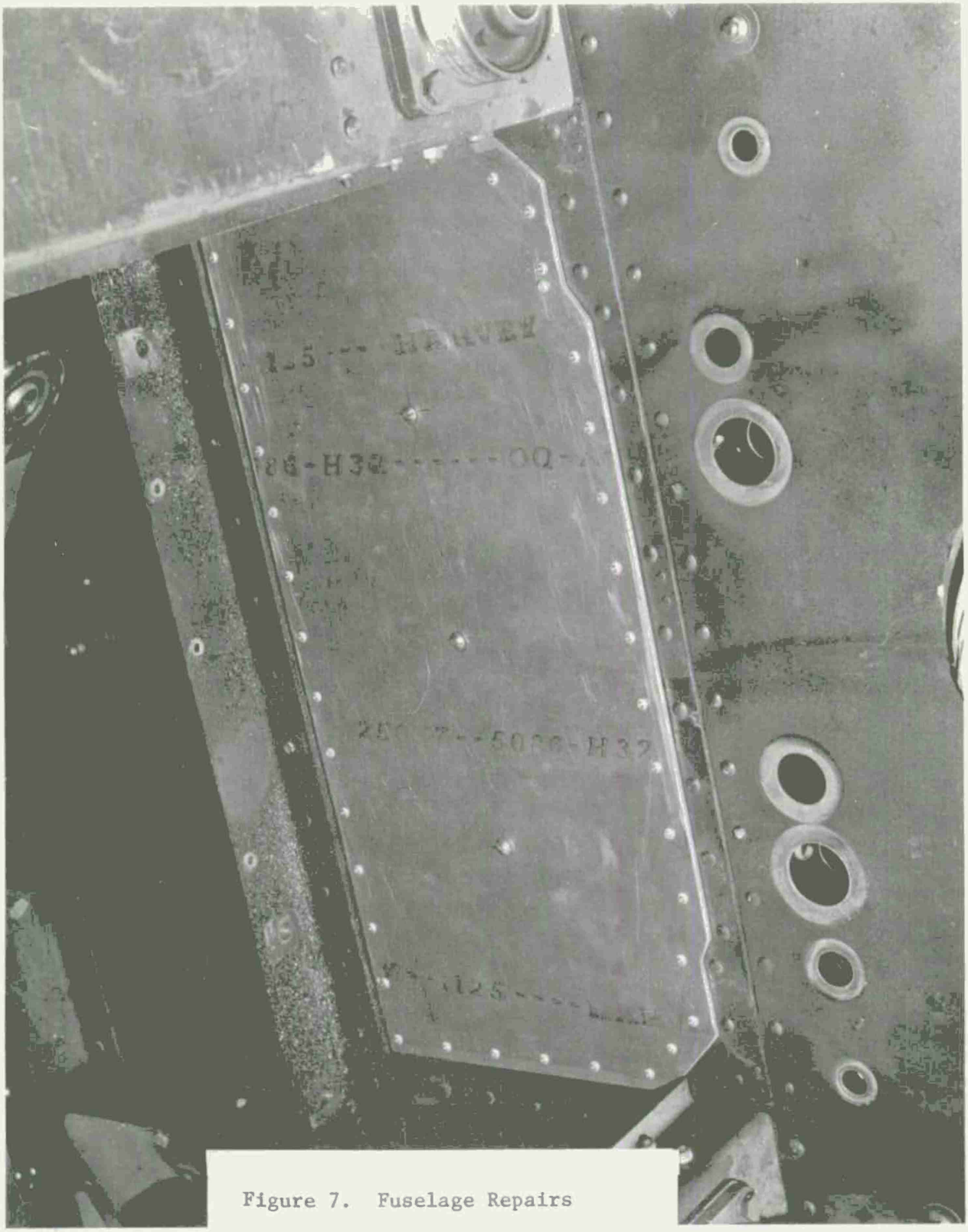


Figure 7. Fuselage Repairs

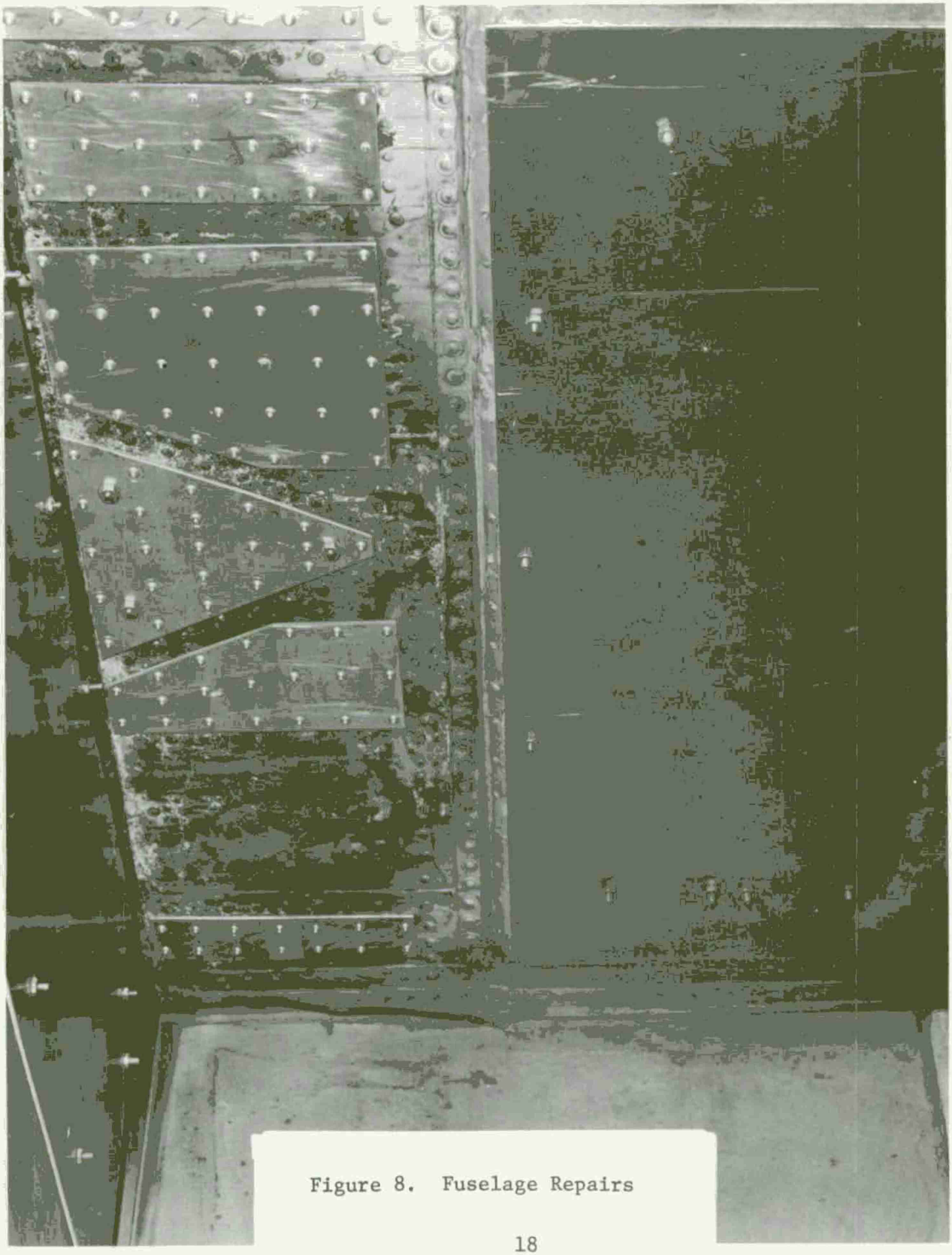


Figure 8. Fuselage Repairs

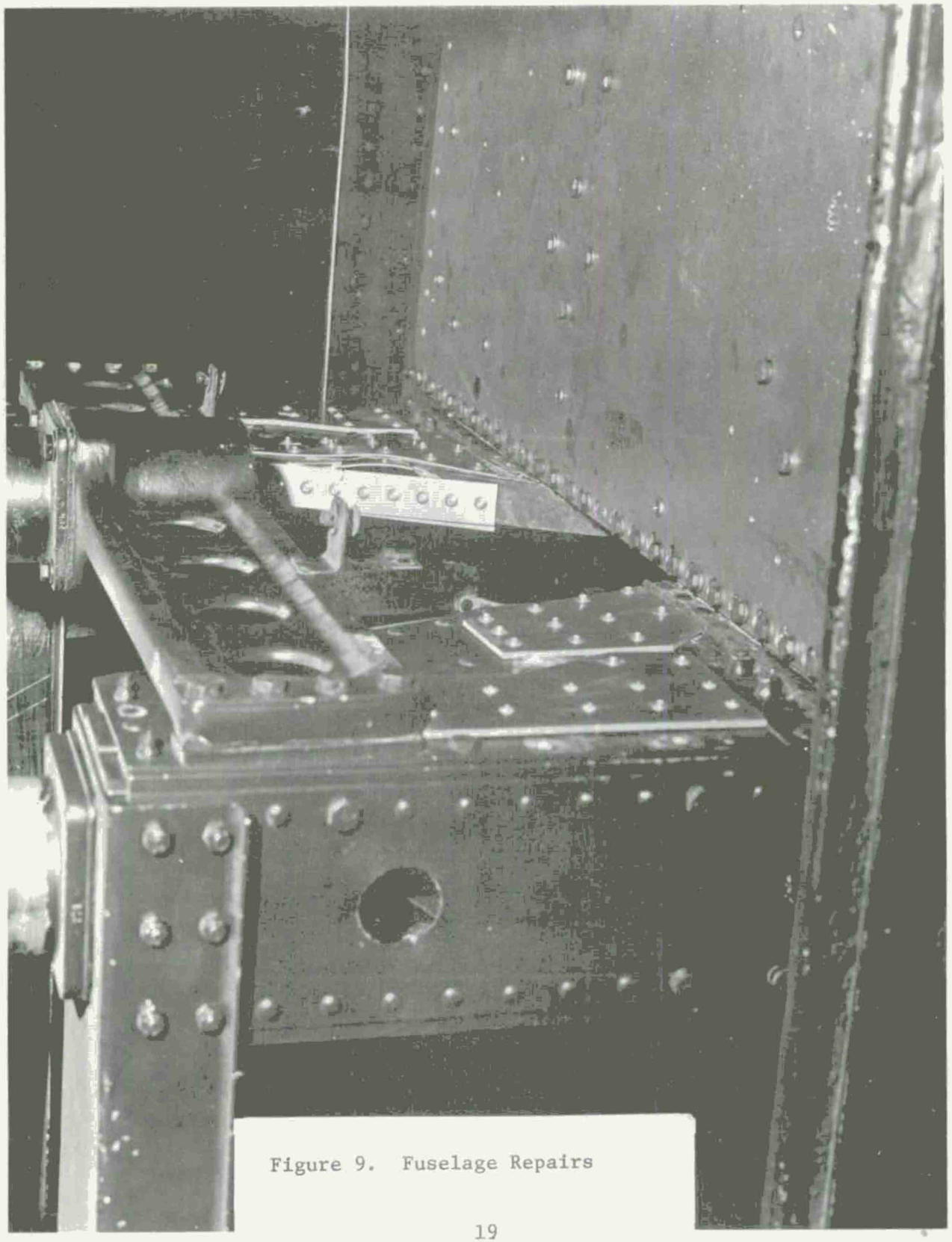


Figure 9. Fuselage Repairs

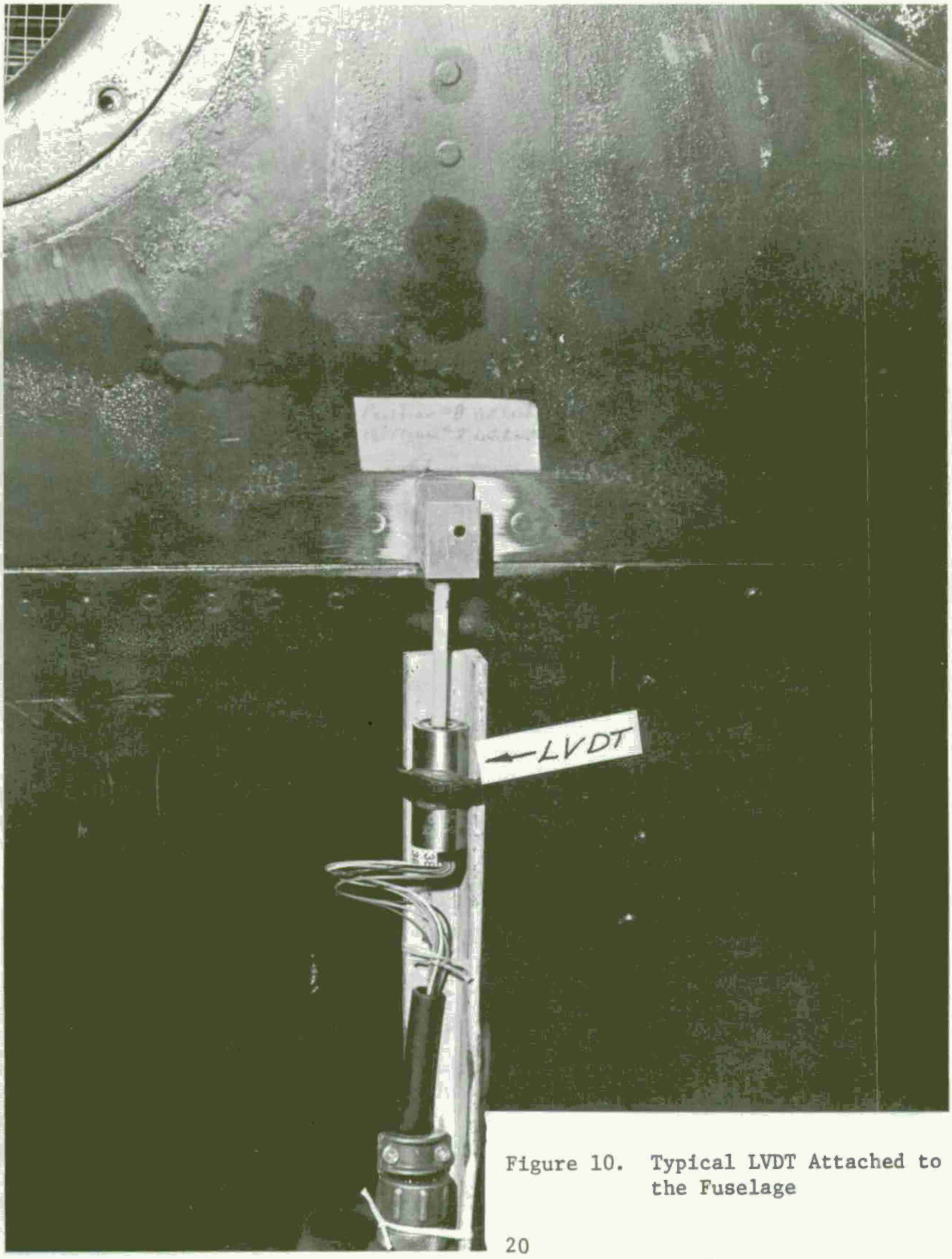


Figure 10. Typical LVDT Attached to the Fuselage

Figure 11. Sangamo Tape Recorder and Signal Conditioning Equipment

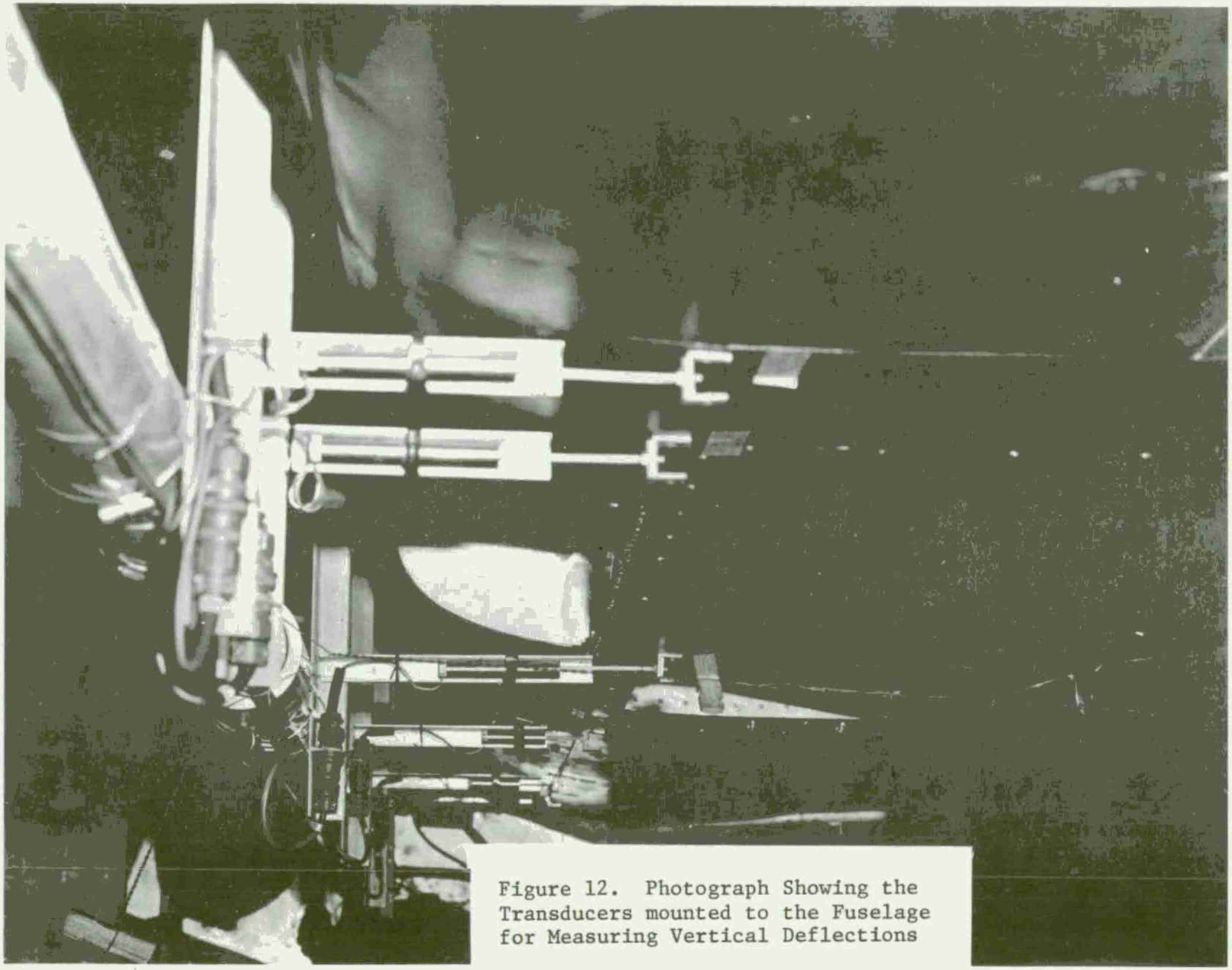


Figure 12. Photograph Showing the Transducers mounted to the Fuselage for Measuring Vertical Deflections

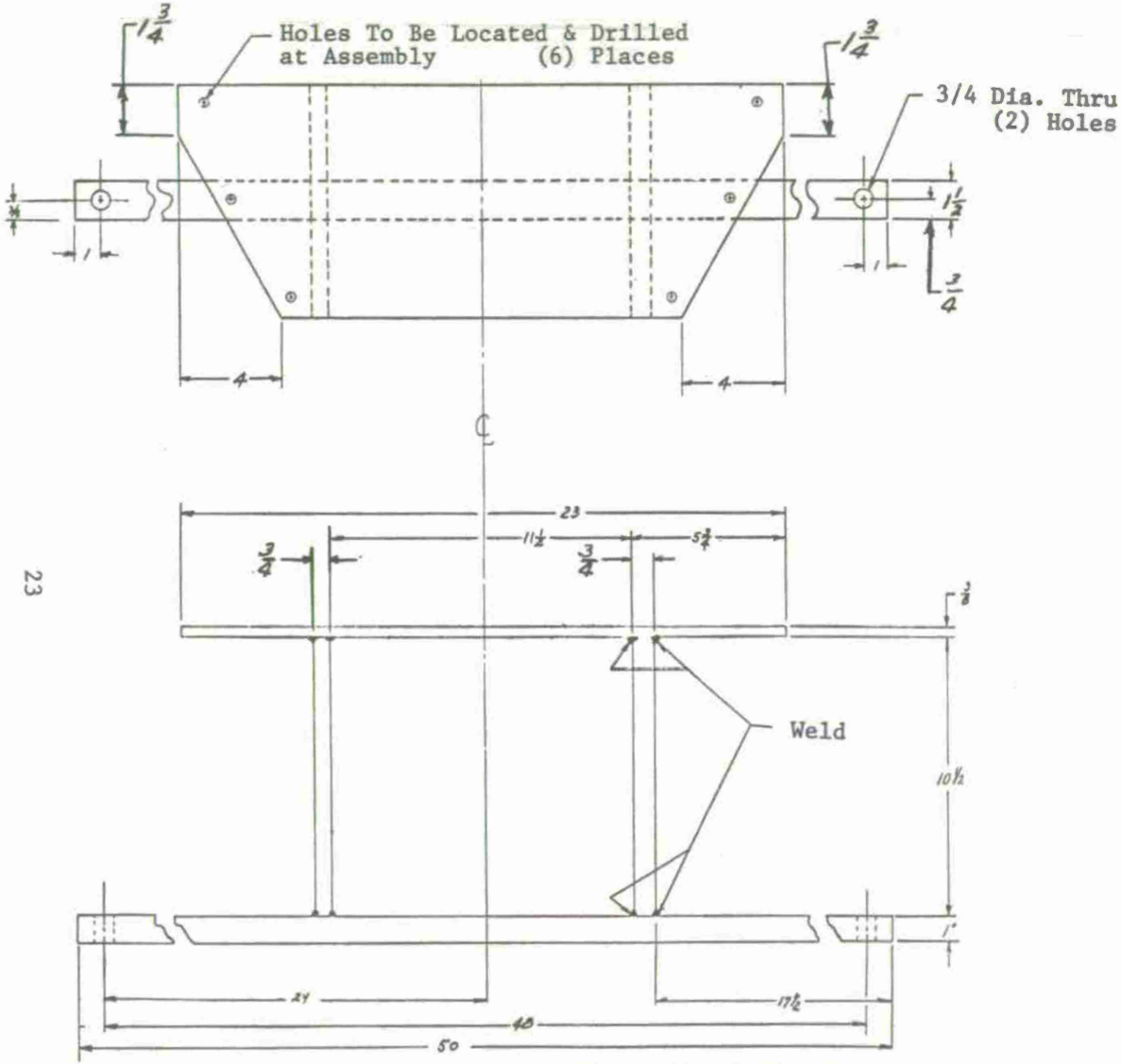
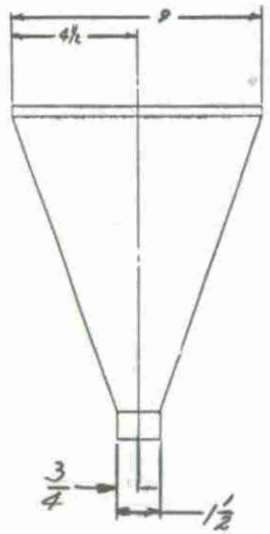


Figure 13. Reduced Size Drawing of the Fixture that Bolts to the Turret Interface for Applying the Vertical Load and the Nose Torsion

NOTES:

1. Edges May Be Sawed or Flame Cut
2. Material: 1020 Steel



Nose Torque Fixture
D.E. Frericks X6868
X.O. 698507

Dwg No: None

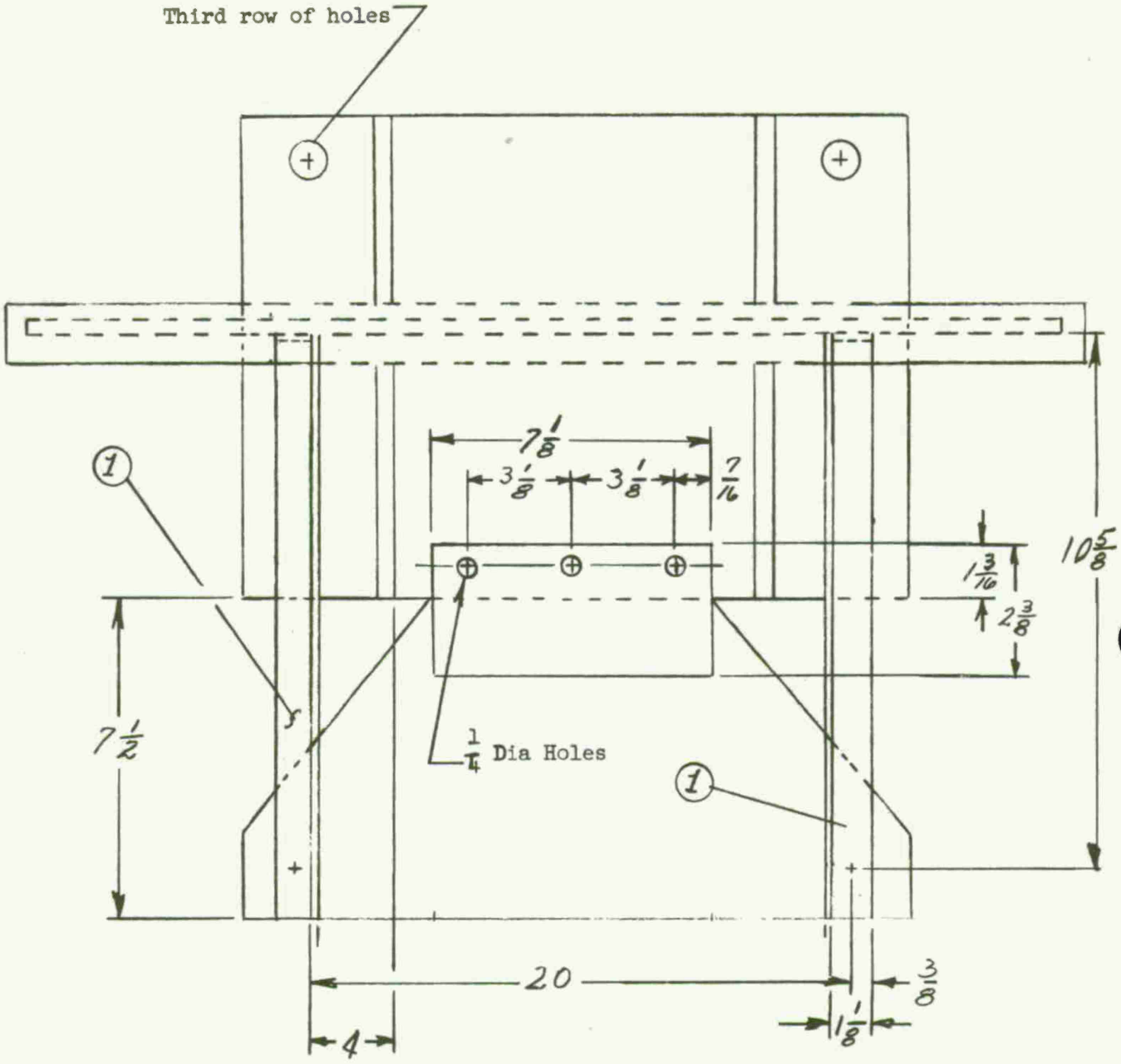


Figure 14. Sketch Showing the Modifications Made to the Fixture Shown in Figure 13 for Providing a Better Distribution of the Loads Over the Interface

Figure 15. Photograph Showing the Modifications to the Fixture for Applying the Vertical Load and Nose Torsion

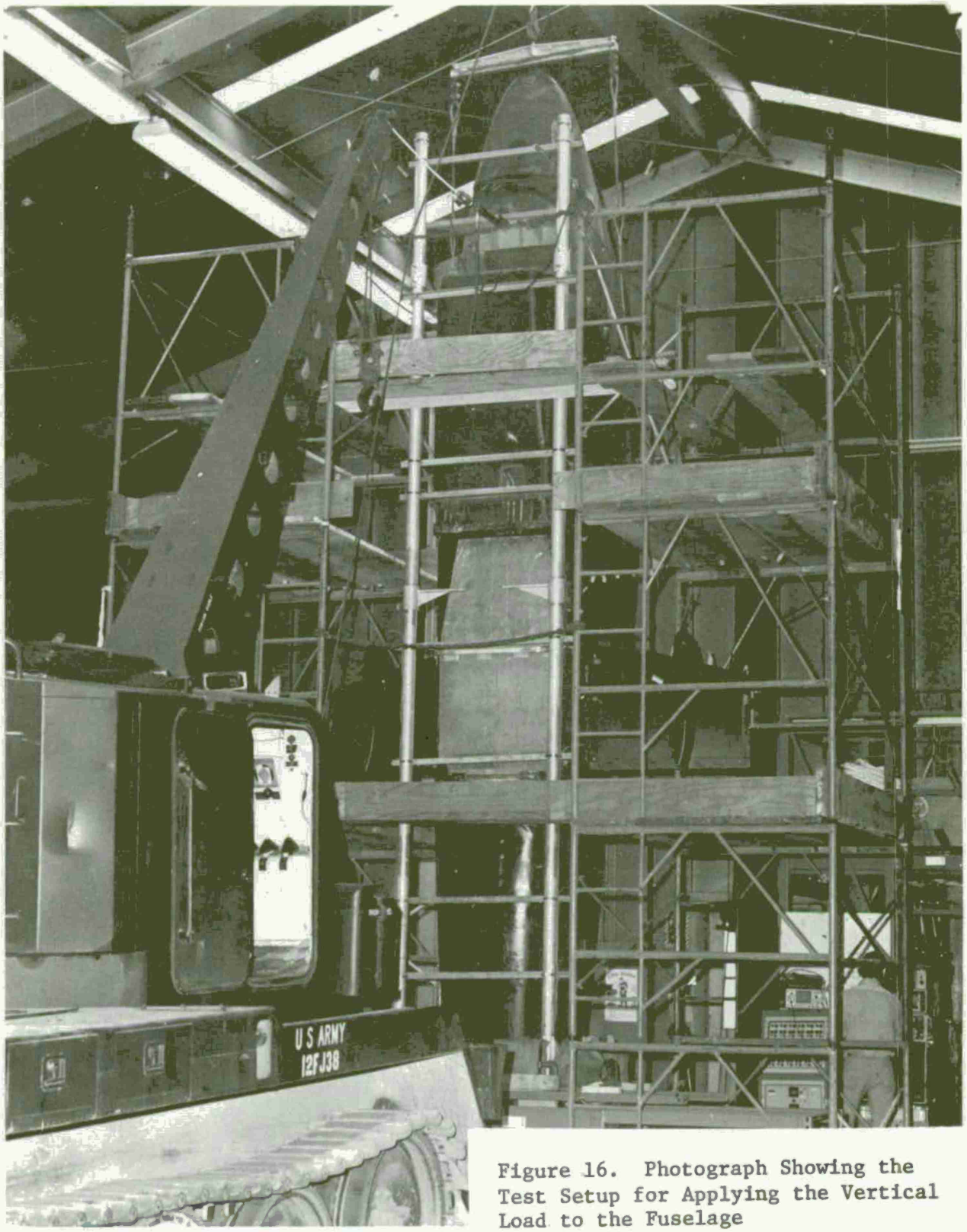


Figure 16. Photograph Showing the Test Setup for Applying the Vertical Load to the Fuselage

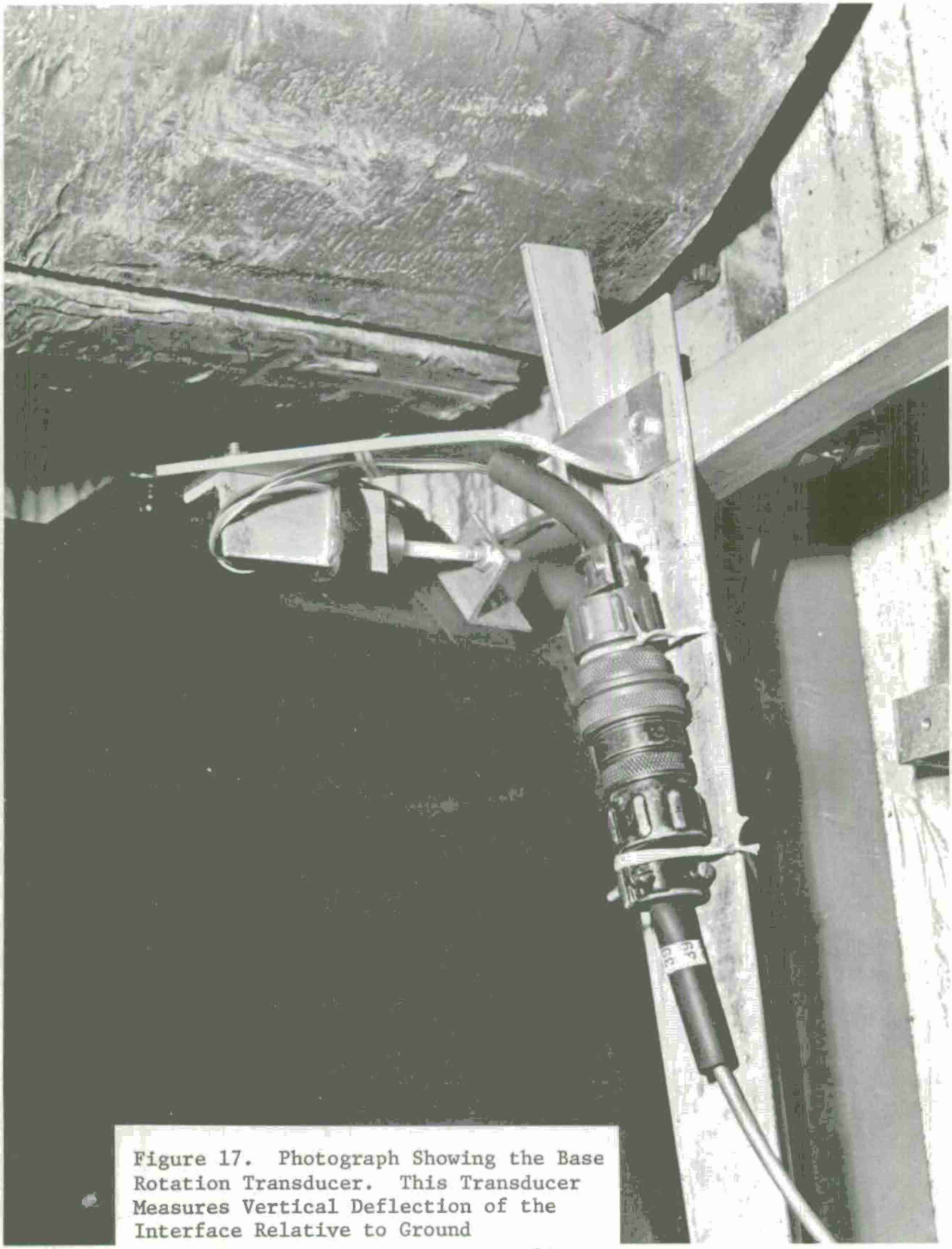


Figure 17. Photograph Showing the Base Rotation Transducer. This Transducer Measures Vertical Deflection of the Interface Relative to Ground

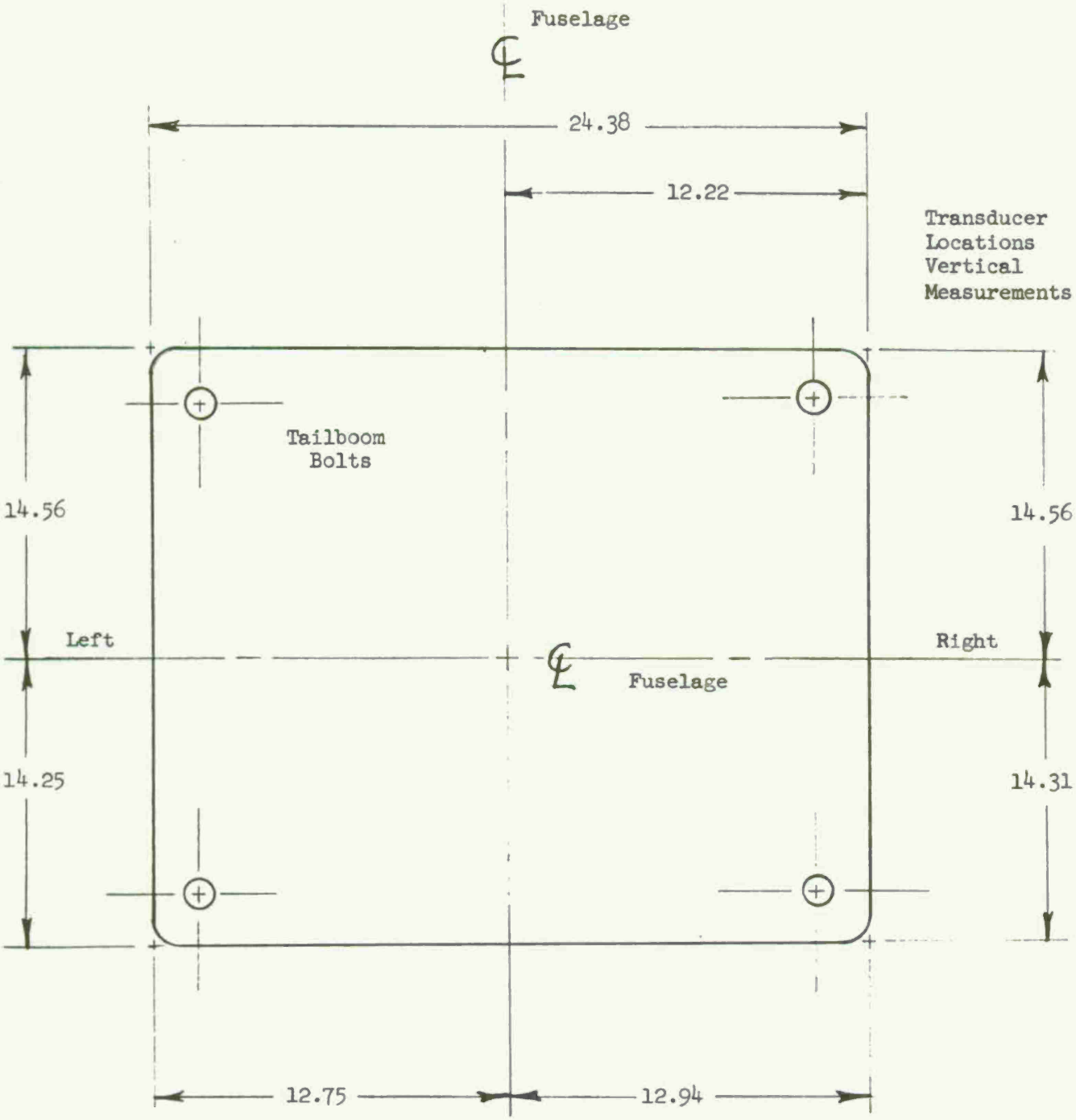


Figure 18. Sketch Showing the Base Rotation Transducer Locations with Reference to the Fuselage Centerline

Figure 19. Photograph Showing the Test Setup for Applying the Torsional Loads to the Fixture Attached to the Turret Interface

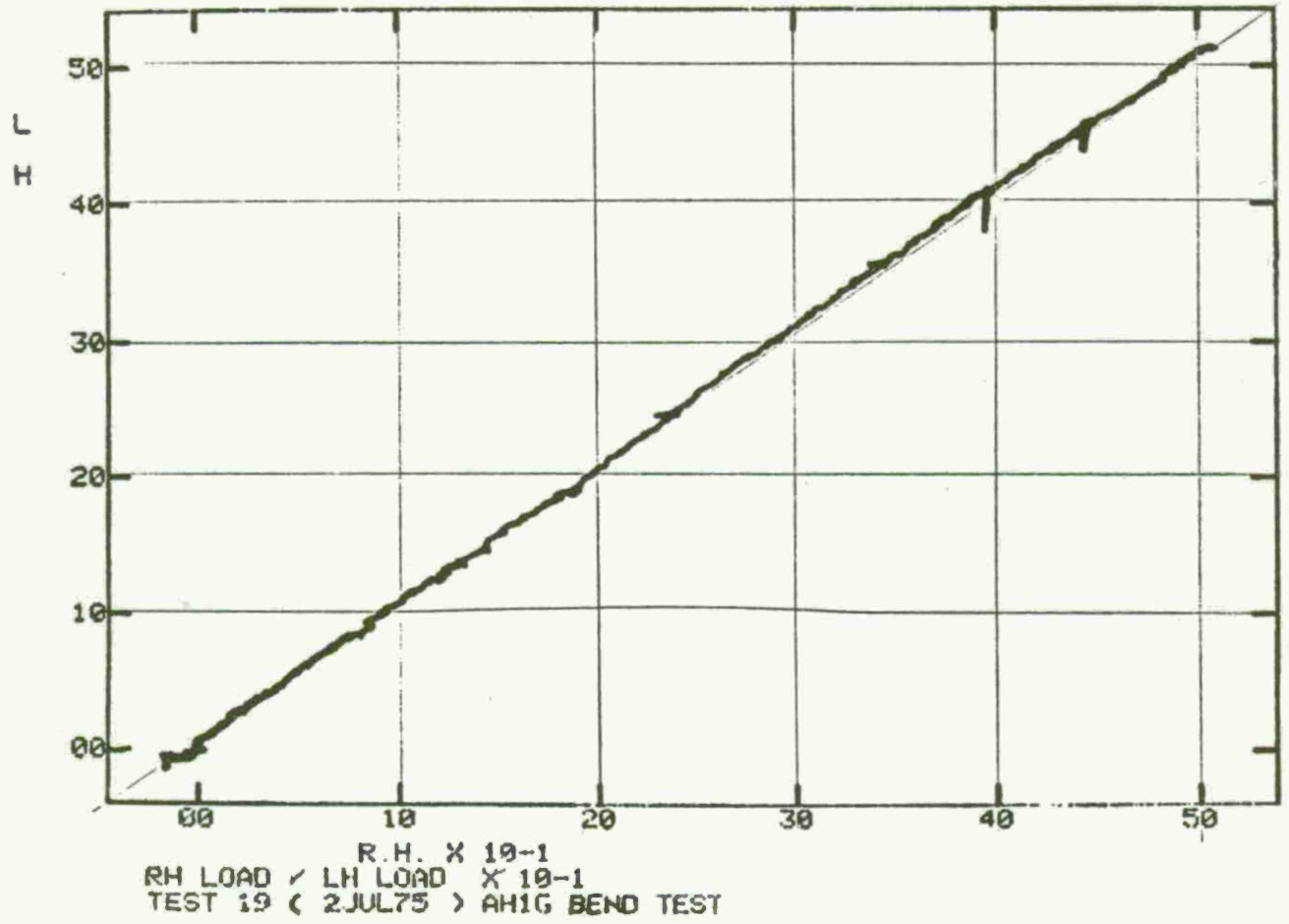


Figure 20. Graph of Right Load Divided by Left Load Showing a 1:1 Relationship

Figure 21. Photograph Showing the Transducer for Measuring Base Rotation for Determining the Correction Required Because of Base Rotation

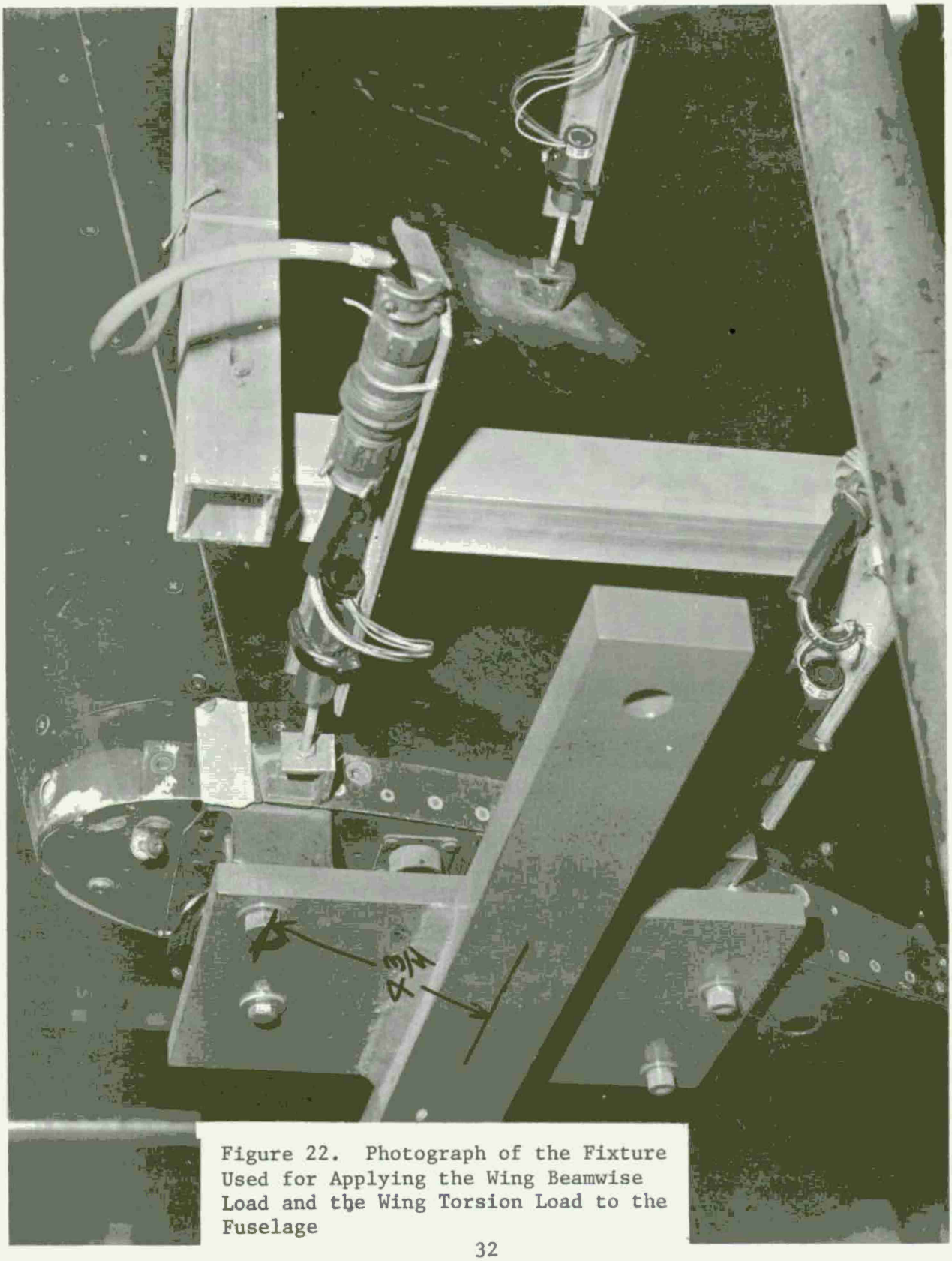


Figure 22. Photograph of the Fixture Used for Applying the Wing Beamwise Load and the Wing Torsion Load to the Fuselage

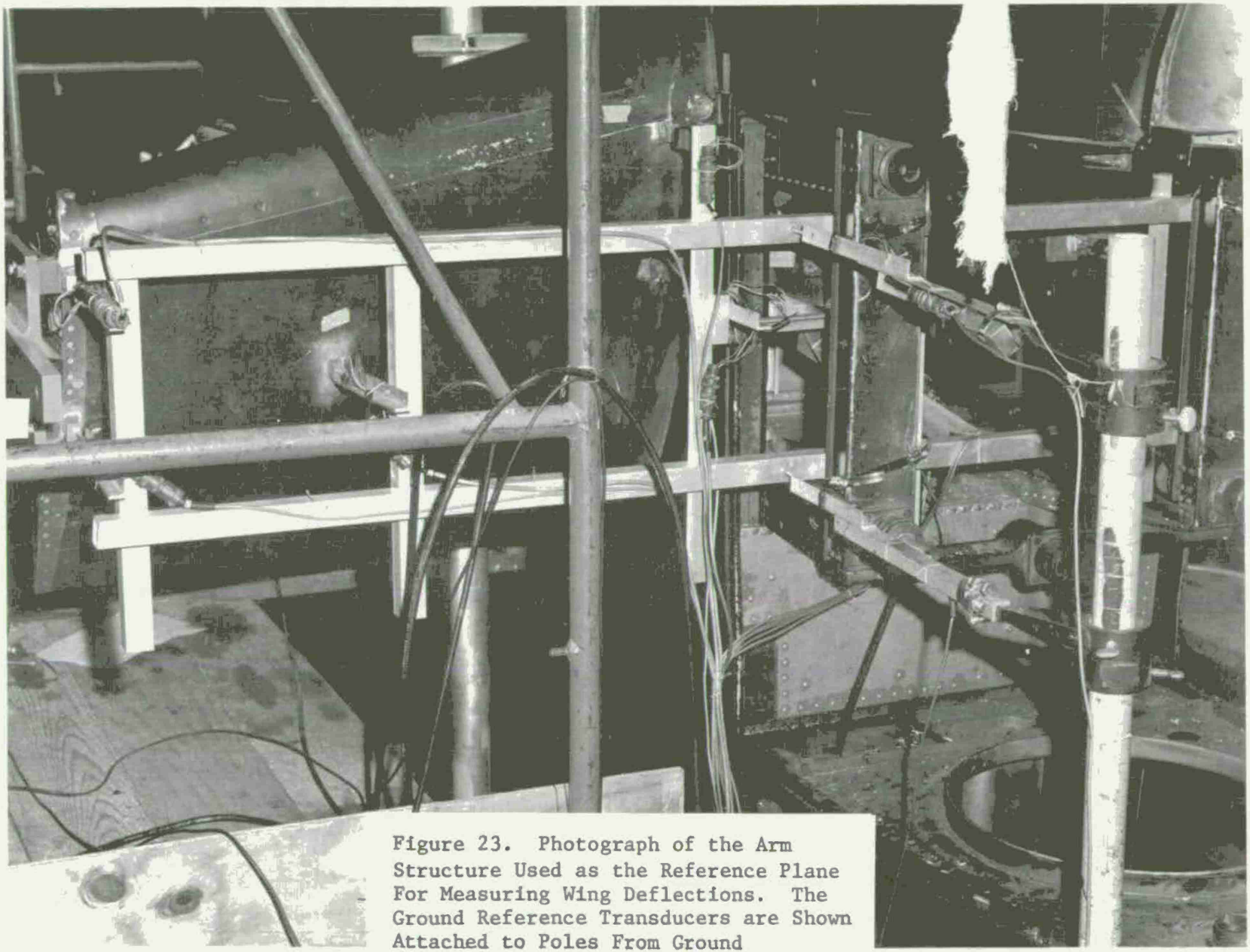


Figure 23. Photograph of the Arm Structure Used as the Reference Plane For Measuring Wing Deflections. The Ground Reference Transducers are Shown Attached to Poles From Ground

Figure 24. Photographs Showing the Transducers Used for Measuring the Wing Deflections During Application of the Wing Beamwise Load

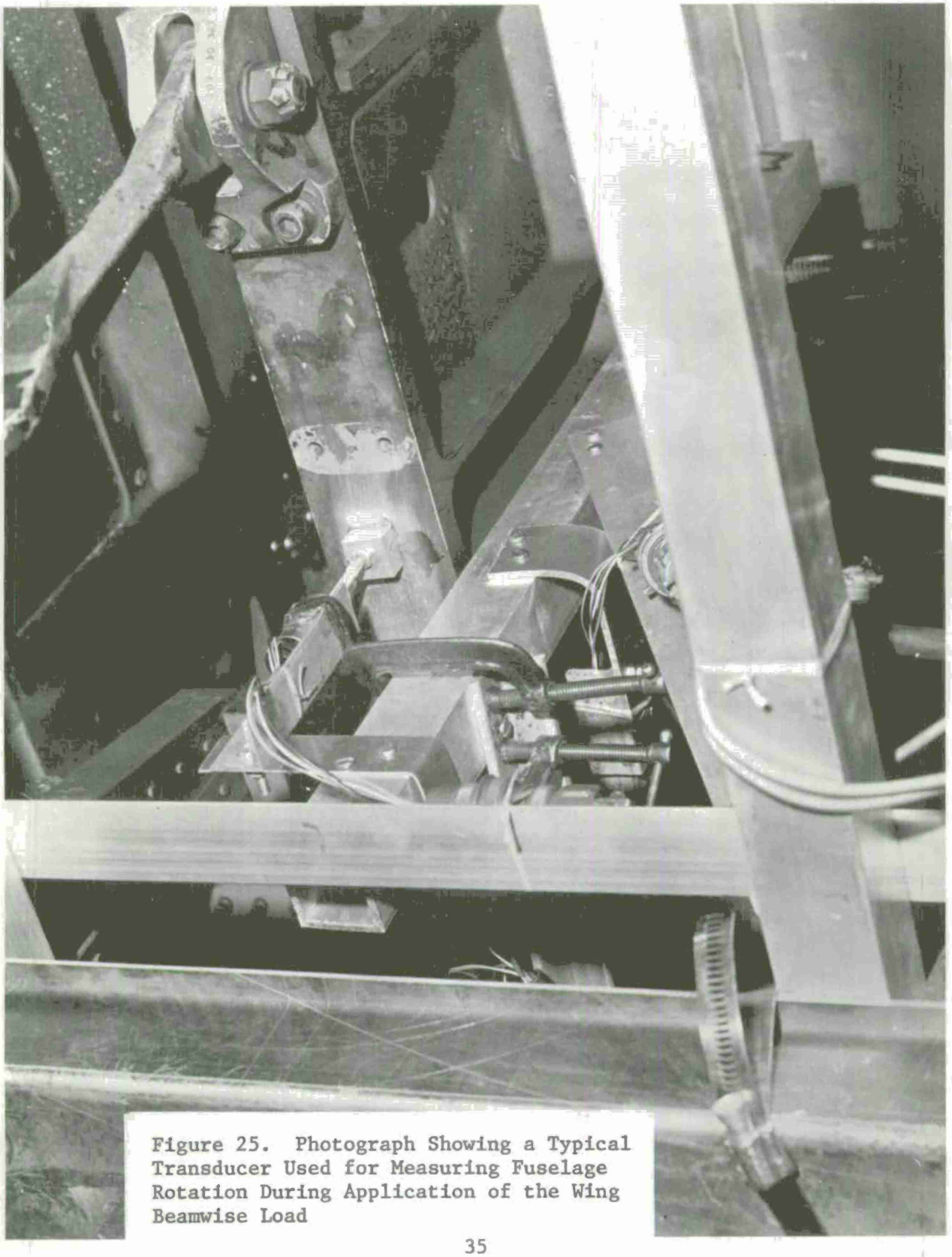


Figure 25. Photograph Showing a Typical Transducer Used for Measuring Fuselage Rotation During Application of the Wing Beamwise Load

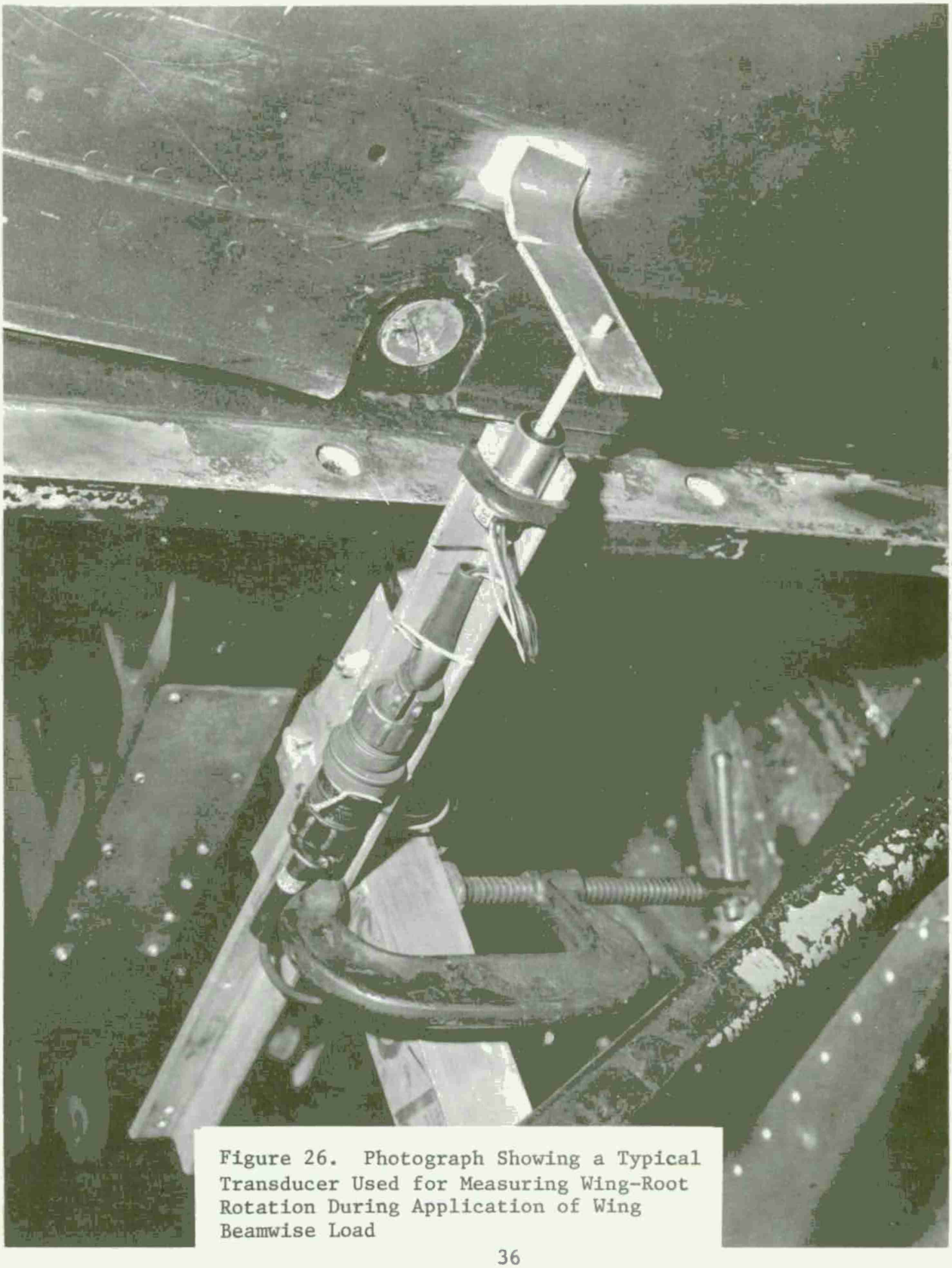


Figure 26. Photograph Showing a Typical Transducer Used for Measuring Wing-Root Rotation During Application of Wing Beamwise Load

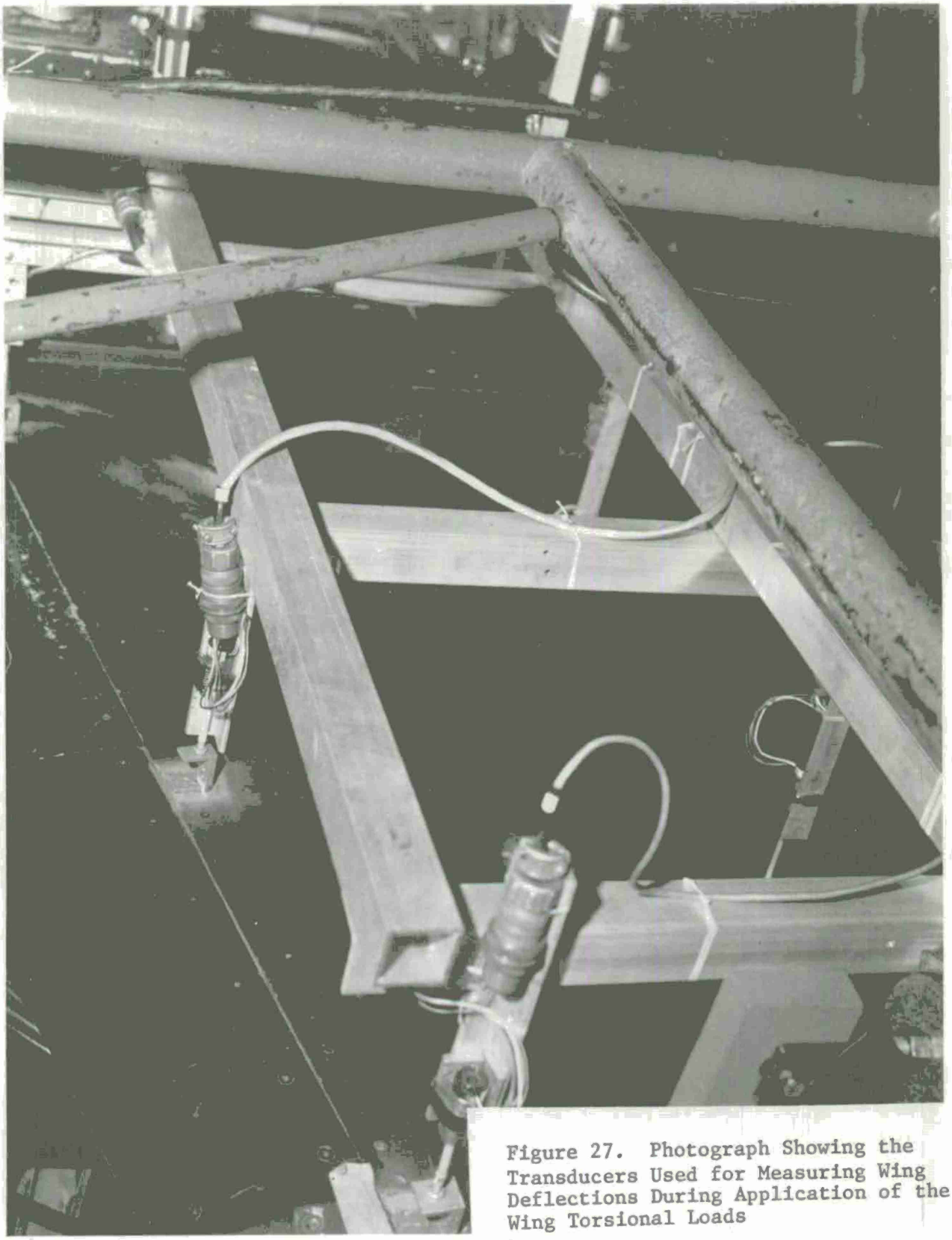


Figure 27. Photograph Showing the Transducers Used for Measuring Wing Deflections During Application of the Wing Torsional Loads

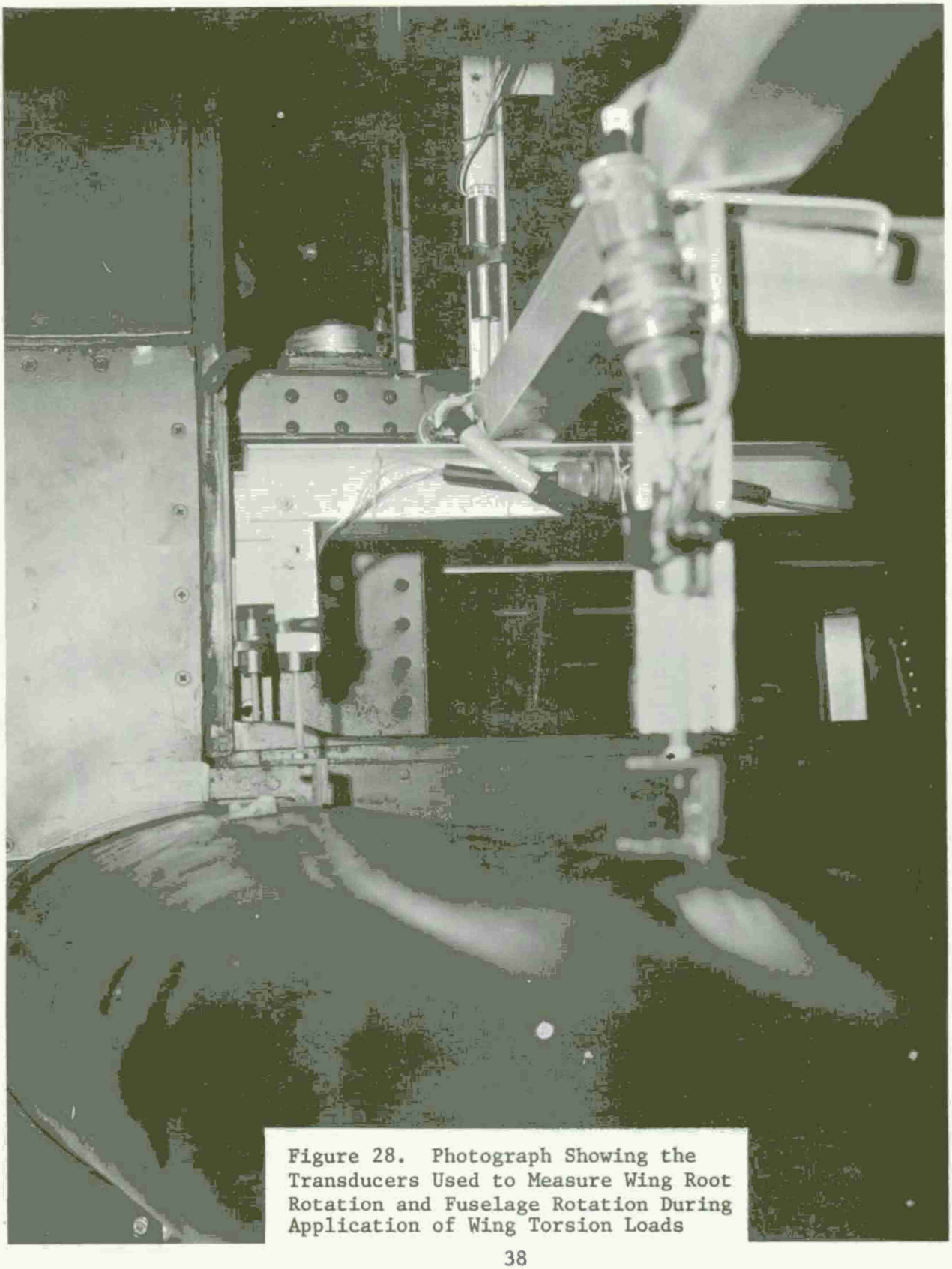


Figure 28. Photograph Showing the Transducers Used to Measure Wing Root Rotation and Fuselage Rotation During Application of Wing Torsion Loads

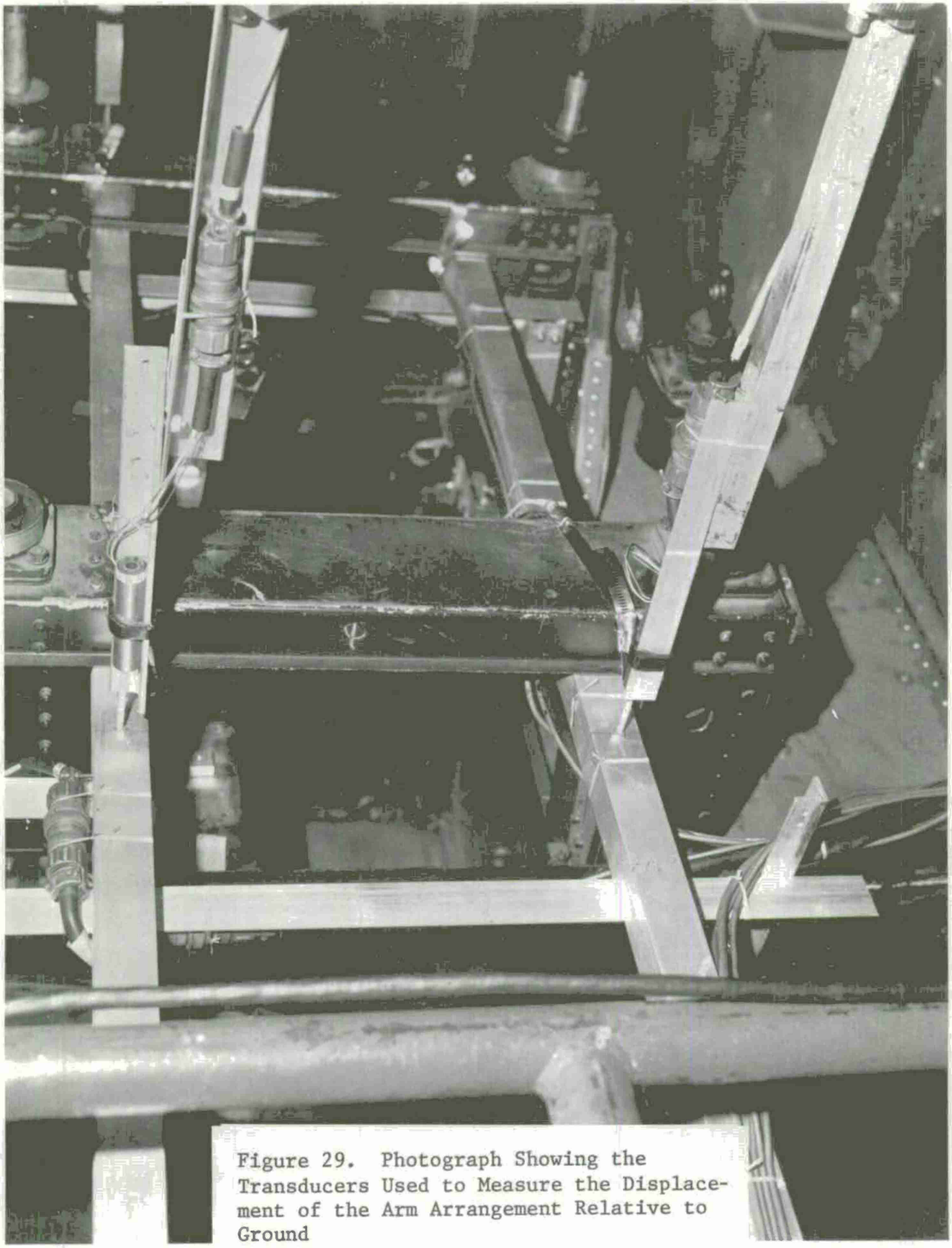


Figure 29. Photograph Showing the Transducers Used to Measure the Displacement of the Arm Arrangement Relative to Ground

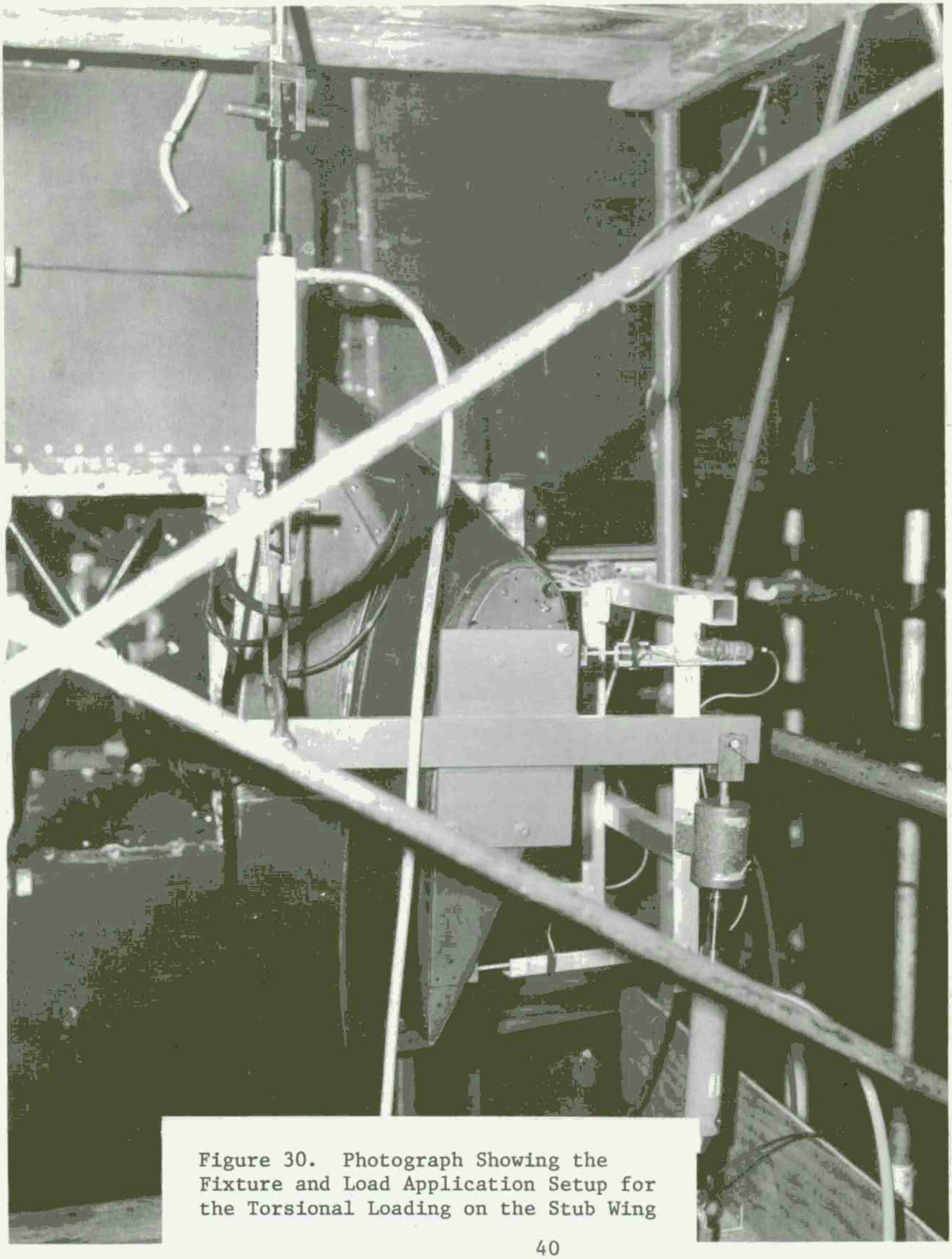


Figure 30. Photograph Showing the Fixture and Load Application Setup for the Torsional Loading on the Stub Wing

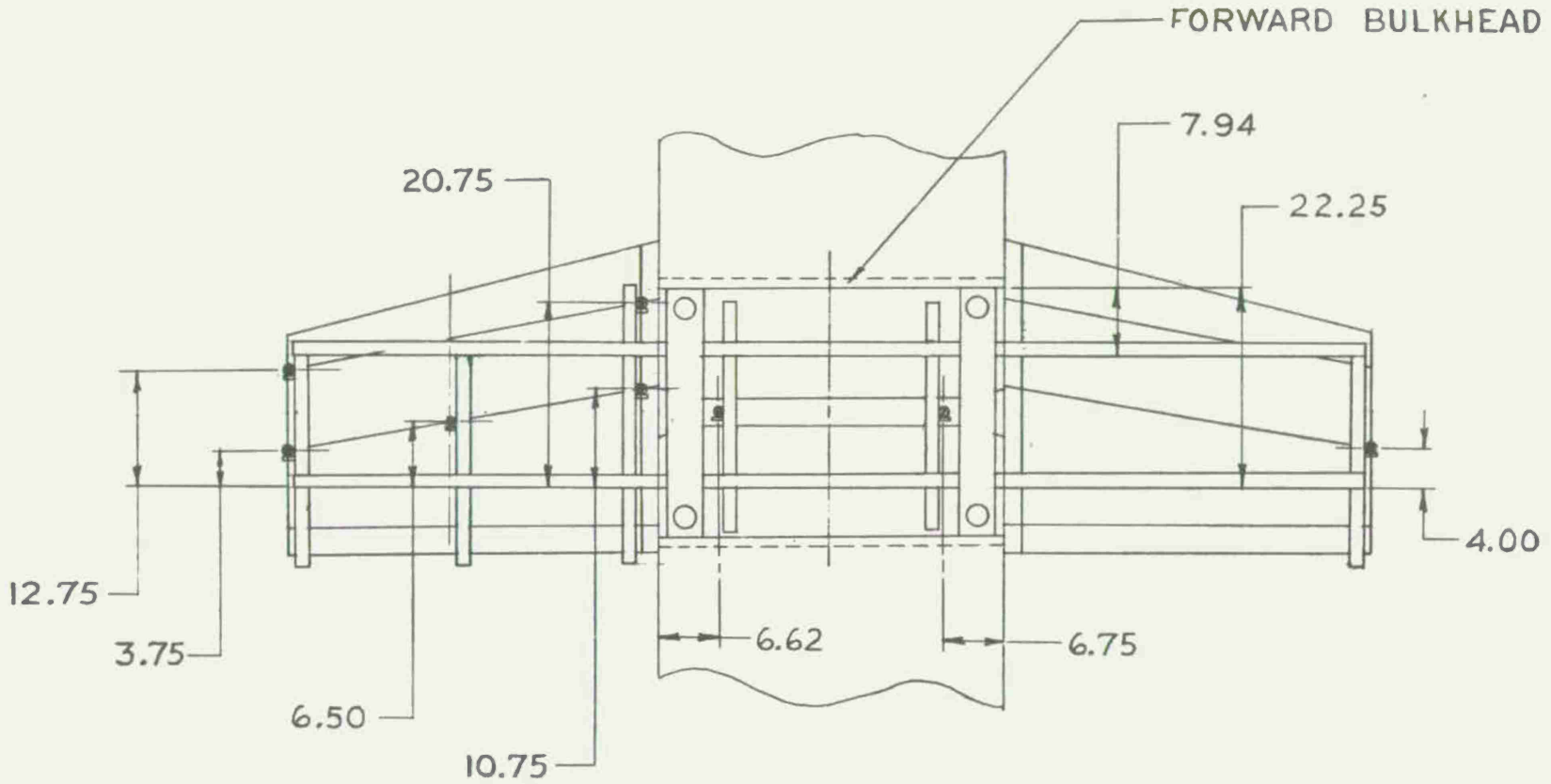


Figure 31. Detail Sketch of the Wing Root and Fuselage Rotation Transducer Locations

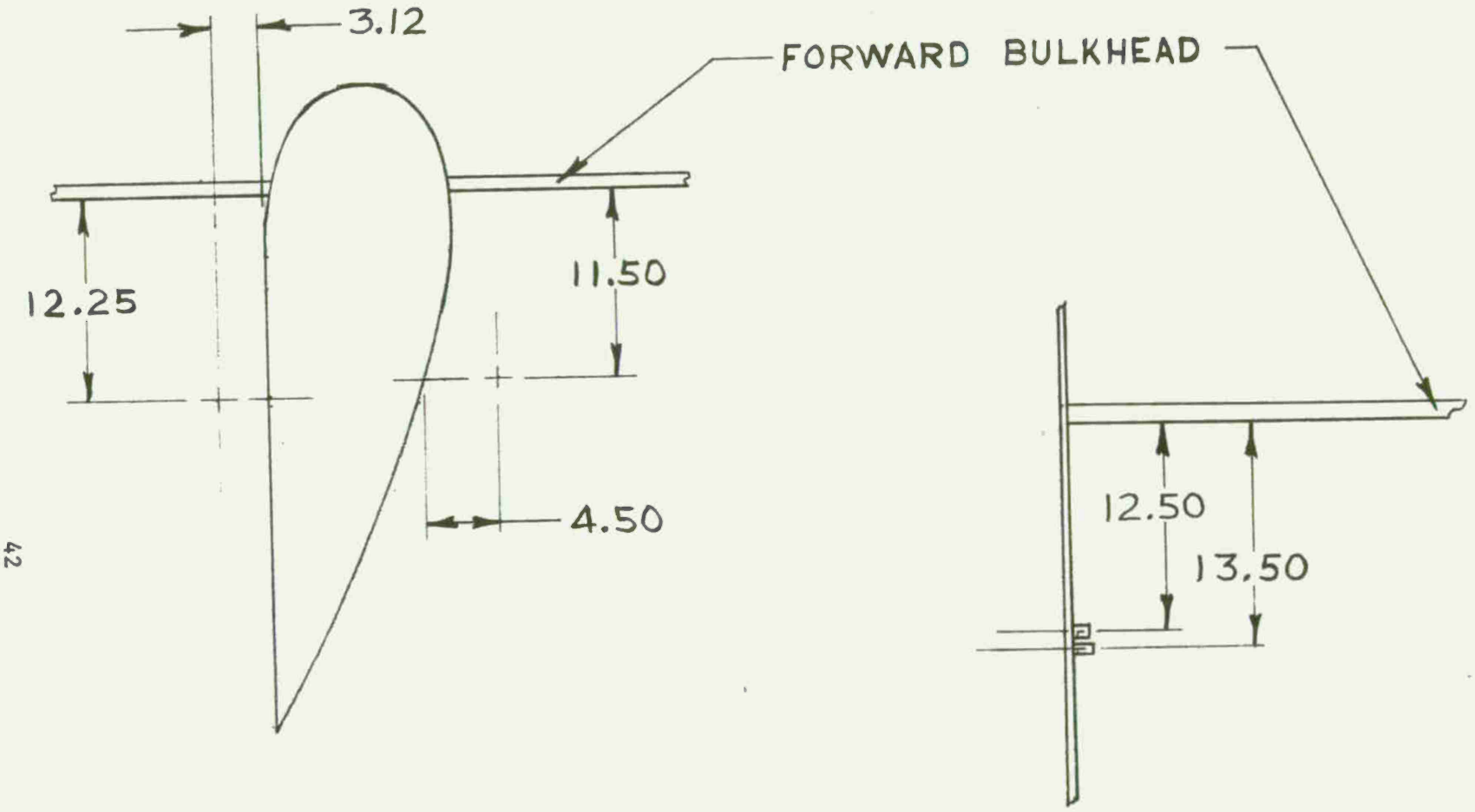


Figure 31. Detail Sketch of the Wing Root and Fuselage Rotation Transducer Locations (Cont'd)

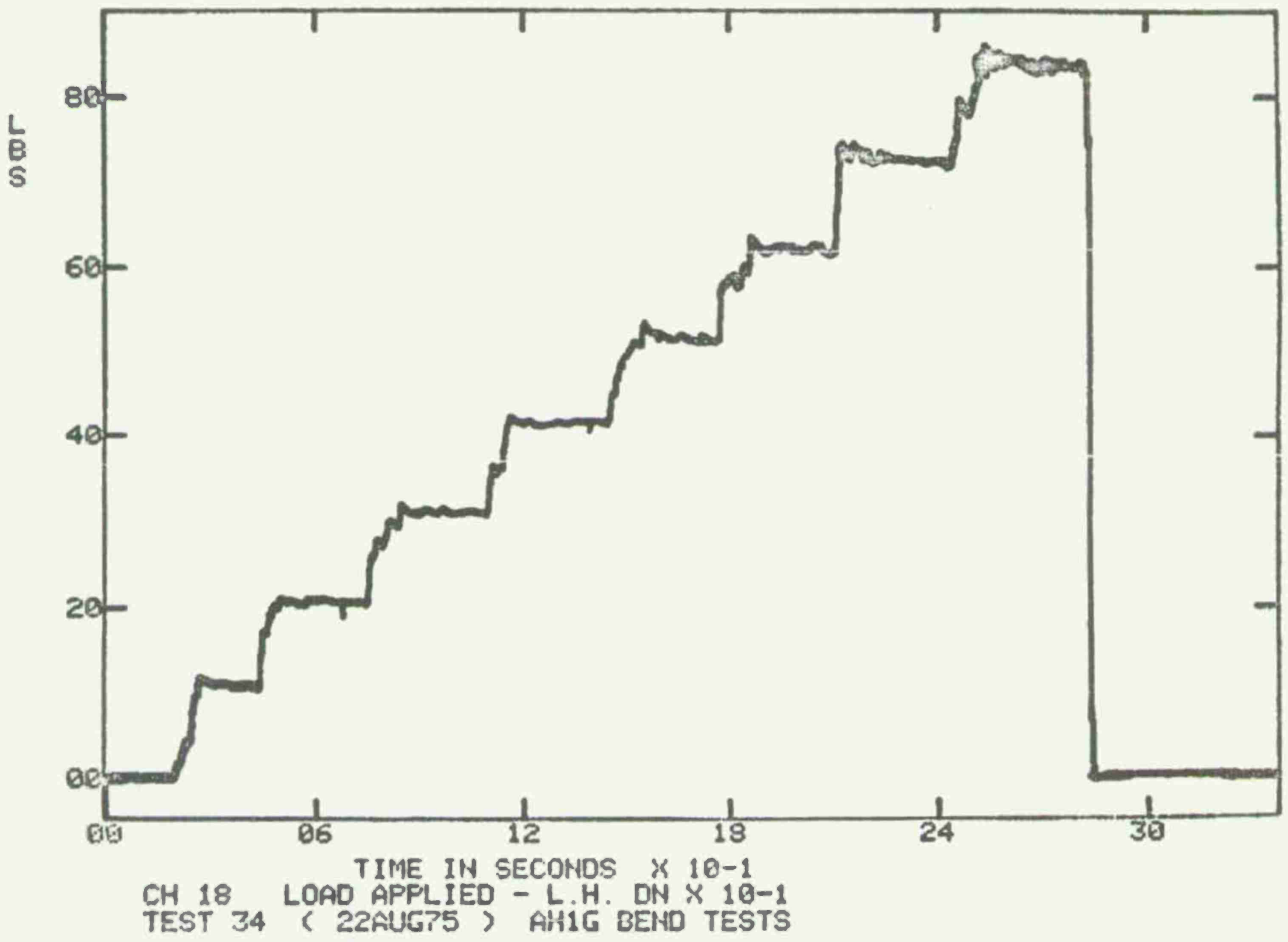


Figure 32. Graph of Load Applied - Left Side, Down

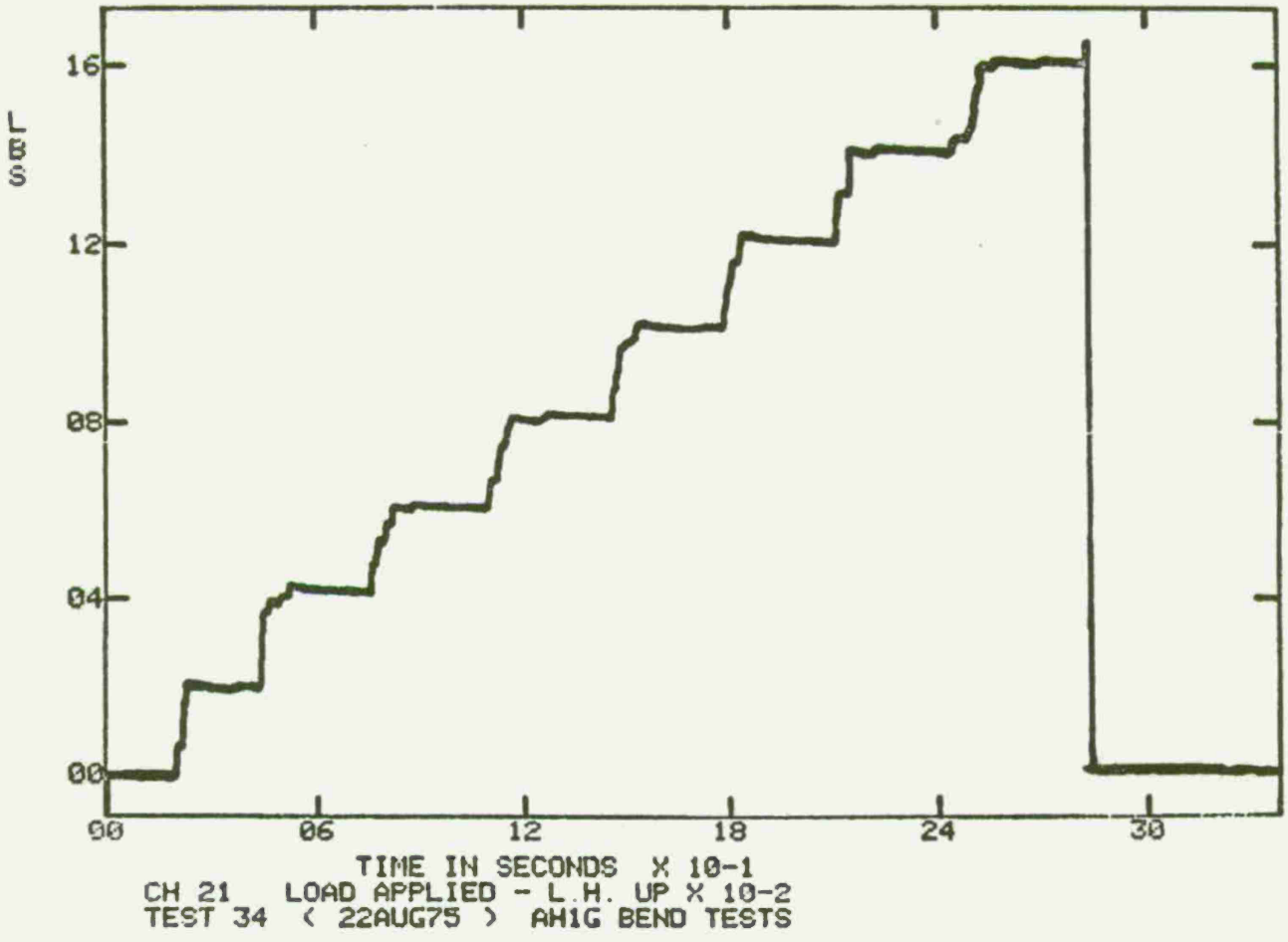


Figure 33. Graph of Load Applied - Left Side, Upward

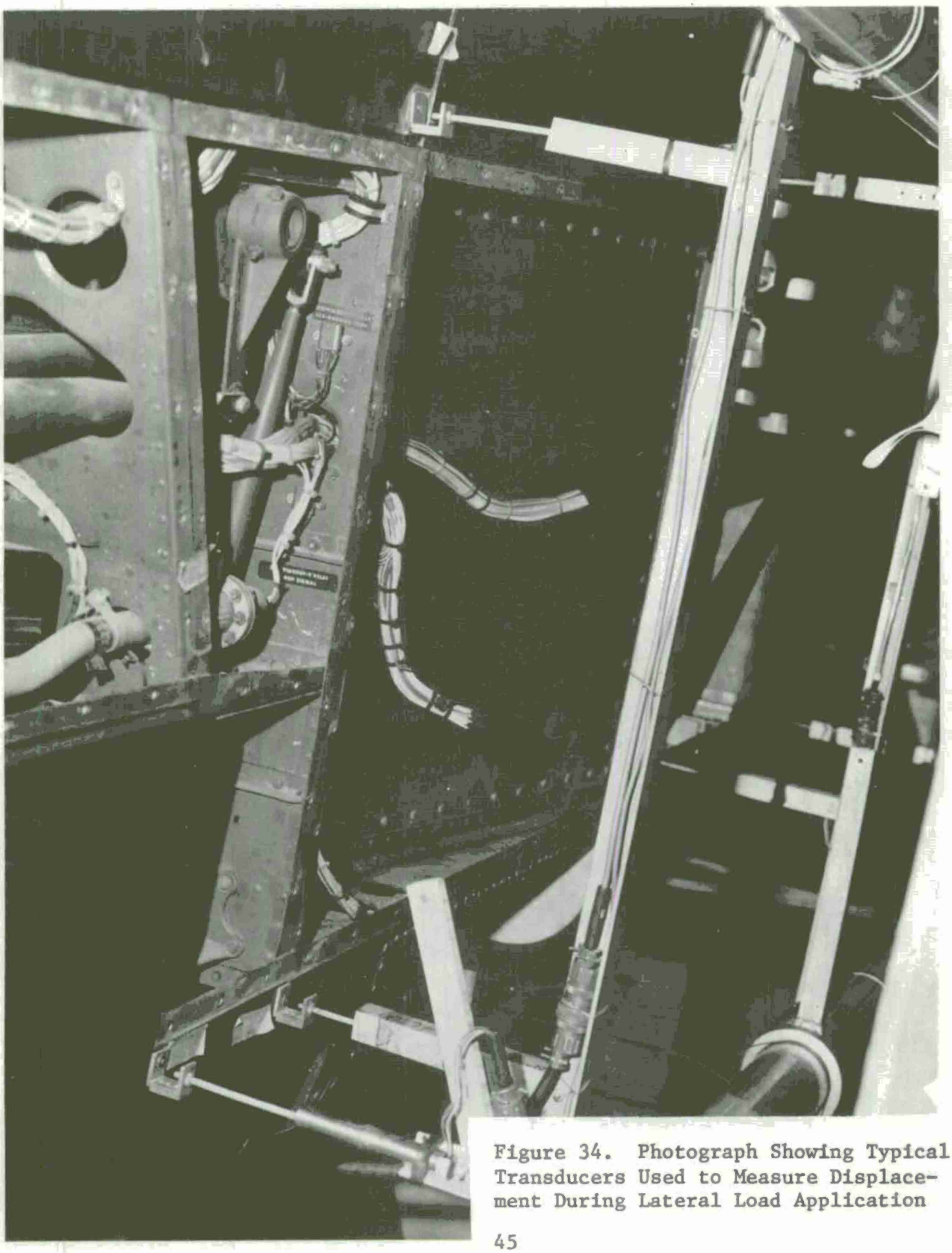


Figure 34. Photograph Showing Typical Transducers Used to Measure Displacement During Lateral Load Application

Figure 35. Photograph Showing Typical Transducers Used to Measure Displacement During Lateral Load Application

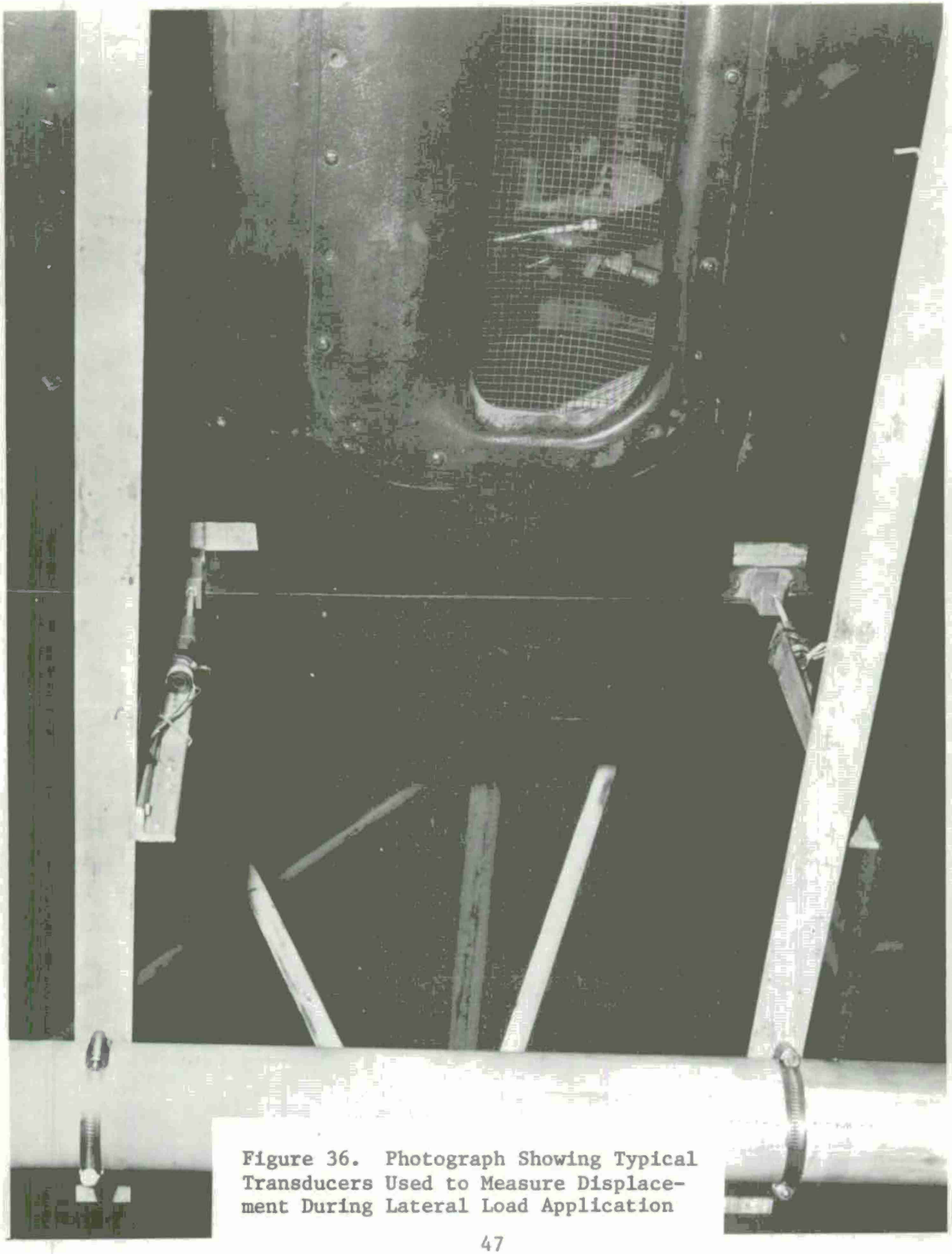


Figure 36. Photograph Showing Typical Transducers Used to Measure Displacement During Lateral Load Application

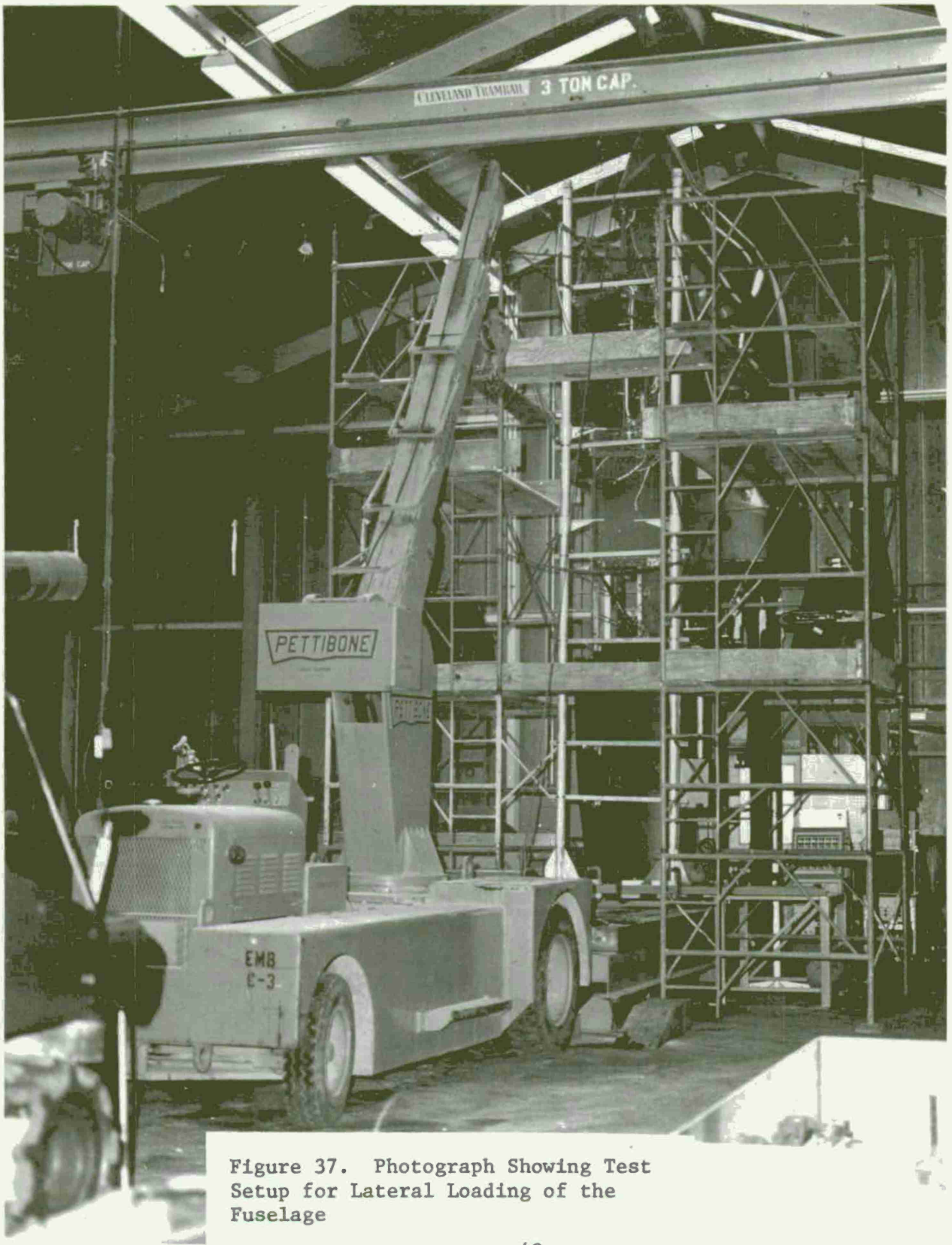


Figure 37. Photograph Showing Test Setup for Lateral Loading of the Fuselage

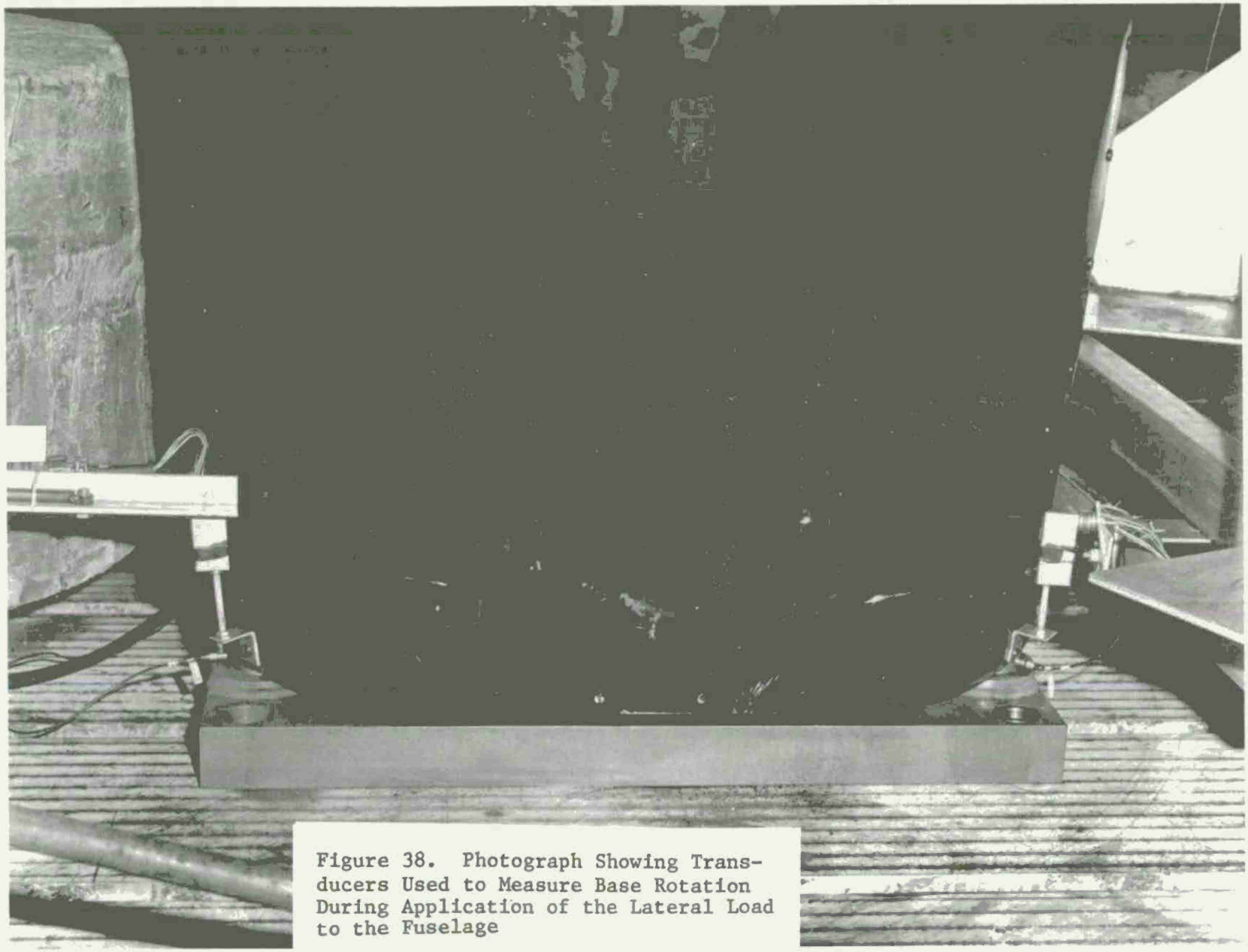


Figure 38. Photograph Showing Transducers Used to Measure Base Rotation During Application of the Lateral Load to the Fuselage

TABLE 1. LIST OF EQUIPMENT USED IN CONDUCT OF TEST

Equipment	Mfg.	Model	Serial	Parameter Measured
LVDT	Trans-Tek	280, 281, 282, 283, 284		Displacement
Recorder, Analog	Sangamo	SABRE V		Signal Conditioning (LVDT)
Rectifier Unit	Honeywell	121C-1	B9r1	Signal Conditioning (LVDT)
Regulator Unit	Honeywell	121D-1	B1047	Signal Conditioning (LVDT)
Oscillator Unit	Honeywell	121E-1	B1152	Signal Conditioning (LVDT)
Rectifier Unit	Honeywell	121C-1	B966	Signal Conditioning (LVDT)
Regulator Unit	Honeywell	121D-1	B1048	Signal Conditioning (LVDT)
Oscillator Unit	Honeywell	121E-1	B1167	Signal Conditioning (LVDT)
Carrier Amplifier	Honeywell	119B1	4564, 4566, 4567, 4591	Signal Conditioning (LVDT)
Carrier Amplifier	Honeywell	119B1	4594, 4596, 4597, 4638	Signal Conditioning (LVDT)
Carrier Amplifier	Honeywell	119B1	4643, 4645 4646, 4647	Signal Conditioning (LVDT)
D.C. Amplifier	Hawkeye	801	EHO-949	Signal Conditioning (LVDT)
Charge Amplifier	Kistler	503	912, 913	Signal Conditioning (Load Cell)
Charge Amplifier	Kistler	503	914, 915	Signal Conditioning (Load Cell)
Time Code Generator	Systron Donner	8150		Time Code on Mag Tape.
Amplifier	Daytronic	830A	808-935	LVDT Conditioner Amplifier
Load Cell	PCB	216A		Tailboom Interface Loads
Load Cell	BLH	U-1		Applied Load

TABLE 2. TABLE LISTING MAGNETIC TAPE CHANNEL NUMBER, PARAMETER MEASURED, AND STATION LOCATION OF TRANSDUCERS FOR VERTICAL PULL TEST

VERTICAL LOADING AT TURRET

CHANNEL	FUNCTION	STATION
1	Vertical Deflection	61.25 LH
2	Vertical Deflection	93.00 LH
3	Vertical Deflection	138.70 LH
4	Vertical Deflection	148.50 LH
5	Vertical Deflection	186.25 LH
6	Vertical Deflection	213.90 LH
7	Vertical Deflection	250.00 LH
8	Vertical Deflection	268.25 LH
9	Vertical Deflection	93.00 RH
10	Vertical Deflection	148.50 RH
11	Vertical Deflection	213.90 RH
12	Base Rotation, Deflection	Upper LH
13	Base Rotation, Deflection	Lower LH
14	Base Rotation, Deflection	Upper RH
15	Base Rotation, Deflection	Lower RH
16		
17	Load LH, Top	Tailboom Bulkhead (300.68)
18	Load LH, Bottom	Tailboom Bulkhead (300.68)
19	Load RH, Top	Tailboom Bulkhead (300.68)
20	Load RH, Bottom	Tailboom Bulkhead (300.68)
21	Load Applied	74.50
22		
23		

TABLE 3. TABLE LISTING MAGNETIC TAPE CHANNEL NUMBER, PARAMETER MEASURED, AND STATION LOCATION OF TRANSDUCERS FOR NOSE TORSION TEST

TORSION AT NOSE

CHANNEL	FUNCTION	STATION
1	Transducer Deflection	93.00 LH
2	Transducer Deflection	138.70 LH
3	Transducer Deflection	148.50 LH
4	Transducer Deflection	186.25 LH
5	Transducer Deflection	213.90 LH
6	Transducer Deflection	300.42 LH
7	Transducer Deflection	93.00 RH
8	Transducer Deflection	138.70 RH
9	Transducer Deflection	148.50 RH
10	Transducer Deflection	186.50 RH
11	Transducer Deflection	213.90 RH
12	Transducer Deflection	300.42 RH
13	Base Rotation (Vertical Movement)	Upper LH
14	Base Rotation (Vertical Movement)	Lower LH
15	Base Rotation (Vertical Movement)	Upper RH
16		
17	Base Rotation (Vertical Movement)	Lower LH
18	Load - Upper LH	300.68
19	Load - Lower LH	300.68
20	Load - Upper RH	300.68
21	Load - Lower RH	300.68
22	Load - Applied RH	74.50
23	Load - Applied LH	74.50

TABLE 4. TABLE LISTING MAGNETIC TAPE CHANNEL NUMBER, PARAMETER MEASURED, AND STATION LOCATION OF TRANSDUCERS FOR WING BEAMWISE LOADING TEST

WING BEAMWISE LOADING

CHANNEL	FUNCTION	LOCATION
1	Displacement	Sta. 195.04 W.S. 59.00
2	Displacement	Sta. 204.04 W.S. 59.00
3	Displacement	Sta. 200.00 W.S. 42.50
4	Displacement	Sta. 197.107 W.S. 21.38
5	Displacement	Sta. 187.30 W.S. 21.38
6	Displacement	Sta. 200.00 BL 12.25
7	Displacement	Sta. 200.00 BL 12.25
8	Displacement	Sta. 204.04 W.S. 59.00
9	Upper Slope (Wing)	Sta. 197.00 W.L. 66.05 + 4.50
10	Lower Slope (Wing)	Sta. 197.00 W.L. 54.45 - 3.12
11	Lower Slope (Fuselage)	Sta. 198.75 W.L. 52.00
12	Upper Slope (Fuselage)	Sta. 199.75 W.L. 65.00
13	Instr. Rack Gnd Ref. (Right Top Sta. 192 W.L. 77 BL 19.)	
14	Instr. Rack Gnd Ref. (Right Bot. Sta. 207 W.L. 77 BL 19.)	
15	Instr. Rack Gnd Ref. (Left Top Sta. 192 W.L. 77 BL 19.)	
16	Tape Reference (400 RKz)	
17	Instr. Rack Gnd Ref. (Left Bot. Sta. 207 W.L. 77 BL 19.)	
18	Base Load Top Left	
19	Base Load Bottom Left	
20	Base Load Top Right	
21	Base Load Bottom Right	
22	Load Applied Right Side	
23	Load Applied Left Side	

TABLE 5. TABLE LISTING MAGNETIC TAPE CHANNEL NUMBER, PARAMETER MEASURED, AND STATION LOCATION OF TRANSDUCERS FOR WING TORSIONAL TEST

WING TORSION TEST

Channel	Function	Station
1	Wing torque deflection	f.s. 175.044; WS 59; f.s.
2	Wing torque deflection	f.s. 212.63; WS 59; a.s.
3	Wing torque deflection	f.s. 191.075; WS 42.5; f.s.
4	Wing torque deflection	f.s. 212.63; WS 42.5; a.s.
5	Wing torque deflection	f.s. 187.50; WS 21.38; f.s.
6	Wing torque deflection	f.s. 212.63; WS 21.38; a.s.
7	Wing torque deflection	f.s. 186.25; B.L. 18;
8	Wing torque deflection	f.s. 212.63; B.L. 18;
9	Wing torque deflection	f.s. 186.25; B.L. 18;
10	Wing torque deflection	f.s. 212.63; B.L. 18;
11	Wing torque deflection	f.s. 195.044; WS 59;
12	Wing torque deflection	f.s. 212.634; WS 59;
13	Ground Reference	R.H. Top
14	Ground Reference	R.H. Bottom
15	Ground Reference	L.H. Top
16	Tape Reference	
17	Ground Reference	L.H. Bottom
18	Load Applied	
19	Load Applied	
20	Load Applied	
21	Load Applied	

TABLE 6. TABLE LISTING MAGNETIC TAPE CHANNEL NUMBER, PARAMETER MEASURED, AND STATION LOCATION OF TRANSDUCERS FOR LATERAL LOADING TEST

FUSELAGE - LATERAL LOADING

CHANNEL	FUNCTION	LOCATION	
1	Displacement	Sta. 61.25	W.L. 46
2	Displacement	Sta. 93.	W.L. 46
3	Displacement	Sta. 138.70	W.L. 46
4	Displacement	Sta. 148.50	W.L. 35.97
5	Displacement	Sta. 186.25	W.L. 35.97
6	Displacement	Sta. 213.94	W.L. 35.97
7	Displacement	Sta. 250.	W.L. 35.97
8	Displacement	Sta. 270.	W.L. 35.97
9	Displacement	Sta. 98.69	W.L. 62.17
10	Displacement	Sta. 148.50	W.L. 63.49
11	Displacement	Sta. 213.94	W.L. 64.627
12	Base Rotation	Top Left	
13	Base Rotation	Bottom Left	
14	Base Rotation	Top Right	
15	Base Rotation	Bottom Right	
16	Tape Reference	(400 KHz)	
17	Base Load	Top Left	
18	Base Load	Bottom Left	
19	Base Load	Top Right	
20	Base Load	Bottom Right	
21	Load Applied - Turret Loading Fixture		

TABLE 7. TABLE OF DISPLACEMENTS TAKEN WITH DIAL INDICATORS AT STATIONS 93, 98.69, 186.25, 213.94, and 300.68

LATERAL LOAD TESTS WITH DIAL INDICATORS

WITH AMMO DOORS CLOSED

FORCE	Sta. 93	Sta. 98.69	W.L. 35.97 Sta. 186.25	W.L. 66.06 Sta. 186.25	W.L. 35.97 Sta. 213.94	W.L. 65.00 Sta. 213.94	W.L. 35.97 Sta. 300.68	W.L. 63.54 Sta. 300.68
				TEST #5				
250	.118	.115	.059	.052	.028	.036	.001	.002
500	.241	.235	.116	.112	.080	.074	.003	.004
750	.369	.359	.176	.170	.123	.116	.005	.007
1000	.502	.487	.238	.232	.168	.159	.008	.009
0	.008	.008	.002	.002	.002	.002		
				TEST #6				
250	.120	.118	.049	.051	.038	.038	.002	.002
500	.239	.232	.106	.105	.078	.073	.003	.004
750	.363	.349	.165	.160	.118	.110	.005	.006
1000	.495	.478	.229	.223	.162	.153	.007	.009
0	.000	-.001	-.008	-.008	-.002	-.006		
				TEST #7				
1000	.498	.482	.234	.231	.166	.162	.007	.009
0	.004	.005	.001	.003	.001	.003		

TABLE 7. TABLE OF DISPLACEMENTS TAKEN WITH DIAL INDICATORS AT STATIONS 93, 98.69, 186.25, 213.94, and 300.68 (Cont'd)

LATERAL LOAD TESTS WITH DIAL INDICATORS

WITH AMMO DOORS OPEN

FORCE	Sta. 93	Sta. 98.69	W.L. 35.97 Sta. 186.25	W.L. 66.05 Sta. 186.25	W.L. 35.97 Sta. 213.94	W.L. 65.00 Sta. 213.94	W.L. 35.97 Sta. 300.68	W.L. 63.54 Sta. 300.68
				TEST #1				
250	.115	.106		.050	.035	.037	.001	.002
500	.236	.225		.103	.080	.075	.003	.005
750	.333	.347		.165	.104	.109	.005	.007
1000	.460	.472		.215	.153	.150	.007	.009
0	-.013	-.004		-.010	-.004	-.005		
				TEST #2				
250	.112	.106	.056	.053	.039	.038	.001	.002
500	.233	.223	.110	.108	.077	.075	.003	.004
750	.348	.348	.173	.169	.120	.115	.005	.006
1000	.482	.478	.237	.232	.165	.160	.007	.009
0	.005	.005	.007	.005	.003	.005		
				TEST #3				
250	.103	.098	.048	.046	.035	.032	.001	.002
500	.229	.219	.106	.106	.075	.073	.003	.004
750	.345	.349	.171	.169	.121	.118	.005	.007
1000	.476	.475	.233	.232	.163	.157	.008	.009
0	-.018	.001	.001	.001	.001	.001		
				TEST #4				
1000	.493	.473	.233	.228	.165	.158	.008	.008
0	.008	.004	.002	.002	.002	.001		

APPENDIX A

1. Work Statement.
2. Letter detailing loads to be applied.
3. Letter inclosing static deflection curves.
4. Work statement for repairing the fuselage.
5. Bell Inter-Office Memo detailing repairs made to the fuselage.

WORK STATEMENT

The proposed test program involves a static influence coefficient test and a shake test of the AH-1G airframe for the purpose of correlating the NASTRAN math model of the airframe structure developed under Contract No. DAAF03-73-C-0122. The program would require bailment of an AH-1G helicopter airframe from the Army to use in the tests.

The program can be separated into three parts: (1) static influence coefficient test, (2) shake test, and (3) documentation.

I. Static Influence Coefficient Test - The static test will be used to very the structural stiffness representation in the NASTRAN model.

A. Tailboom and Vertical Fin

1. Tailboom - Cantilever support the tailboom and apply the following loads at the aft end of the tailboom (sta 485.). Deflections are measured relative to the support fixture.

a. Lateral - apply a single lateral load in increments and measure lateral deflections at 10 stations along the tailboom.

b. Vertical - apply a single vertical load in increments and measure lateral deflections at 10 stations along the tailboom.

c. Torsion - apply a single torsion load in increments and measure torsional deflections at 5 stations along the tailboom.

2. Vertical Fin - The vertical fin is attached to the tailboom. Loads are applied at the tail rotor 90° gearbox attachment.

a. Lateral (Beamwise) - apply a single lateral load in increments and measure lateral deflections at three locations: the tip, mid span and root, and measure slope at the root.

b. Fore-and-Aft (Chordwise) - apply a single load in increments in a chordwise direction and measure chordwise deflections at three locations: tip, mid-span and root, and measure slope at the root.

c. Torsion - apply a single torsion load in increments and measure torsional deflections at three locations: the tip, mid-span and root.

B. Fuselage - Cantilever support the fuselage at the tailboom junction and apply the following loads at the nose of the fuselage (station 61.25). Deflections are measure relative to the support fixture.

1. Lateral - apply a single lateral load in increments and measure lateral deflections at 10 stations along the fuselage.

2. Vertical - apply a single vertical load in increments and measure vertical deflections at 10 stations along the fuselage.

3. Torsion - apply a single torsional load in increments and measure torsional deflections at 5 stations along the fuselage.

C. Wing - Support the fuselage at the landing gear attachment points leaving the wings connected to the fuselage structure. Loads are applied at the wing tip and deflections of the wing are measured relative to the fuselage structure at the wing root.

1. Vertical (Beamwise) - apply a single beamwise load in increments and measure beamwise deflections at three locations: wing tip (BL 60), inboard store (BL 42.5) and wing root (BL 19), and slope at the root.

2. Torsion - apply a single torsion load in increments and measure wing torsional deflections at three stations: wing tip, inboard store, and wing root.

D. Main Rotor Pylon - With the fuselage supported at the landing gear attachment points apply loads at the main rotor hub and measure pylon deflections relative to the fuselage mount plane (WL 77.).

1. Fore-and-Aft (Pitch) - apply a single load in increments and measure fore-and-aft deflections at three locations: hub, top of transmission case, and transmission case mount plane, and slope at transmission case mount plane.

2. Lateral (Roll) - apply a single load in increments and measure lateral deflections at three locations: hub, top of transmission case and transmission case at mount plane, and slope at transmission case mount plane.

II. Shake Test - The shake test will be used to verify fuselage natural vibration modes up through 30 Hertz calculated using the NASTRAN model. The fuselage should be suspended vertically at the hub by a soft support and the main rotor should be replaced by a lumped mass of equivalent weight.

A. Lateral Shake Test

1. Lateral shake at the tail of the airframe (station 489.) 5 through 40 Hertz and measure lateral accelerations at 10 or more locations. Mode shapes would be taken at natural frequencies and frequency

versus response curves generated for each location measured. Purpose - to determine airframe natural frequencies and mode shapes.

2. Lateral shake at the hub (1 to 5 Hertz) with electromagnetic shaker. Purpose - to identify the lateral pylon rock natural frequency and damping.

B. Vertical Shake Test

1. Vertical shake at the tail of the airframe 5 to 40 Hertz, measure vertical response at 10 or more vertical locations. Purpose - to determine airframe natural frequencies and modes.

2. Fore and aft shake at the hub (1 to 5 Hertz) with electromagnetic shaker. Purpose - to identify the fore and aft pylon rock natural frequency and damping.

III. Documentation

A. Data

1. Deflection versus load data measured in the static influence coefficient tests.

2. Response versus frequency and natural mode data measured in the shake test.

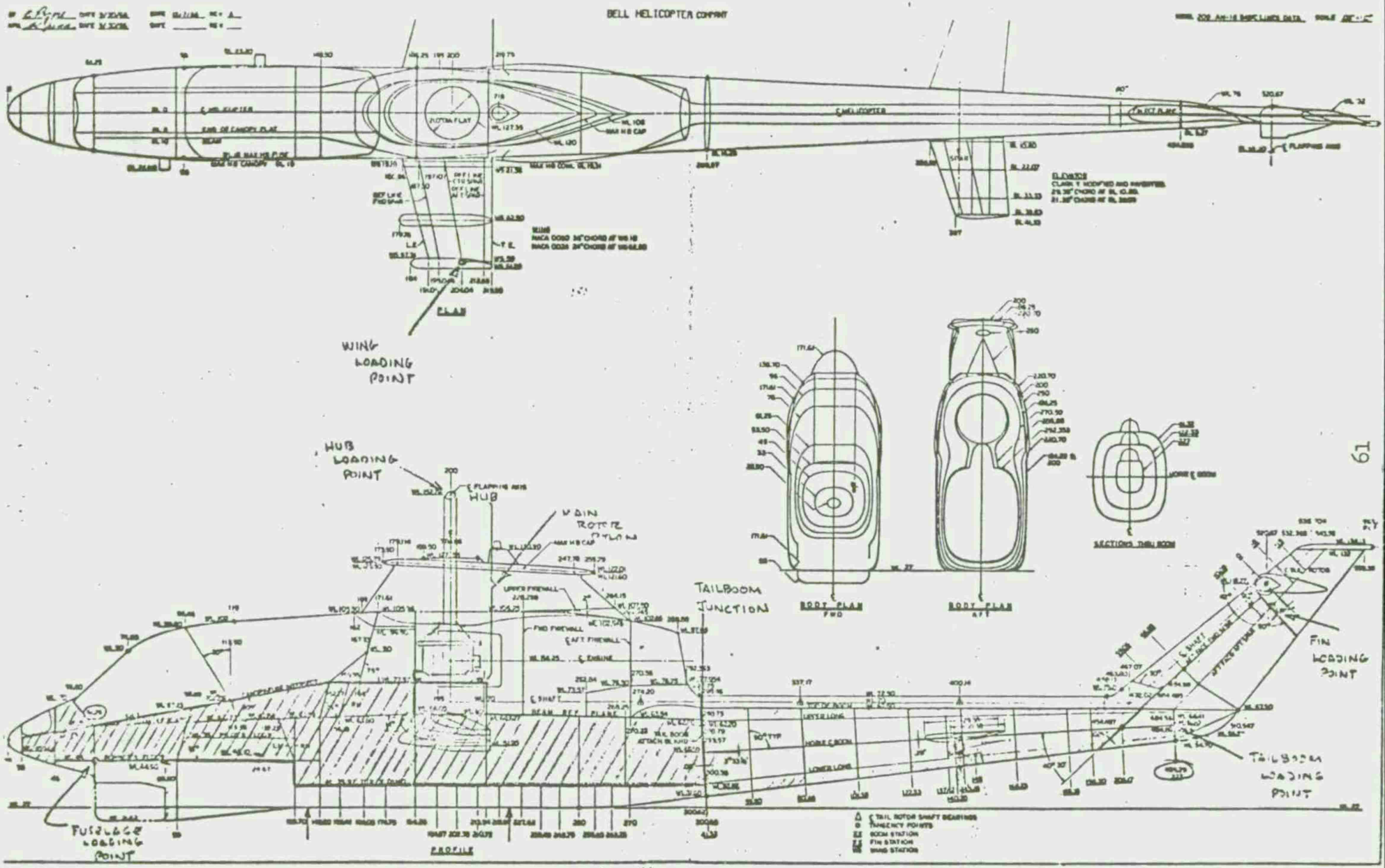
B. Correlation

1. The AH-1G NASTRAN model will be loaded to simulate the static loading in the influence coefficient tests of the actual structure and the results will be compared.

2. The airframe natural frequencies and response-versus-frequency calculated results will be compared to the shake test measurements.

C. Changes to the NASTRAN Model

1. Changes and improvements to the NASTRAN model will be incorporated or recommended to improve correlation with the static and shake test results.


BELL HELICOPTER COMPANY
WING LOADING POINT
HUB LOADING POINT
HUB
MAIN ROTOR PYLON
TAILBOOM JUNCTION
FUSELAGE LOADING POINT
FIN LOADING POINT
TAILBOOM LOADING POINT
PROFILE
BODY PLAN FWD
BODY PLAN AFT
SECTIONS THRU BOOM
61

BELL HELICOPTER COMPANY
POST OFFICE BOX 482 · FORT WORTH, TEXAS 76101 A textron COMPANY

In reply refer to:
81:JDC:mb-312

22 November 1974

Mr. Don Frericks
Gen. Thomas J. Rodman Laboratory
SARRI-LR
Rock Island Arsenal
Rock Island, Illinois 61201

Dear Don:

Enclosed are sketches showing the locations for deflection measurements to be used in the fuselage static test to be done at ARMCOM. The measurements are for the following loading conditions.

(1) Up to 1000 lb vertical loading at nose (station 61.25 - 93.0)
Total - 13 vertical measurements, base rotation

(2) Up to 1000 lb lateral loading at nose (station 61.25 - 93.0)
Total - 13 lateral measurements, base rotation

(3) Up to 20,000 in-lb torsion loading at nose (station 61.25 - 93.0)
Total - 12 vertical measurements

(4) Up to 1000 lb beamwise loading at wing tip (WS 60.)
Total - 8 vertical measurements on wing, 2 slopes

(5) Up to 20,000 in-lb torsion loading at wing tip (WS 60.)
Total - 12 vertical measurements on wing

These are suggested measurements for the fuselage and wing static tests. If there are problems getting them all, give me a call and we will try to work them out or change the measurements.

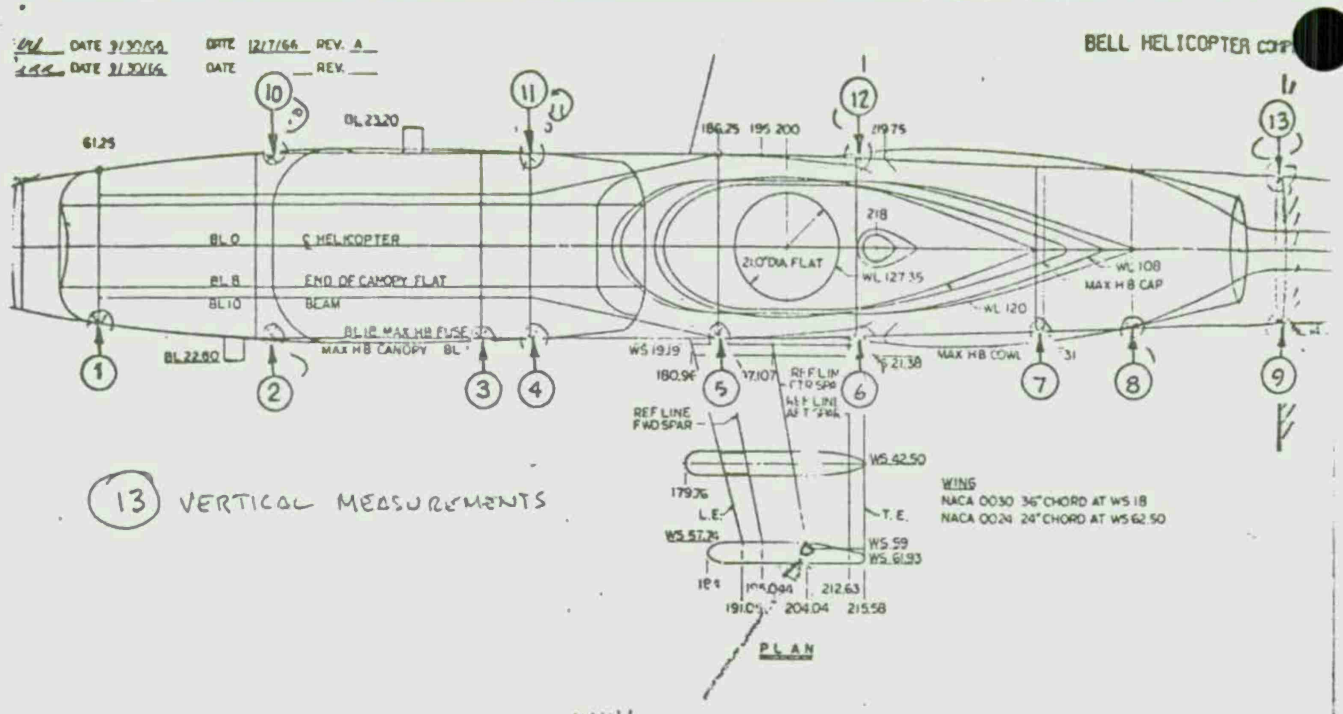
Yours very truly,

BELL HELICOPTER COMPANY

Jim Cronkhite

J. D. Cronkhite
Senior Dynamics Engineer
(817) 280-2886

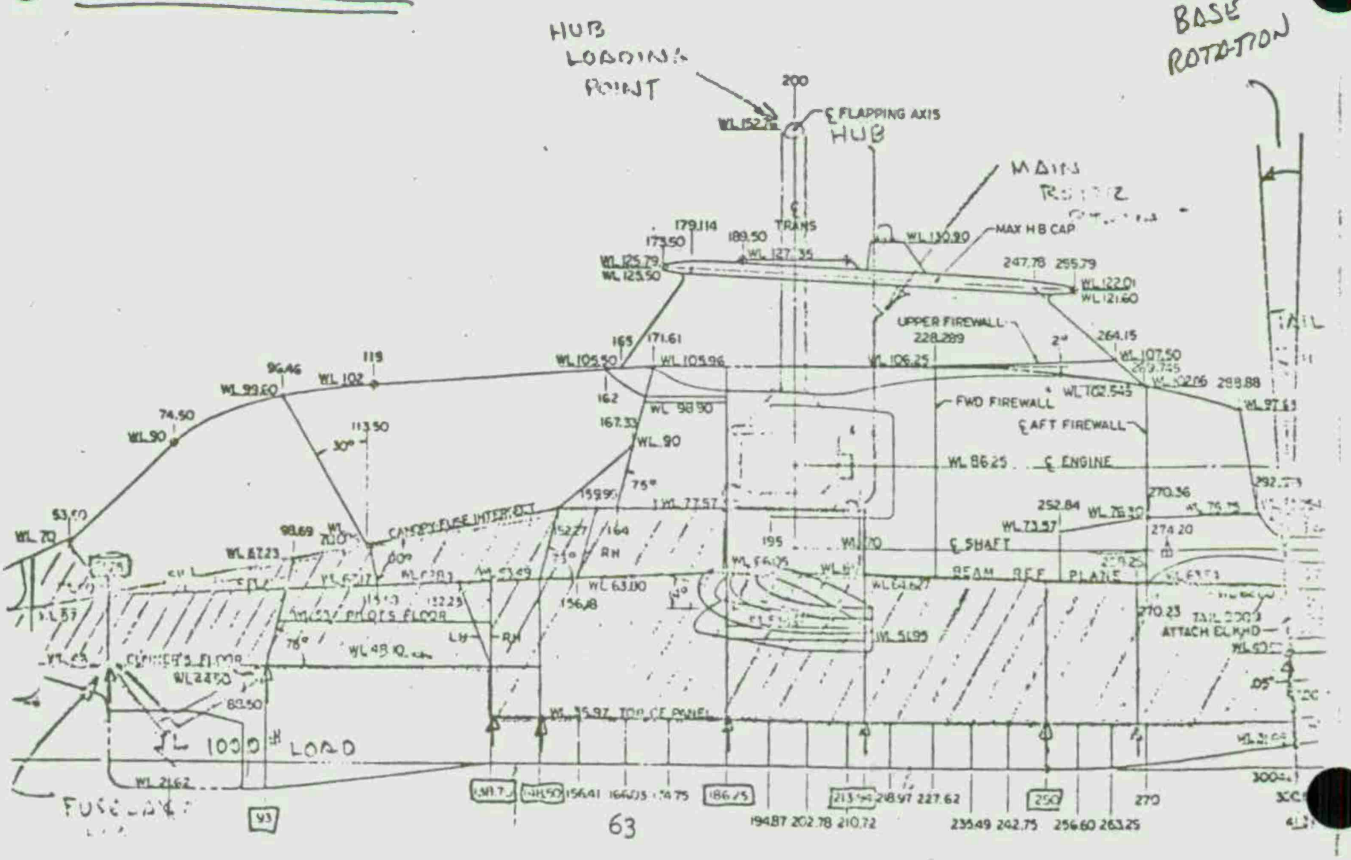
cc: C. Swindlehurst
AMRDL, Langley



(13) VERTICAL MEASUREMENTS

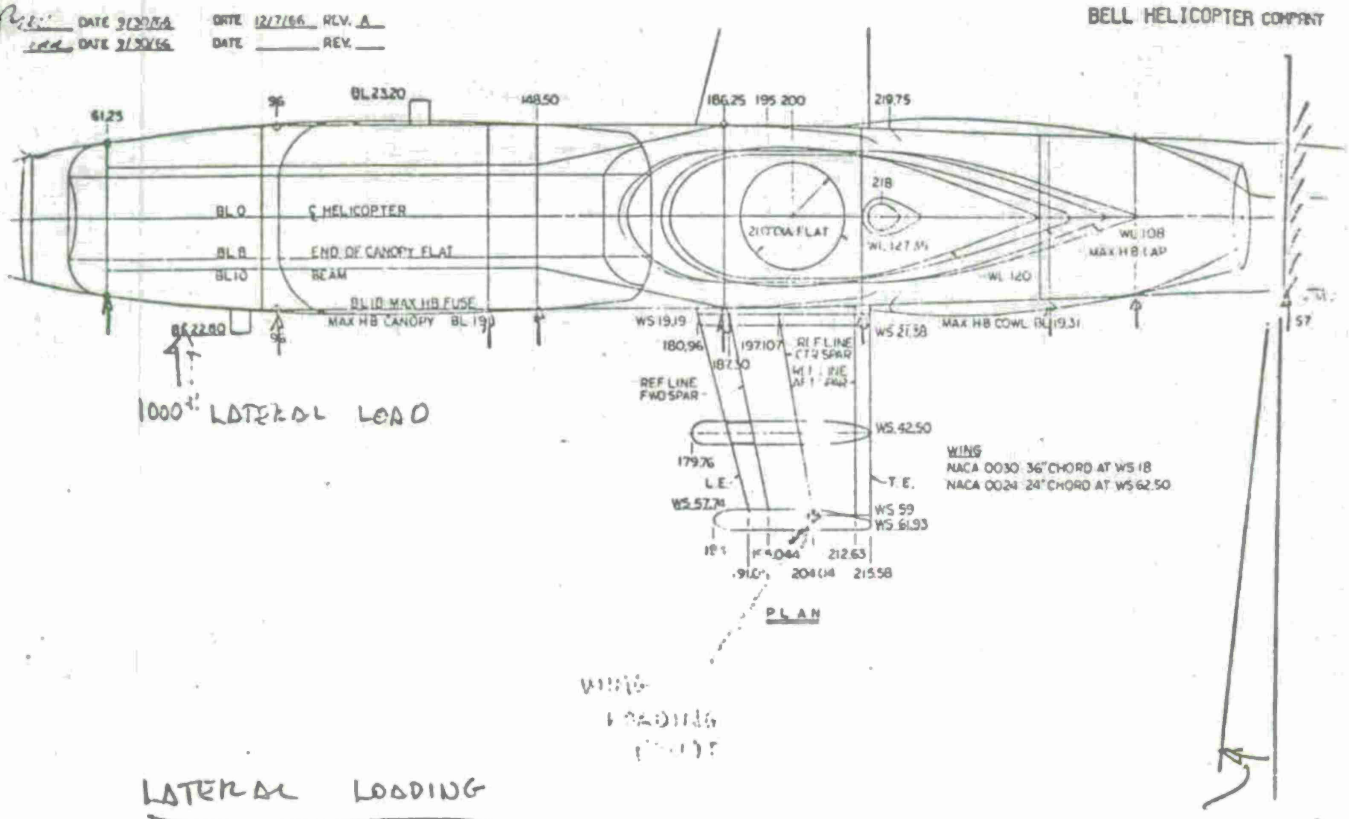
WING LOADING POINT

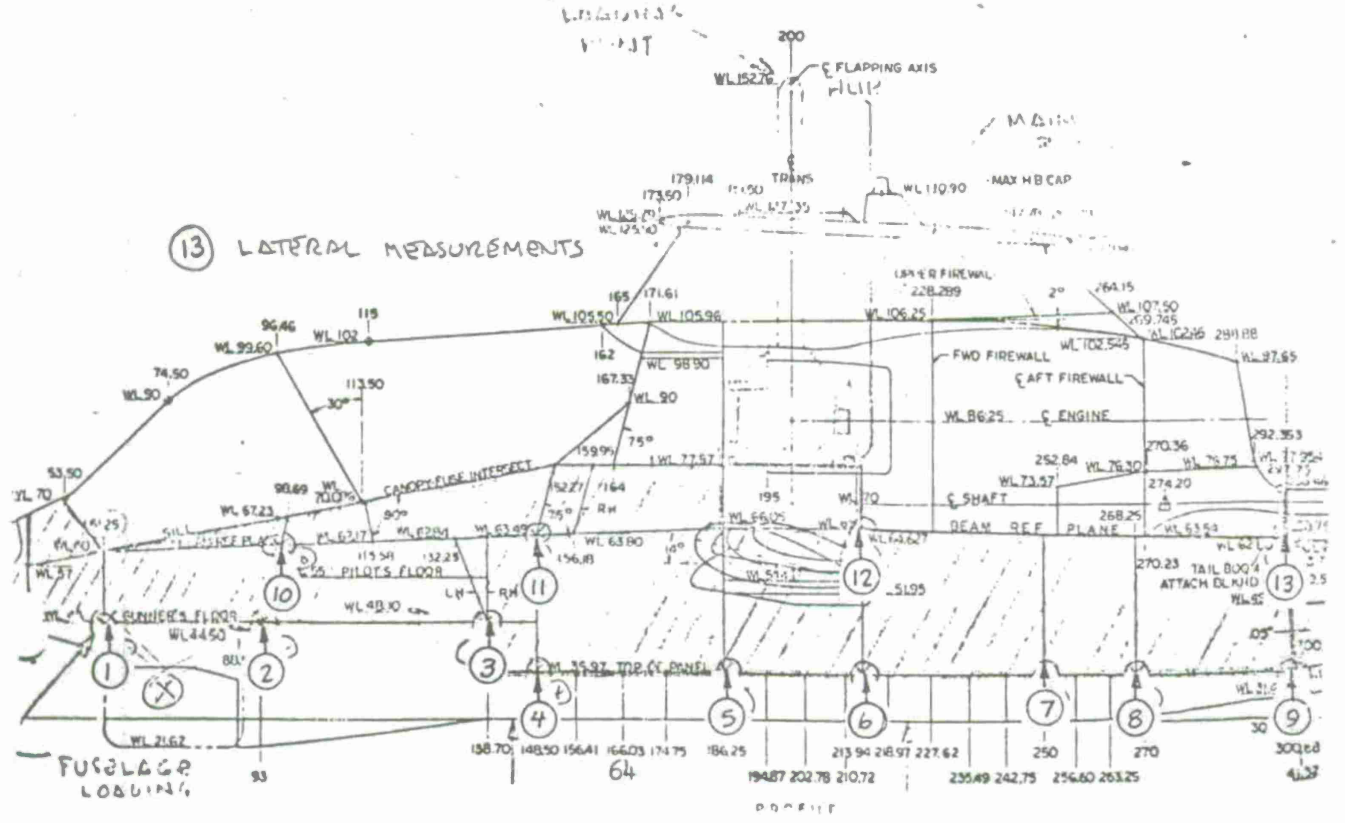
VERTICAL LOADING



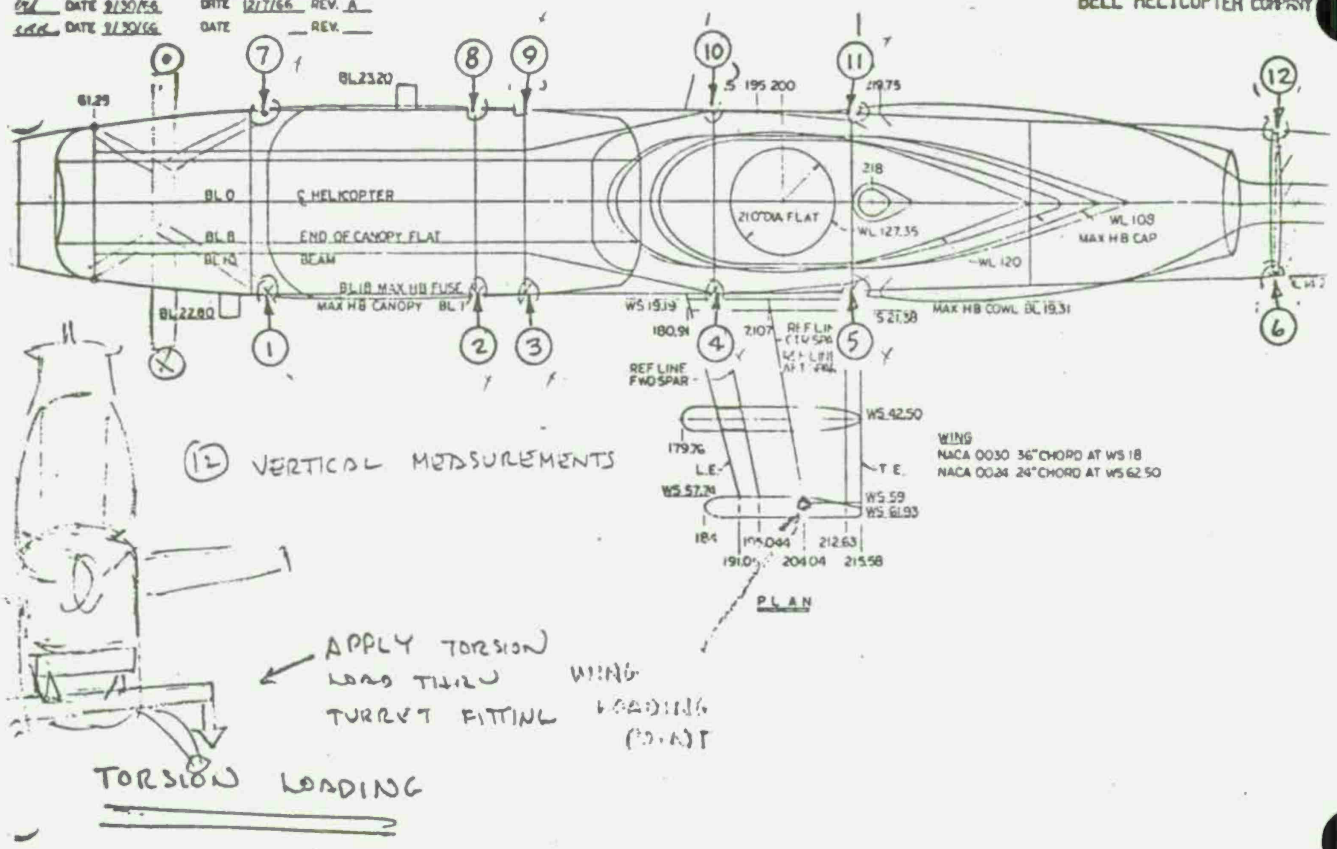
DATE 9/30/66 DRTE 12/7/66 REV. A
DATE 9/30/66 DATE _____ REV. ___

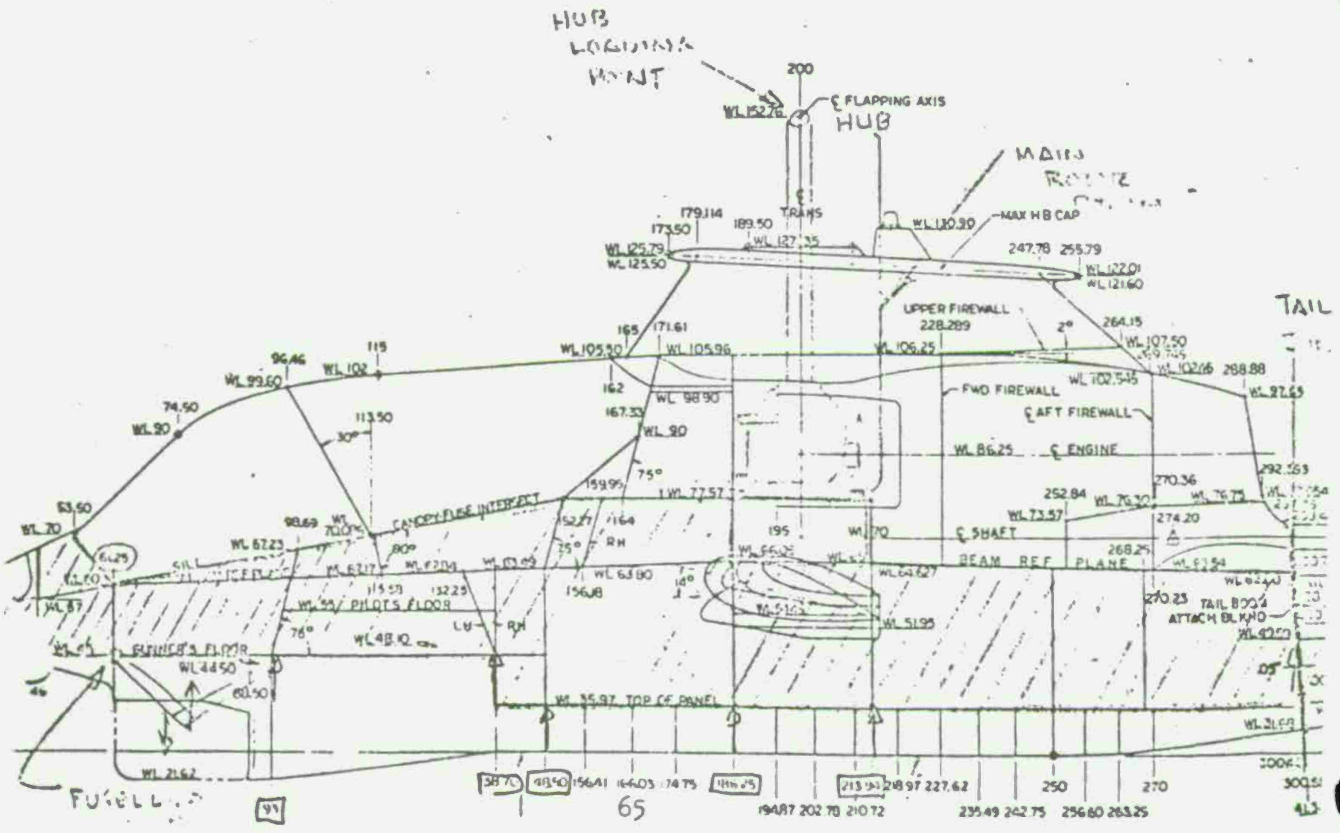
BELL HELICOPTER COMPANY

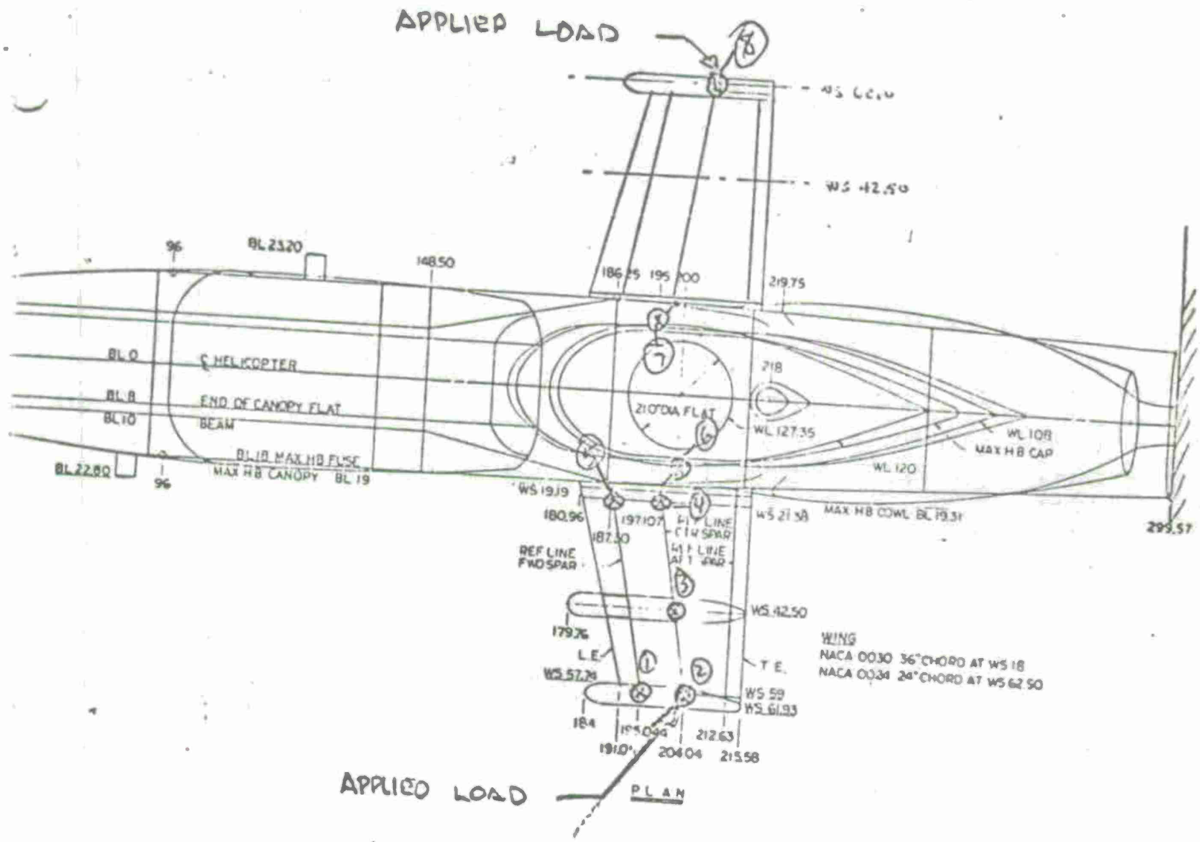


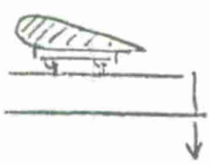


DATE 9/30/66 DATE 12/7/66 REV. A
DATE 9/30/66 DATE REV.

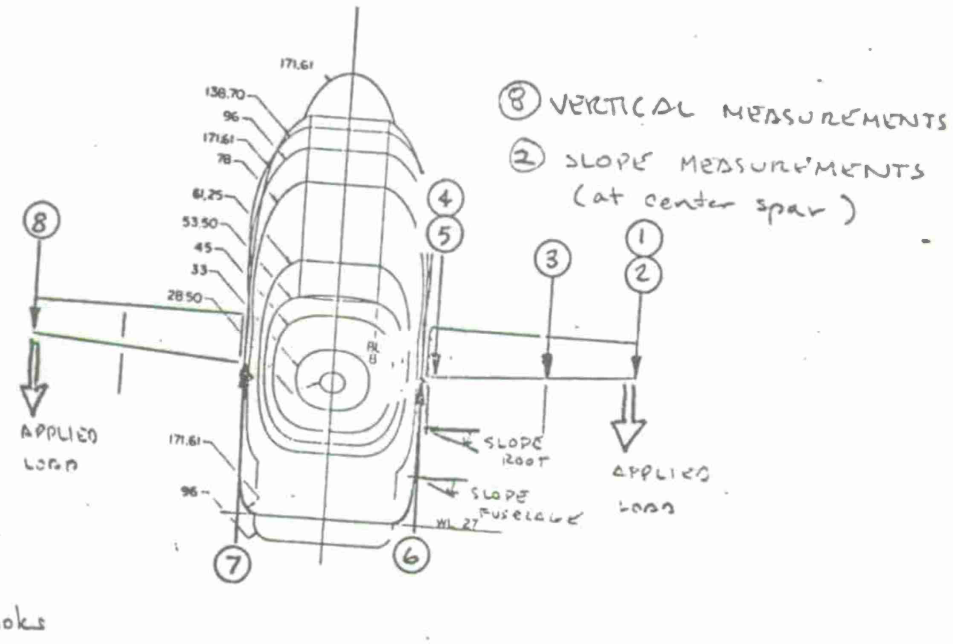




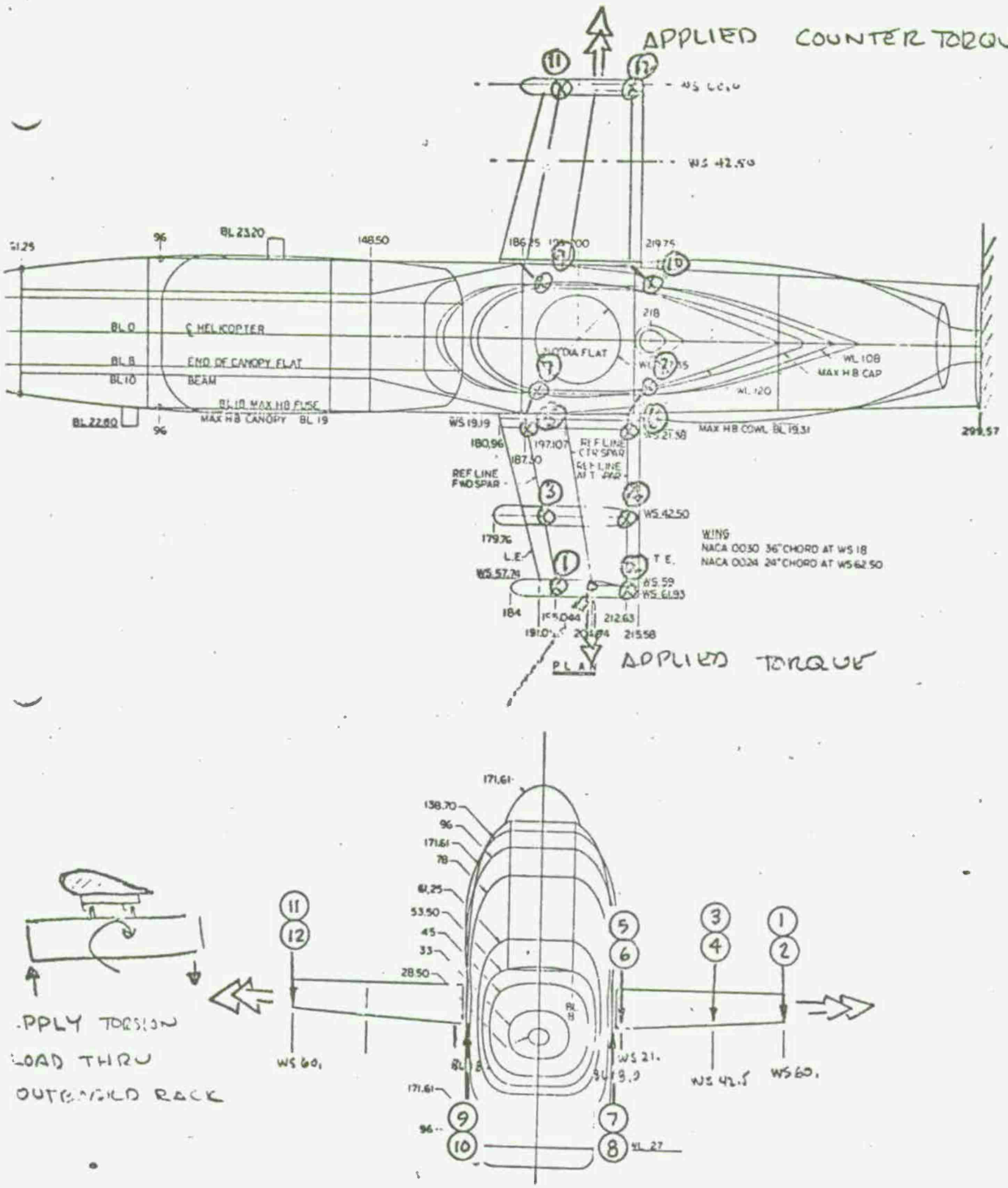




'PLY LOAD
ZU OUTBOARD
-CK –
..ght even
.. able to use
..acket pod which
..lready has lugs
..hich fit the hooks
.. the rack



WING BEAMWISE LOADING



WING TORSION LOADING

BELL HELICOPTER COMPANY
POST OFFICE BOX 482 • FORT WORTH, TEXAS 76101 A textron COMPANY

15 May 1975

In reply refer to:
81:JDC:ph-158

Mr. Carl E. Swindlehurst, Jr.
U. S. Army Air Mobility R & D Lab
National Aeronautics and Space Administration
Langley Research Center
Hampton, Va 23665

Dear Carl:

Enclosed are the computed static deflection curves using the NASTRAN model of the AH-1G fuselage and incorporating the structure repair changes. The following curves are included:

1. Fuselage vertical deflections for a 1000 lb vertical load - with structure repairs

2. Fuselage lateral deflections for a 1000 lb lateral load - with structure repairs and standard AH-1G

3. Fuselage LH and RH vertical deflections for a 1000 in-lb torque - with structure repairs

4. Fuselage vertical deflections for a 1000 lb vertical load - standard AH-1G

5. Fuselage LH and RH vertical deflections for a 1000 in-lb torque - standard AH-1G

Comparing the deflection curves for the standard AH-1G structure with the curves incorporating the structure repair changes shows only small changes due to the repair modifications.

I am sending Don Frericks at ARMCOM a copy of these deflection curves, but the results will not effect their instrumentation setup since there is so little change.

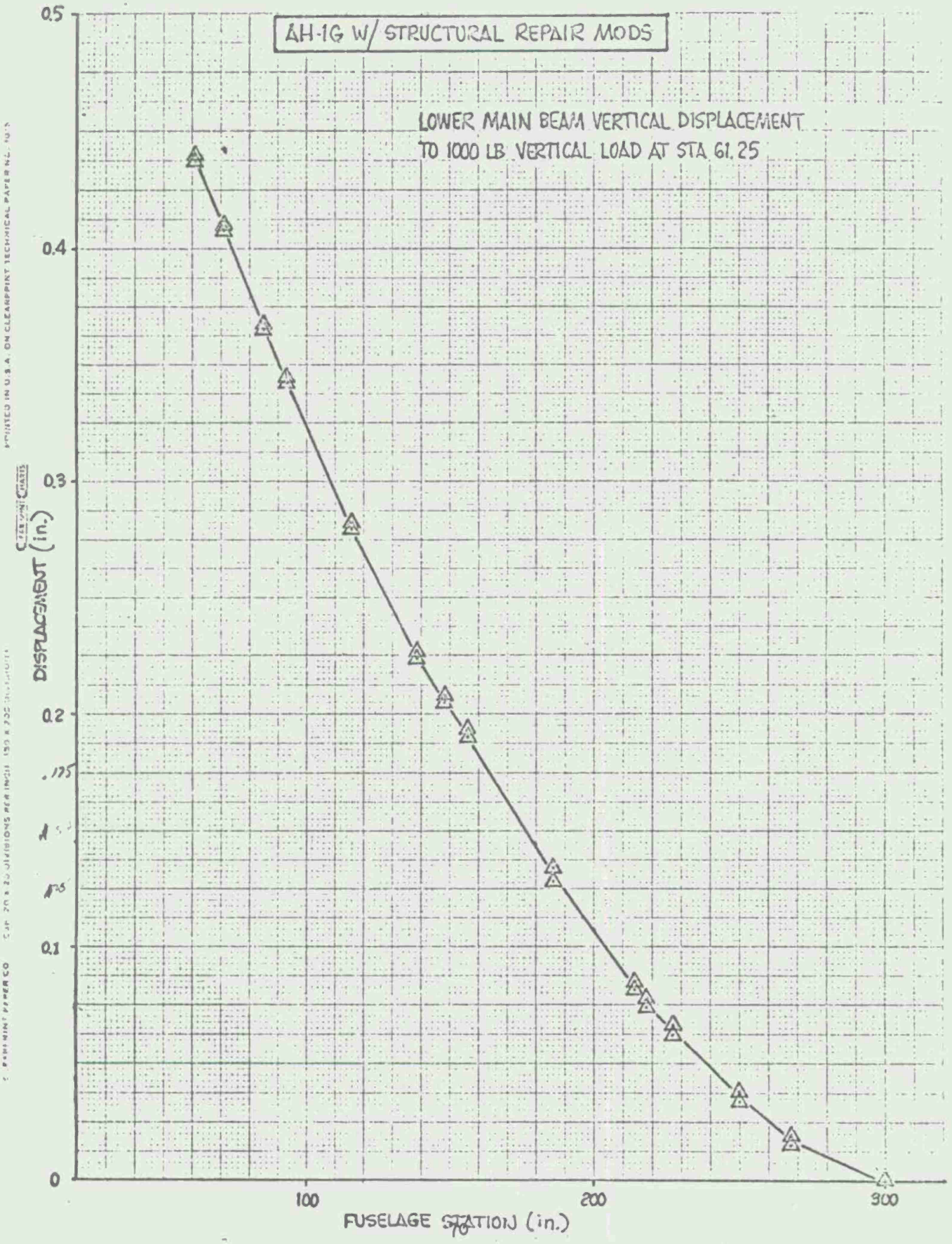
I am enclosing a copy of Tom Haas' in-house memo documenting the fuselage structure repair done at the Rock Island Arsenal.

Sincerely yours,

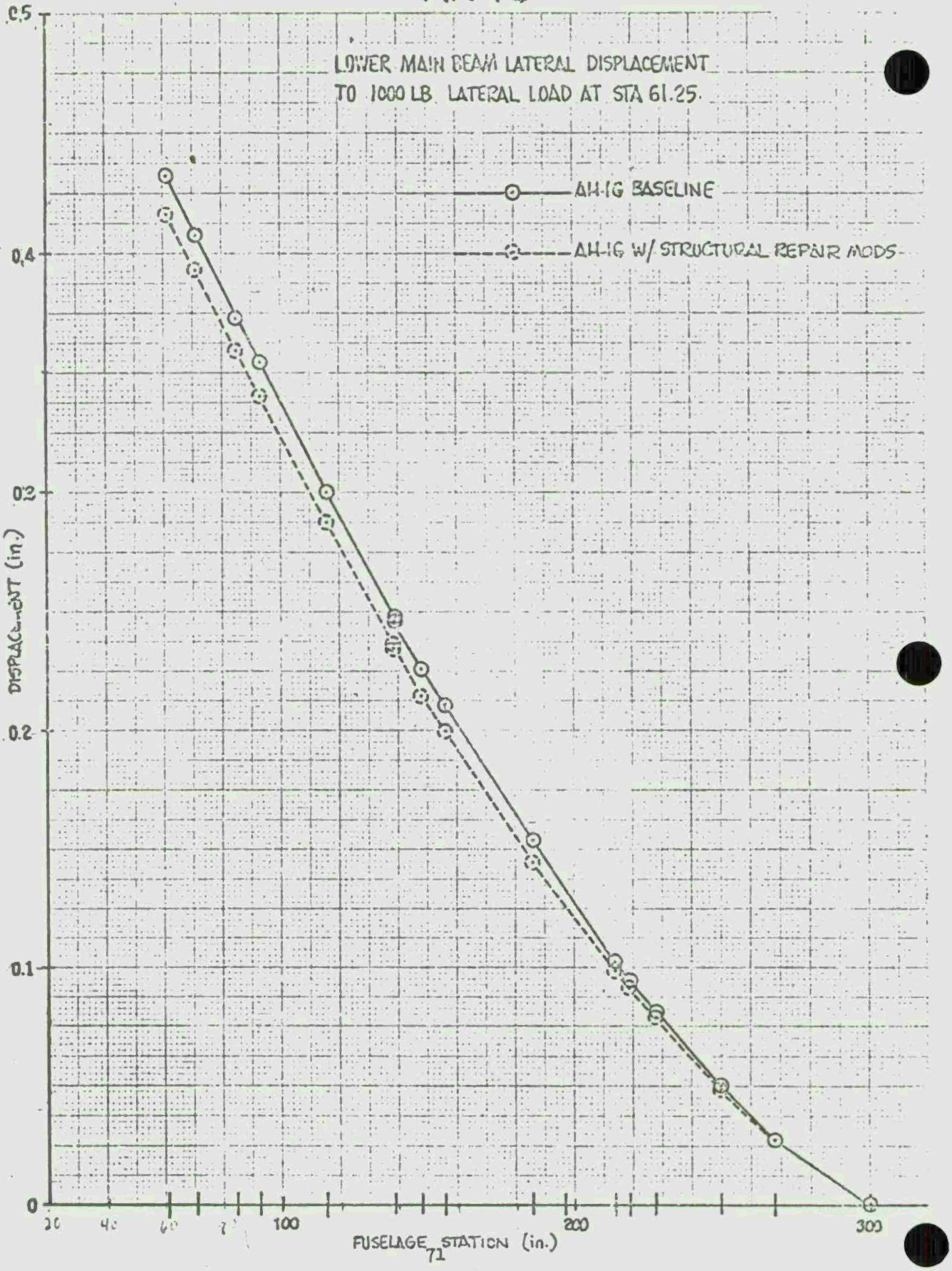
J. D. Cronkhite

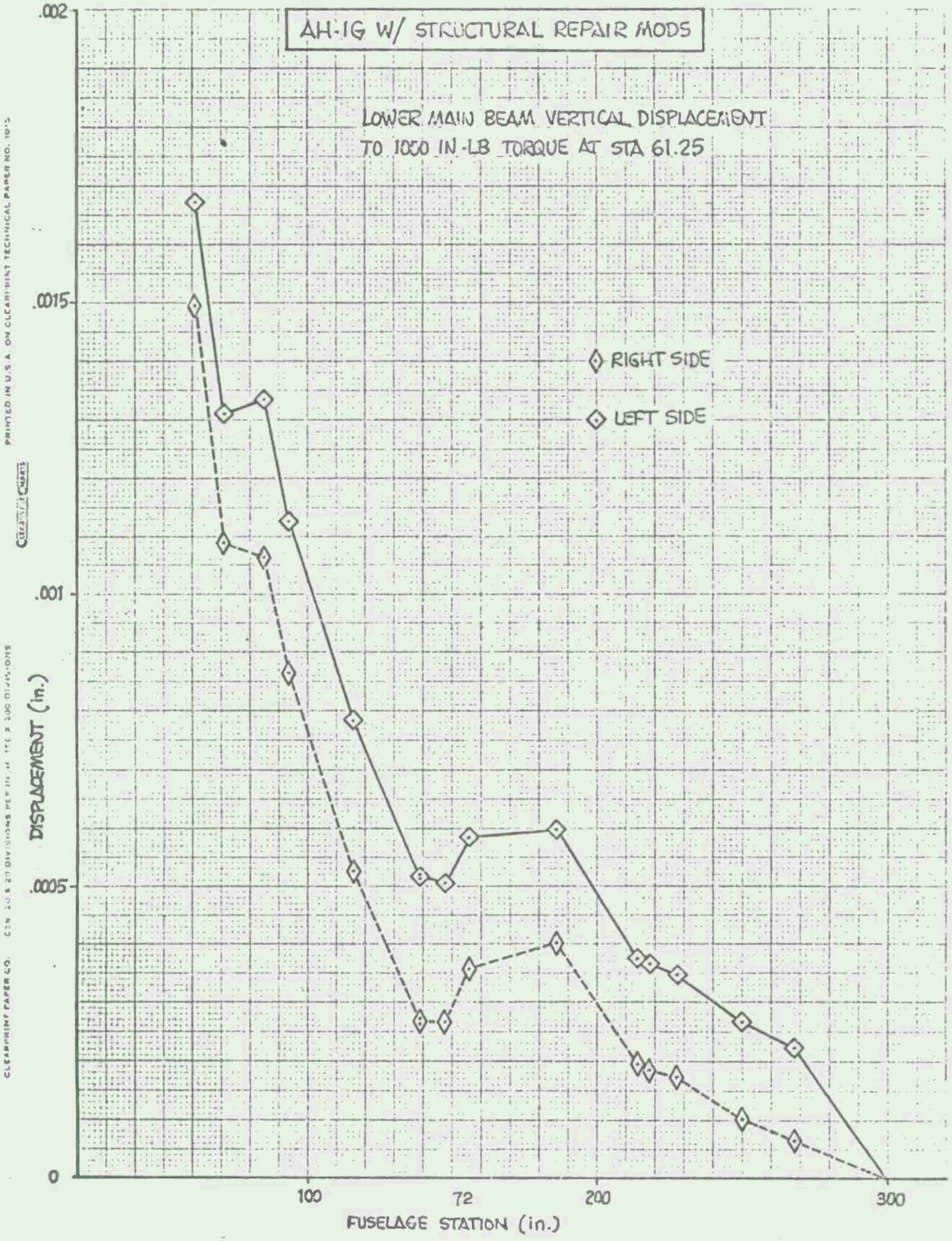
J. D. Cronkhite
Sr. Structural Dynamics Engineer

cc: Don Frericks - ARMCOM
Contract Administrator
(NAS1-13801) - NASA, Langley

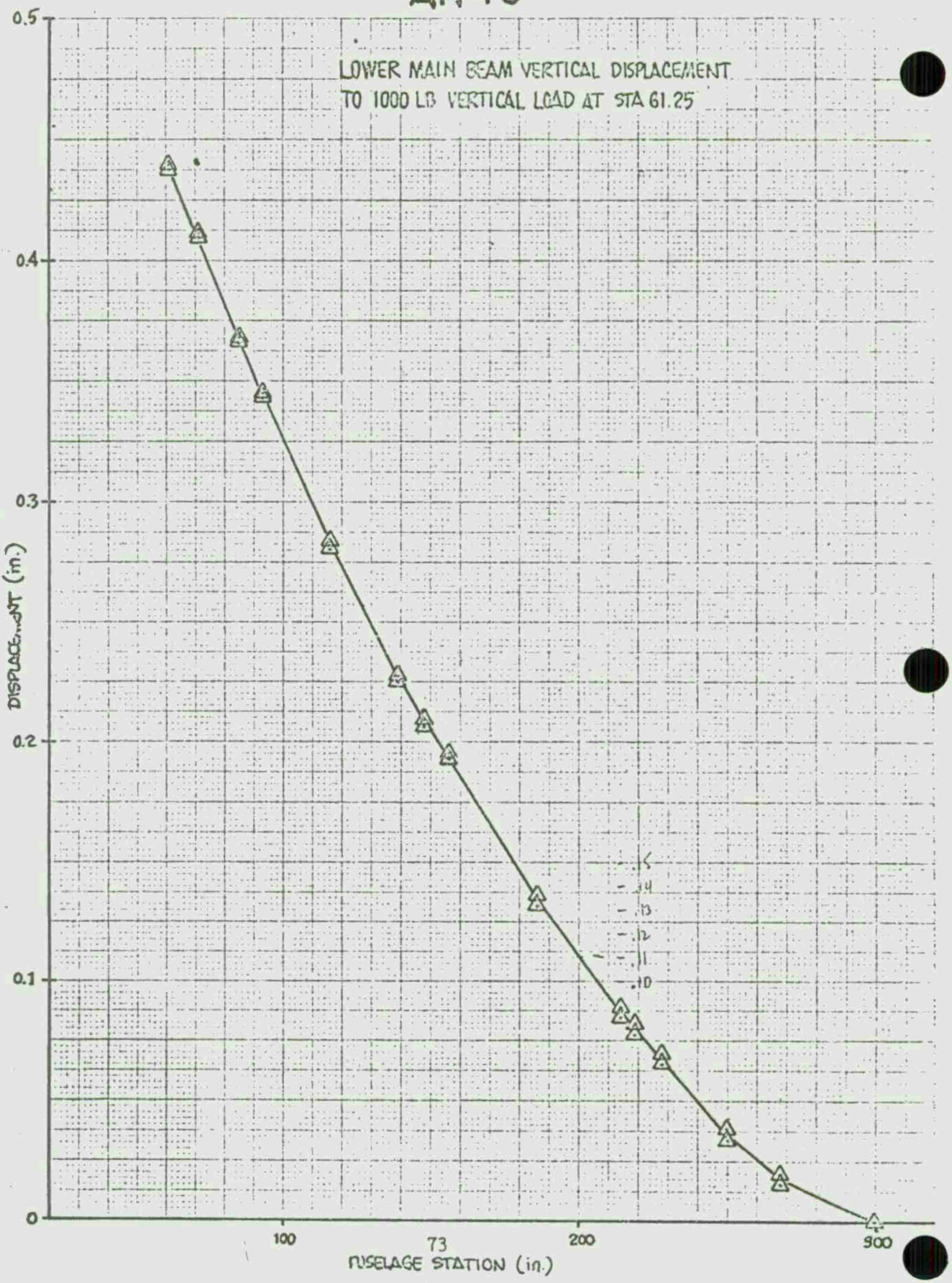

AH-1G W/ STRUCTURAL REPAIR MODS
LOWER MAIN BEAM VERTICAL DISPLACEMENT
TO 1000 LB VERTICAL LOAD AT STA 61.25
DISPLACEMENT (in.)
0.5
0.4
0.3
0.2
.175
0.1
0
100
200
300
FUSELAGE STATION (in.)

AH-1G

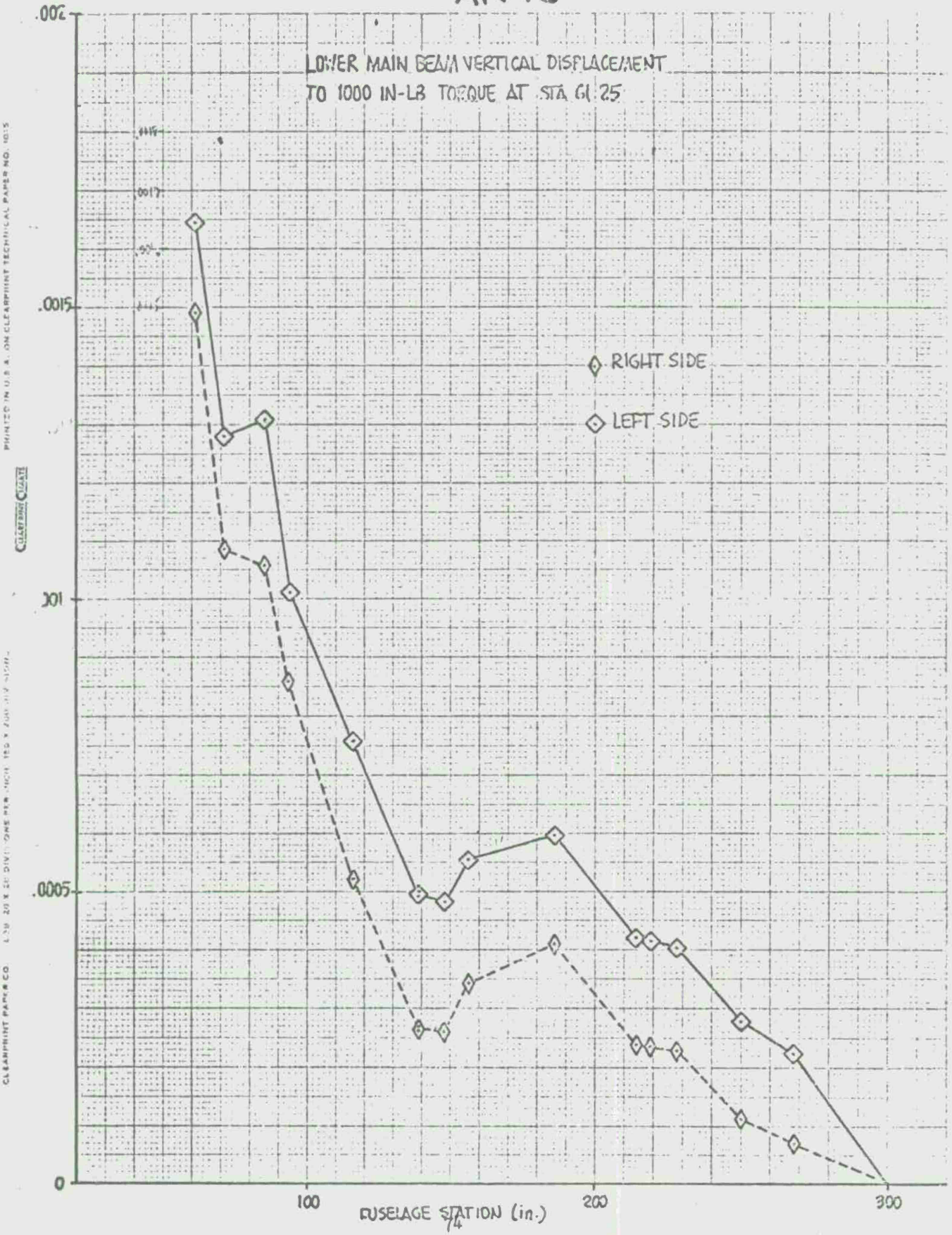

LOWER MAIN BEAM LATERAL DISPLACEMENT
TO 1000 LB LATERAL LOAD AT STA 61.25
AH-1G BASELINE
AH-1G W/ STRUCTURAL REPAIR MODS
DISPLACEMENT (in.)
0.5
0.4
0.3
0.2
0.1
0
100
200
300
FUSELAGE STATION (in.)


AH-1G W/ STRUCTURAL REPAIR MODS
LOWER MAIN BEAM VERTICAL DISPLACEMENT
TO 1000 IN-LB TORQUE AT STA 61.25
RIGHT SIDE
LEFT SIDE
.002
.0015
.001
.0005
0
DISPLACEMENT (in.)
100
72
200
300
FUSELAGE STATION (in.)

AH-16


LOWER MAIN BEAM VERTICAL DISPLACEMENT
TO 1000 LB VERTICAL LOAD AT STA 61.25
DISPLACEMENT (in.)
0.5
0.4
0.3
0.2
0.1
0
100
73
200
300
FUSELAGE STATION (in.)

AH-1G


LOWER MAIN BEAM VERTICAL DISPLACEMENT
TO 1000 IN-LB TORQUE AT STA 61.25
RIGHT SIDE
LEFT SIDE
.002
.0015
.001
.0005
0
100
200
300
FUSELAGE STATION (in.)

WORK STATEMENT

An AH-1G helicopter has been damaged by a fire which originated in the "Hell Hole." The helicopter is located at an Army Arsenal in Rock Island, Illinois and it is desired to repair the helicopter so that it can be used in static influence coefficient tests.

AVAILABLE ALUMINUM
① 33.0 x 18.0 x .125
② 33.0 x 18.0 x .063
③ 21.0 x 10.0 x .125
④ 21.0 x 10.0 x .063
⑤ 19.03 x 34.53 x .125
⑥ 19.03 x 34.53 x .063
⑦ 14.35 x 35.30 x .125
⑧ 14.35 x 35.30 x .063
⑨ 35.0 x 10.0 x .050
⑩ 10.0 x 10.0 x .050

The following items will be repaired:

1. The honeycomb structure on the F.S. 186.25 bulkhead between W.L. 35.97 and W.L. 77.57.
2. The honeycomb structure on the F.S. 213.94 bulkhead between W.L. 35.97 and W.L. 55.00.
3. The honeycomb structure on the W.L. 65.00 engine deck between F.S. 213.94 and F.S. 228.29.
4. The sheet metal web of the F.S. 213.94 bulkhead above W.L. 55.00 and the 209-030-121-27, -28, -29, -30 stiffeners.
5. The lower floor of the "Hell Hole" at W.L. 35.97.

The repairs to the honeycomb structure will be accomplished by clamping the structure between two sheets of aluminum, .125 thick on the metal side and .063 thick on the fiberglass side, with a field pattern of .19 diameter fasteners. The web of the F.S. 213.94 bulkhead will be stiffened by attaching an .050 aluminum doubler to the web with .125 cherry-lock fasteners. The lower floor of the "Hell Hole" has been replaced with a .25 thick aluminum plate. Additional fasteners will have to be installed tieing the plate more securely to the airframe. This will be done by installing .125 cherry-lock fasteners between the existing fasteners.

The repair task can be divided into three functions: design, fabrication and installation. The design function will be responsible for detailing each of the repairs in a full-size sketch which can in turn be used as a template for laying out the parts. Fabrication will assemble all raw materials, lay out the detail parts from the templates and acquire all the tools required. Installation of the repair parts will be done at the Rock Island Arsenal by Bell and Army personnel with material and tools supplied by Bell.

Prior to installation, the helicopter must be prepared to receive the repair, that preparation should include the following items:

1. The transmission and engine will be removed from the aircraft.
2. The mold line skin and the .25 panel at the bottom of the "Hell Hole" will be removed.
3. All fittings, braces and brackets will be removed from the bulkheads and engine deck.
4. Remove the left forward fuel cell door and the right aft fuel cell door and take out fuel bags which are filled with sand.
5. Remove transmission castings along top of wing carry-through beams.

BELL HELICOPTER COMPANY

INTER-OFFICE MEMO

17 April 1975
81:TH:nm-126

Memo To: Messrs. J. Cronkhite, G. Grimes

Copies To: Messrs. G. Alsmiller, O. Baker, D. Kidd, J. McGuigan, D. Poster, E.C.F.

Subject: REPAIR OF FIRE DAMAGED AH-1G HELICOPTER TO BE USED AS A STATIC TEST ARTICLE

Reference: (1) IOM 81:TH:jl-63, Inspection of Fire Damaged AH-1G Helicopter to Determine its Suitability as a Static Test Article.
(2) BHC Report 209-099-432, A Nastran Vibration Model of the AH-1G Helicopter Airframe.

A trip was made to the Rock Island Army Arsenal in order to repair a fire-damaged AH-1G helicopter fuselage such that it could be used as a static test article. A previous trip, Reference (1), had been made during which the extent of the structural damage was ascertained and the mode of repair was determined.

The items which were repaired or replaced are listed below:

1) The forward fuel cell, honeycomb floor from F.S. 156.41 to F.S. 186.25 between the main beam lower caps.

2) The F.S. 186.25 bulkhead, honeycomb structure from W.L. 35.97 to W.L. 56.00 and from W.L. 65.60 to W.L. 77.57.

3) The W.L. 35.97, pylon floor.

4) The splice between the W.L. 35.97, Pylon Floor, the F.S. 213.94 bulkhead and the aft fuel cell floor.

5) The aft fuel cell, honeycomb floor from F.S. 213.94 to F.S. 218.97 and from F.S. 218.97 to F.S. 227.62.

6) The F.S. 213.94 bulkhead, honeycomb structure from W.L. 35.97 to W.L. 54.78 and the sheet metal structure between W.L. 54.78 and W.L. 65.00.

7) The engine deck, honeycomb structure between F.S. 213.94 and F.S. 228.29.

The description of the repairs is as follows:

1) The forward fuel cell floor was repaired by attaching a plate of .125 inch, 5086-H32, aluminum to the lower skin with NAS 1738B4 cherrylock rivets along the periphery of the plate at F.S. 156.41, F.S. 186.25 and the main beam lower caps. The .125 inch plate of

aluminum will be considered as the effective thickness of the floor in this region. Therefore shear panels "Y", "CC", "DD", and "GG" and rod elements "H", "J", "K", "L", "M", "N", and "P" on Page 3-139 of Reference (2) will be modified to reflect this change.

2) The F.S. 186.25 bulkhead was repaired in the same manner. Therefore the shear panel elements "BB", "CC", "DD", "EE", "XX", "YY", "ZZ", "AAA", "BBB", "CCC", "DDD", "EEE", "FFF", "GGG", "HHH" and "III" on Page 3-127 of Reference (2) will be changed to reflect the effective thickness of .125 inch of aluminum.

3) The W.L. 35.97, pylon floor was replaced with a stiffened plate of .125 inch, 5086-H32, aluminum which was attached to the F.S. 186.25 bulkhead, the main beam caps and the F.S. 213.94 bulkhead using NAS 1738B4 cherrylock rivets. Most of the original attachment holes were used by increasing the hole diameter from .125 inch to .144 inch. Therefore the shear panel elements and rod elements shown on Page 3-149 of Reference (2) will be changed to reflect the effective thickness of .125 inch of aluminum.

4) The "T" extrusion which forms the shear tie between the F.S. 213.94 bulkhead, the pylon floor, and the fuel cell floor was stiffened by the addition or a 1.5 x 1.5 x .19 angle of 6061-T6 aluminum joining the bulkhead and pylon floor and a 3.0 x .050 splice plate of 6061-T6 aluminum joining the pylon floor and fuel cell floor. These additional splice components were attached with NAS 1738B4 cherrylock rivets across the width of the pylon bay. The increase in area of .72 square inches will be reflected by rod elements "N", "O", "P" AND "Q" on Page 3-176 of Reference (2).

5) To repair the honeycomb floor of the aft fuel cell between F.S. 213.94 and F.S. 218.97, the core and fiberglass upper skin had to be removed. The remaining skin of .016 titanium was clamped between two sheets of .050 inch, 6061-T6, aluminum with a field pattern of NAS 1398B5 huck rivets. Panels "DD", "GG", "JJ", and "MM" and rod elements "A", "G", "N", "U", "AA", "D", "E", "J", "K", "Q", "R", "X", and "Y" on Page 3-189 of Reference (2) will be modified to reflect an equivalent thickness of .079 inch of titanium.

The honeycomb floor between F.S. 218.97 and F.S. 227.62 was repaired by clamping the lower skin, core and upper skin between two plates of .125 inch, 5086-H32, aluminum using a field pattern of AN3 bolts. Panels "EE", "HH", "KK", and "NN" on Page 3-189 of Reference (2) will not be affected.

6) The F.S. 213.94 bulkhead, honeycomb structure was repaired by attaching a plate of .125 inch, 5086-H32, aluminum to the forward

skin with NAS 1738B4 cherrylock rivets around the periphery of the panel. To hold the panel in place during installation, bolts were installed through the honeycomb core to clamp the panel against the forward skin. In order to prevent core crushing, a .125 inch plate was used on the aft side of the bulkhead to provide a larger bearing area under the nuts. The holes for the bolts were drilled oversize, therefore the aft plate cannot carry any shear load. Therefore the shear panel elements "W", "X", "Y", and "Z" on Page 3-176 of Reference (2) will be modified to reflect an effective thickness of .125.

The F.S. 213.94 bulkhead sheet metal structure was repaired by attaching plates of .125 inch, 5086-H32, aluminum to the existing sheets using field patterns of NAS 1398B5 huck rivets. The shear panel elements "R", "S", "T" and "V" on Page 3-176 of Reference (2)will reflect an increase in thickness of .125 inch and panel element "U" will increase by .040.

7) The engine deck, honeycomb structure between F.S. 213.94 and F.S. 228.29 was repaired by attaching a plate of .125 inch, 5086-H-32, aluminum to the upper skin of rigidized titanium with NAS 173884 cherrylock rivets along the periphery of the plate. To facilitate the installation, the .125 inch plate was clamped down to the upper skin using bolts through the honeycomb core and a .125 inch plate on the lower surface. Additional fasteners were installed using existing inserts in the core. These additional fasteners will stabilize the existing rigidized titanium sheet. Therefore the shear panel elements shown on Page 3-200 of Reference(2) should be remodeled to reflect an effective total thickness of .079 inch of titanium in the region between F.S. 213.94 and F.S. 228.29.

The Nastran model should also reflect the changes in the airframe structure due to the removal of the following items:

1) The belly skins from F.S. 156.41 to F.S. 218.97; Reference (2), Pages 3-155 and 3-158.

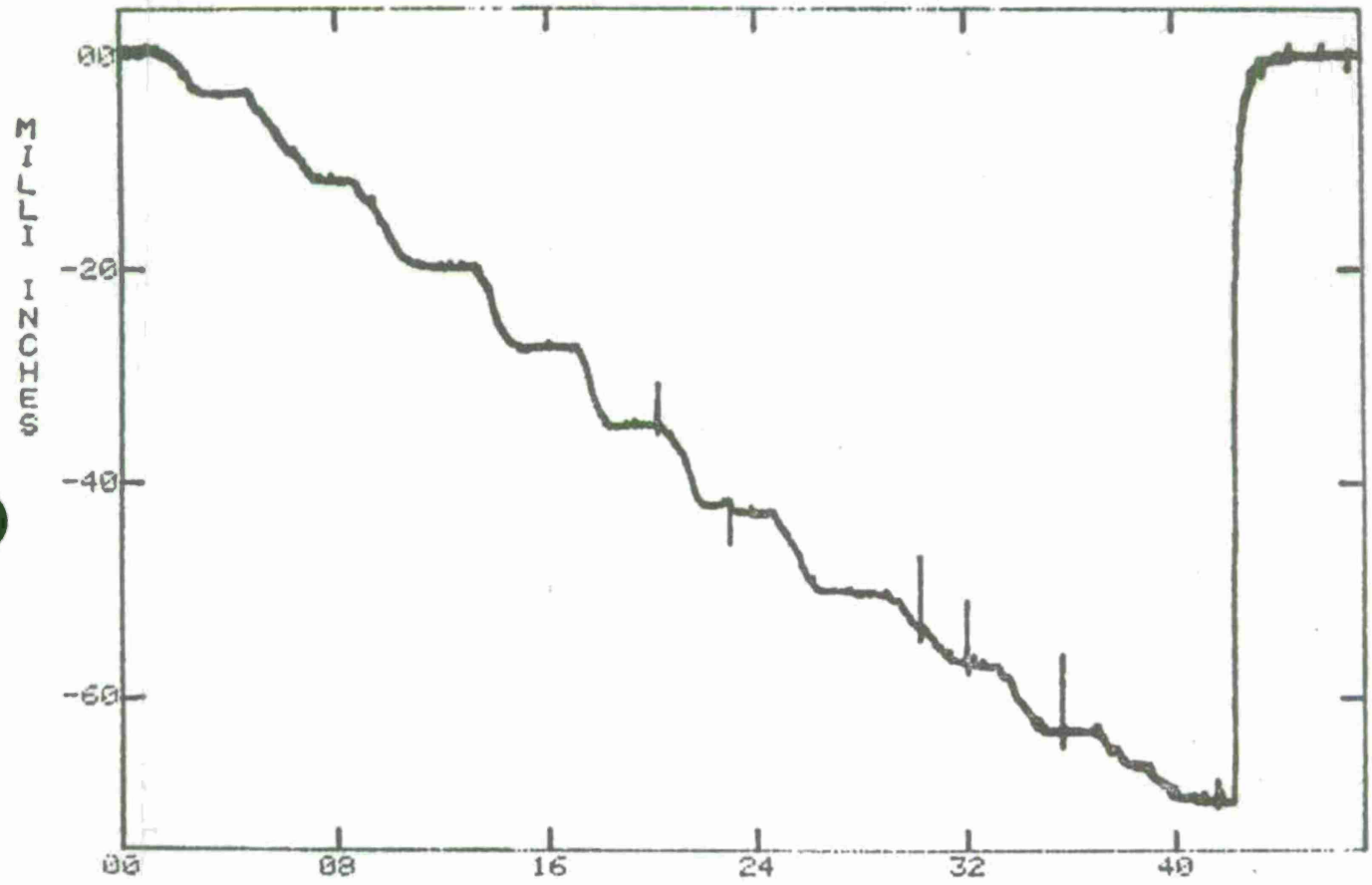
2) The F.S. 186.25 bulkhead below W.L. 35.97; Reference (2), Page 3-127, Panels "JJJ", "KKK", "LLL", "MMM", "NNN", "OOO", and "PPP".

3) The partial belly bulkhead at F.S. 218.97; Reference (2), Page 3-179, Panels "C", "O", and "E".

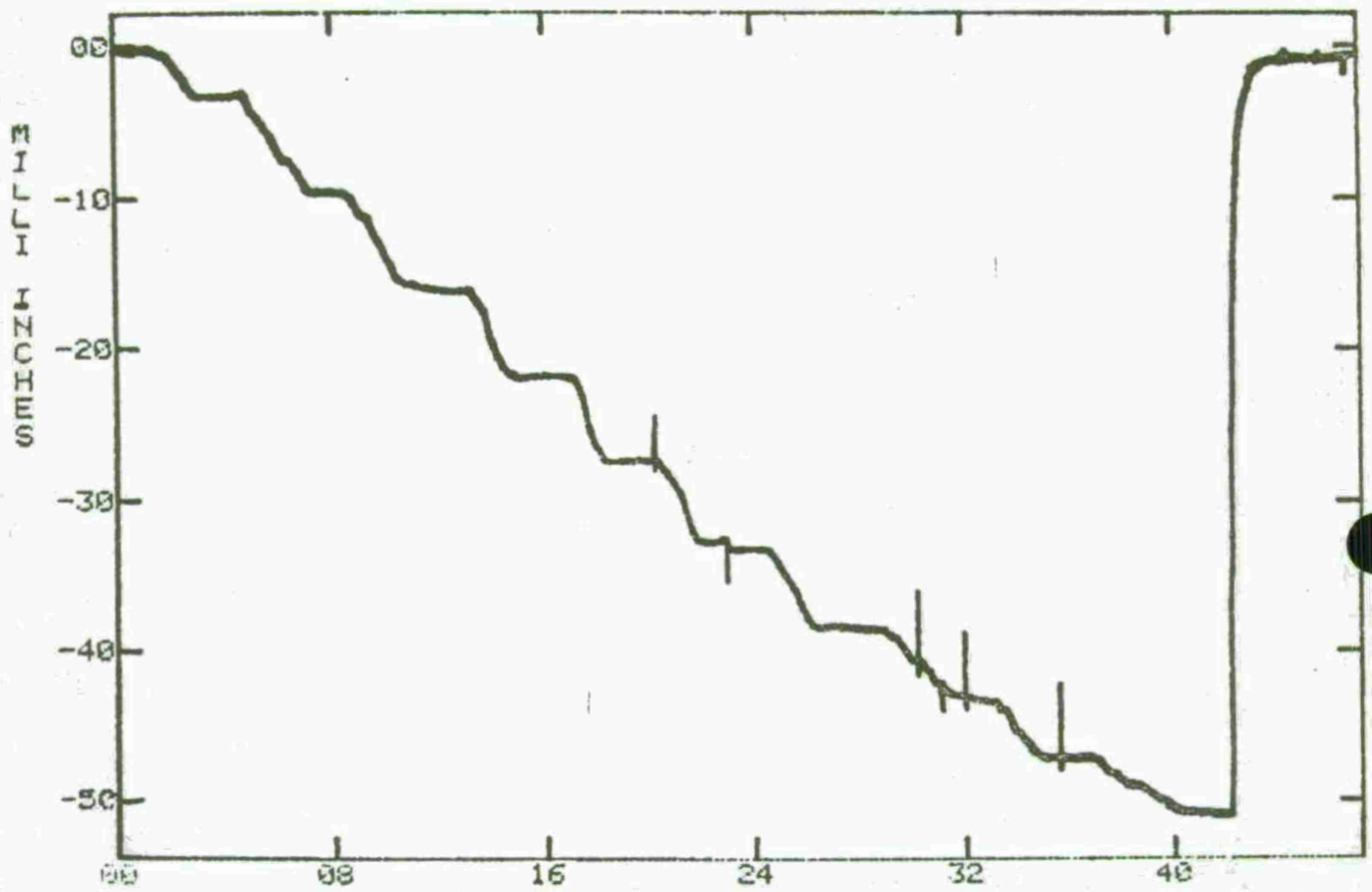
Thomas Haas
Structures Engineer
Ext. 3157

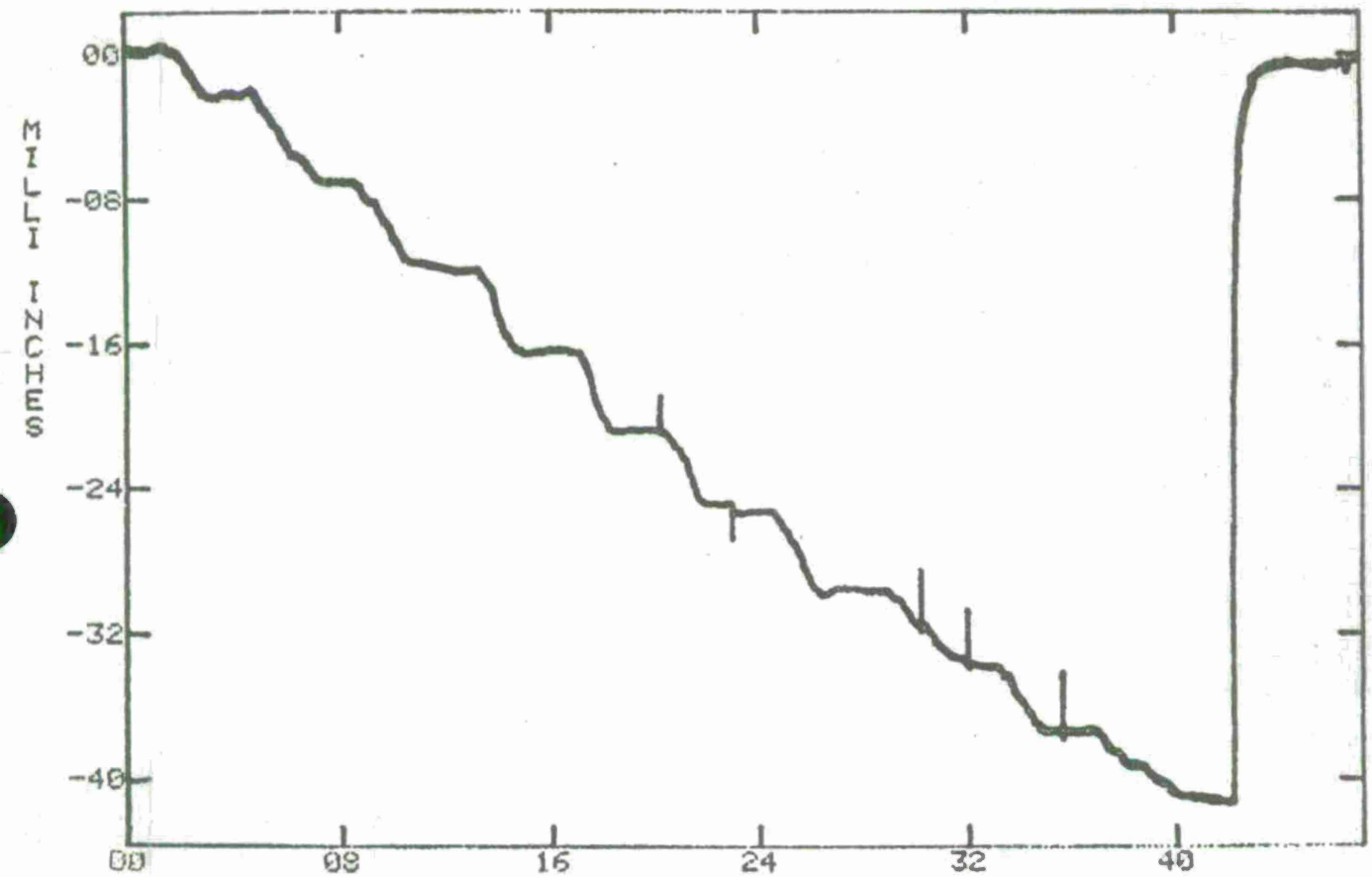
APPENDIX B

Data Sheets for Vertical Pull Test

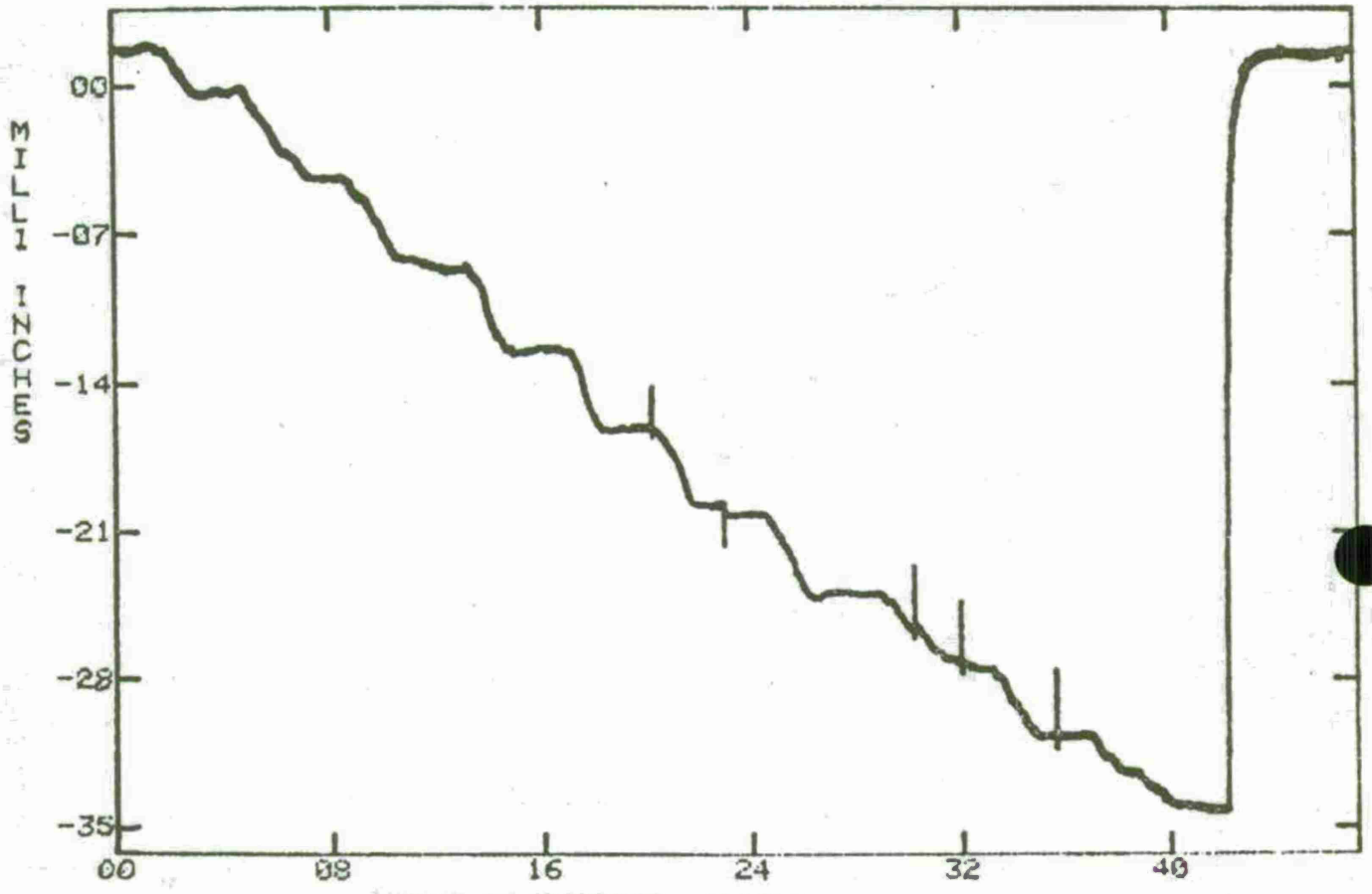


CH 1 VERT DEFLECTION - ST 61.25 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST

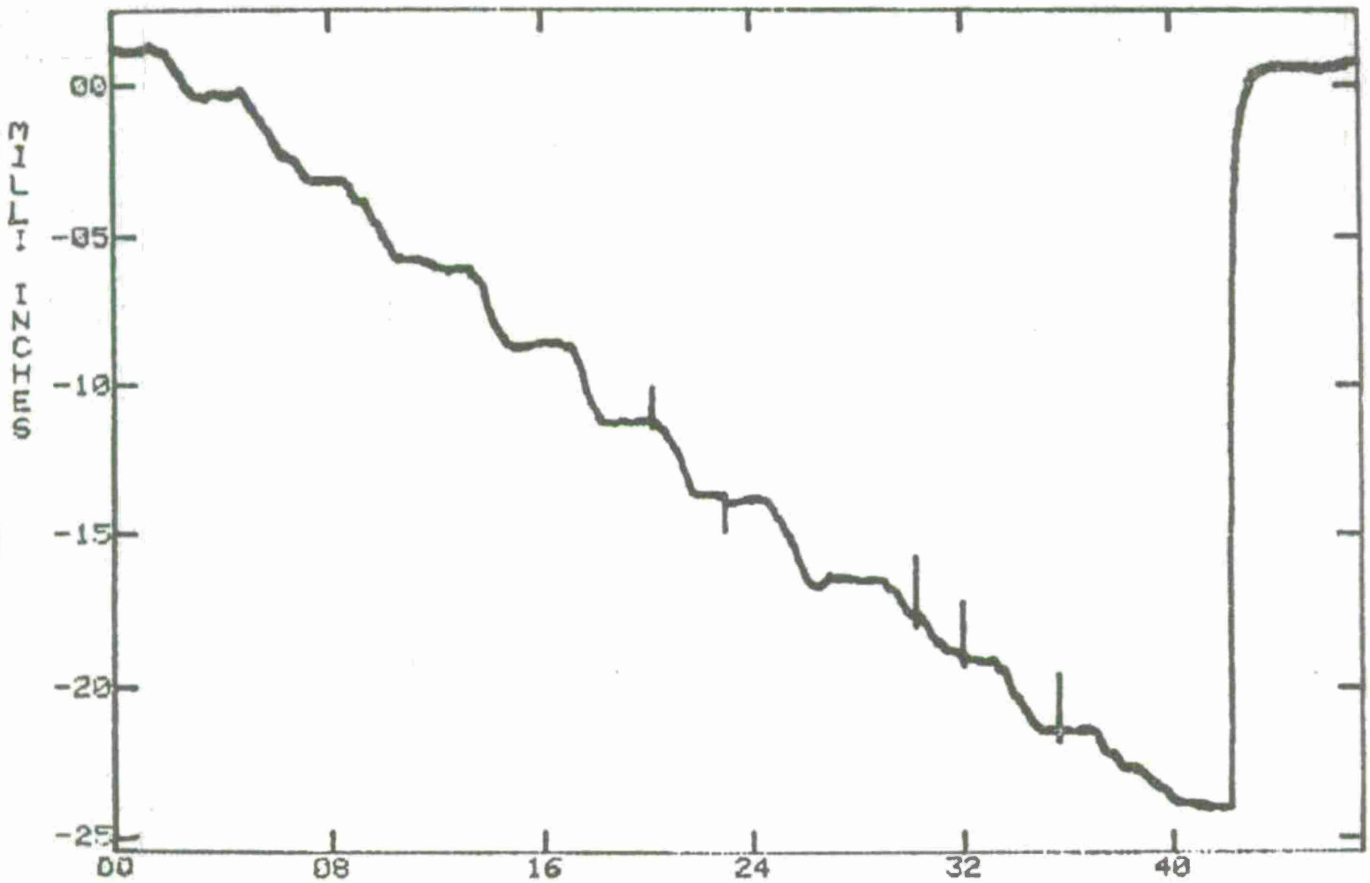

MILLI INCHES
00
-10
-20
-30
-40
-50
00
08
16
24
32
40
TIME IN SECONDS X 10-1
CH 2 VERT DEFLECTION - ST 93.00 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



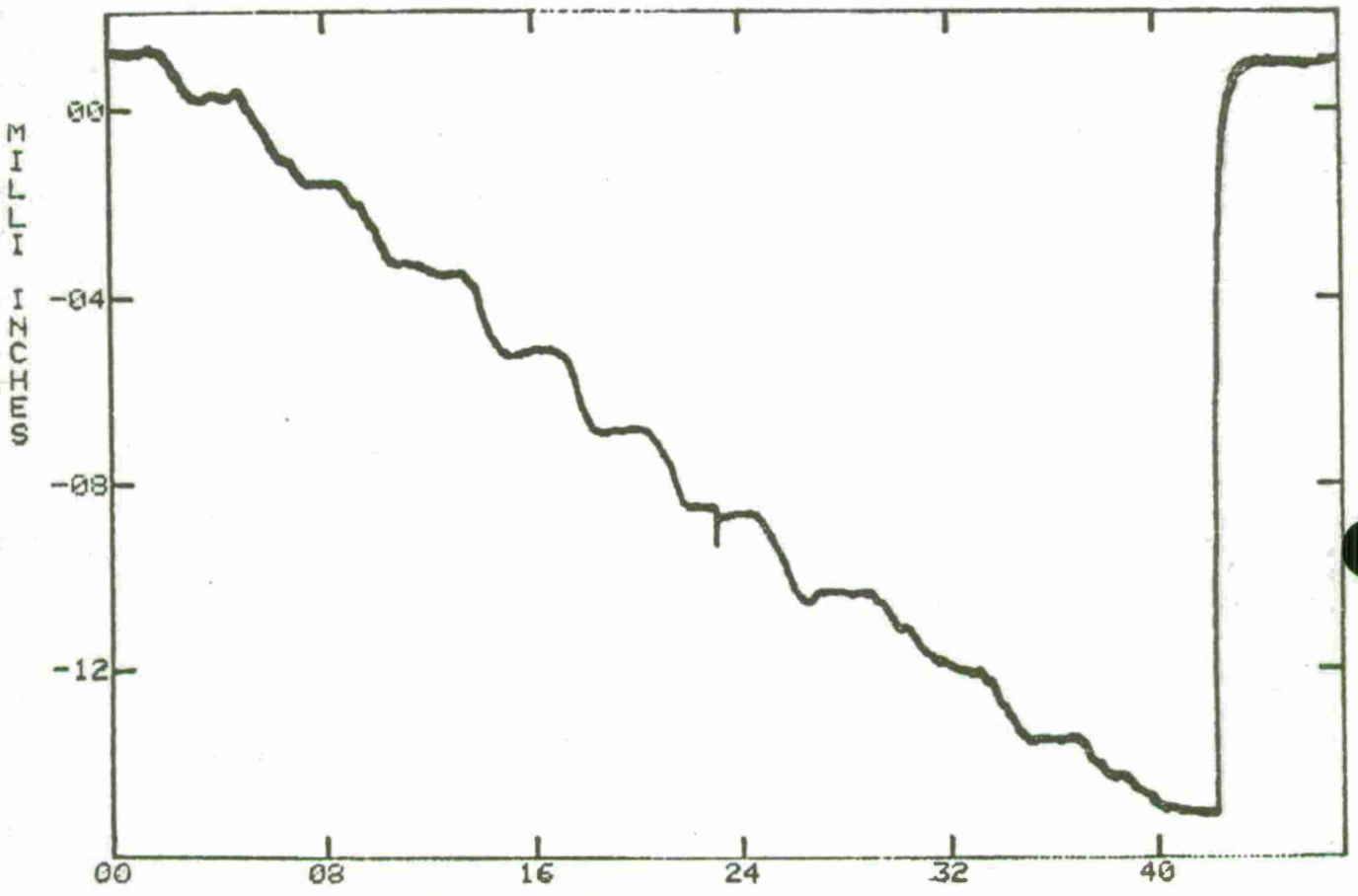
CH 2 VERT DEFLECTION - ST 138.70 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



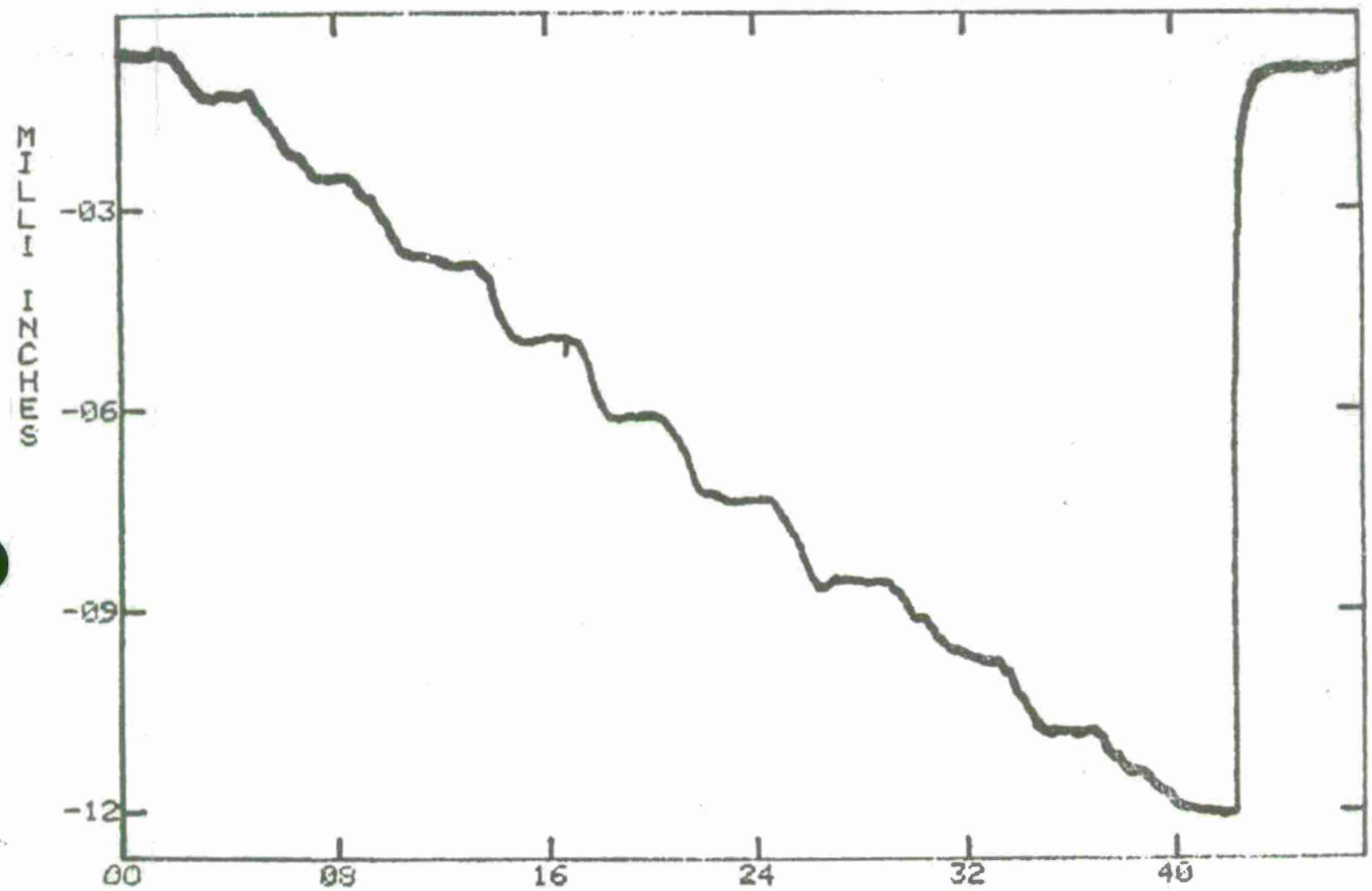
CH 4 VERT DEFLECTION - ST 148.50 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



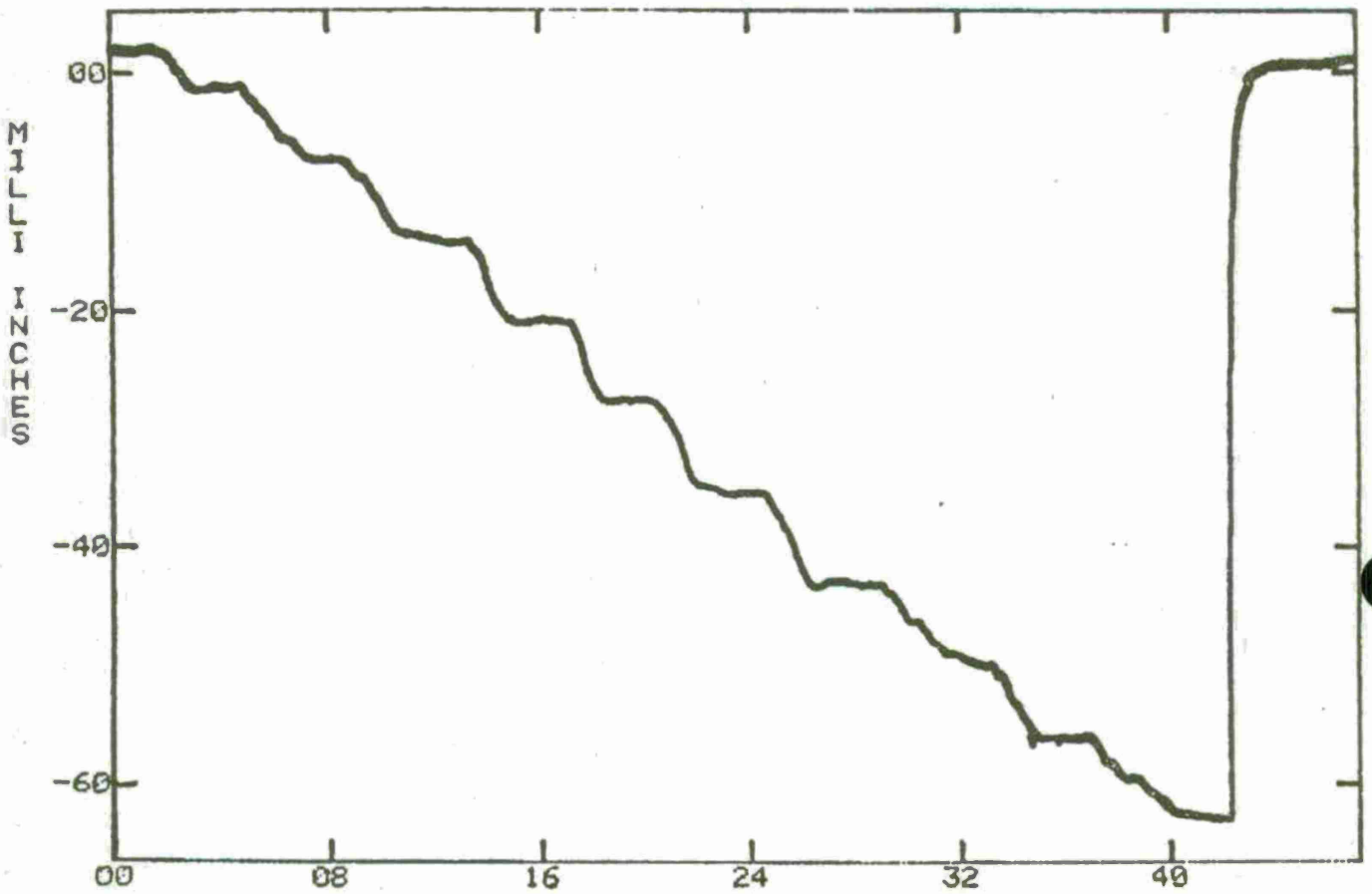
CH 5 VERT DEFLECTION - ST 186.25 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



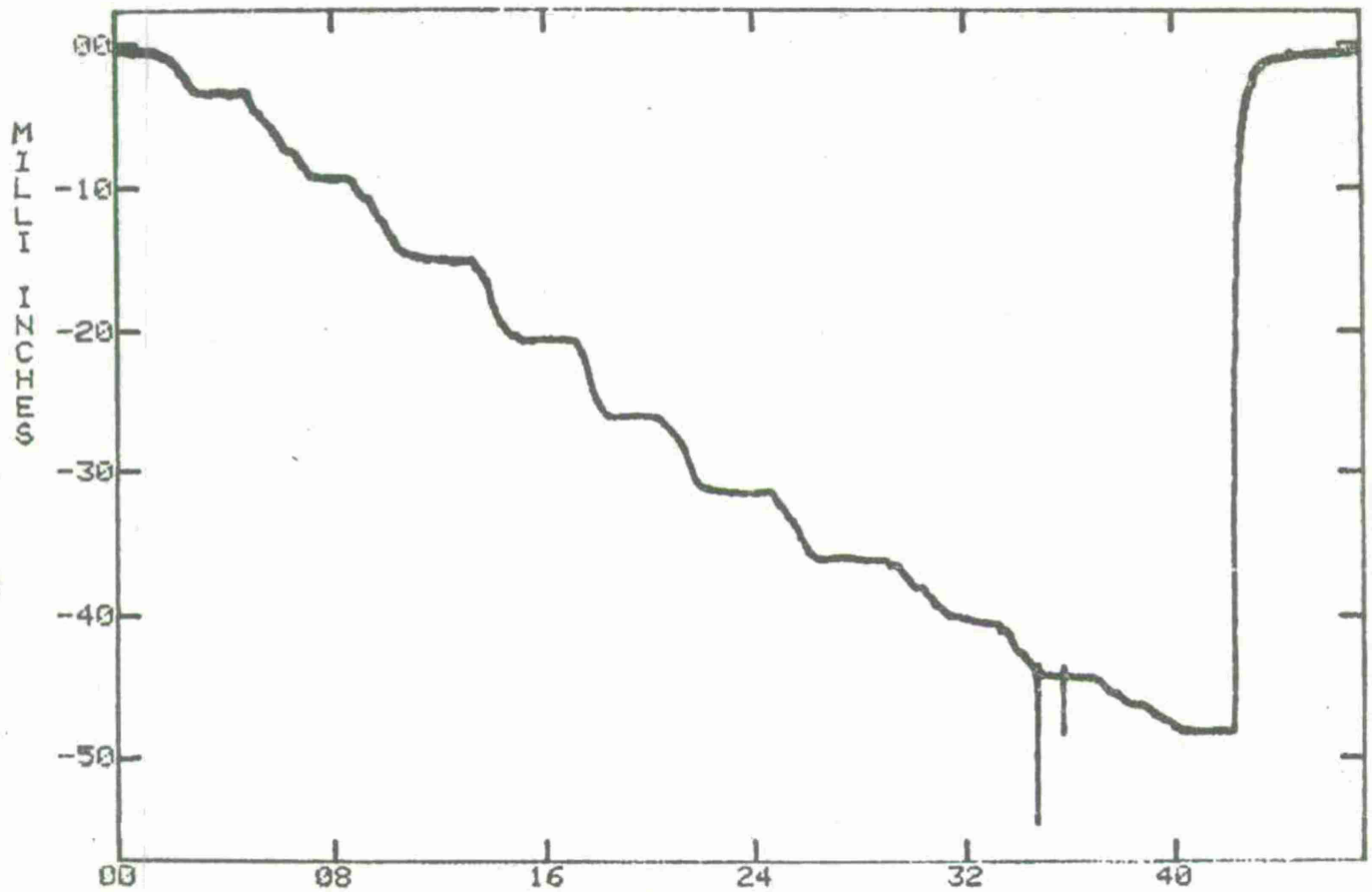
CH 6 VERT DEFLECTION - ST 213.90 L H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



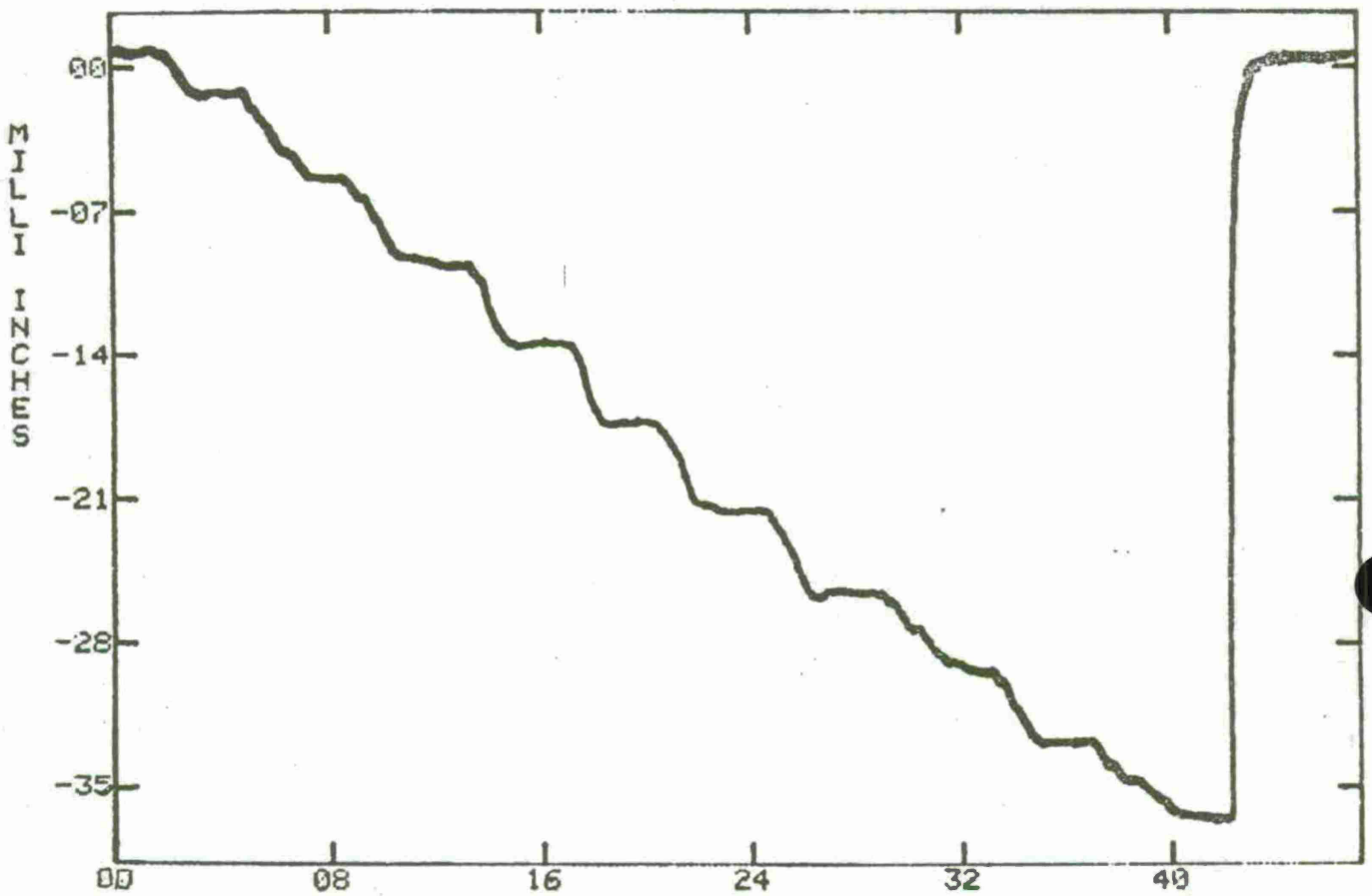
CH 7 VERT DEFLECTION - ST 250.00 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST

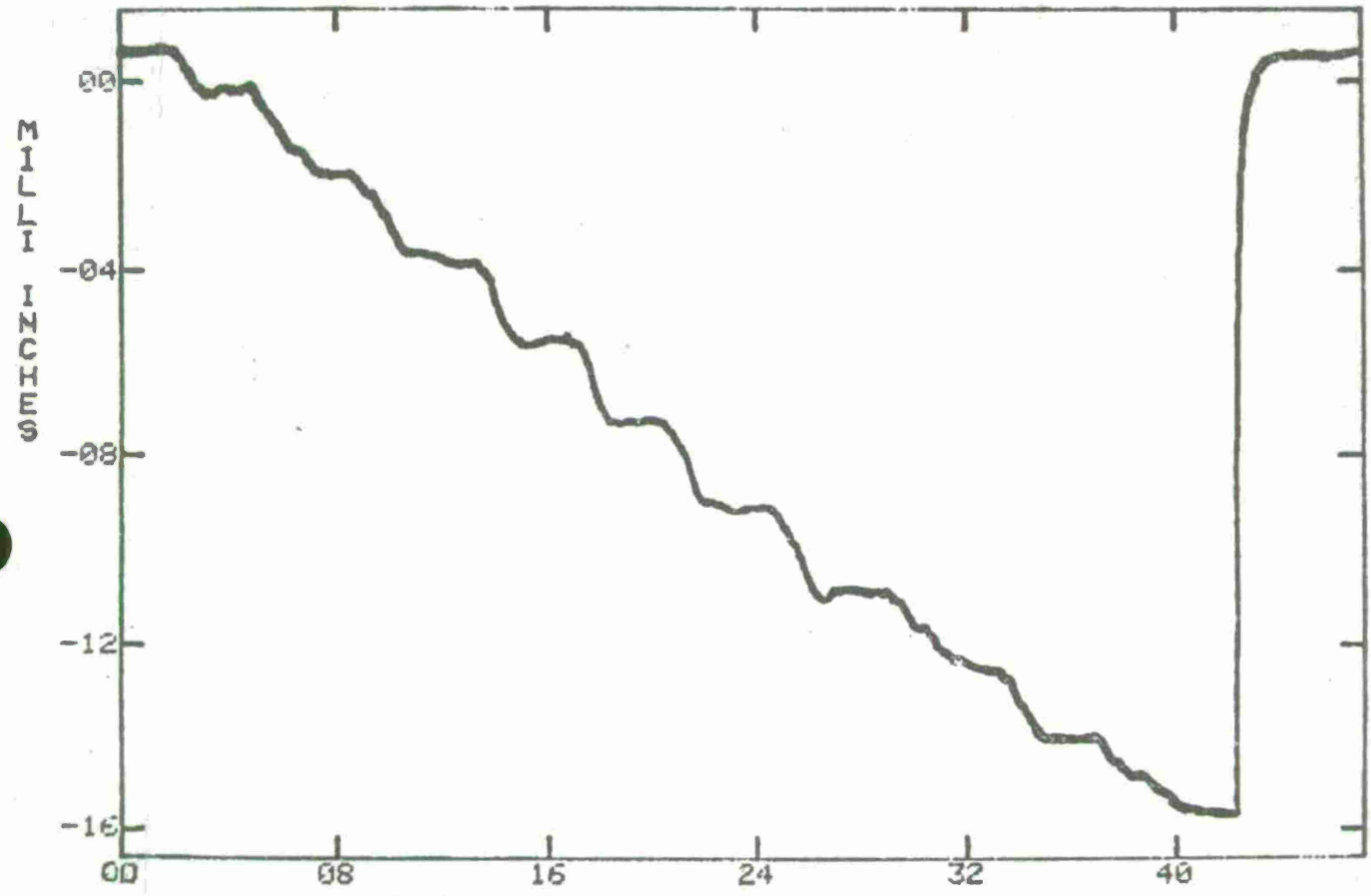


CH 8 VERT DEFLECTION - ST 268.25 L.H. X 10+0
TEST 23 (9JUL75) AH1G BEND TEST

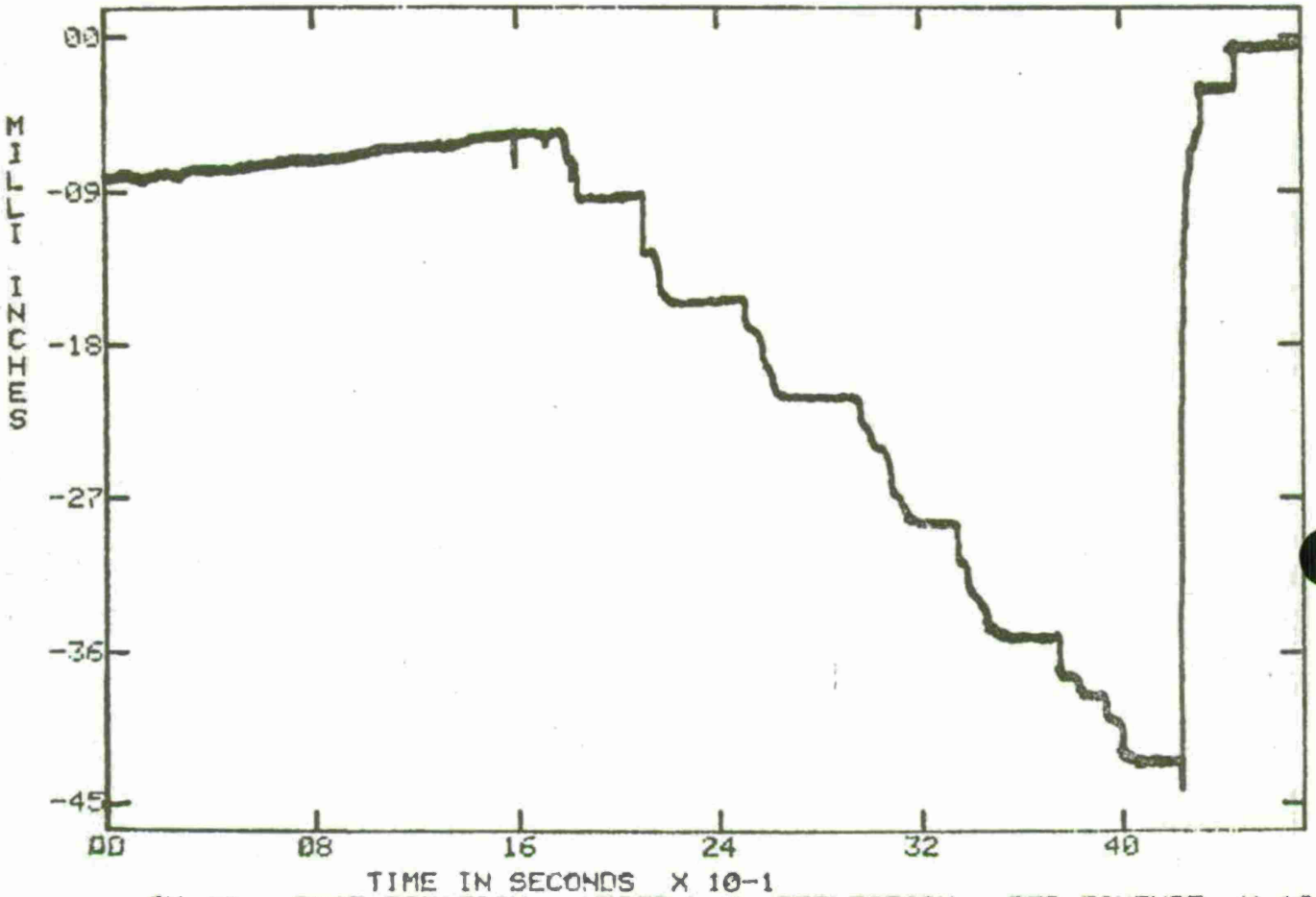


CH 9 VERT DEFLECTION - ST 93.00 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST

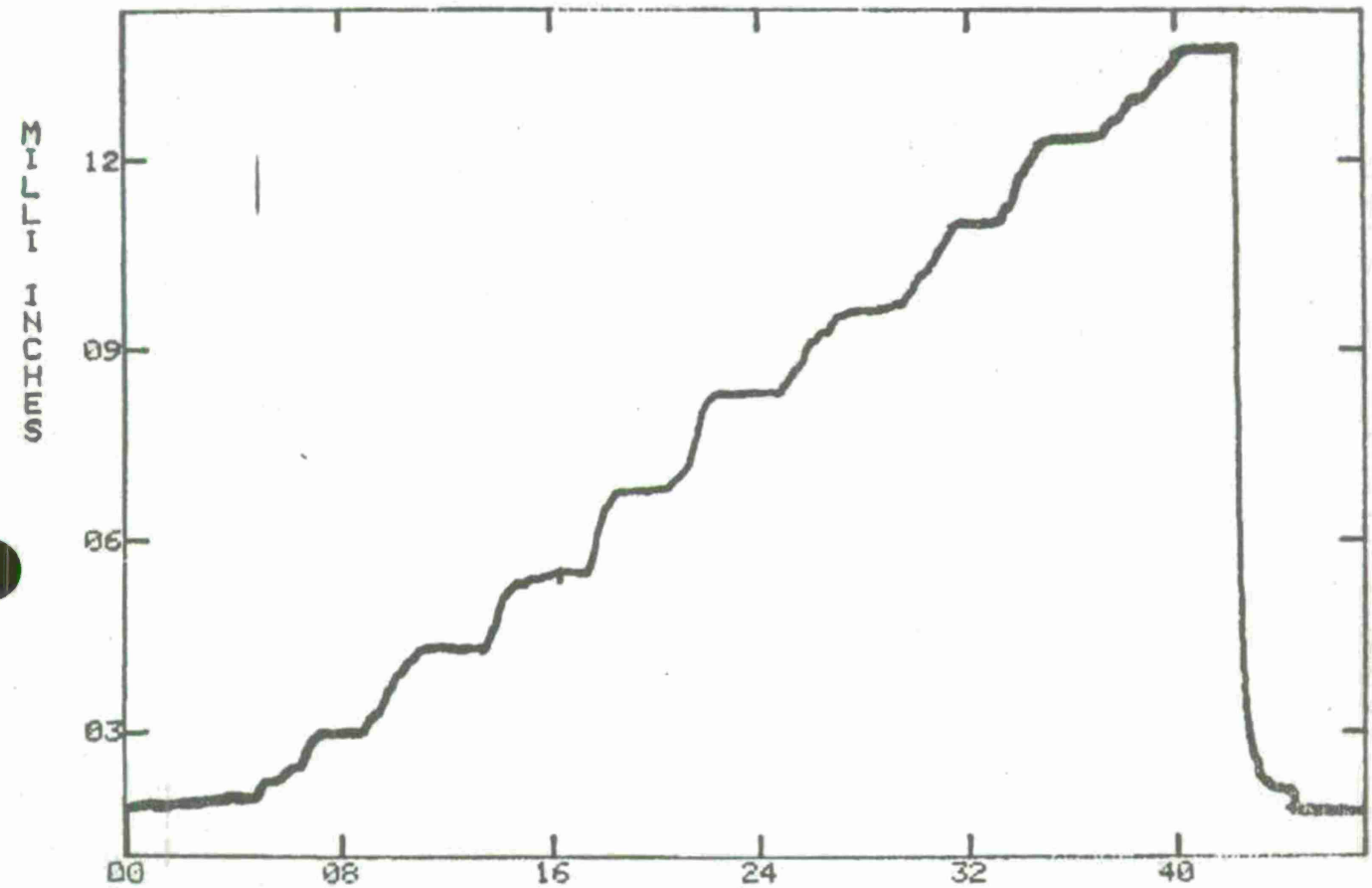

MILLI INCHES
00
-07
-14
-21
-28
-35
00
08
16
24
32
40
TIME IN SECONDS X 10-1
CH 10 VERT DEFLECTION - ST 148.50 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



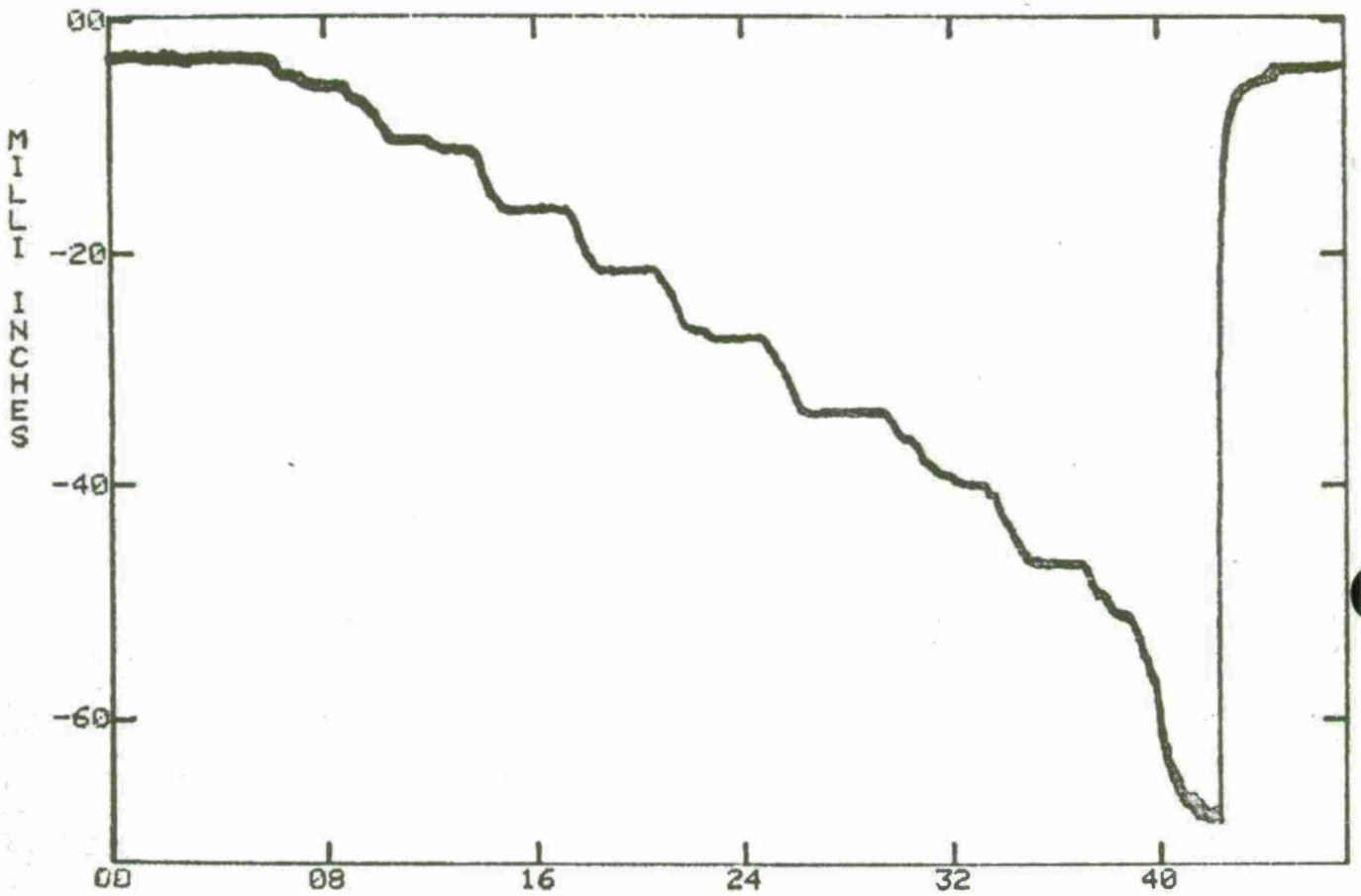
CH 11 VERT DEFLECTION - ST 213.90 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



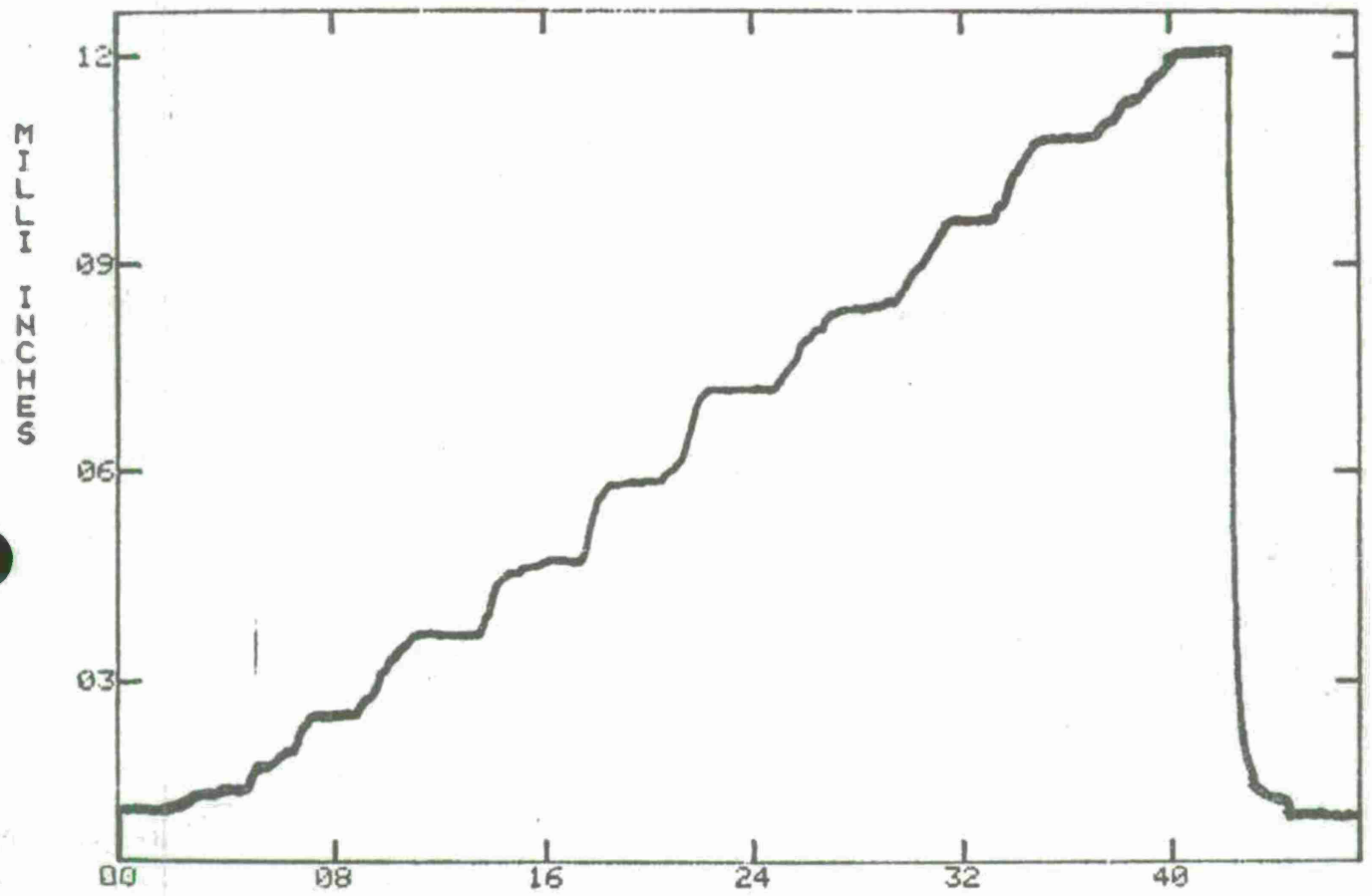
CH 12 BASE ROTATION - UPPER L.H. DEFLECTION - BED FIXTURE X 10
+1 TEST 23 (9JUL75) AH1G BEND TEST



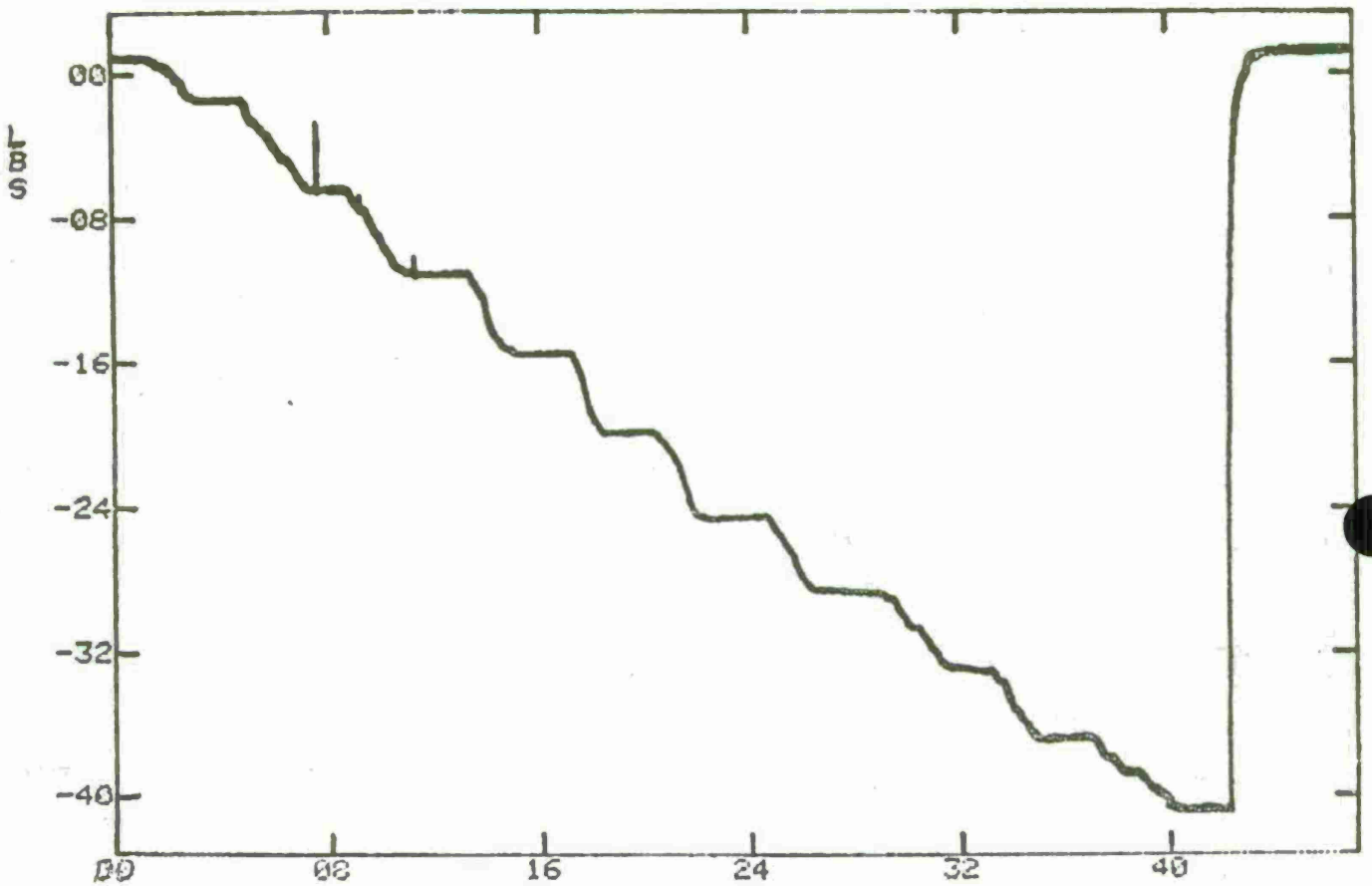
CH 13 BASE ROTATION - LOWER L.H. DEFLECTION - BED FIXTURE X 10+0
TEST 23 (9JUL75) AH1G BEND TEST

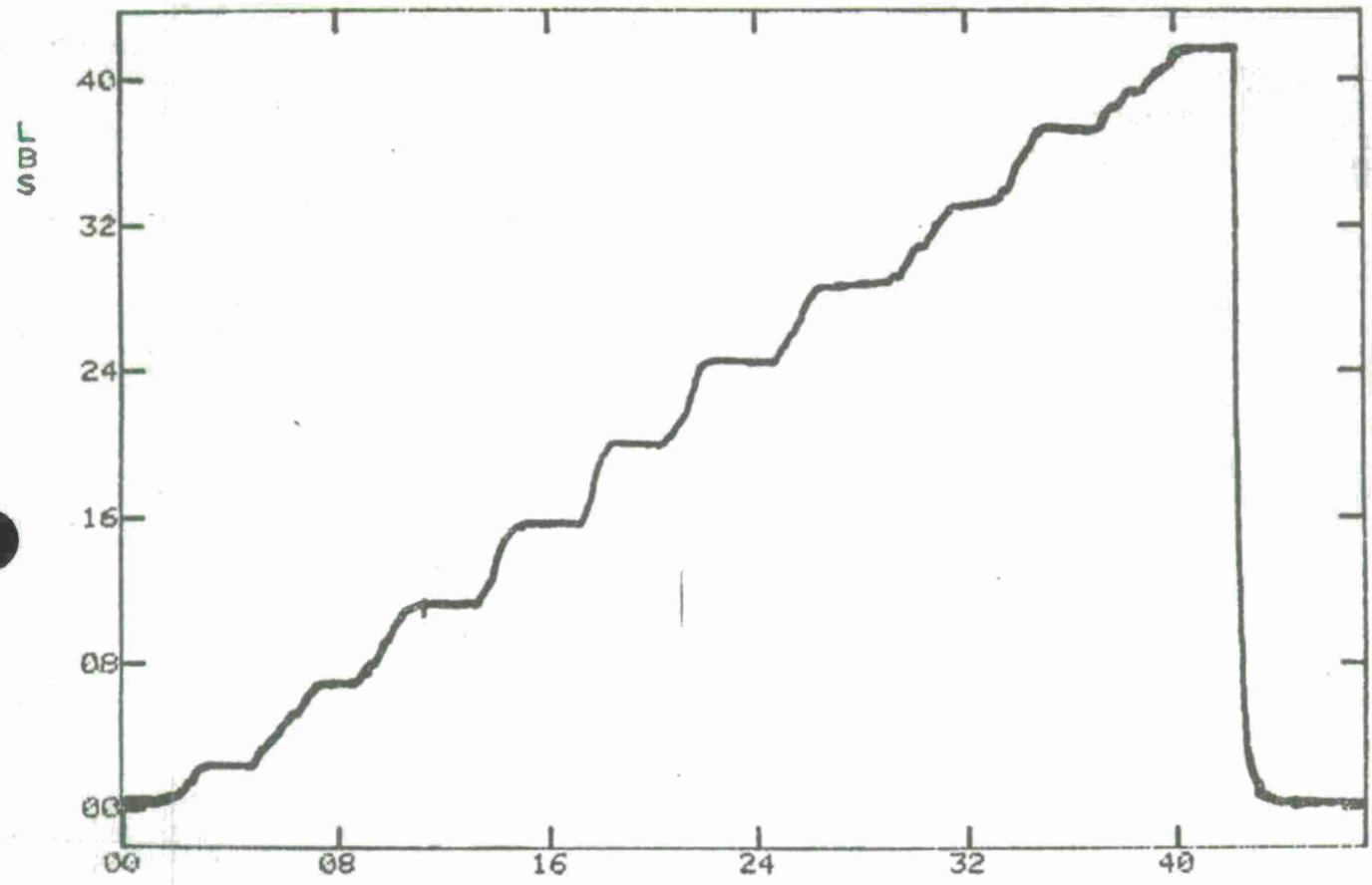


CH 14 BASE ROTATION - UPPER R.H. DEFLECTION - FUSELAGE X 10+1
TEST 23 (9JUL75) AH1G BEND TEST

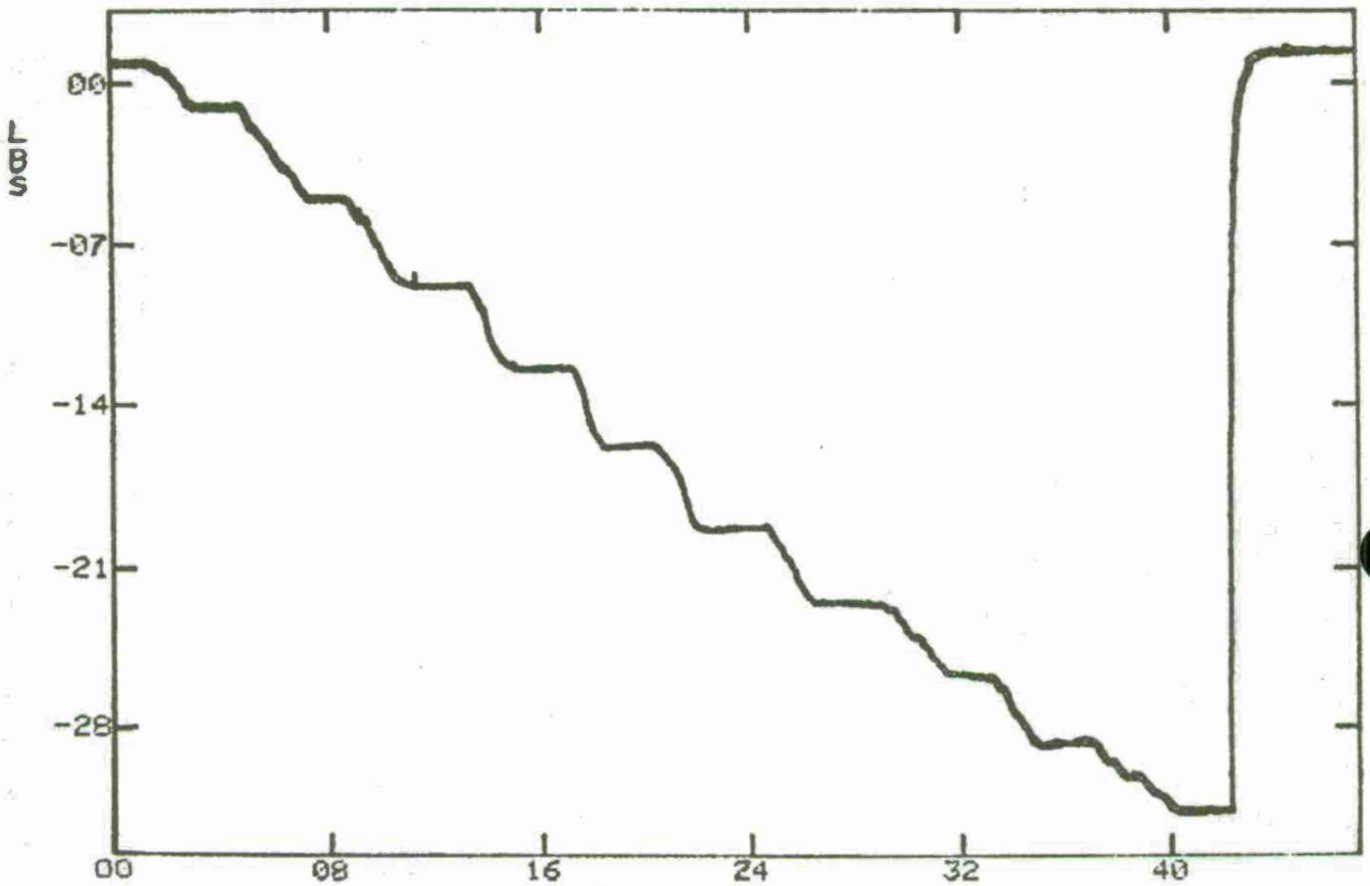


CH 15 BASE ROTATION - LOWER R.H. DEFLECTION - FUSELAGE X 10+0
TEST 23 (9JUL75) AH1G BEND TEST

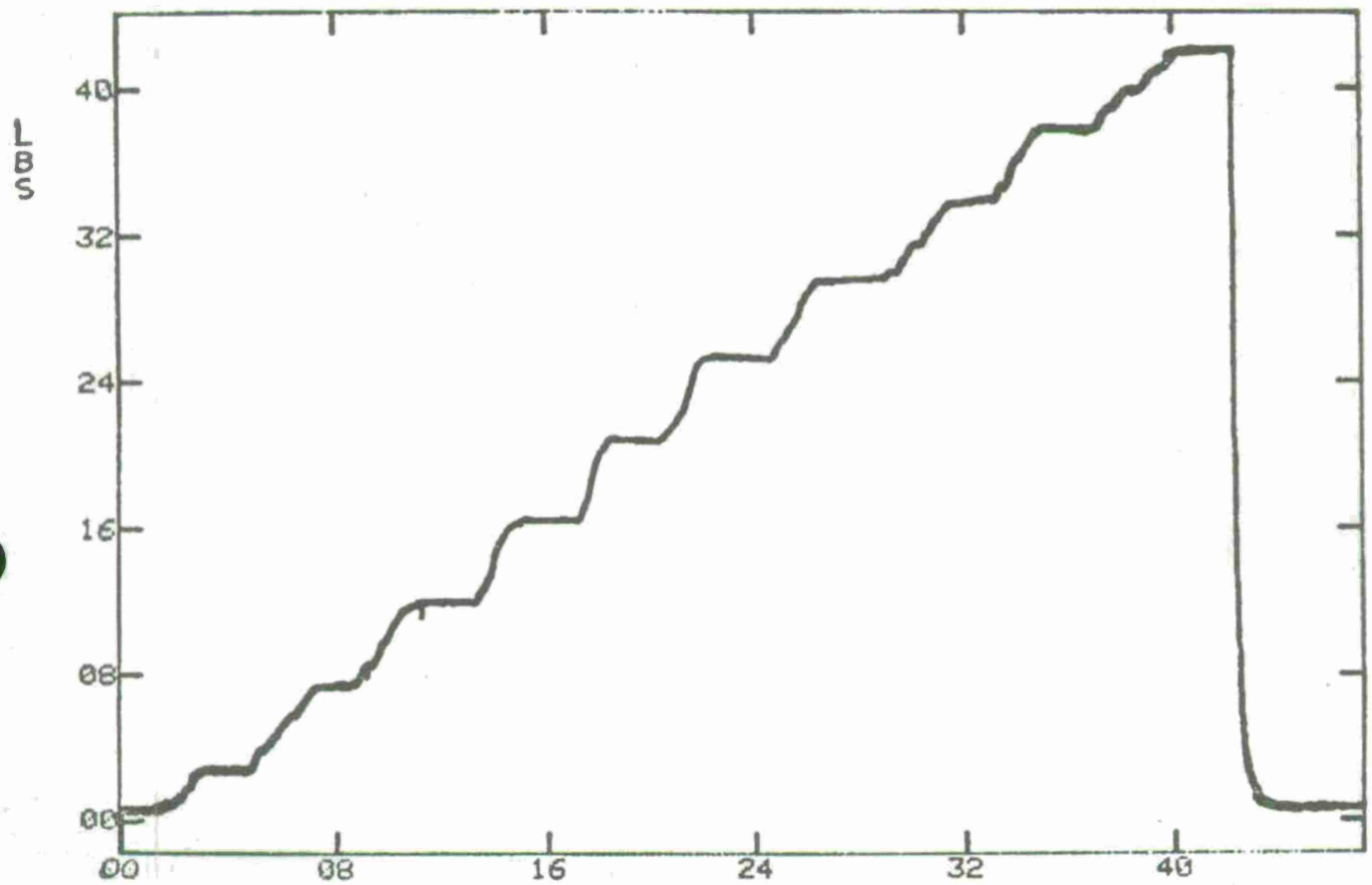

00
-08
-16
-24
-32
-40
00
08
16
24
32
40
TIME IN SECONDS X 10-1
CH 17 LOAD - L.H. TOP X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



CH 18 LOAD - L.H. BOTTOM X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



CH 19 LOAD - R.H. TOP X 10-2
TEST 23 (9JUL75) AH1G BEND TEST


LBS
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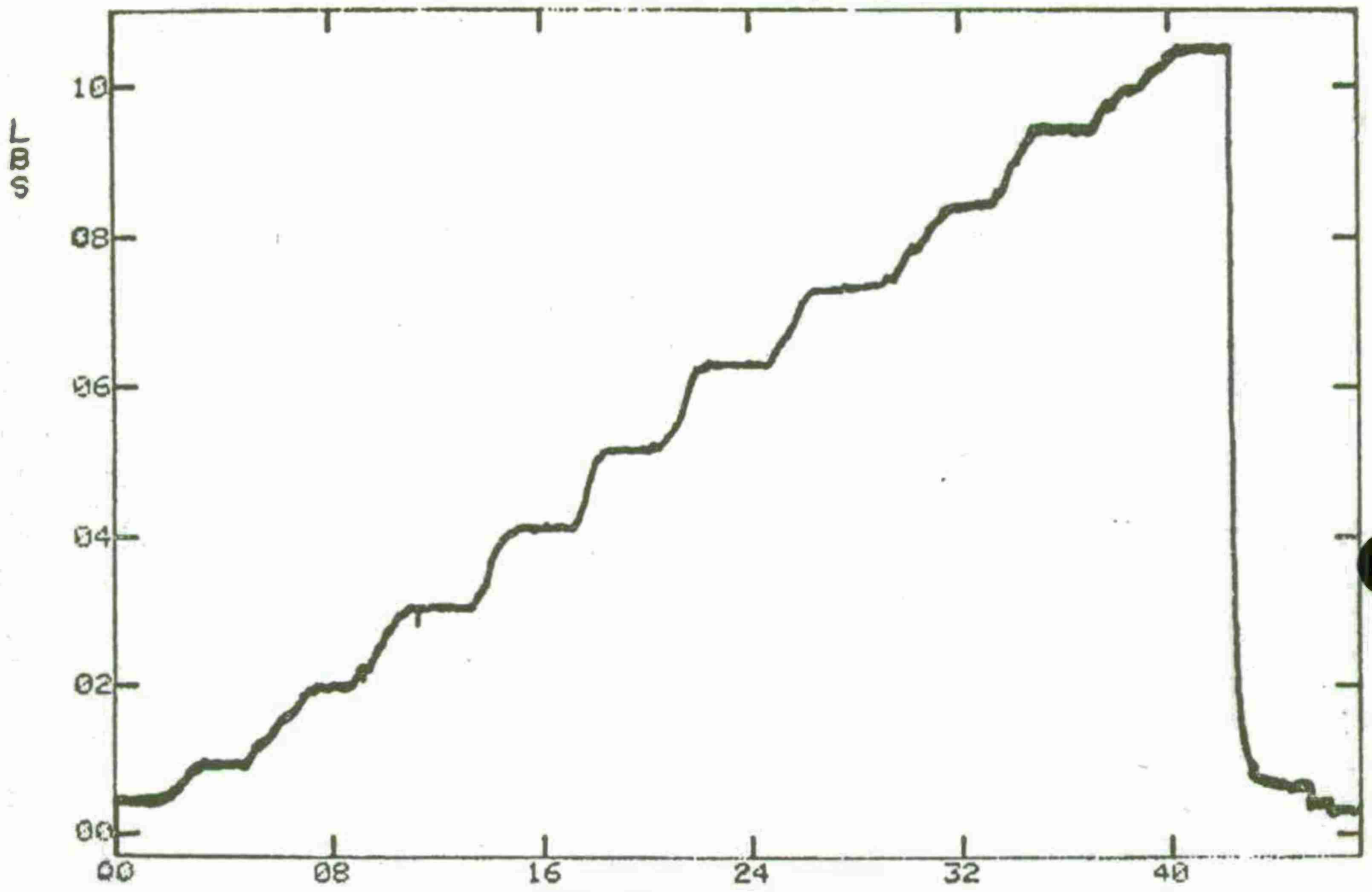
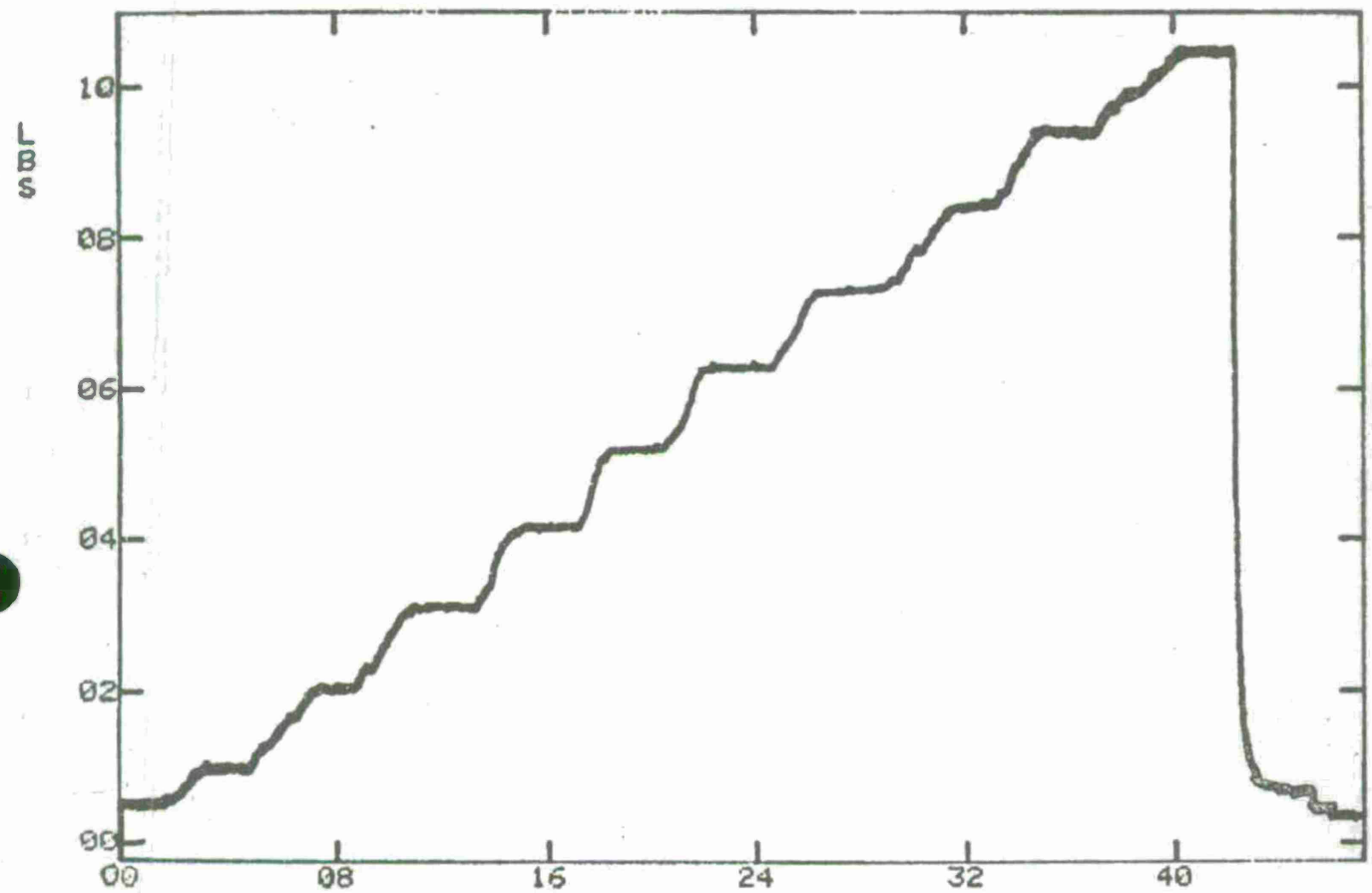
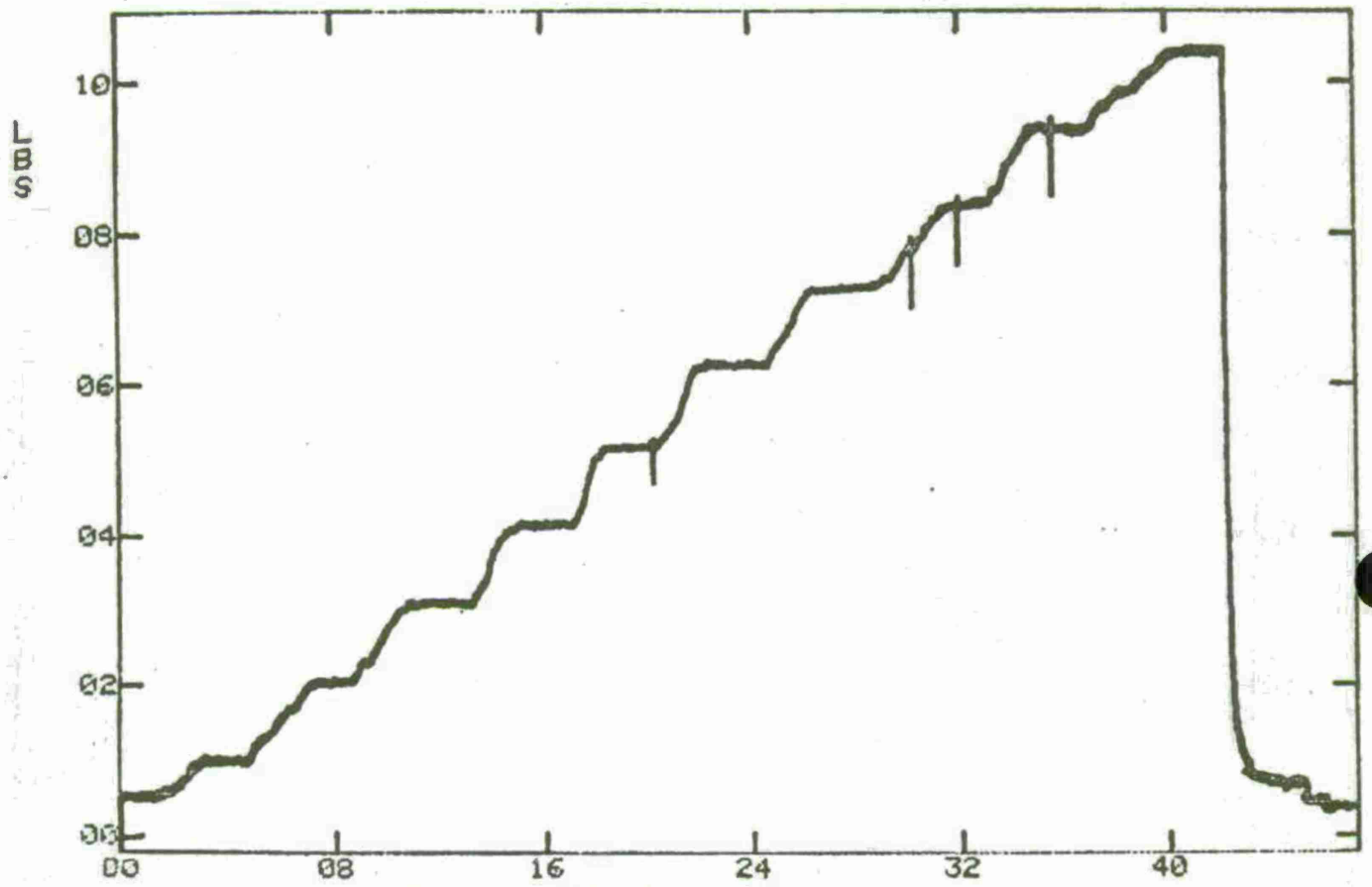
32
40
TIME IN SECONDS X 10-1
CH 20 LOAD - R.H. BOTTOM X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



CH 21 LOAD APPLIED (CH 17/20) X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



CH 21 LOAD APPLIED (CH 6/10) X 10-2
TEST 23 (9JUL75) AH1G BEND TEST


LBS
10
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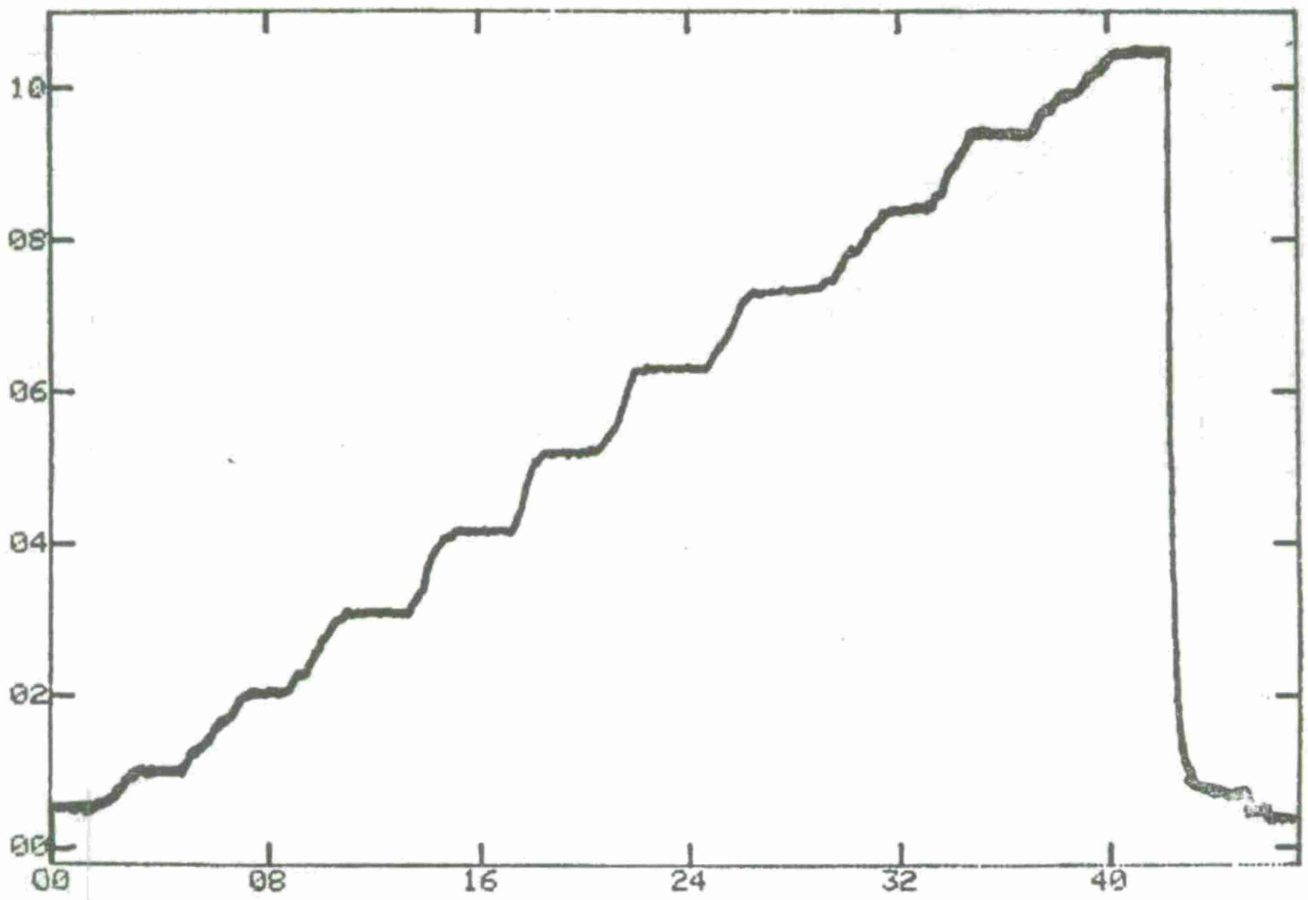
16
24
32
40
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 1/5) X 10-2
TEST 23 (9JUL75) AH1G BEND TEST


10
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02
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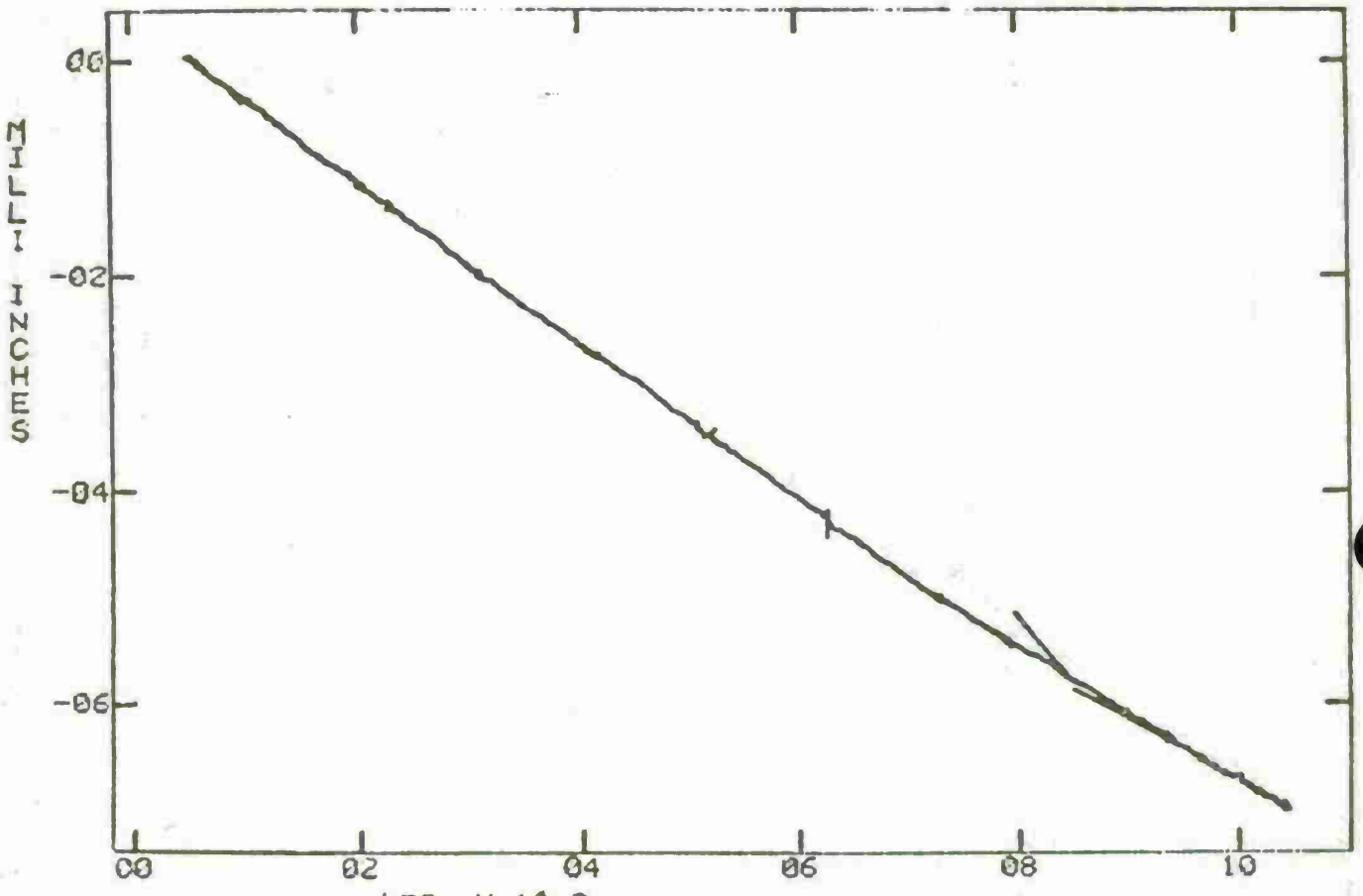
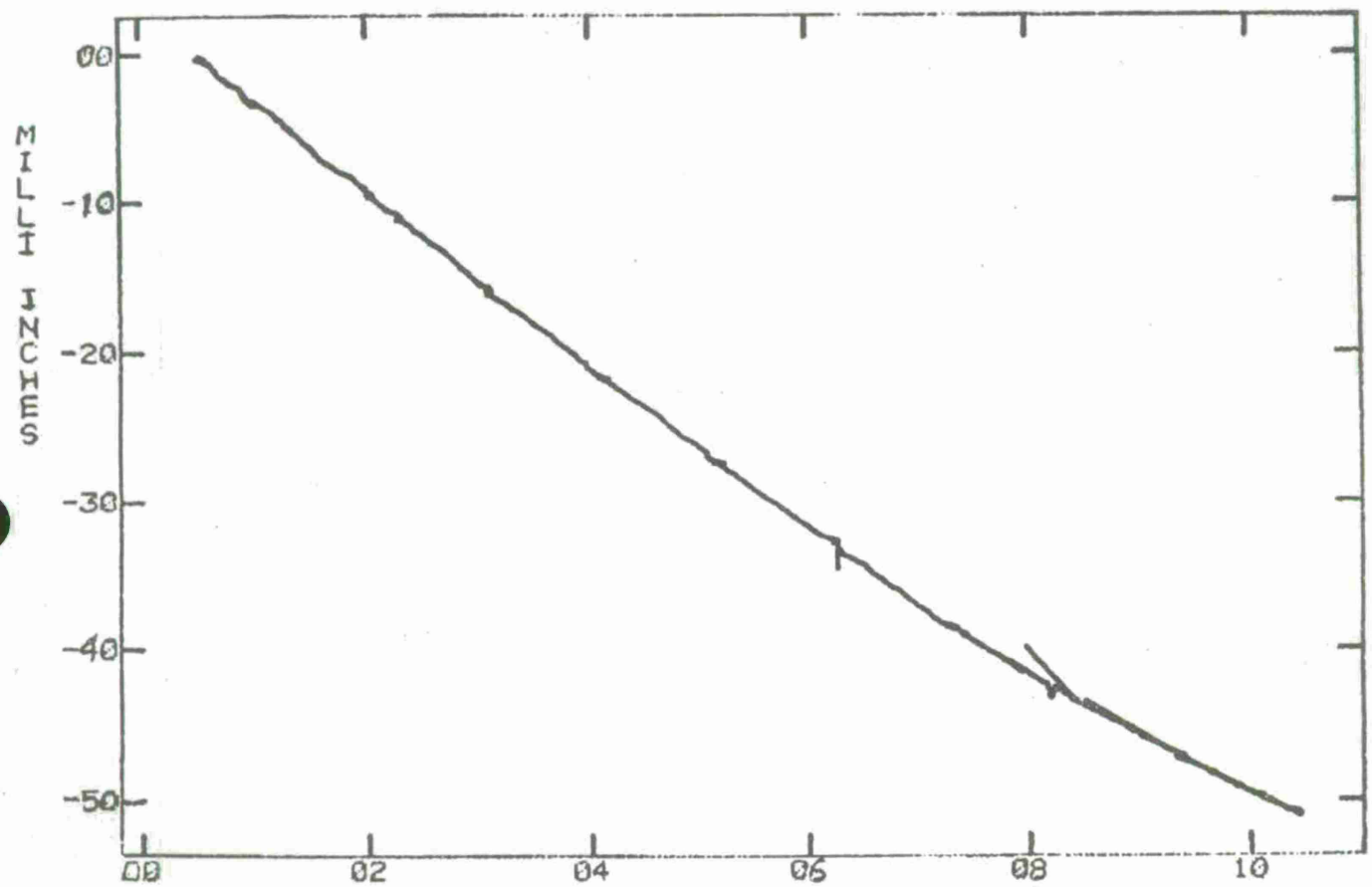
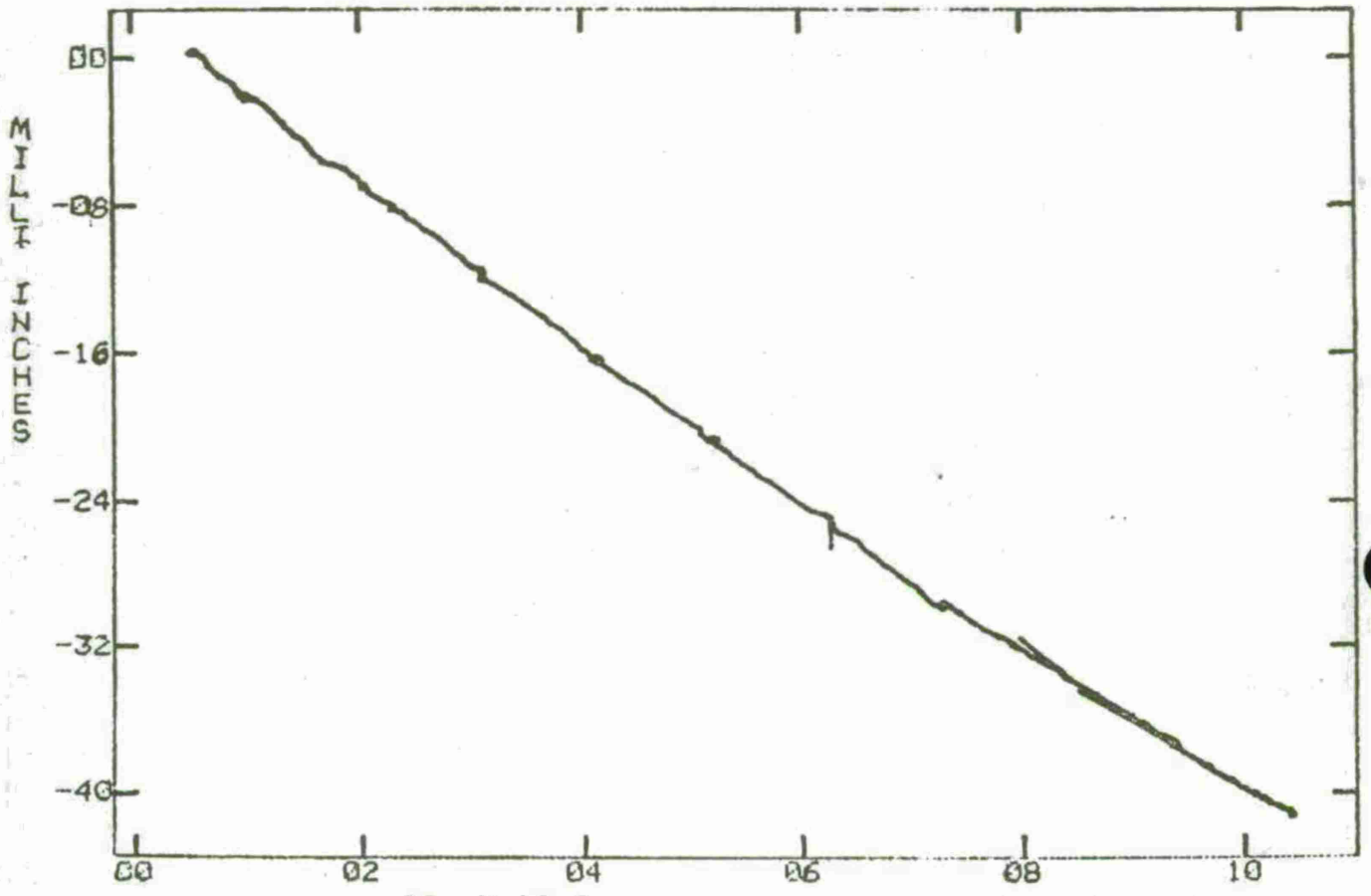
08
16
24
32
40
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 11/15) X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



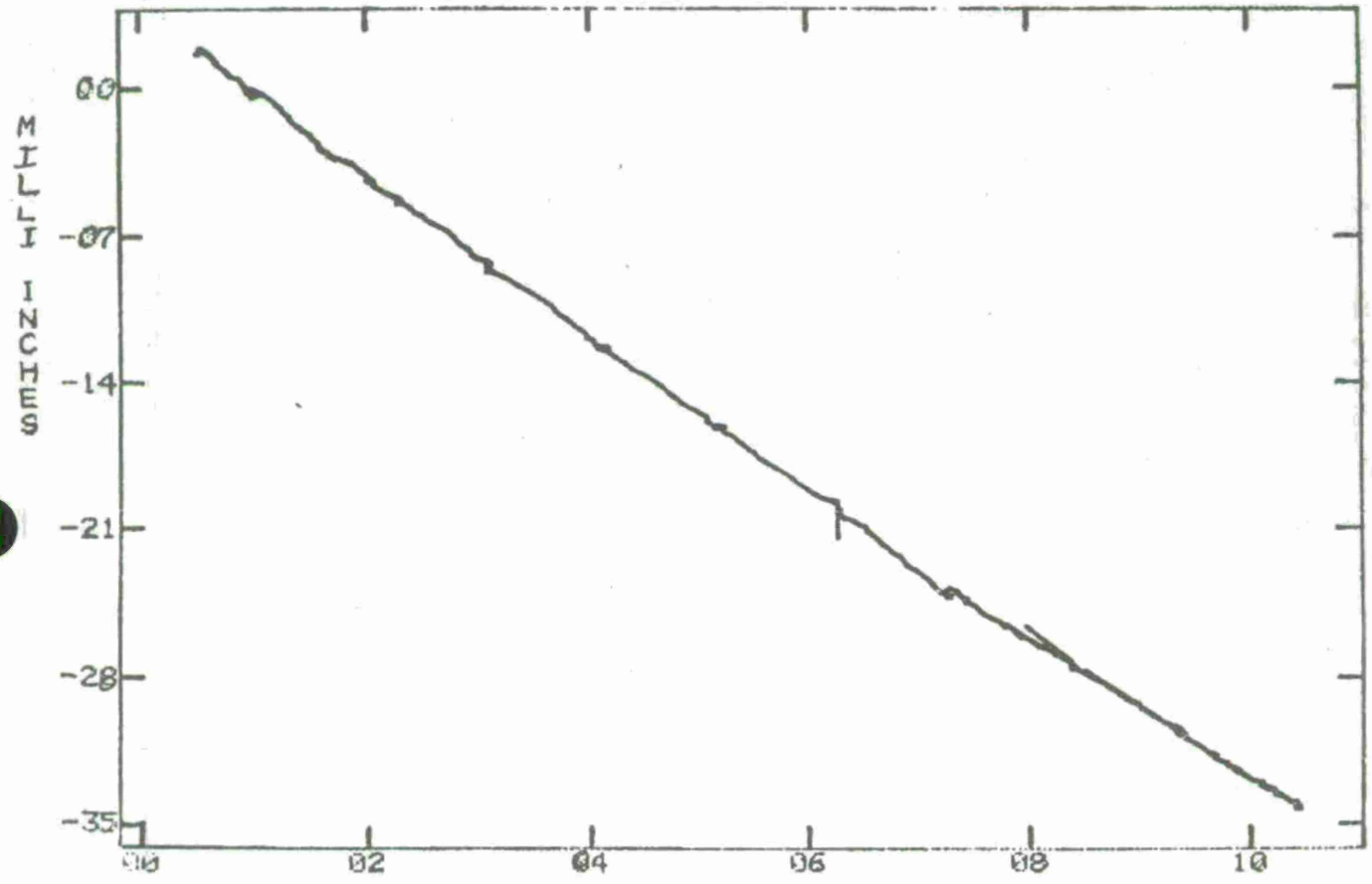
LOAD APPLIED VS VERT DEFLN - ST 61.25 L.H. X 10-2
TEST 23 (9JUL75) AH1G BEND TEST



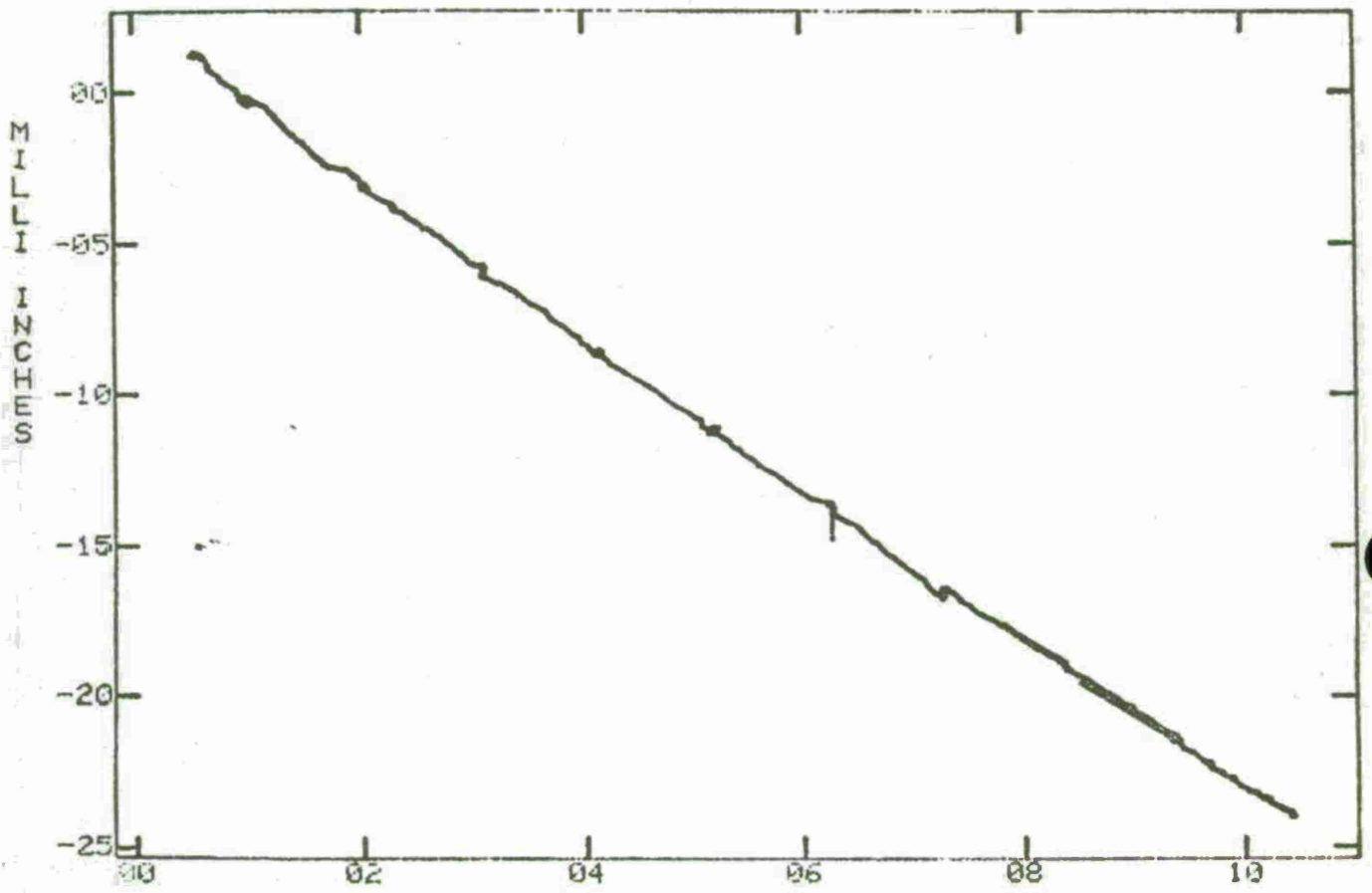
LOAD APPLIED VS VERT DEFLN - ST 93.00 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



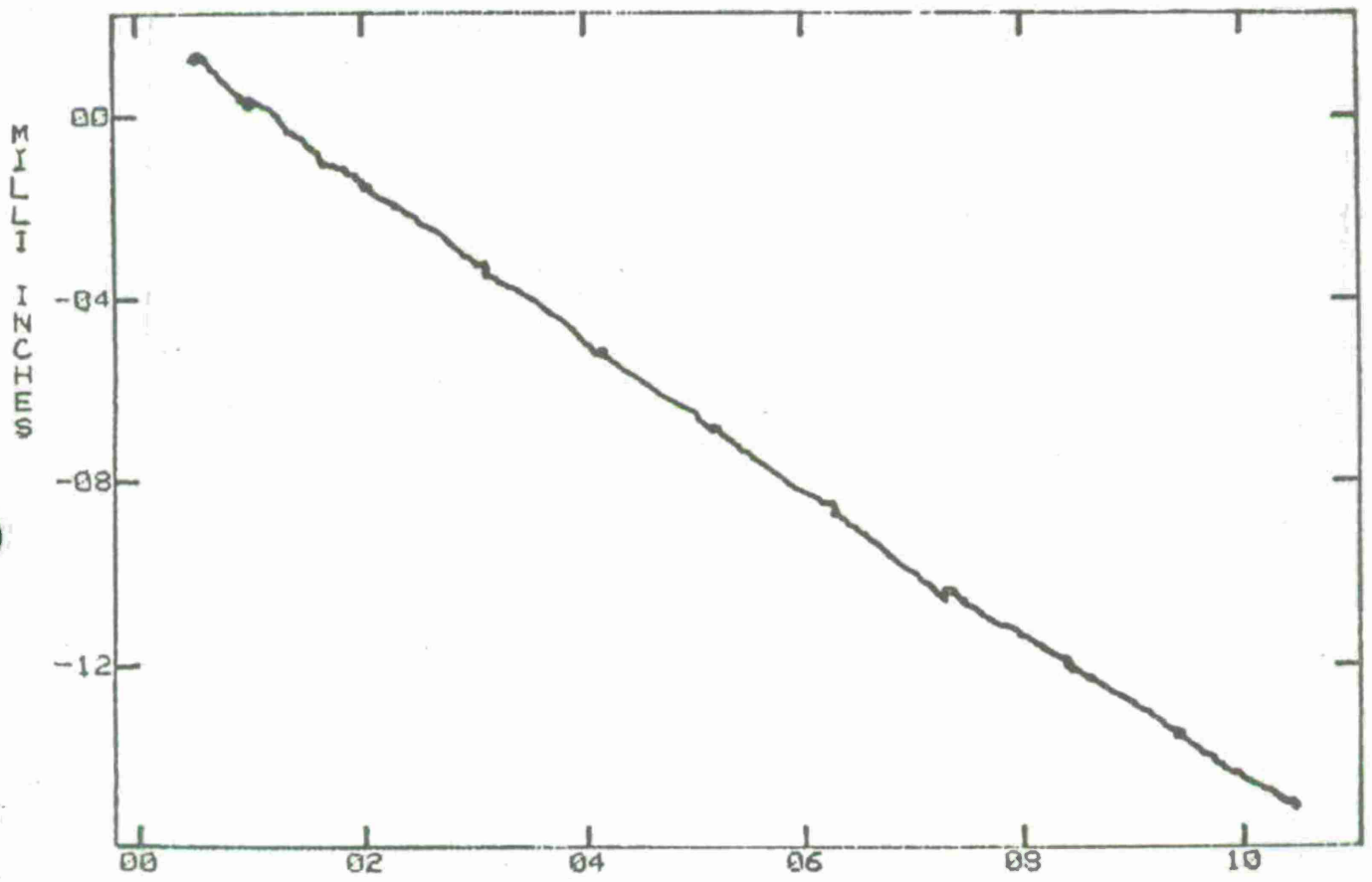
LOAD APPLIED VS VERT DEFLN - ST 138.70 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



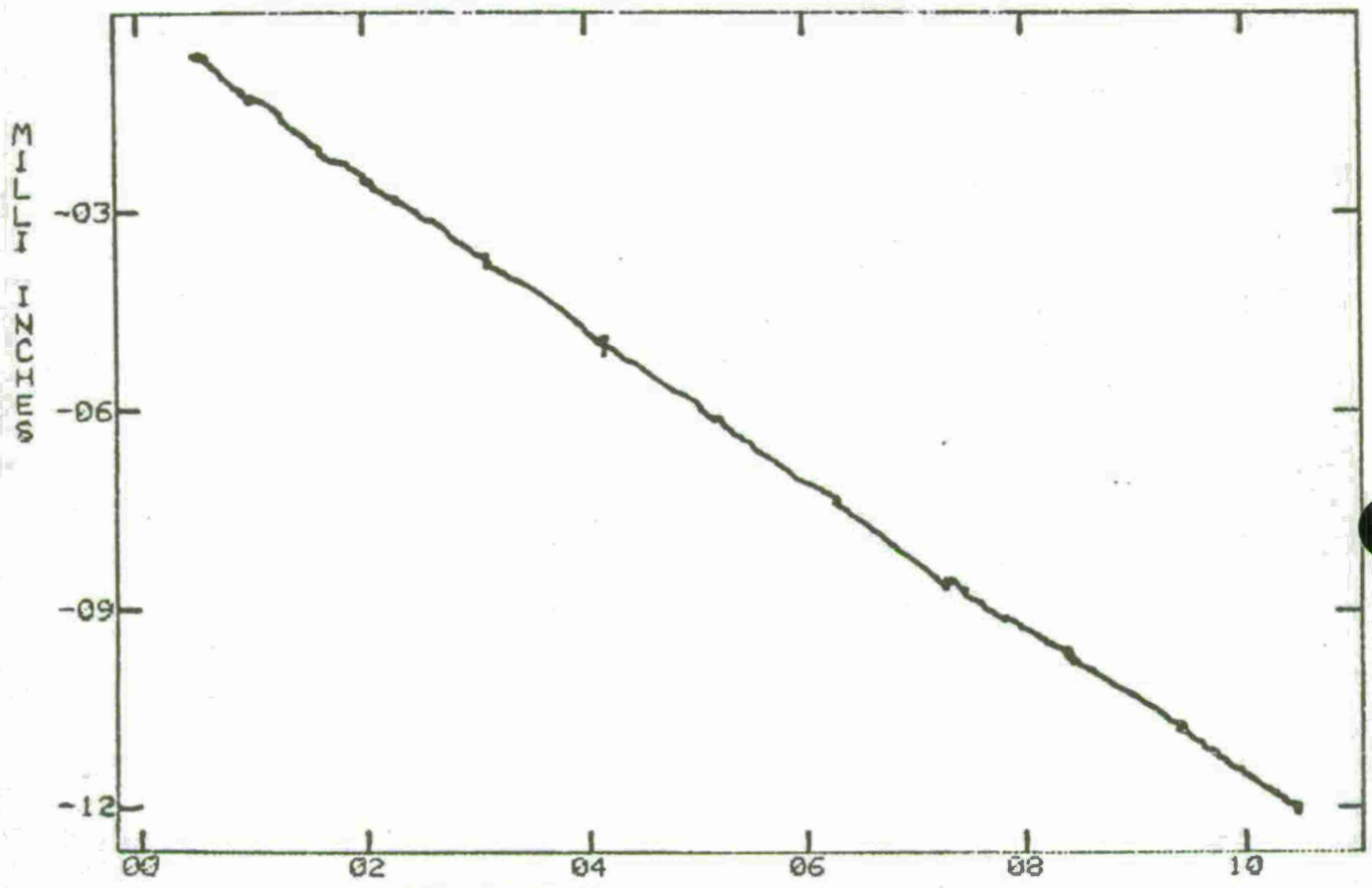
LOAD APPLIED VS VERT DEFLN - ST 148.50 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



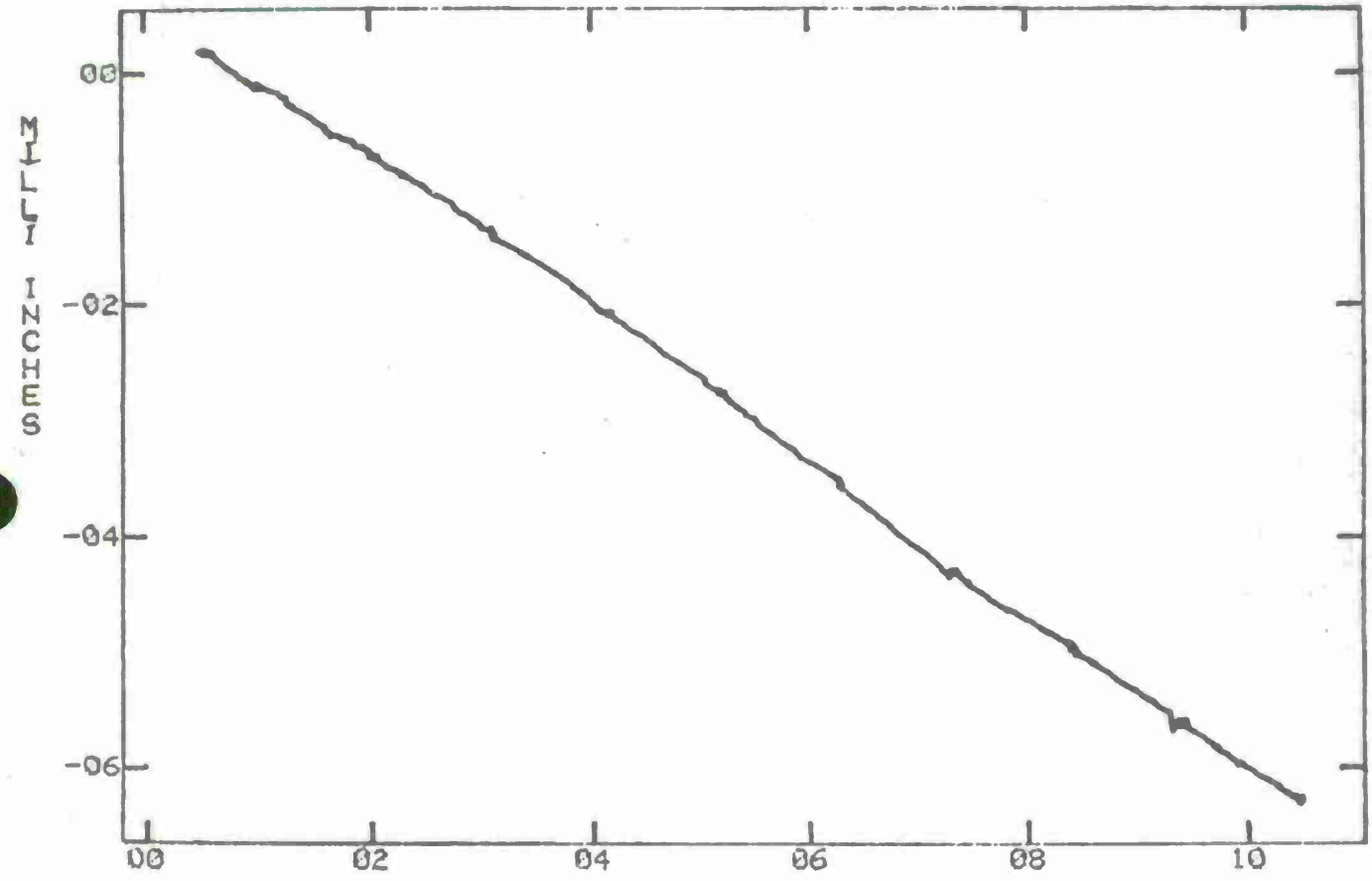
LOAD APPLIED VS VERT DEFLN - ST 186.25 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



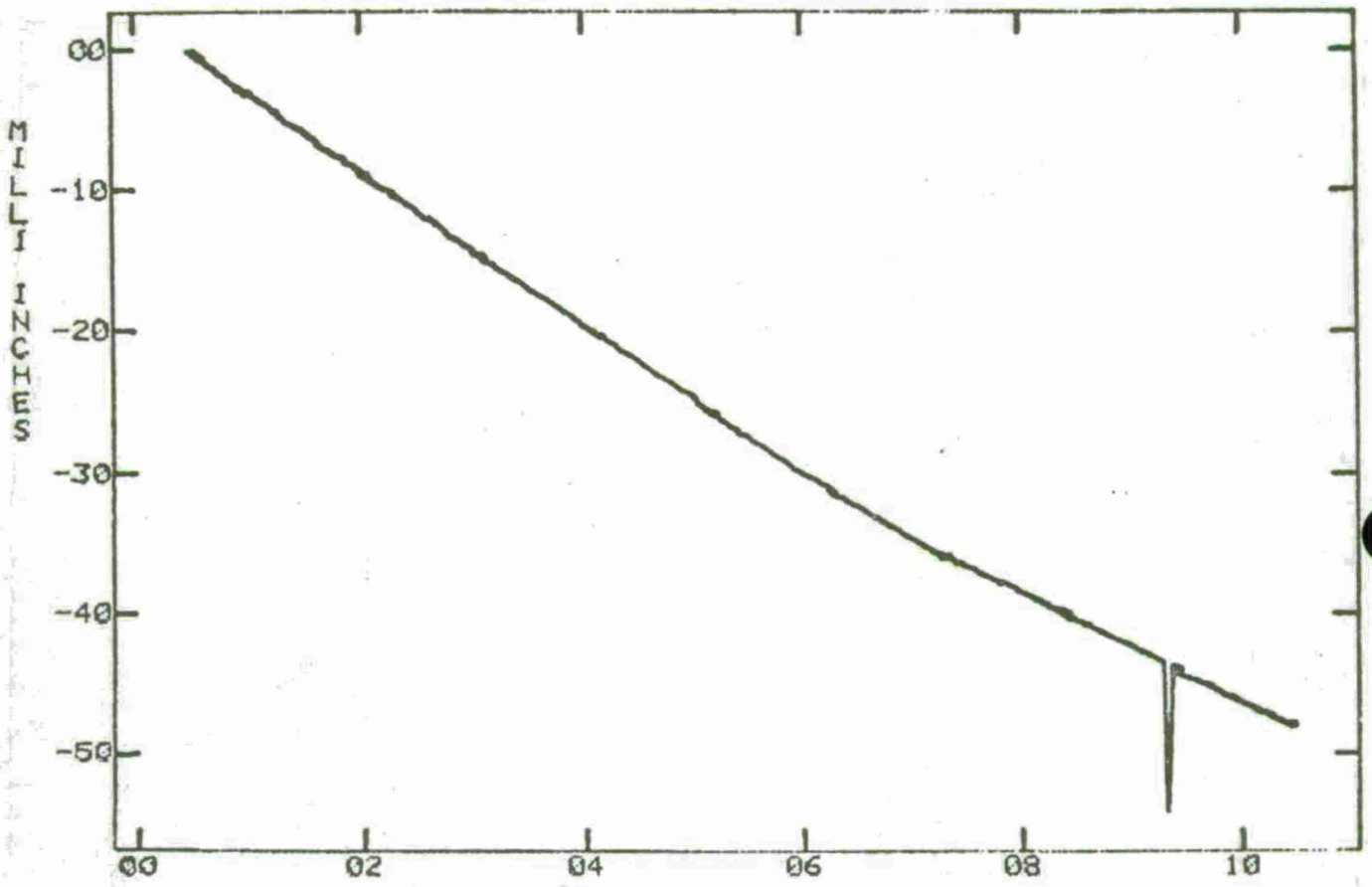
LOAD APPLIED VS VERT DEFLN - ST 213.90 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



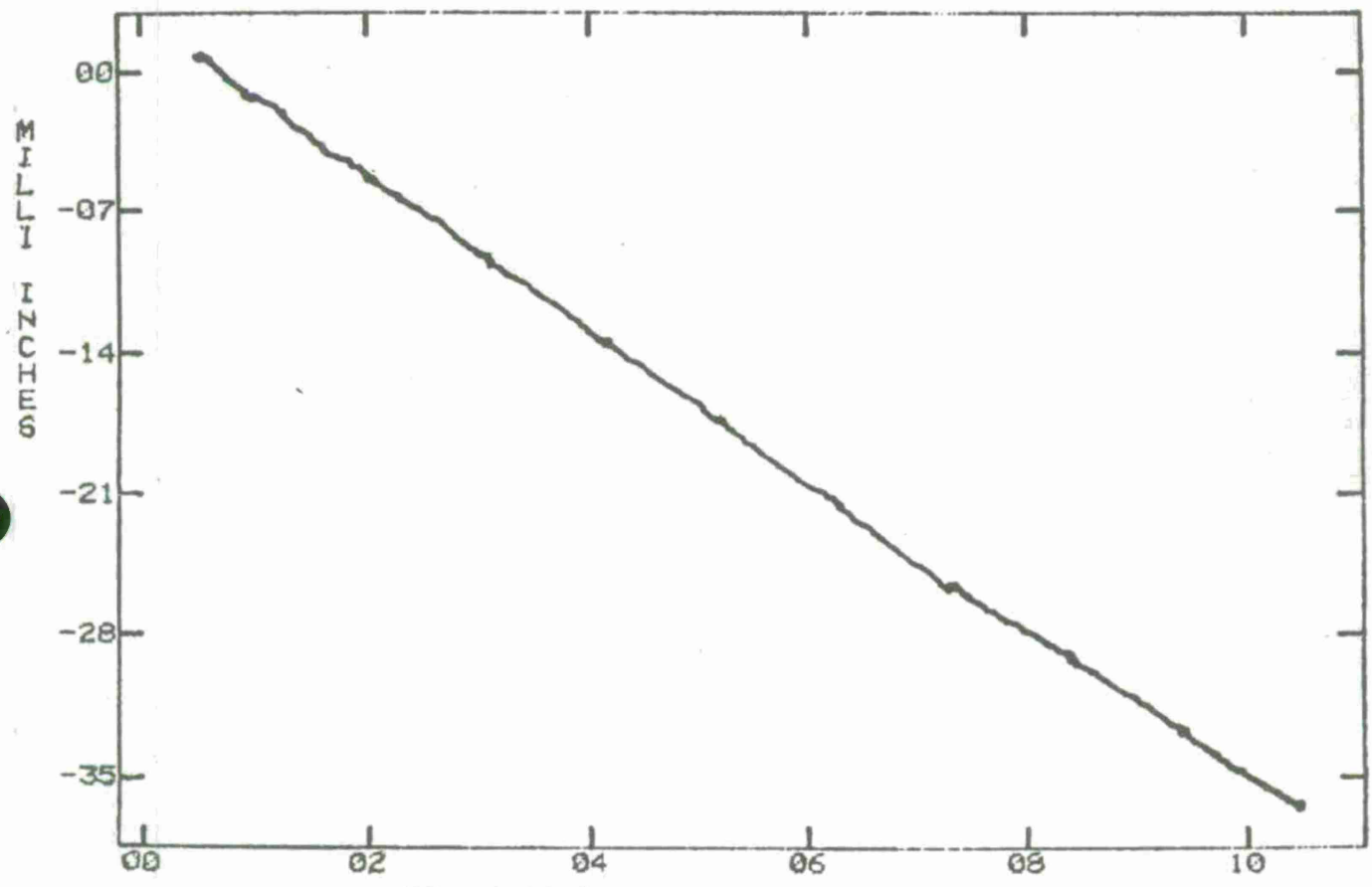
LOAD APPLIED VS VERT DEFLN - ST 250.00 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



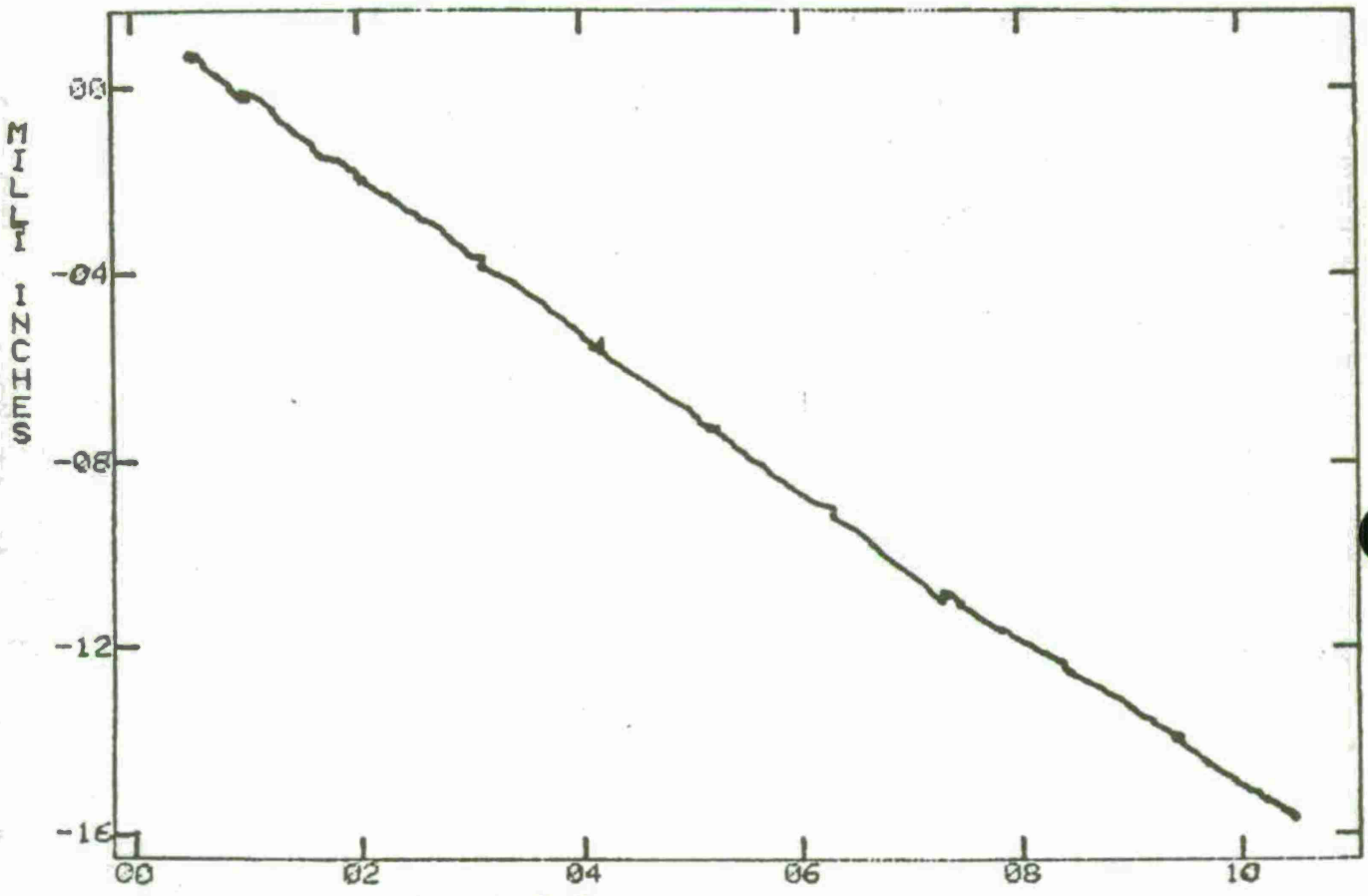
LOAD APPLIED VS VERT DEFLN - ST 268.25 L.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



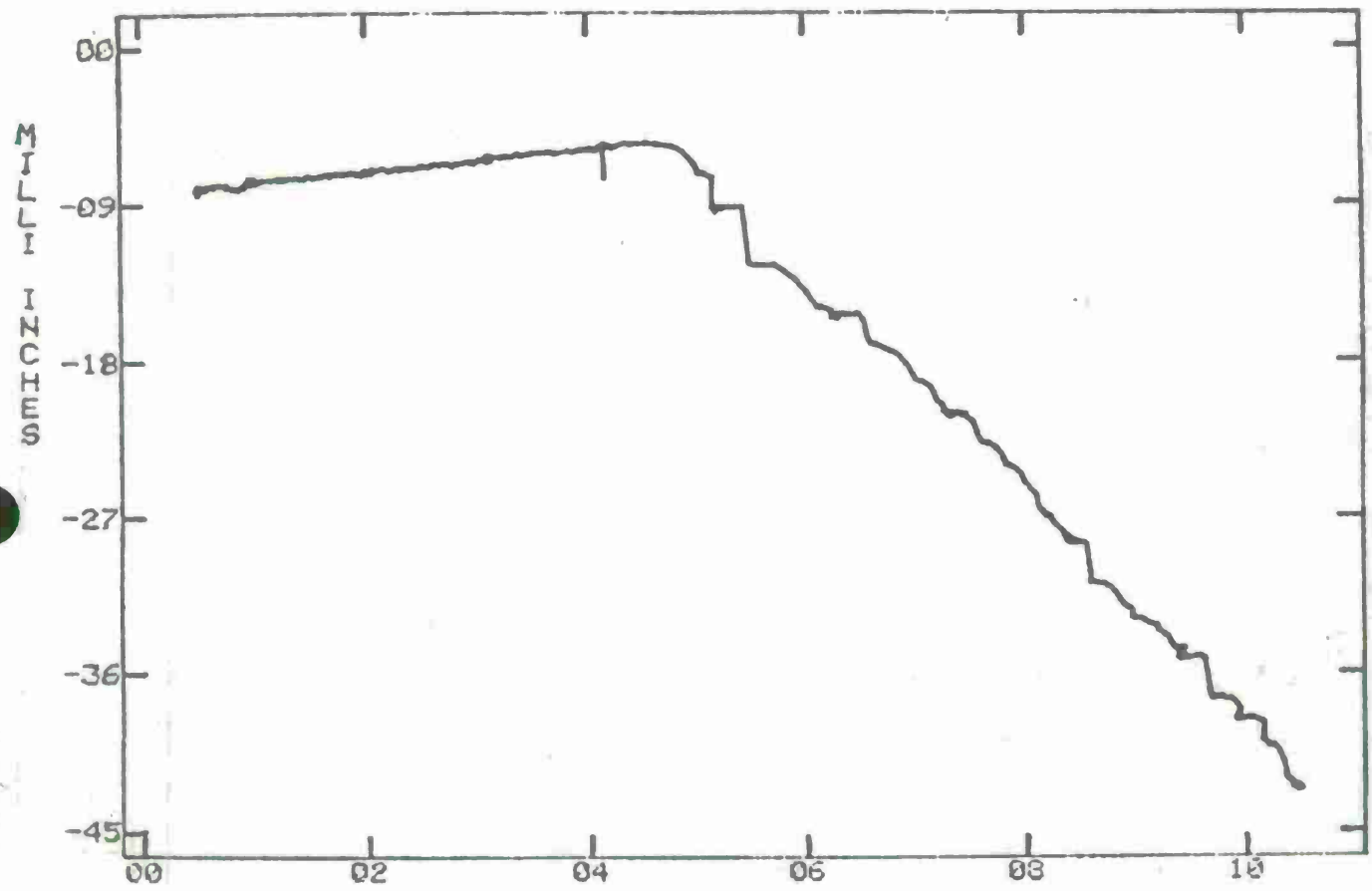
LOAD APPLIED VS VERT DEFLN - ST 93.00 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



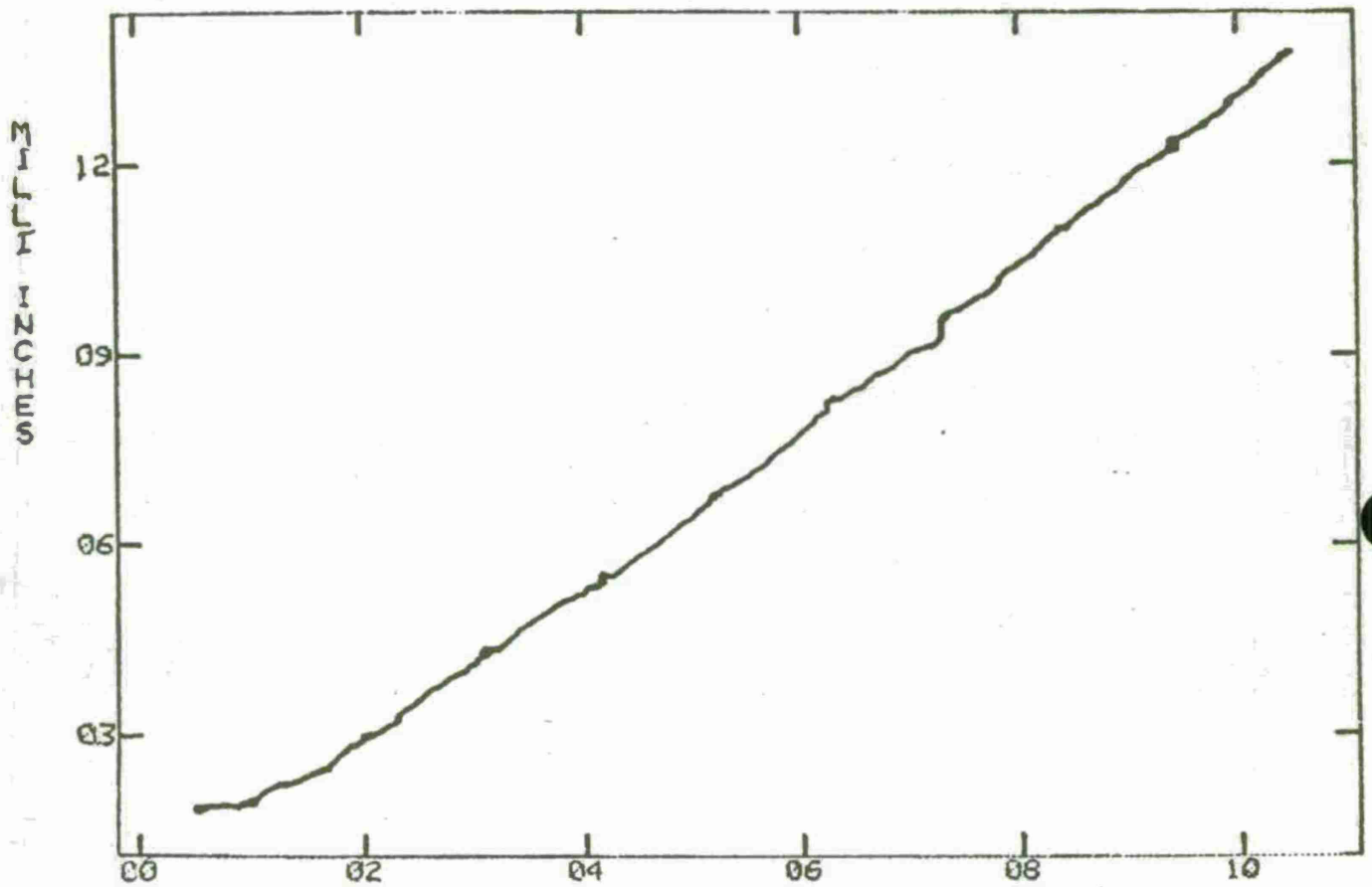
LOAD APPLIED VS VERT DEFLN - ST 148.50 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



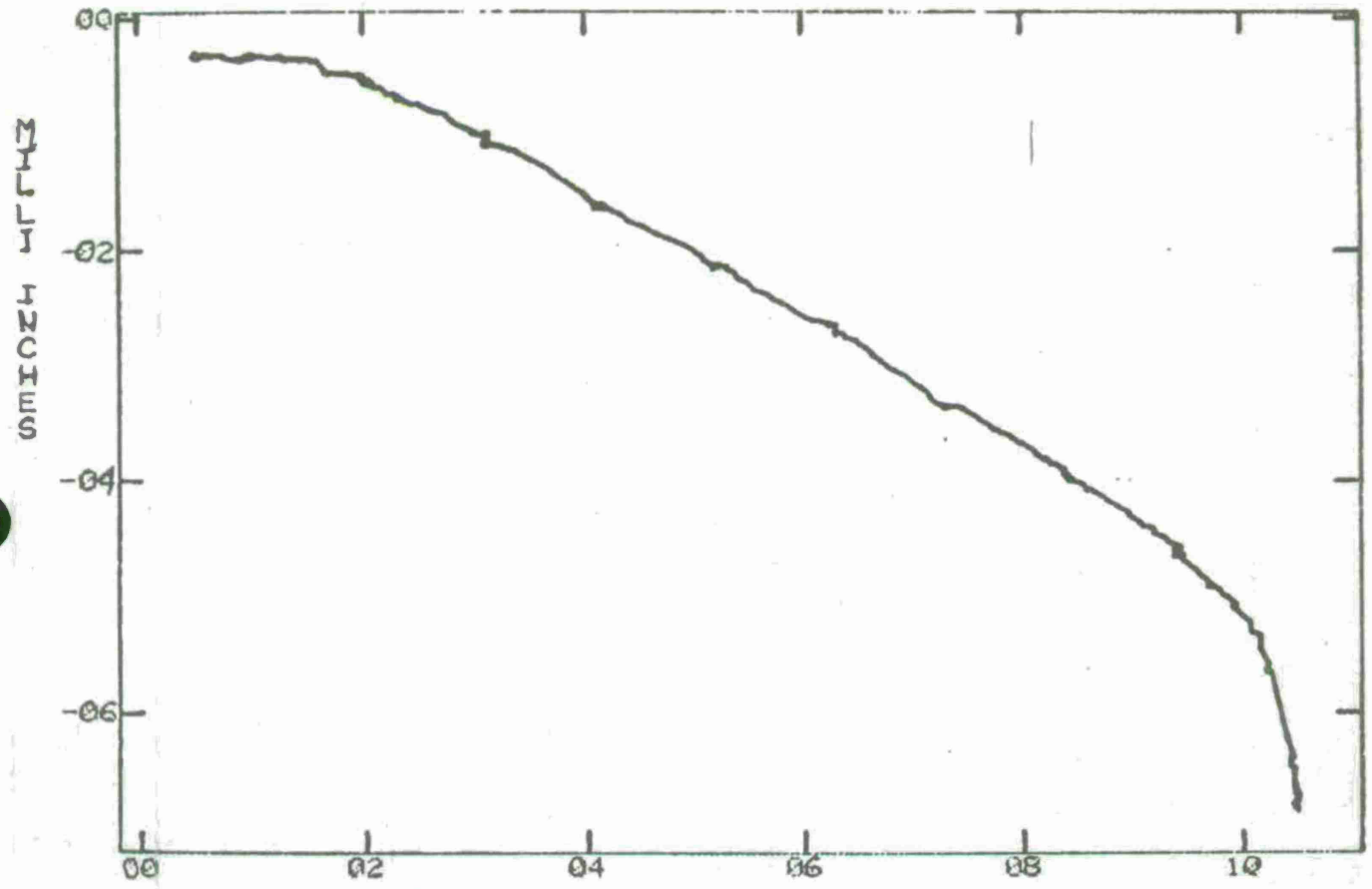
LOAD APPLIED VS VERT DEFLN - ST 213.90 R.H. X 10-1
TEST 23 (9JUL75) AH1G BEND TEST



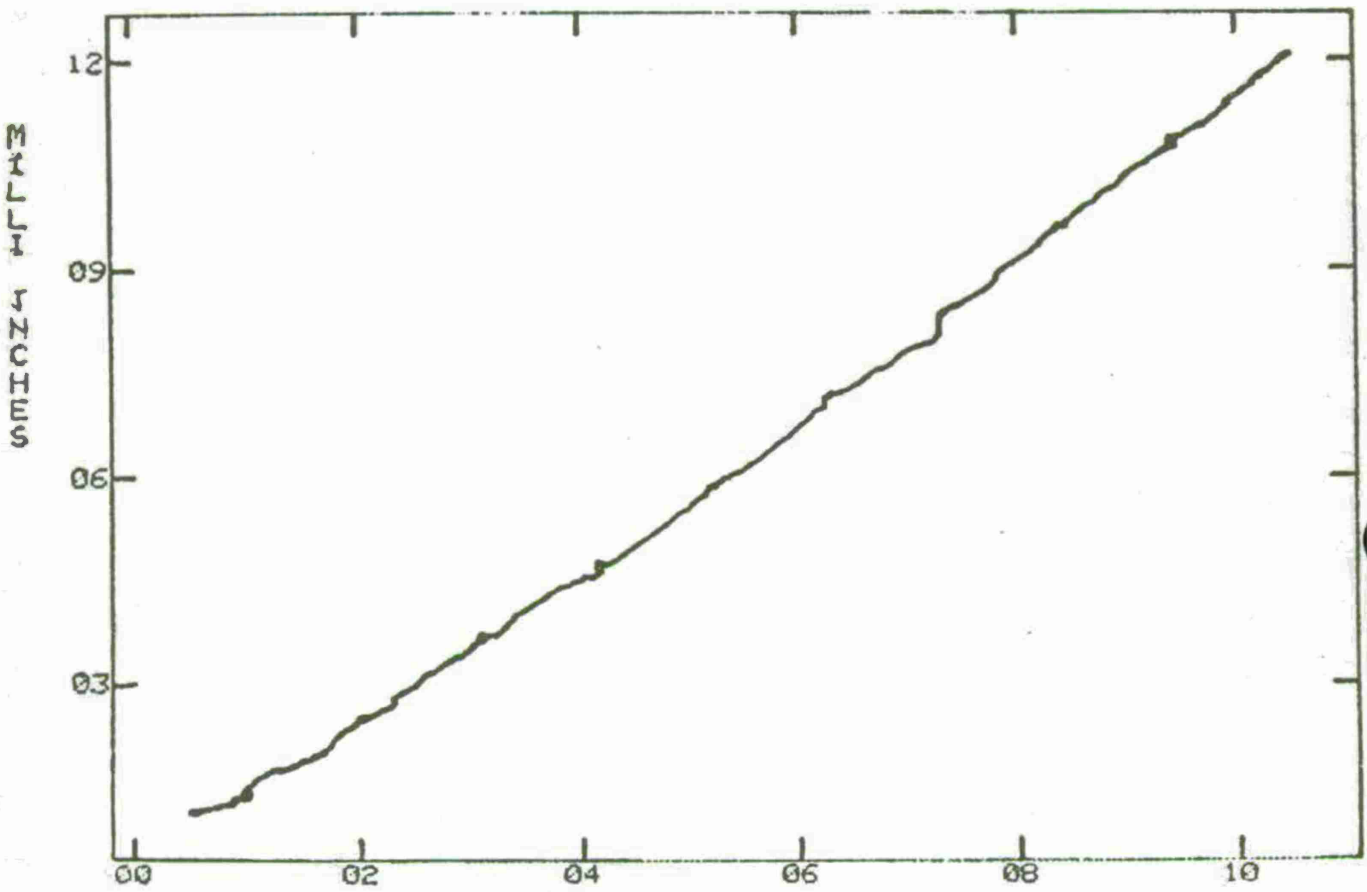
LOAD APPLIED VS BASE ROTN DEFLN - UPPER L.H. X 10+1
TEST 23 (9JUL75) AH1G BEND TEST



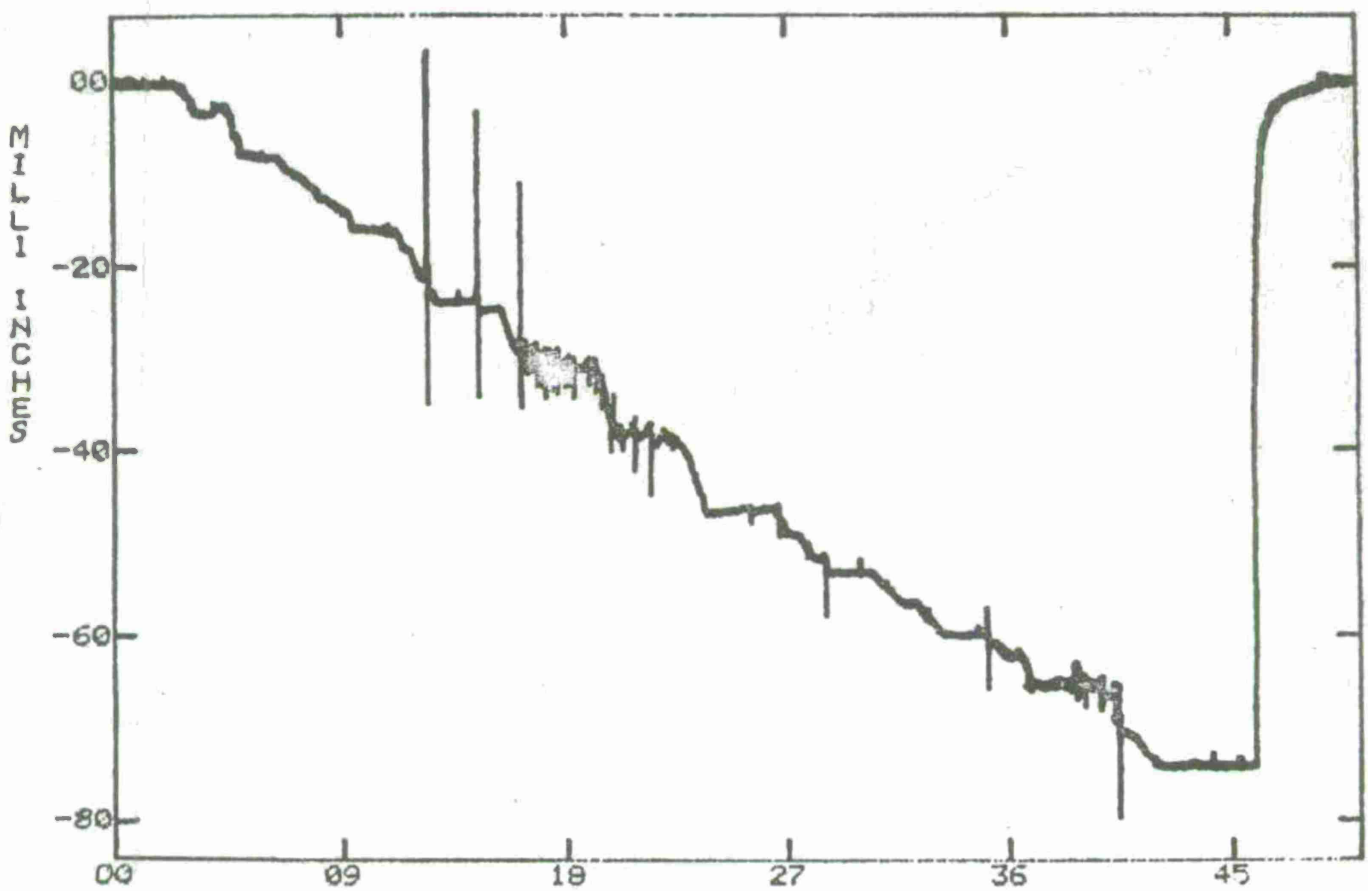
LOAD APPLIED VS BASE ROTN DEFLN - LOWER L.H. X 10+0
TEST 23 (9JUL75) AH1G BEND TEST



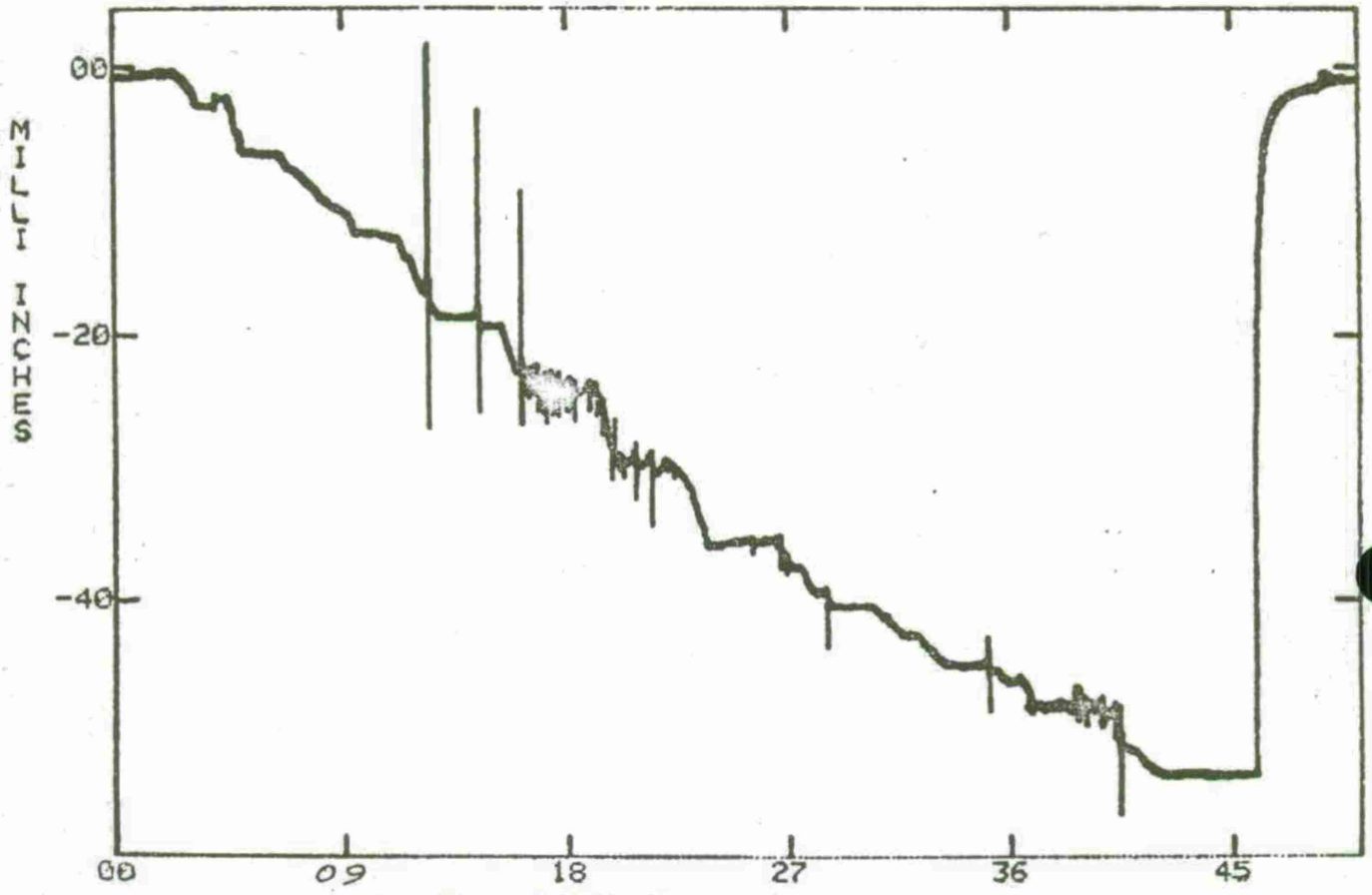
LOAD APPLIED VS BASE ROTN DEFLN - UPPER R.H. X 10+0
TEST 23 (9JUL75) AH1G BEND TEST



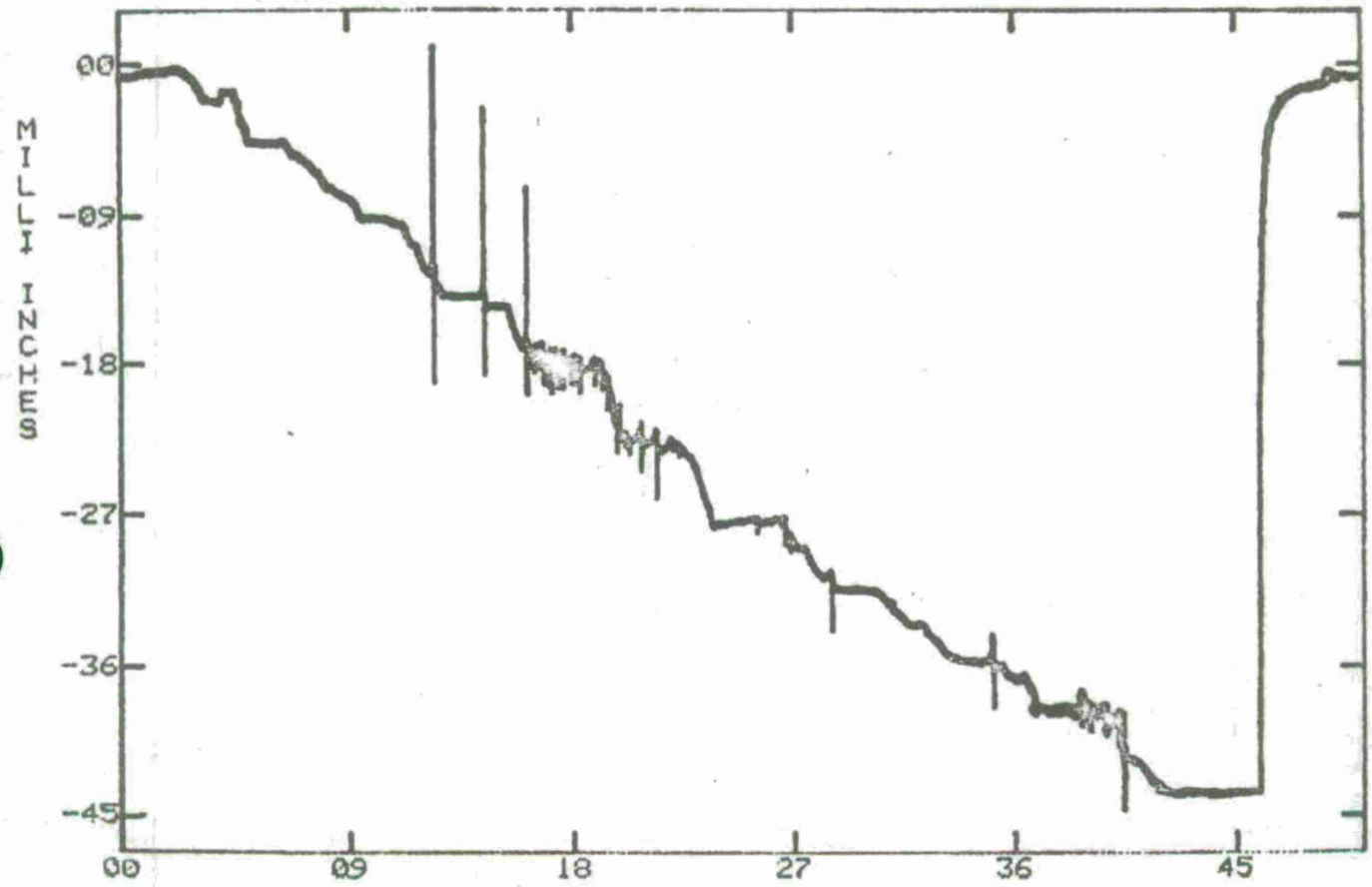
LOAD APPLIED VS BASE ROTN DEFLN - LOWER R.H. X 10+0
TEST 23 (9JUL75) AH1G BEND TEST



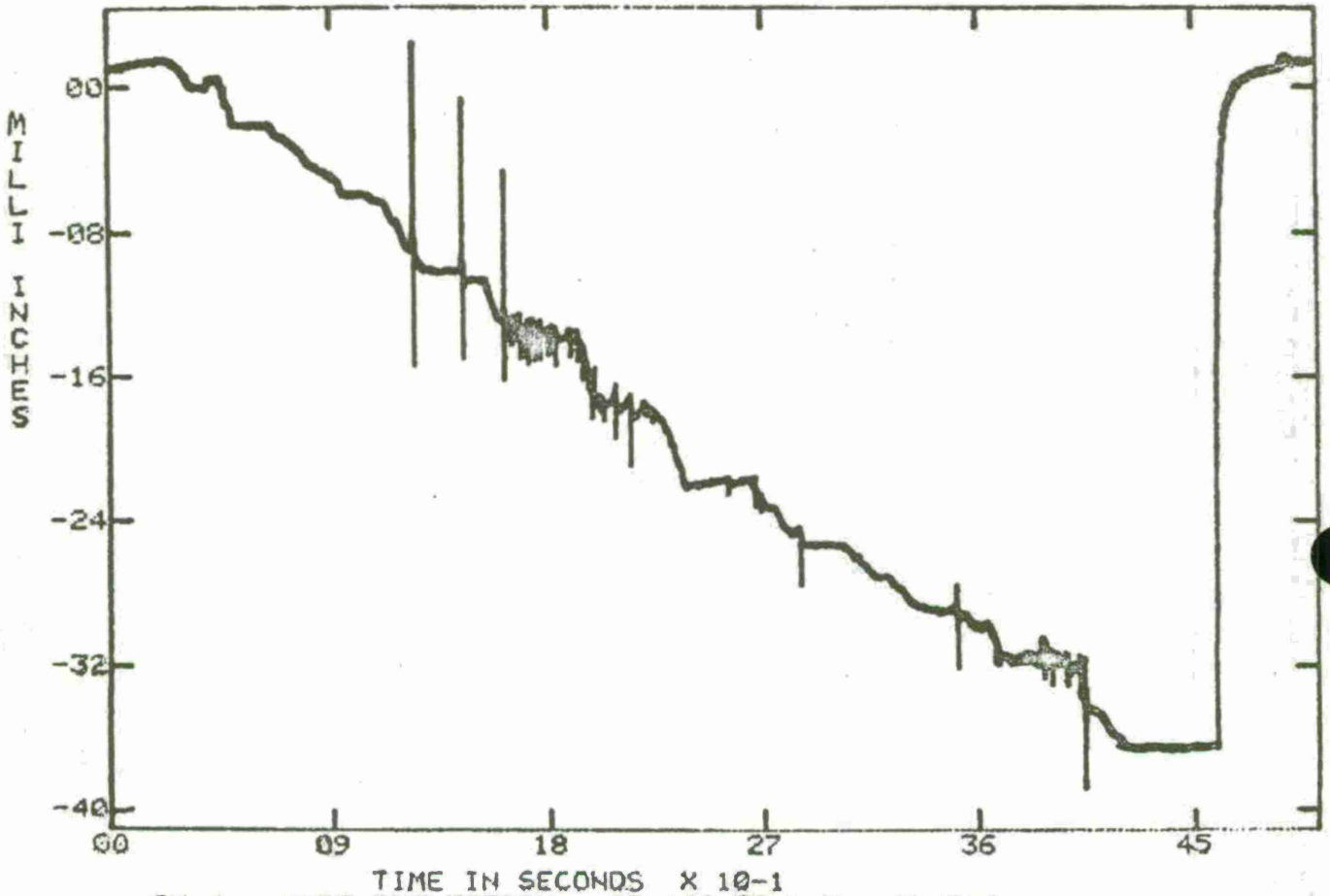
CH 1 VERT DEFLECTION - ST 61.25 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



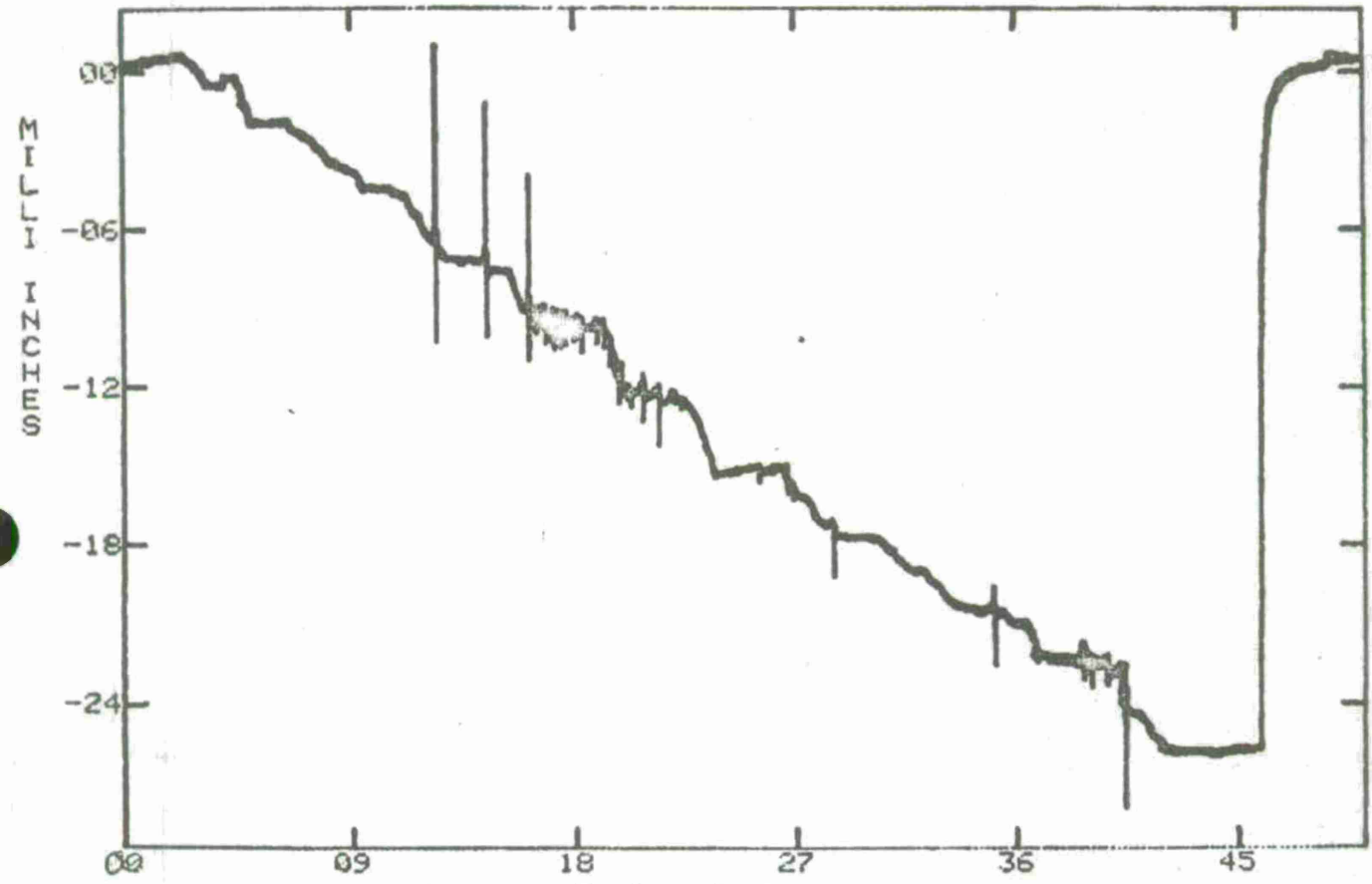
TIME IN SECONDS X 10-1
CH 2 VERT DEFLECTION - ST 93.00 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



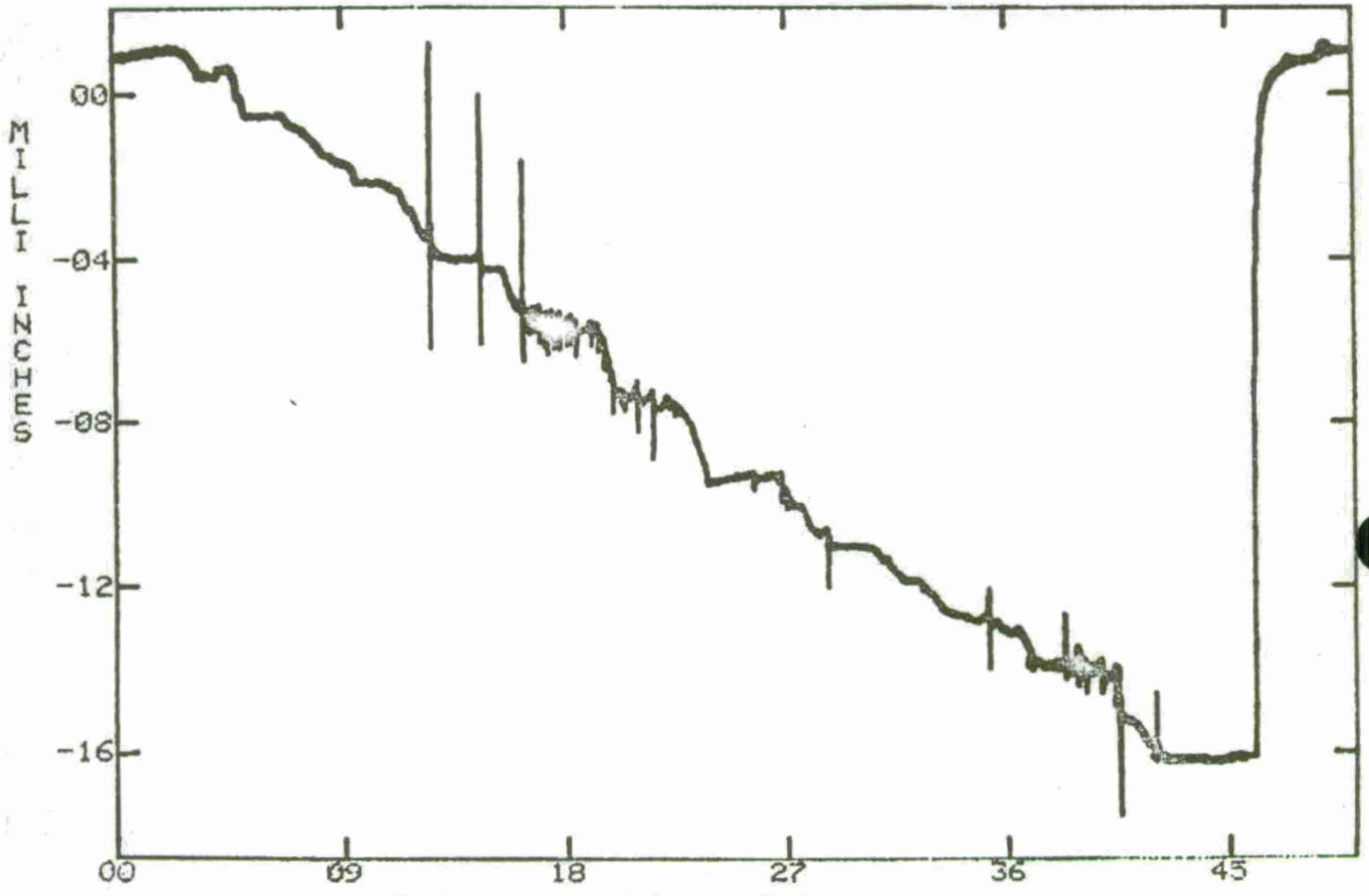
CH 3 VERT DEFLECTION - ST 138.70 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



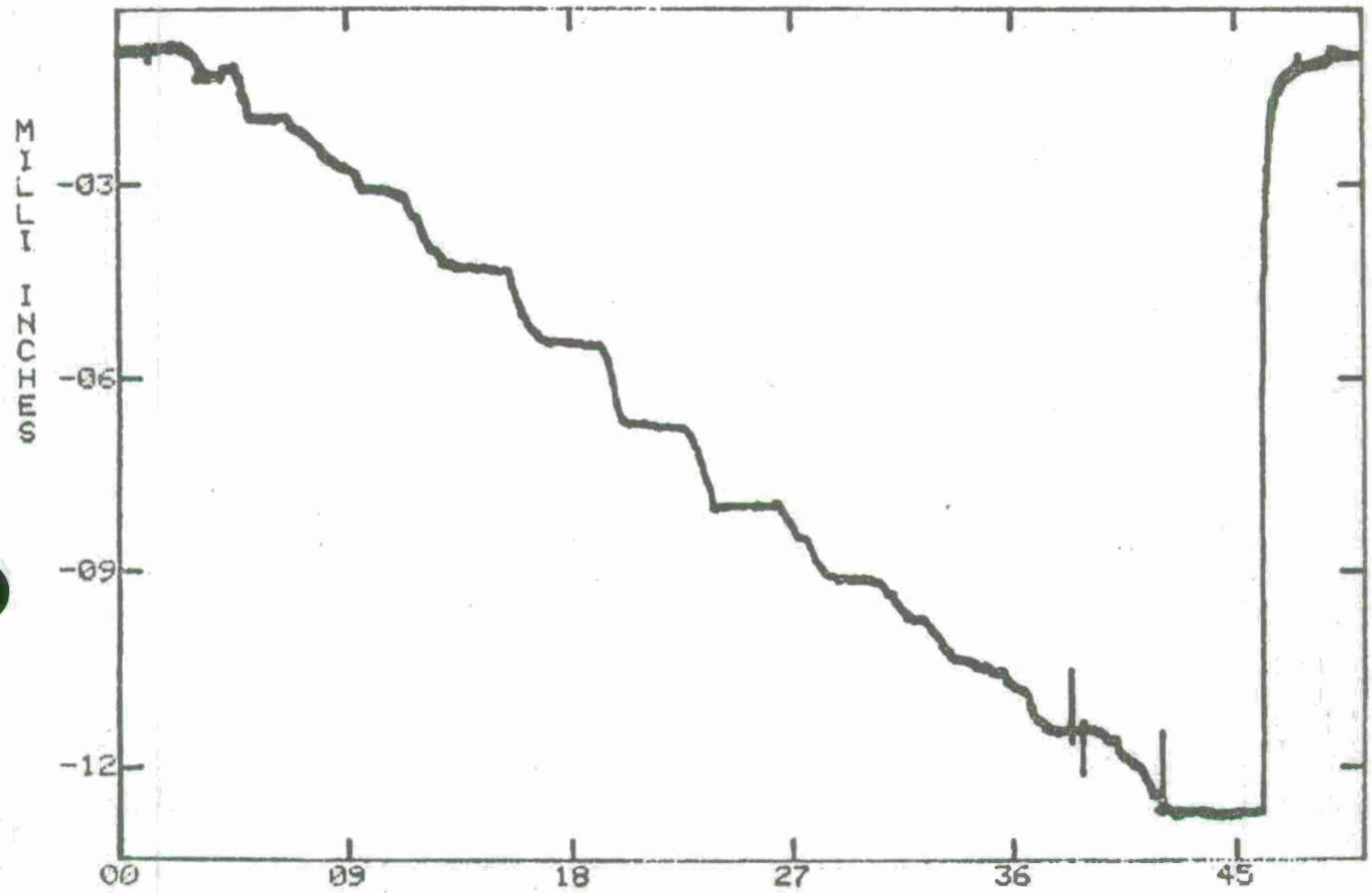
CH 4 VERT DEFLECTION - ST 148.50 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



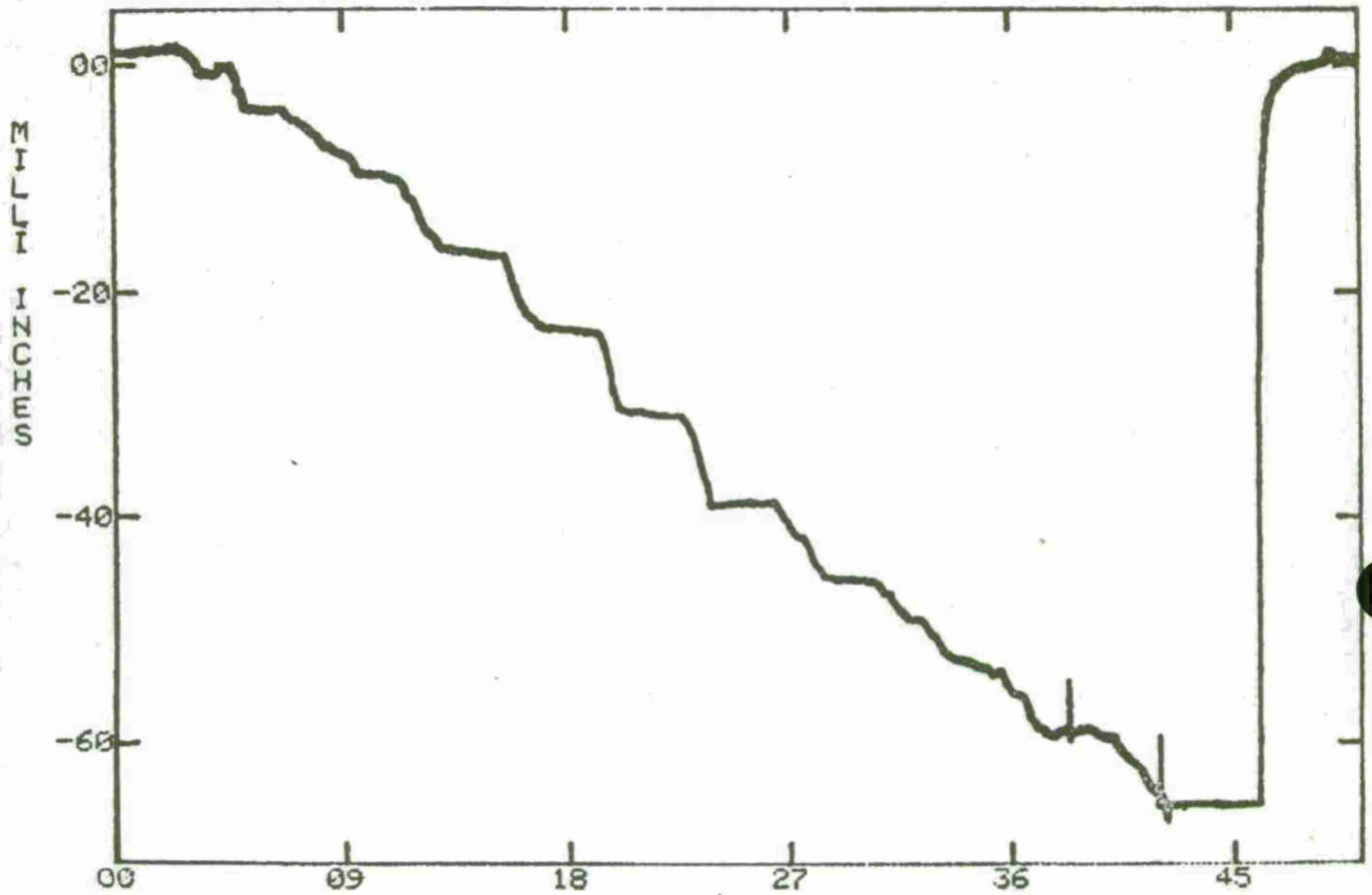
CH 5 VERT DEFLECTION - ST 186.25 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



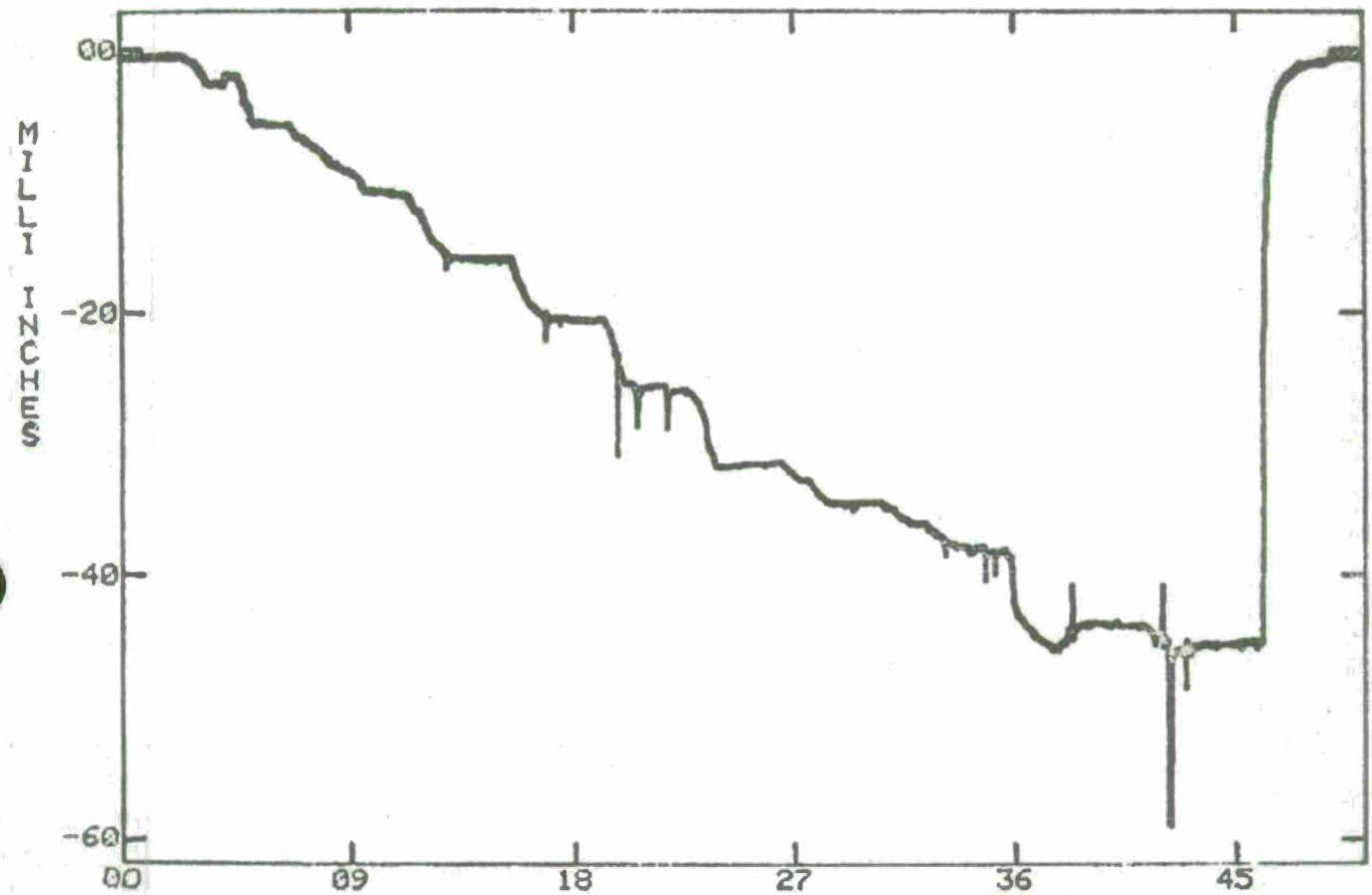
CH 6 VERT DEFLECTION - ST 213.90 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



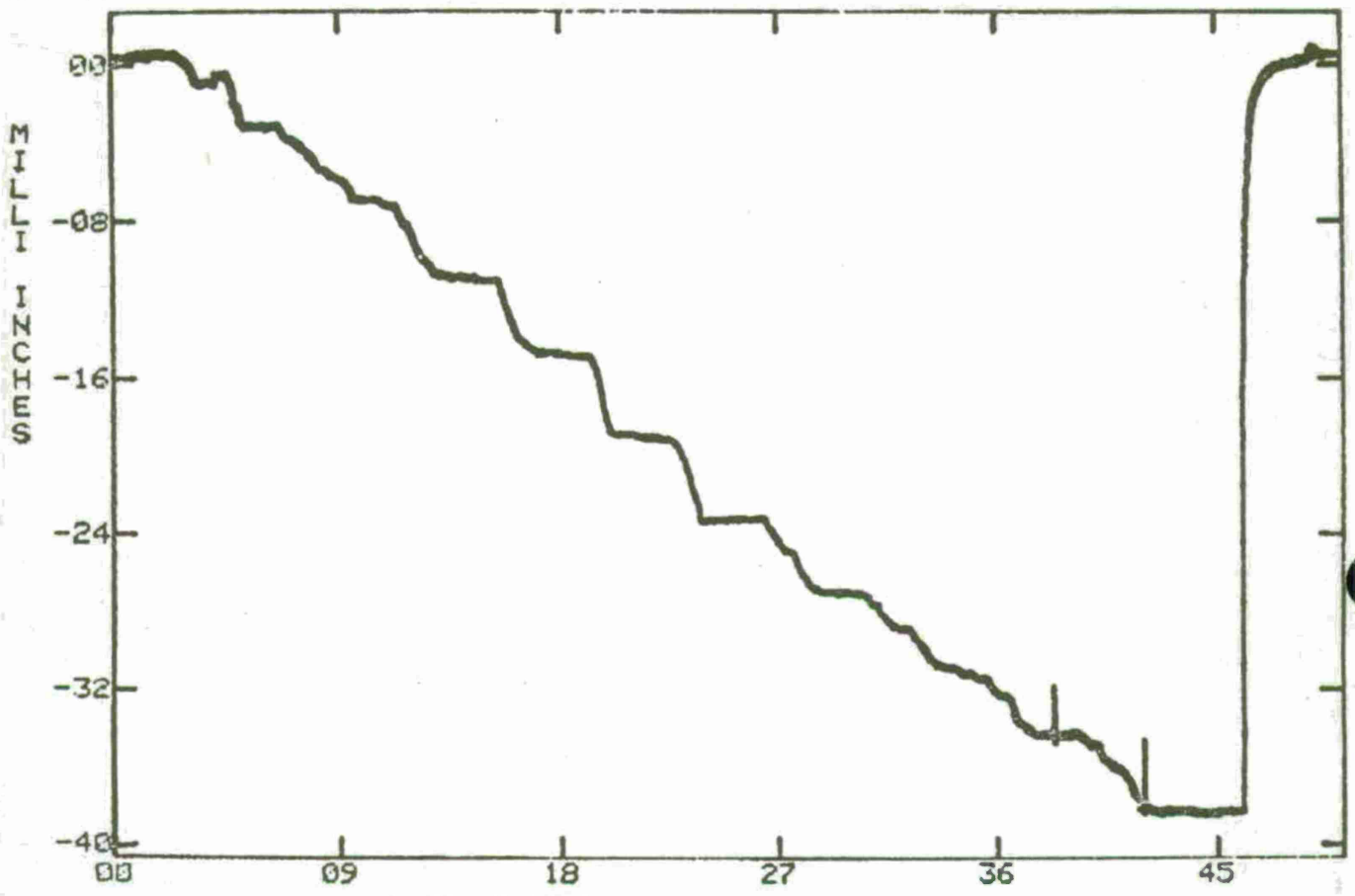
CH 7 VERT DEFLECTION - ST 250.00 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



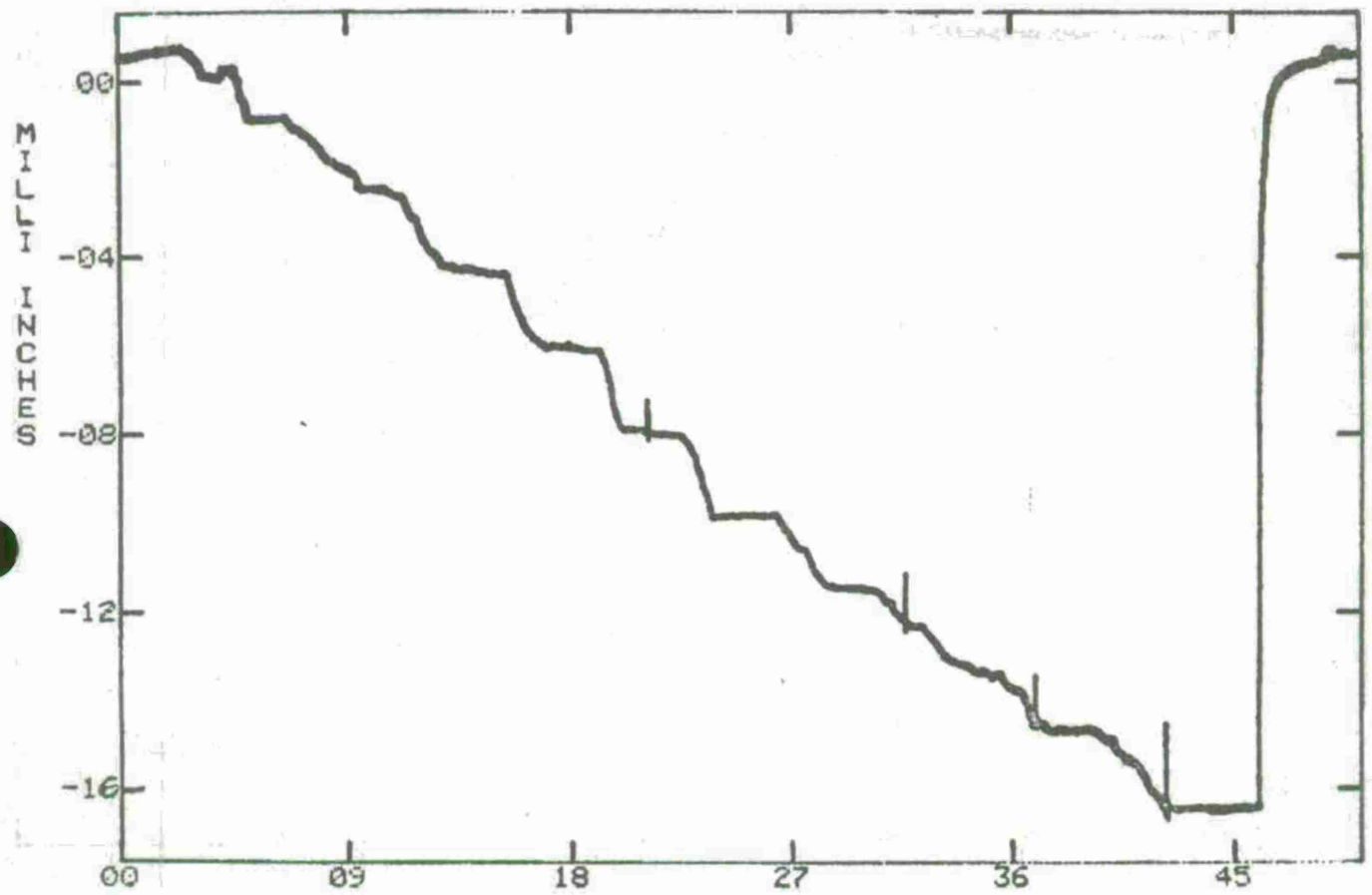
CH 8 VERT DEFLECTION - ST 268.25 L.H. X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



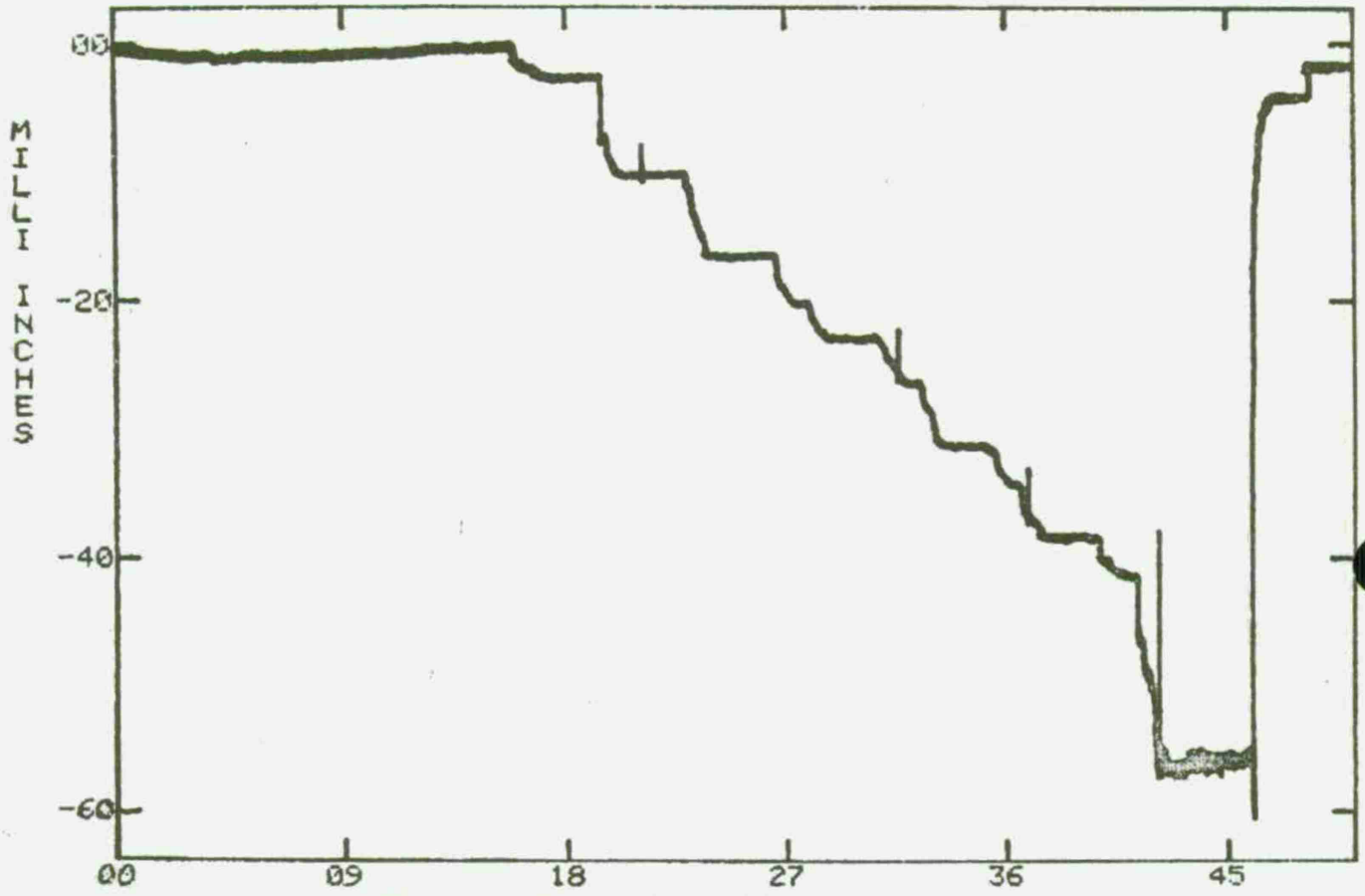
CH 9 VERT DEFLECTION — ST 93.00 R H X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



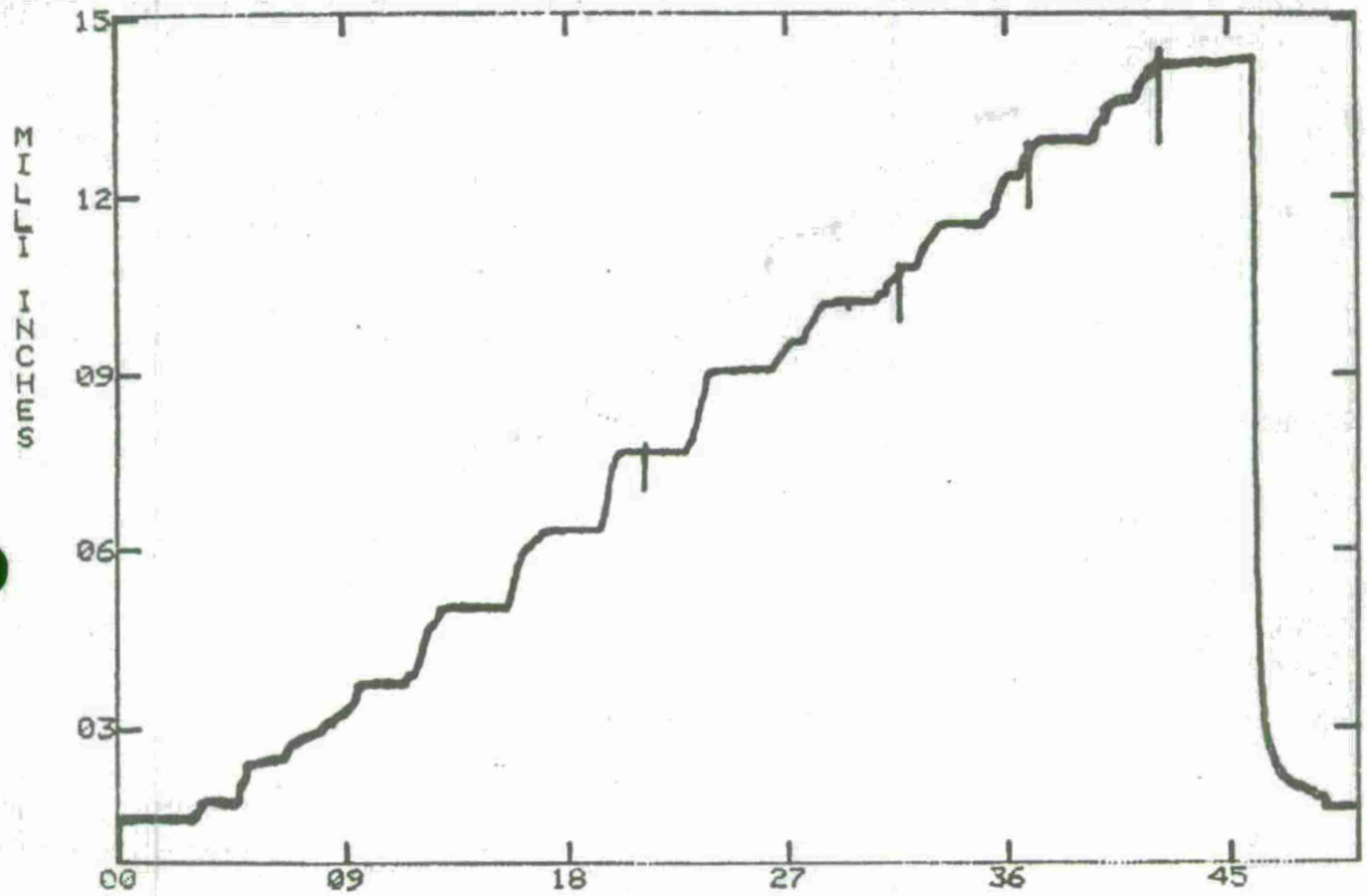
CH 10 VERT DEFLECTION - ST 148.50 R.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



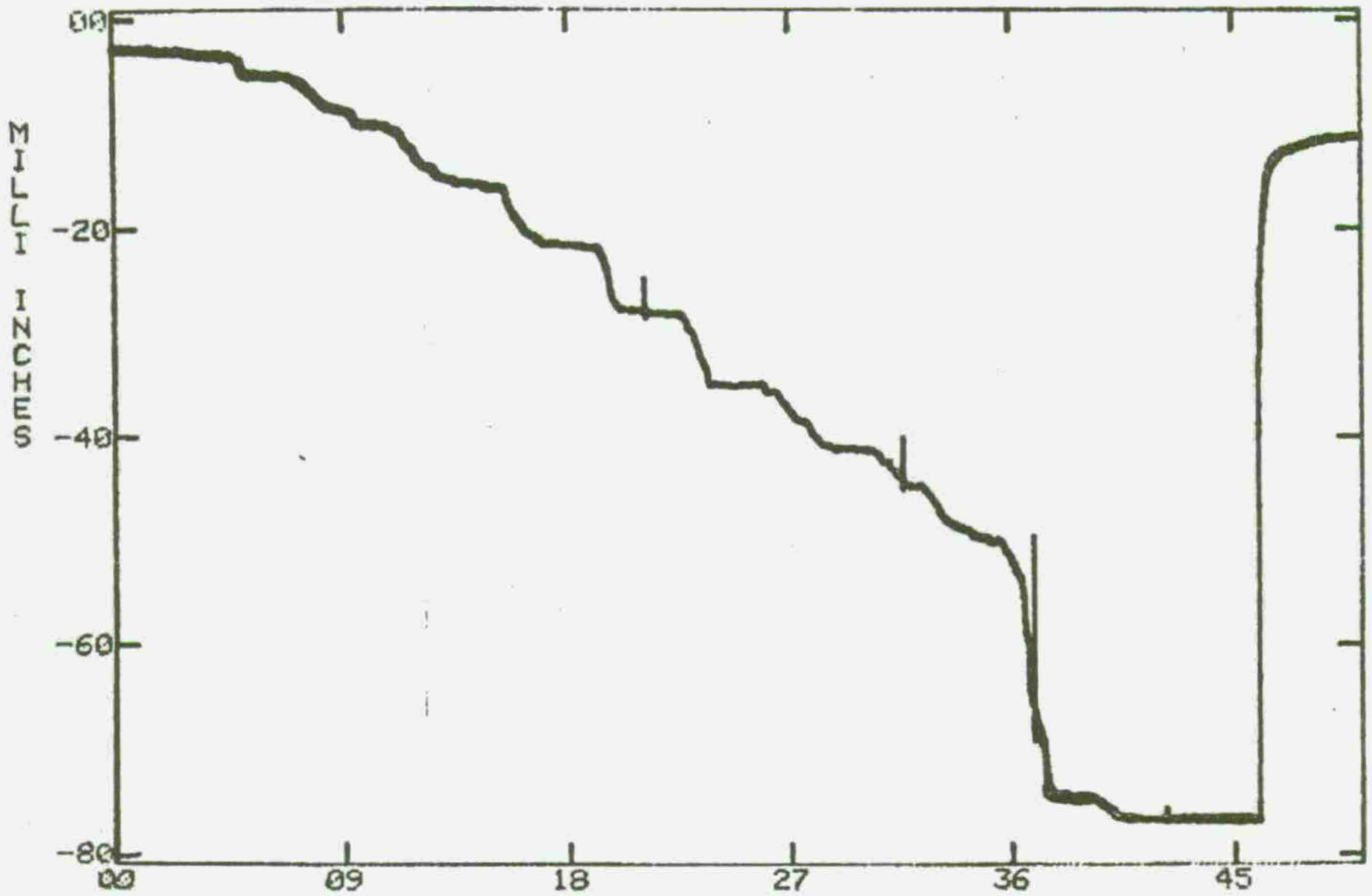
CH 11 VERT DEFLECTION - ST 213.90 R.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



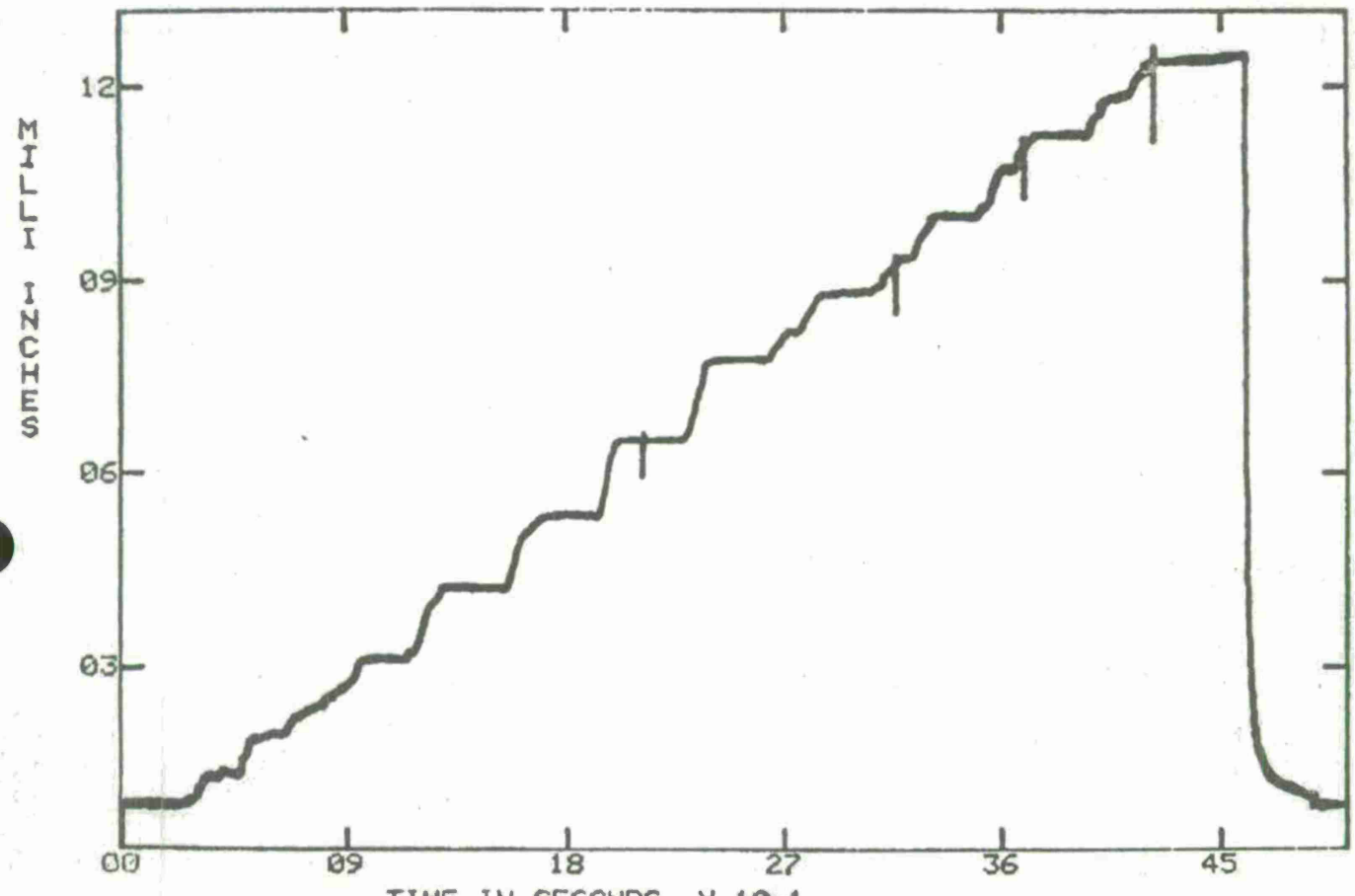
CH 12 BASE ROTATION - UPPER L.H. DEFLECTION - BED FIXTURE X 10+1
TEST 24 (9JUL75) AH1G BEND TEST



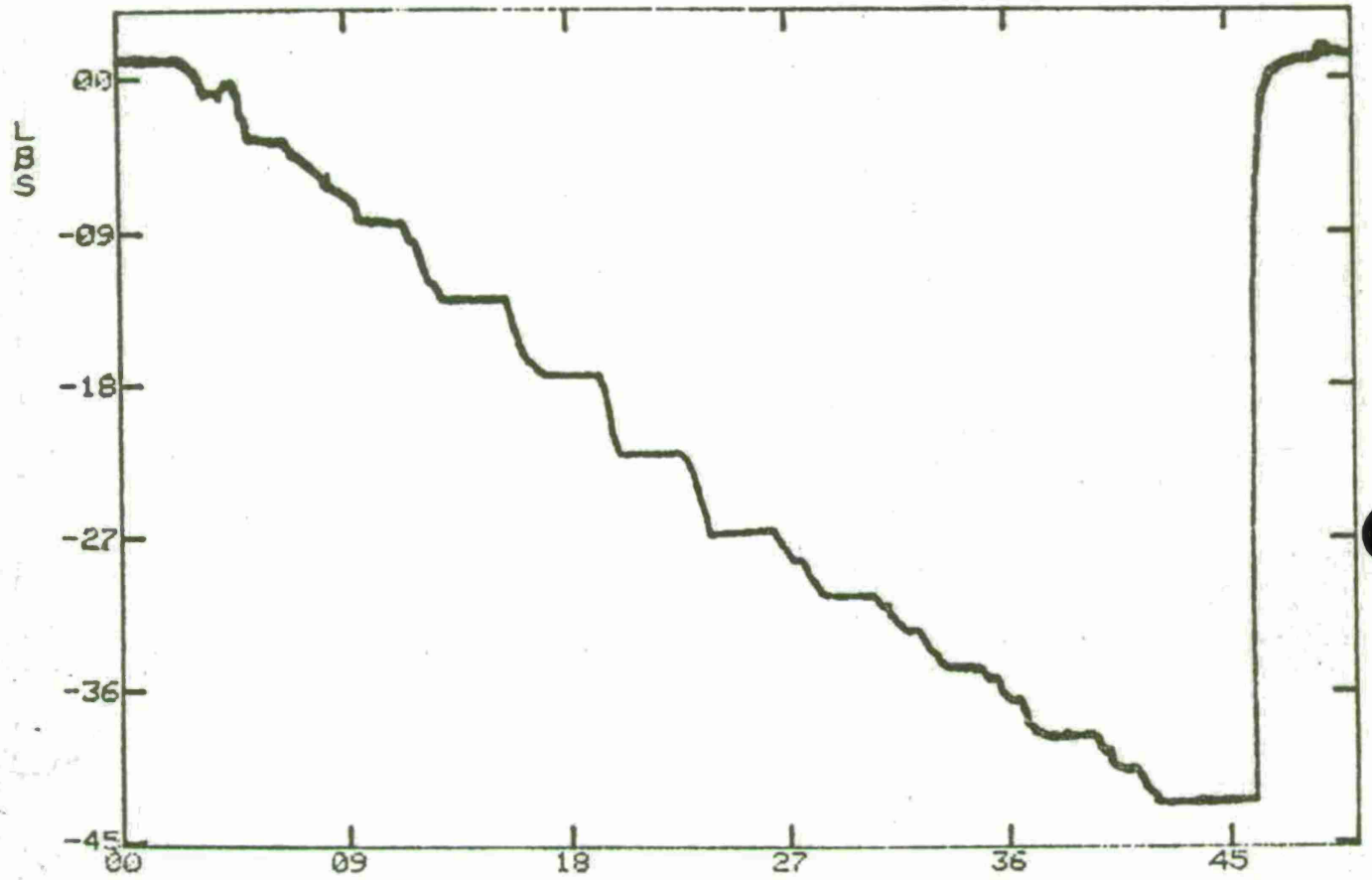
CH 13 BASE ROTATION - LOWER L.H. DEFLECTION - BED FIXTURE X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



CH 14 BASE ROTATION - UPPER R.H. DEFLECTION - FUSELAGE X 10+1
TEST 24 (9JUL75) AH1G BEND TEST



CH 15 BASE ROTATION - LOWER R.H. DEFLECTION - FUSELAGE X 10+0
TEST 24 (9JUL75) AH1G BEND TEST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-45
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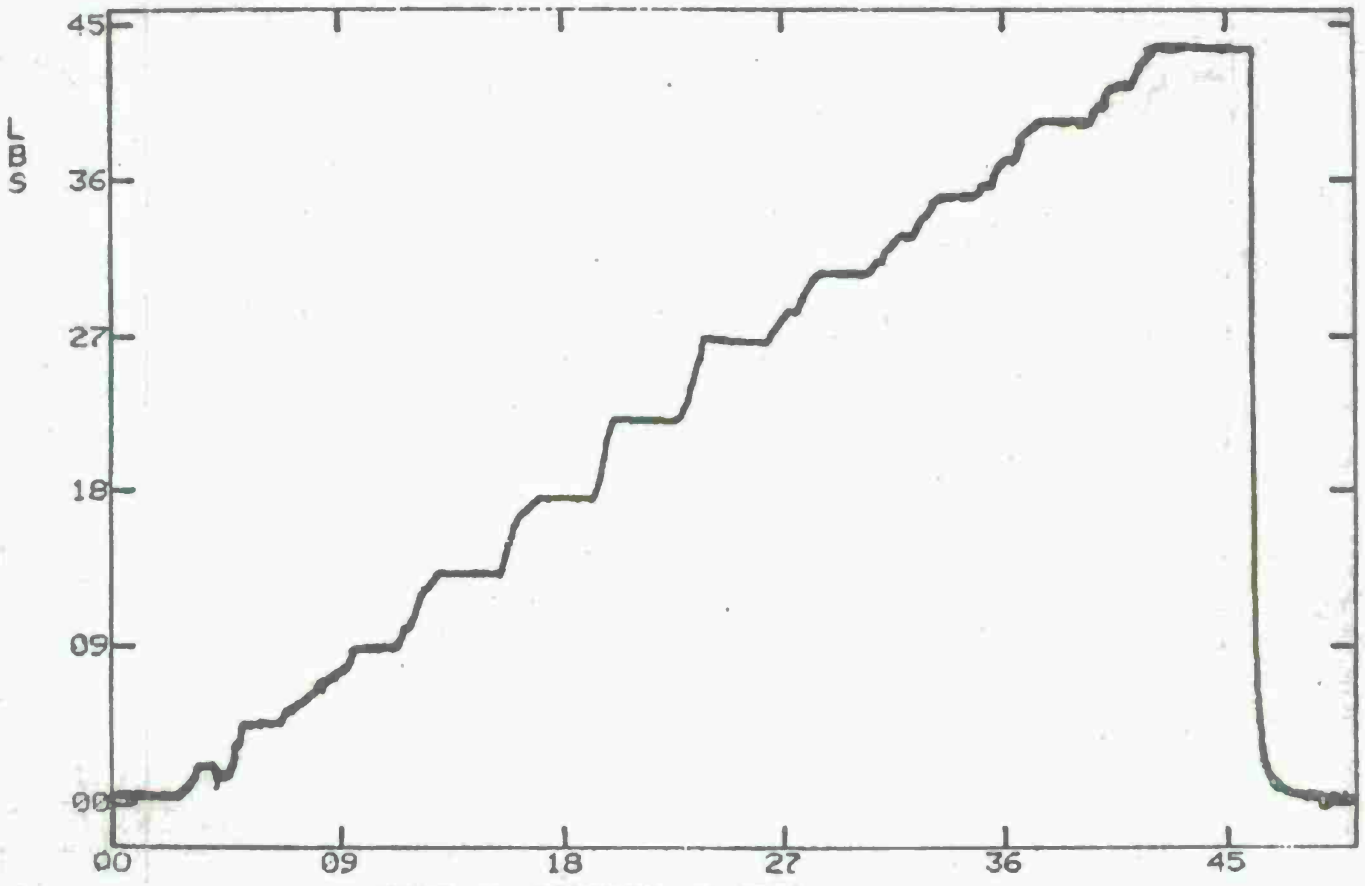
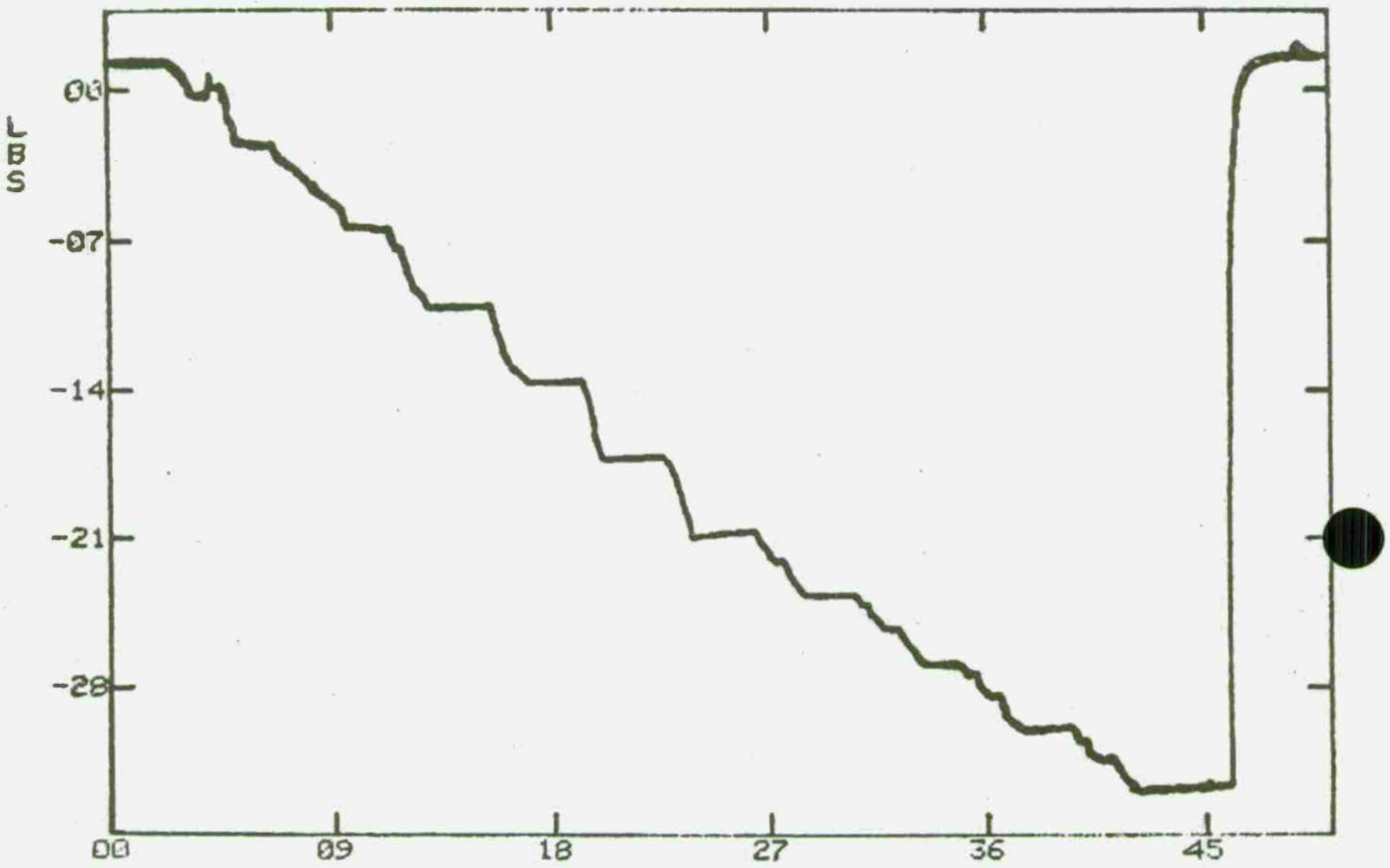
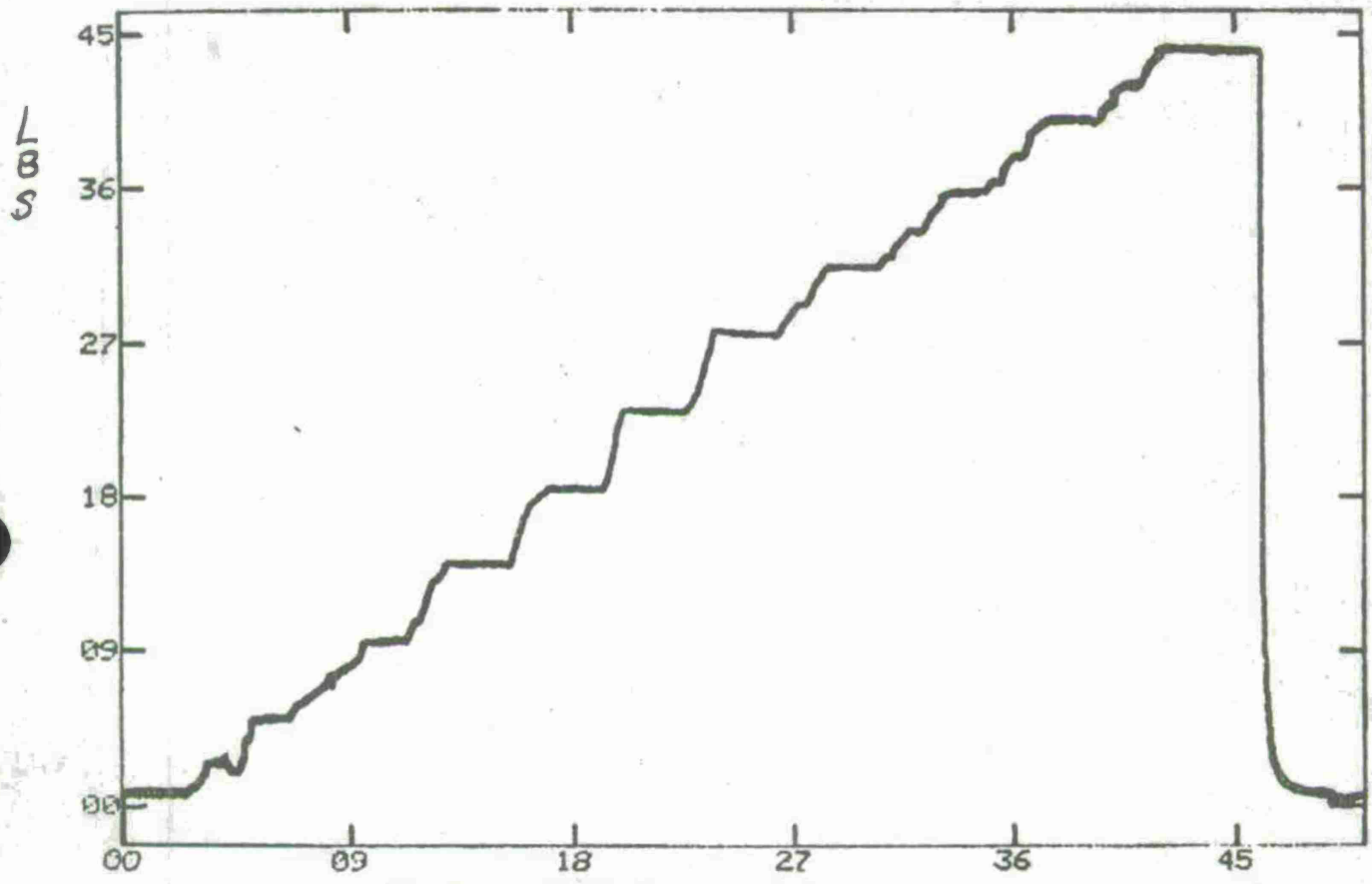
45
TIME IN SECONDS X 10-1
CH 17 LOAD - L.H. TOP X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



CH 18 . LOAD - L.H. BOTTOM X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



CH 19 LOAD - R.H. TOP X 10-2
TEST 24 (9JUL75) AH1G BEND TEST


LBS
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18
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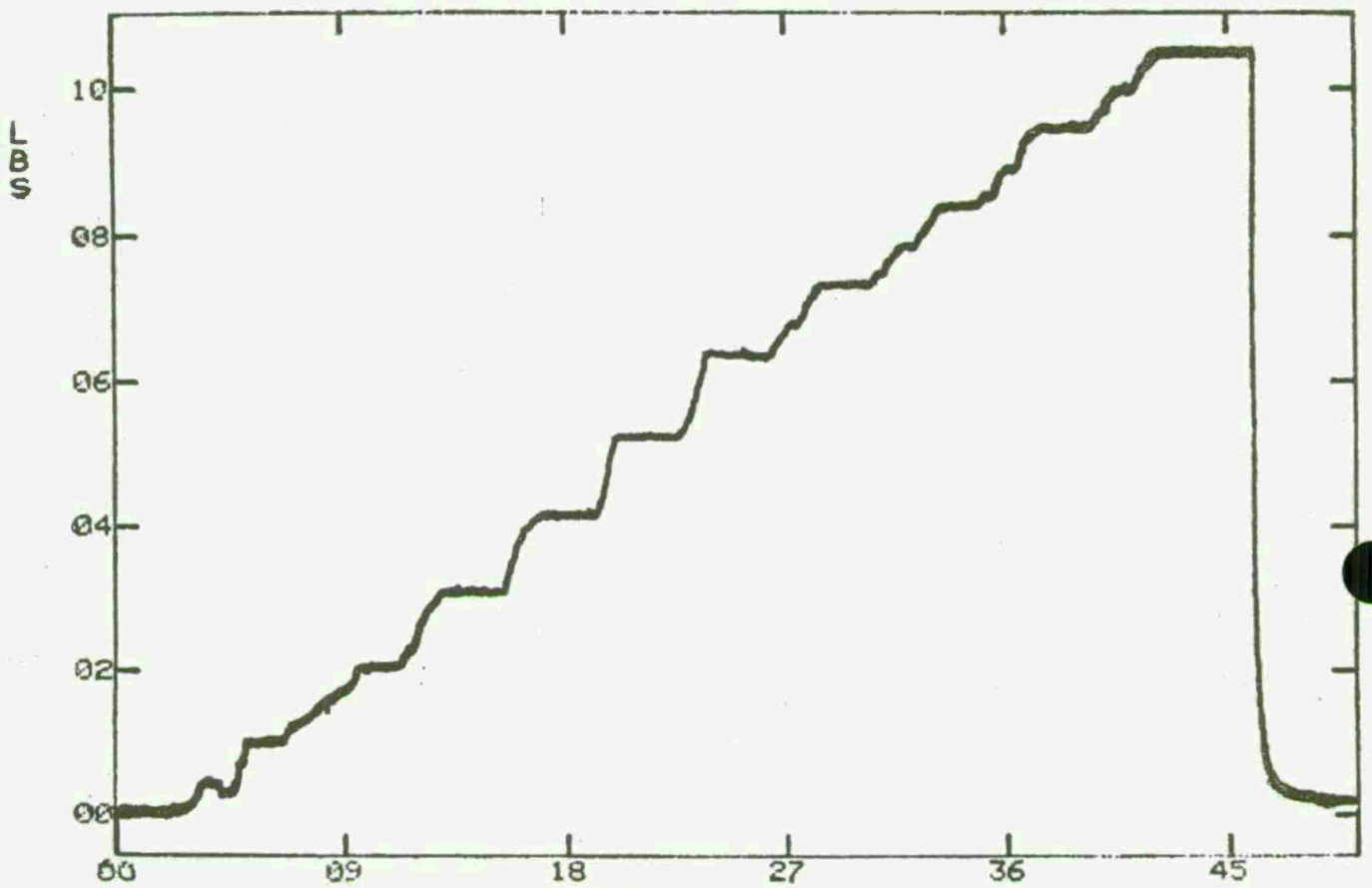
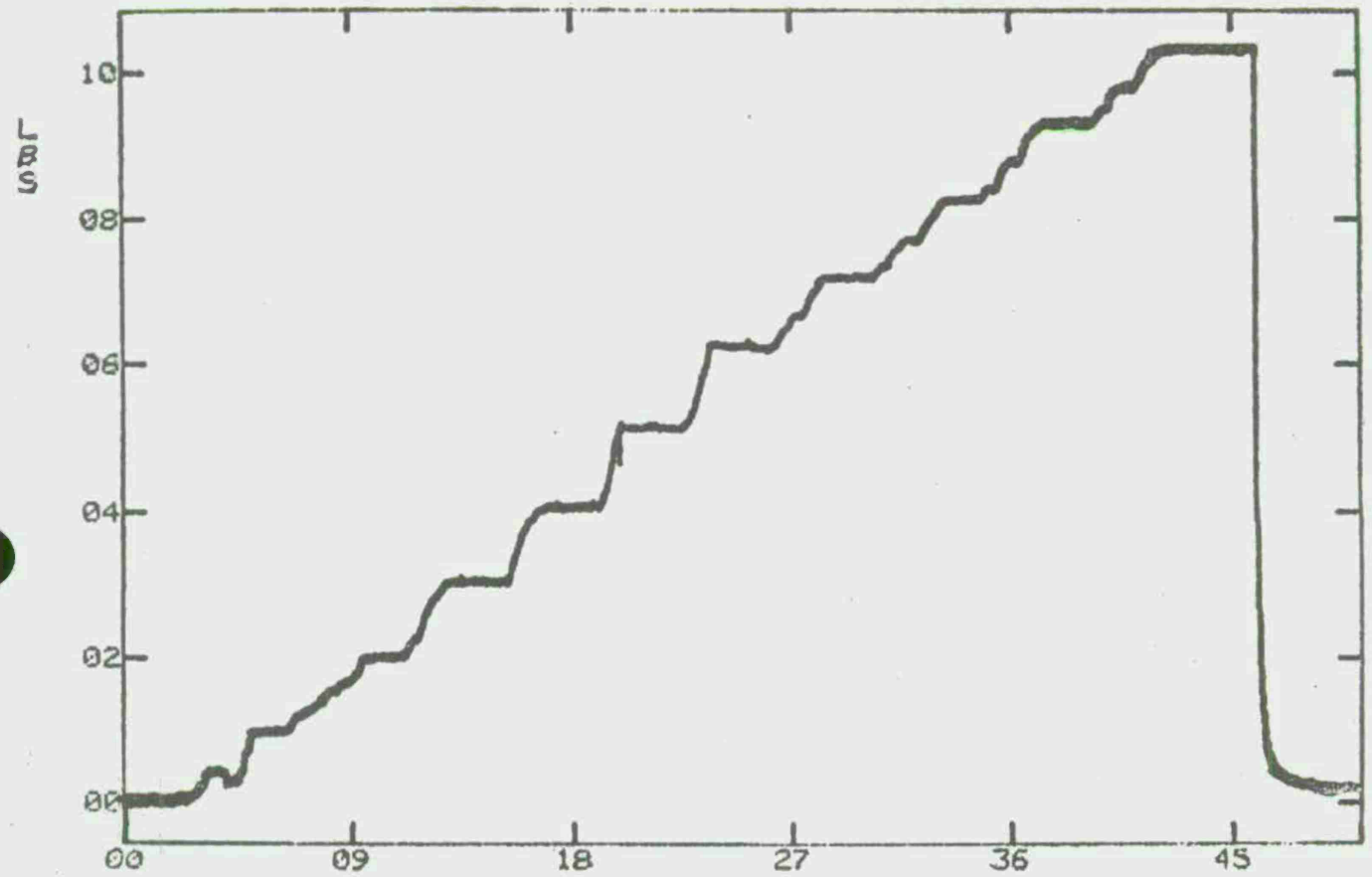
36
45
TIME IN SECONDS X 10-1
CH 20 LOAD - R.H. BOTTOM X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



CH 21 LOAD APPLIED (CH 17/20) X 10-2
TEST 24 (9JUL75) AH1G BEND TEST


LBS
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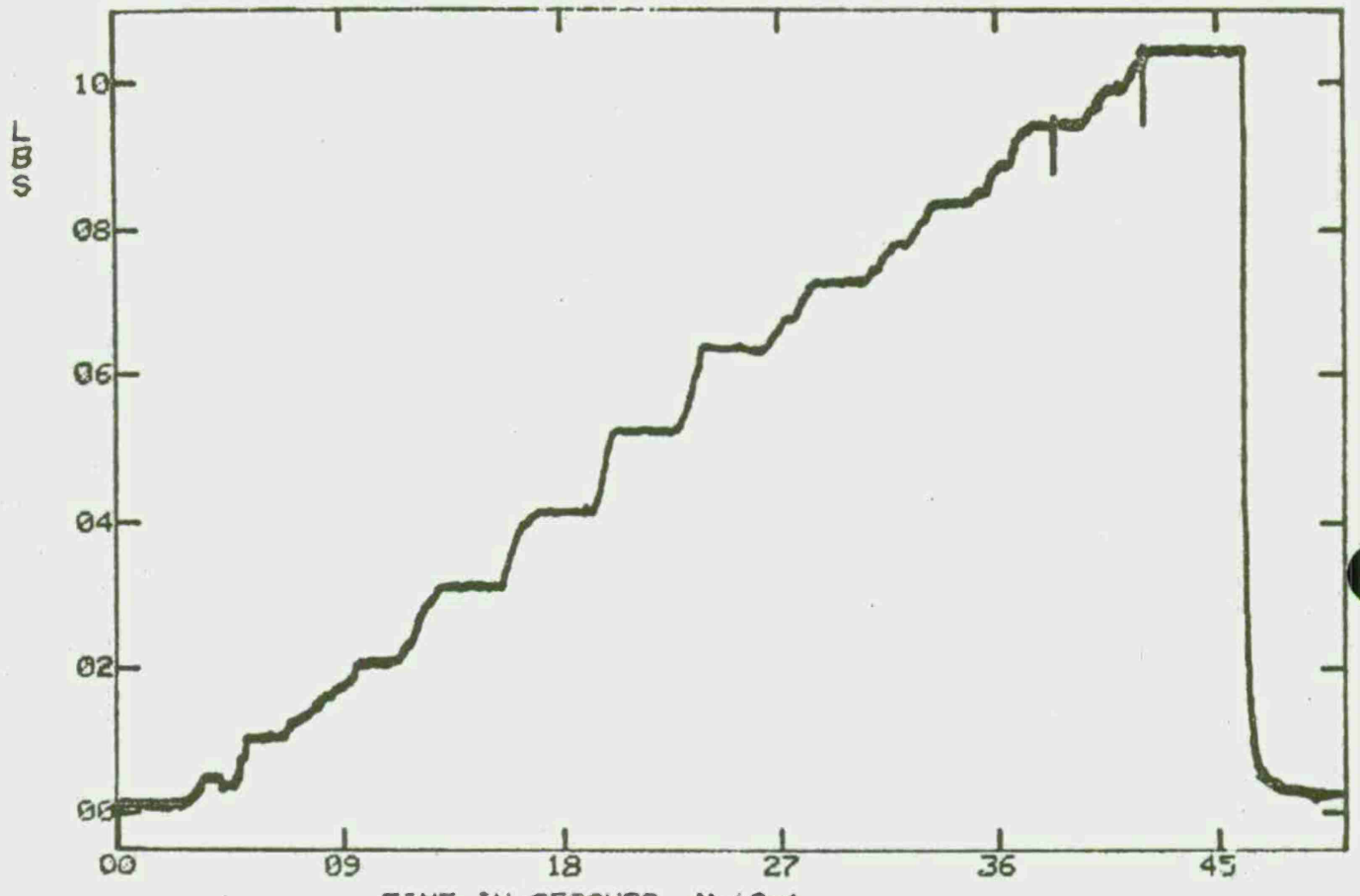
09
18
27
36
45
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 1/5) X 10-2
TEST 24 (9JUL75) AH1G BEND TEST


LBS
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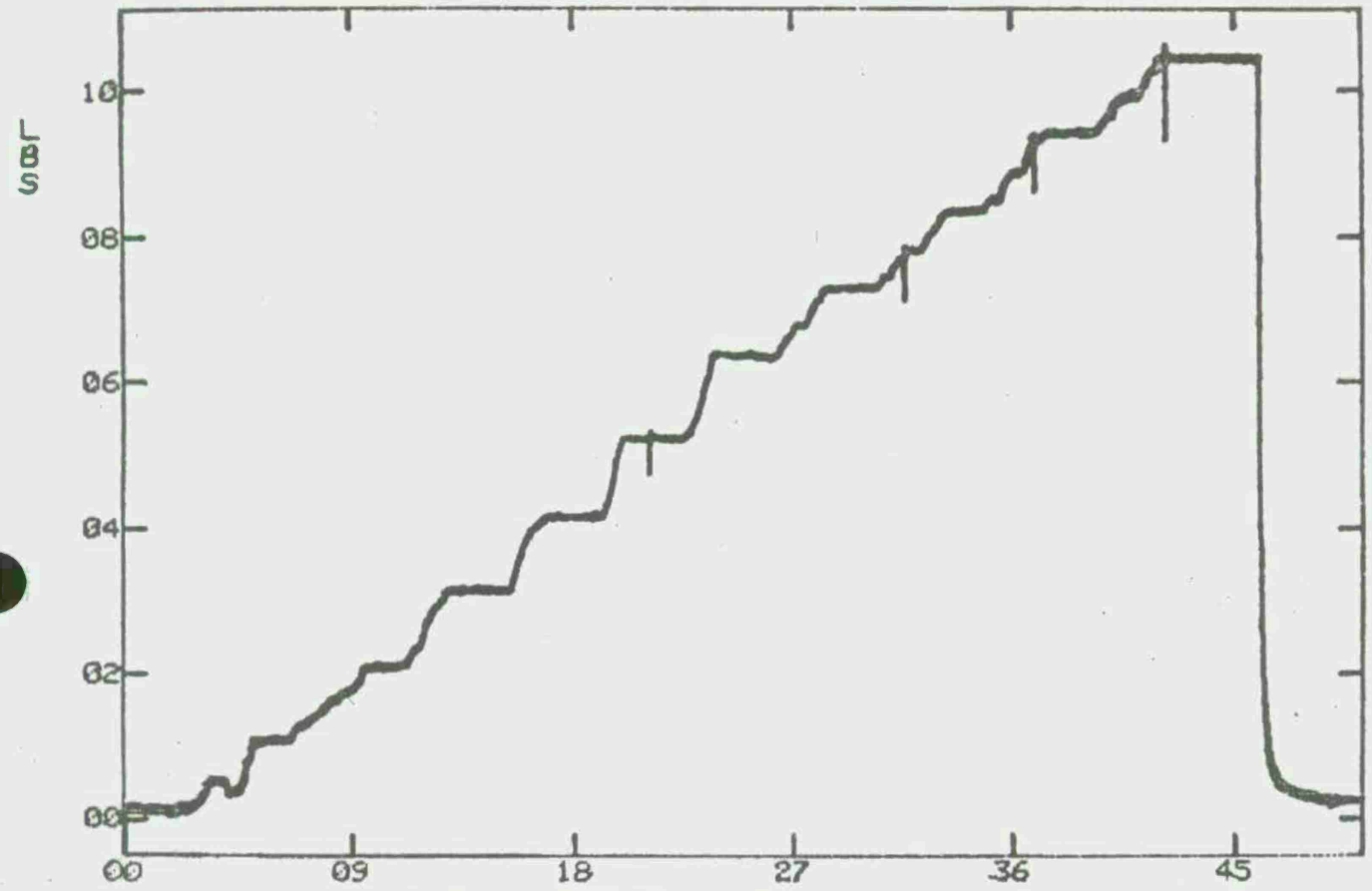
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 6/10) X 10-2
TEST 24 (9JUL75) AH1G BEND TEST


LBS
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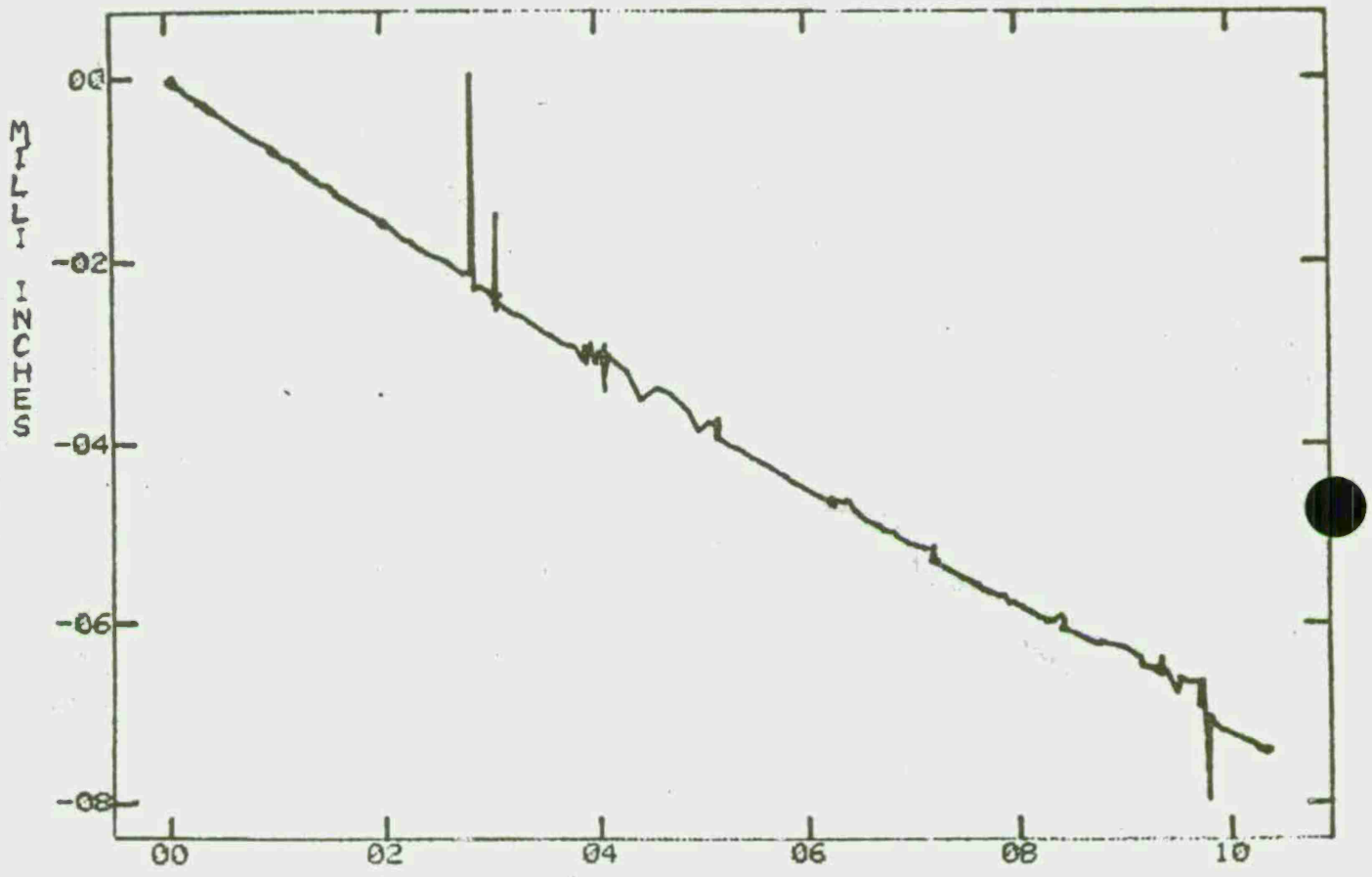
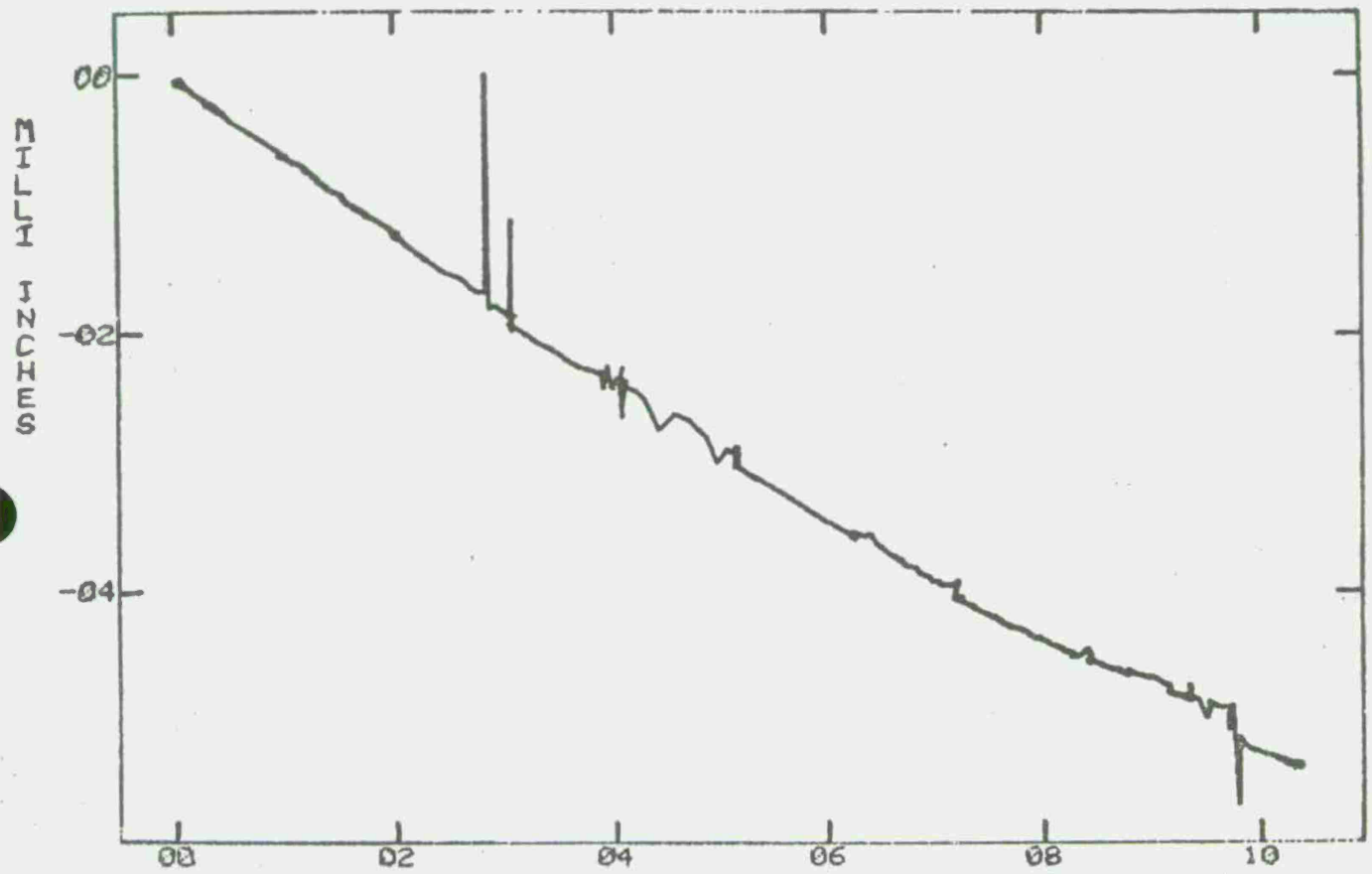
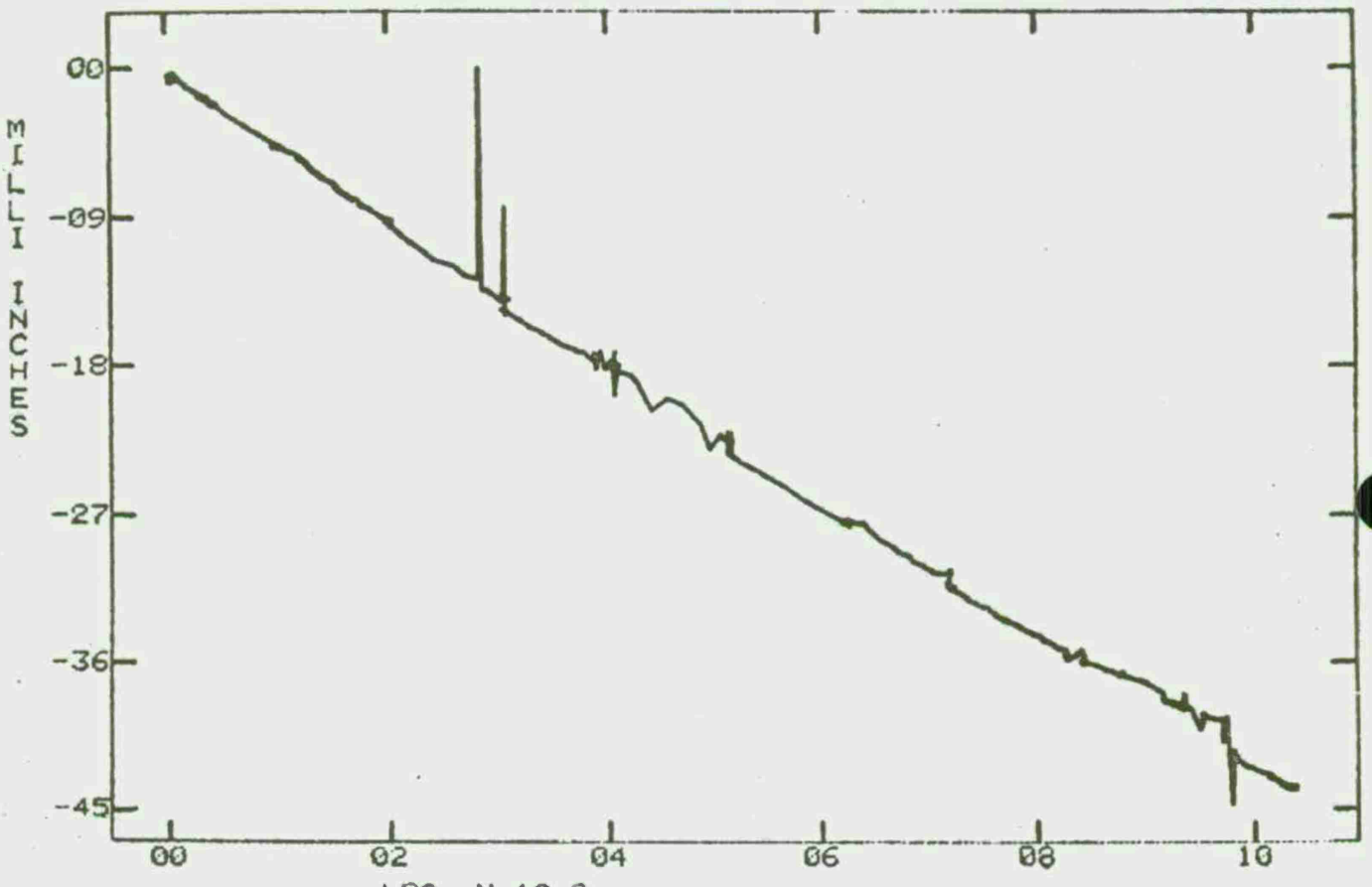
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 11/15) X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



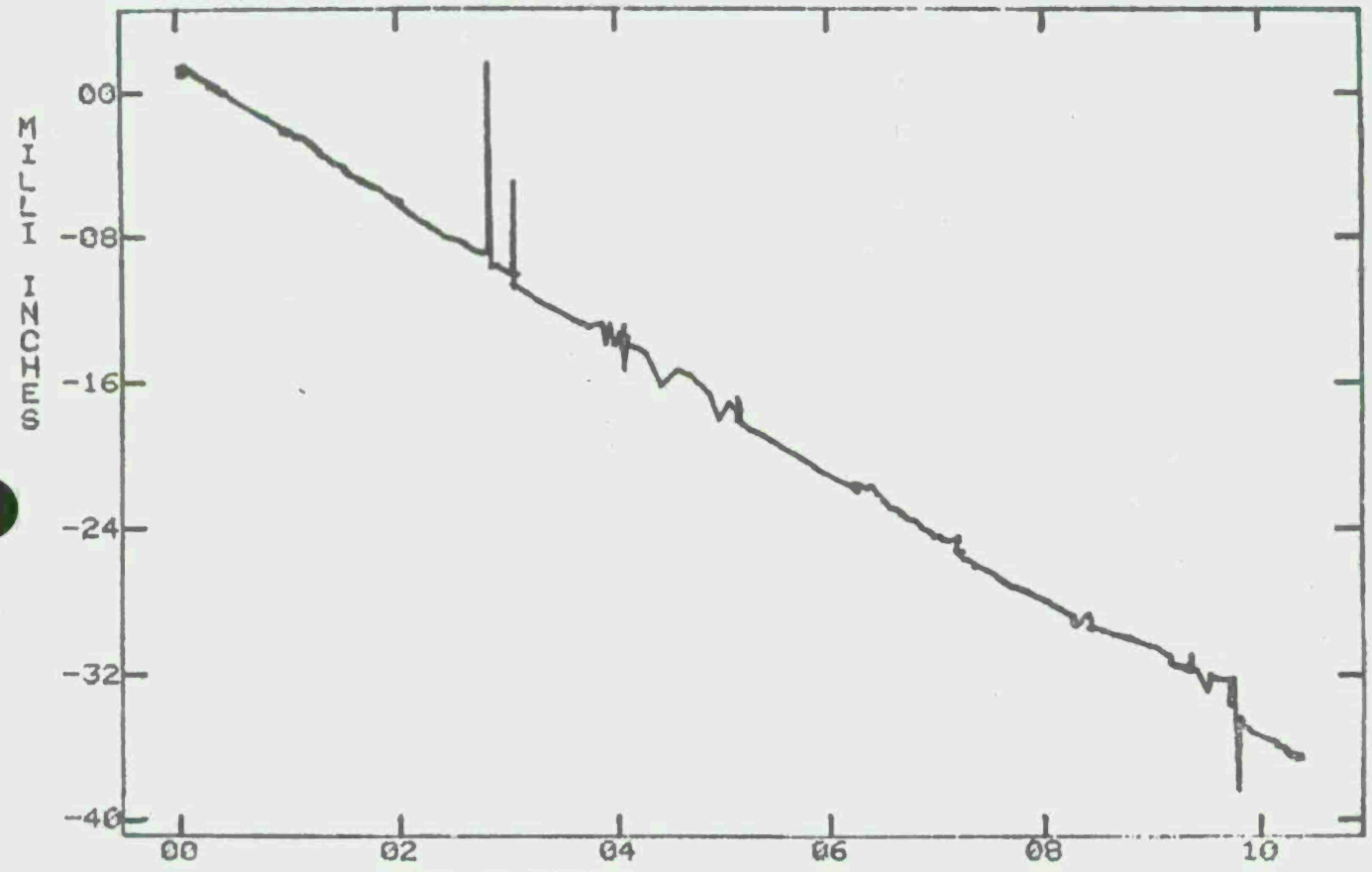
LOAD APPLIED VS VERT DEFLN - ST 61.25 L.H. X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



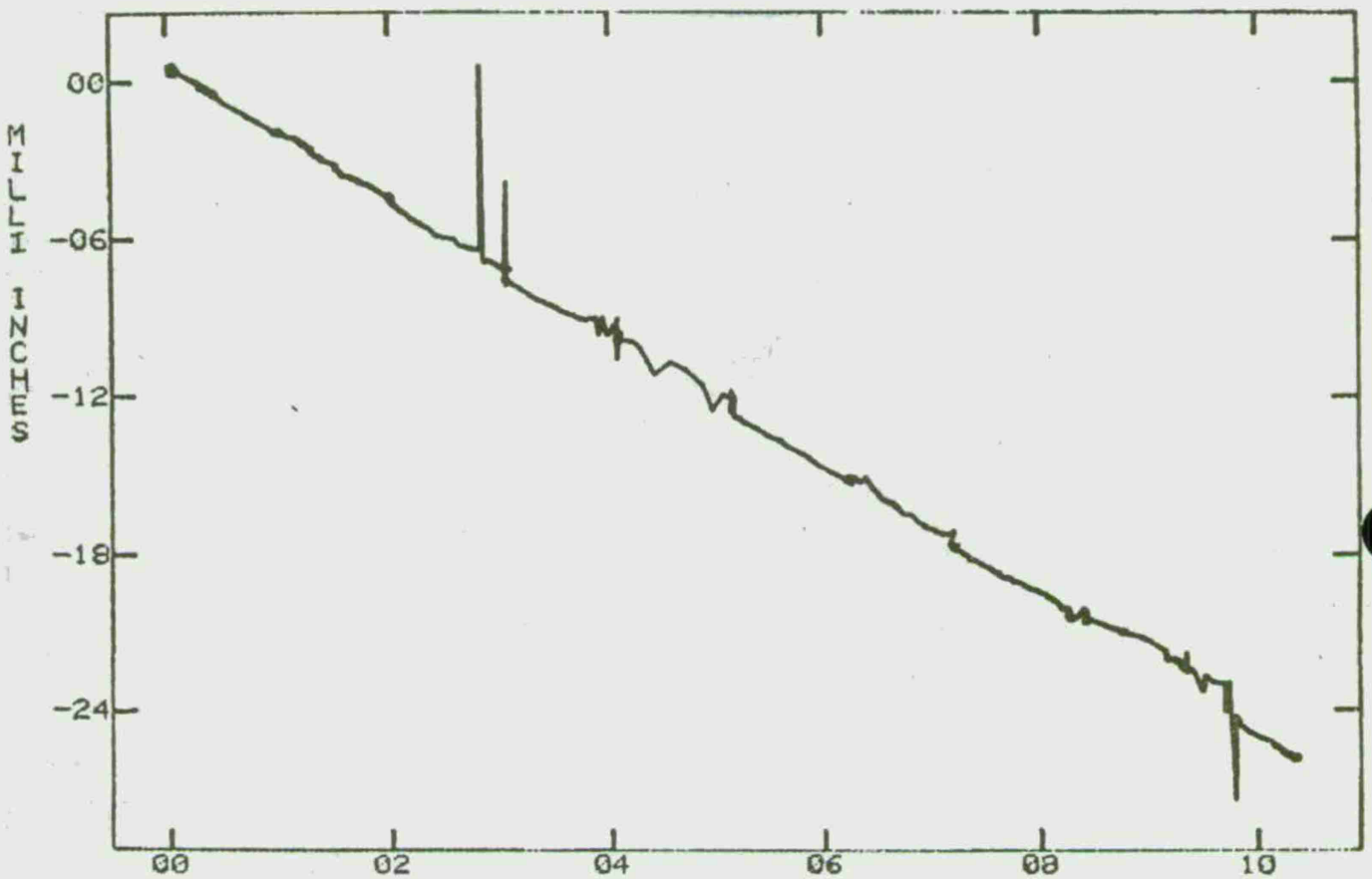
LOAD APPLIED VS VERT DEFLN - ST 93.00 L H. X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



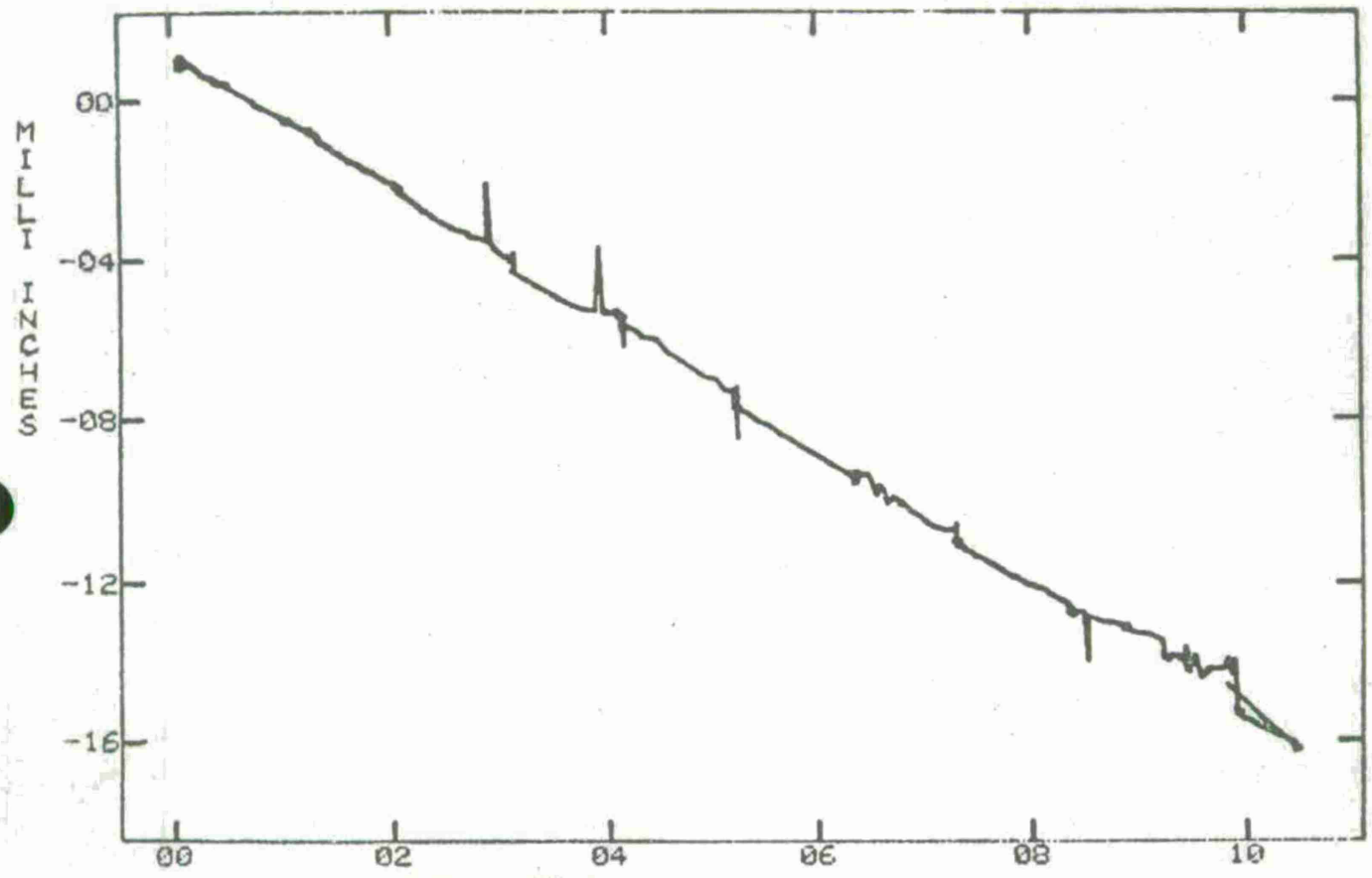
LOAD APPLIED VS VERT DEFLN - ST 138.70 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



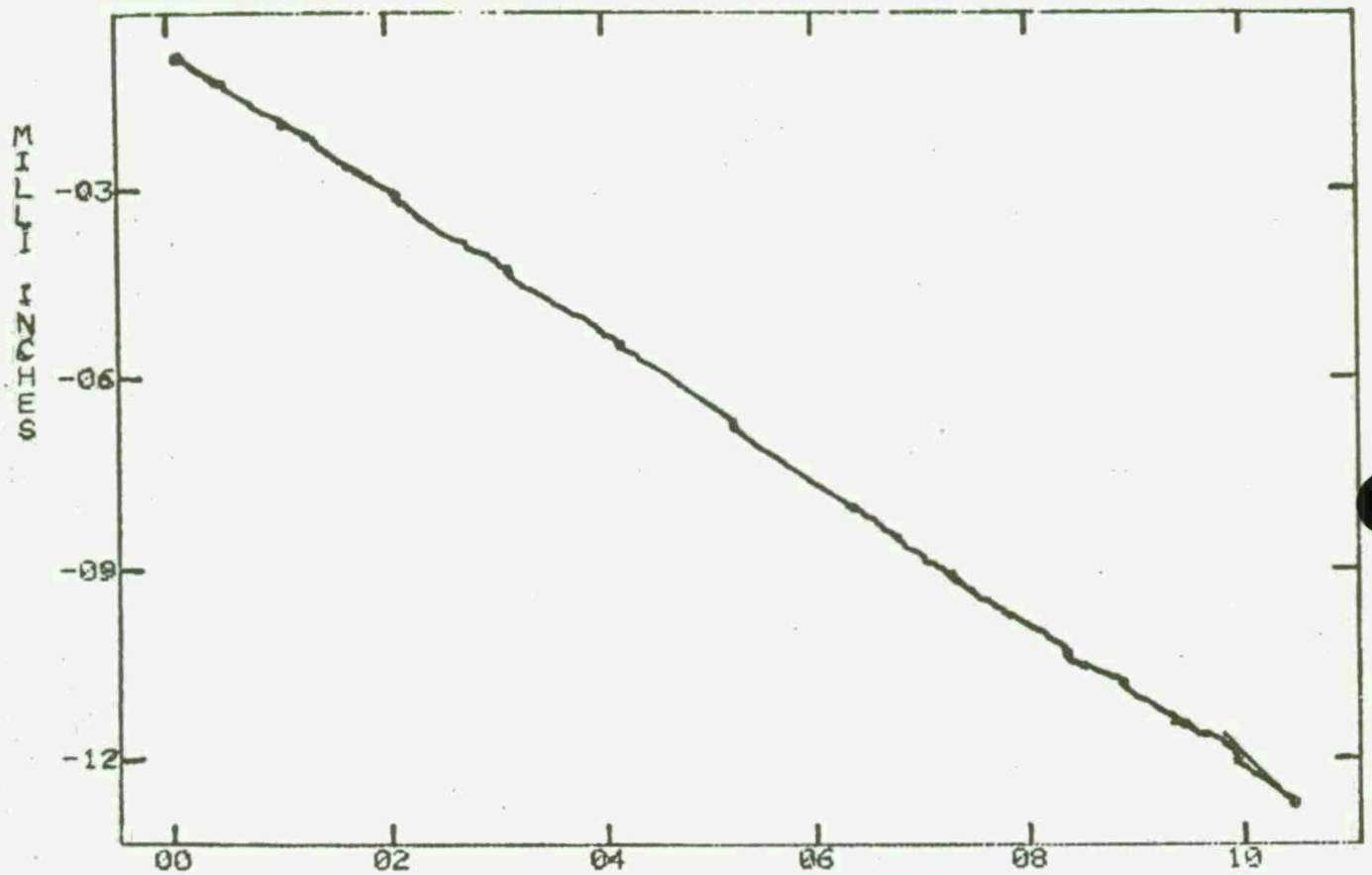
LOAD APPLIED VS VERT DEFLN - ST 148.50 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



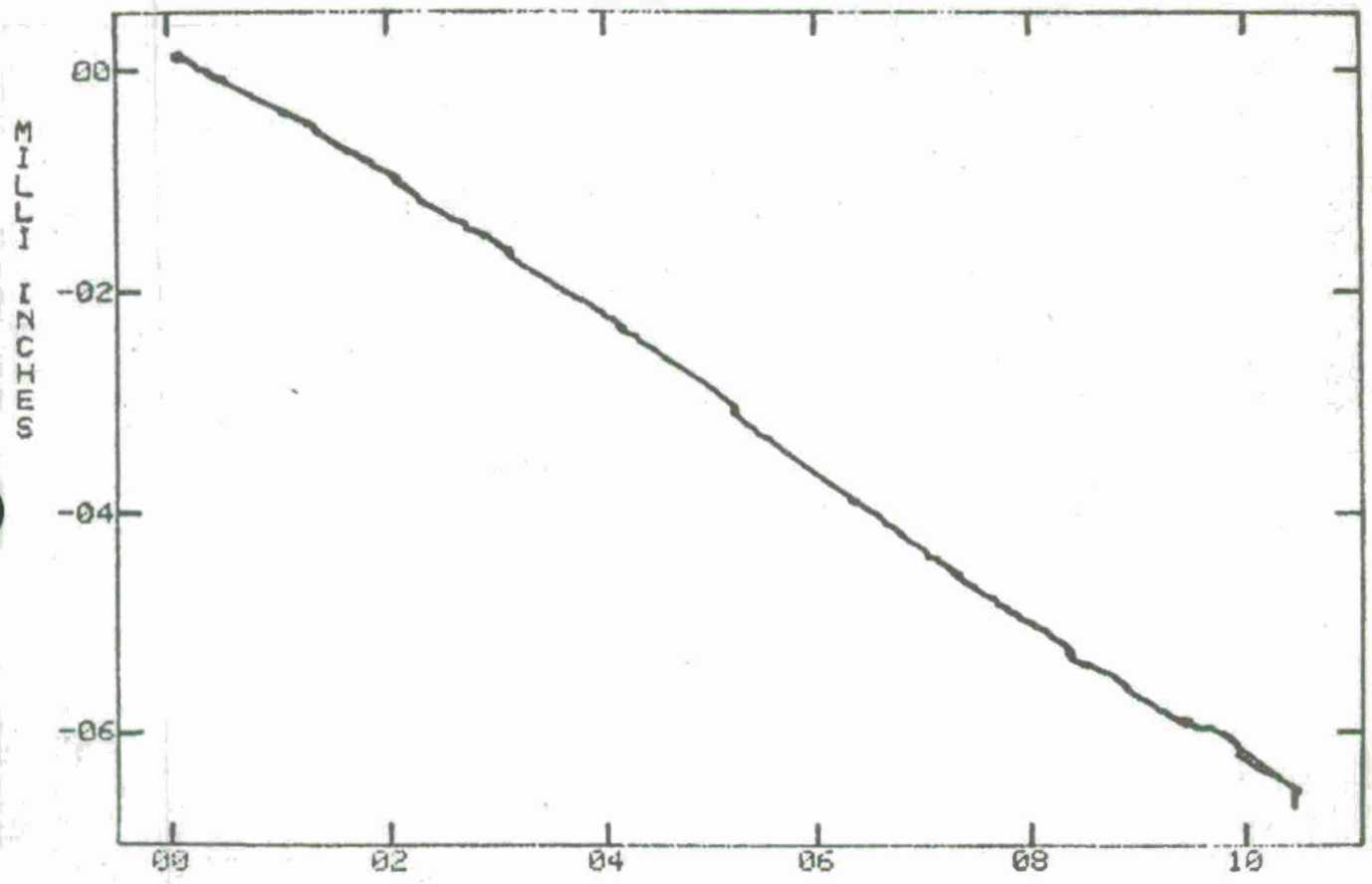
LOAD APPLIED VS VERT DEFLN - ST 186.25 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



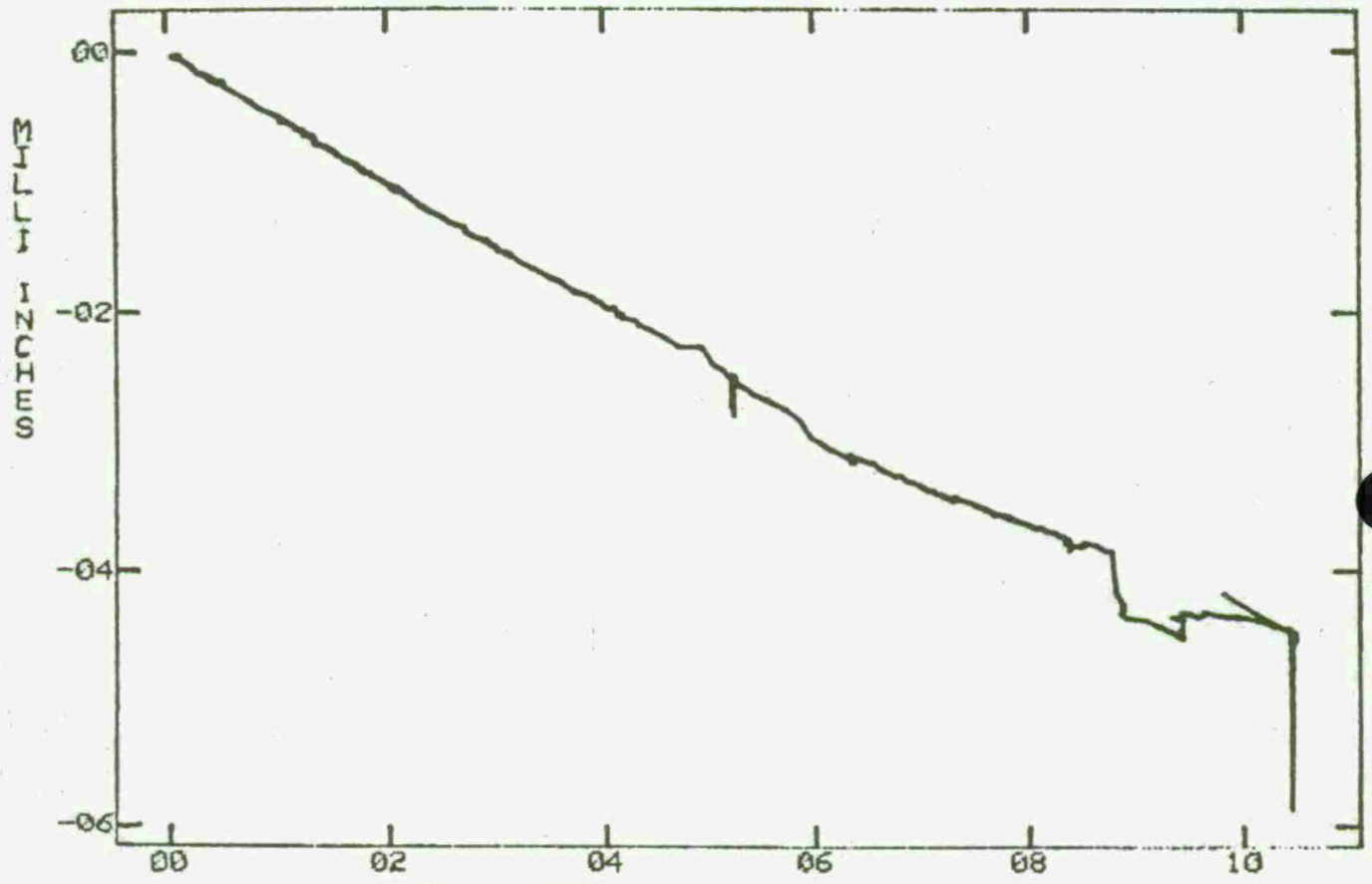
LOAD APPLIED VS VERT DEFLN - ST 213.90 L H X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



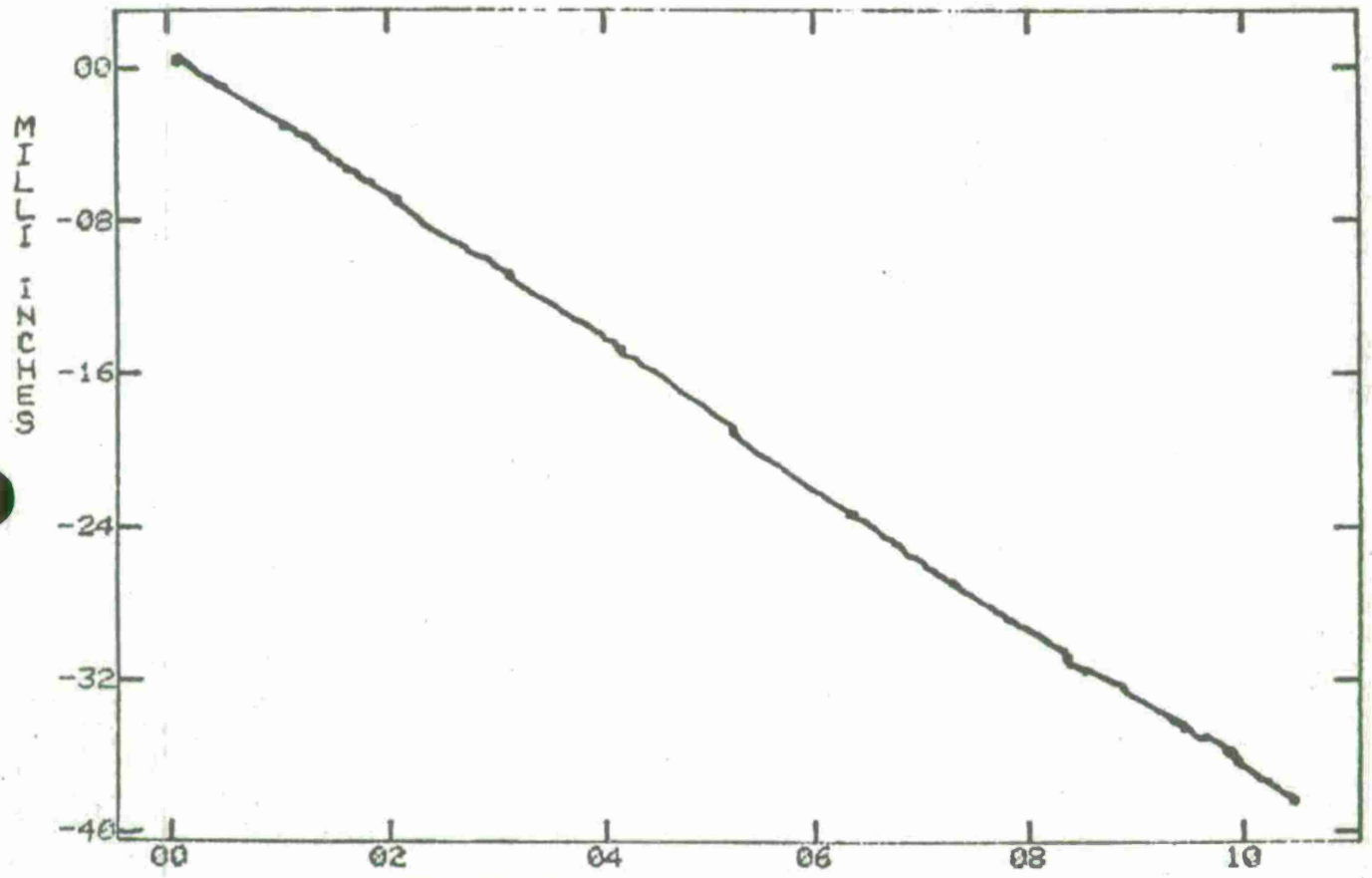
LOAD APPLIED US VERT DEFLN - 250.00 L.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



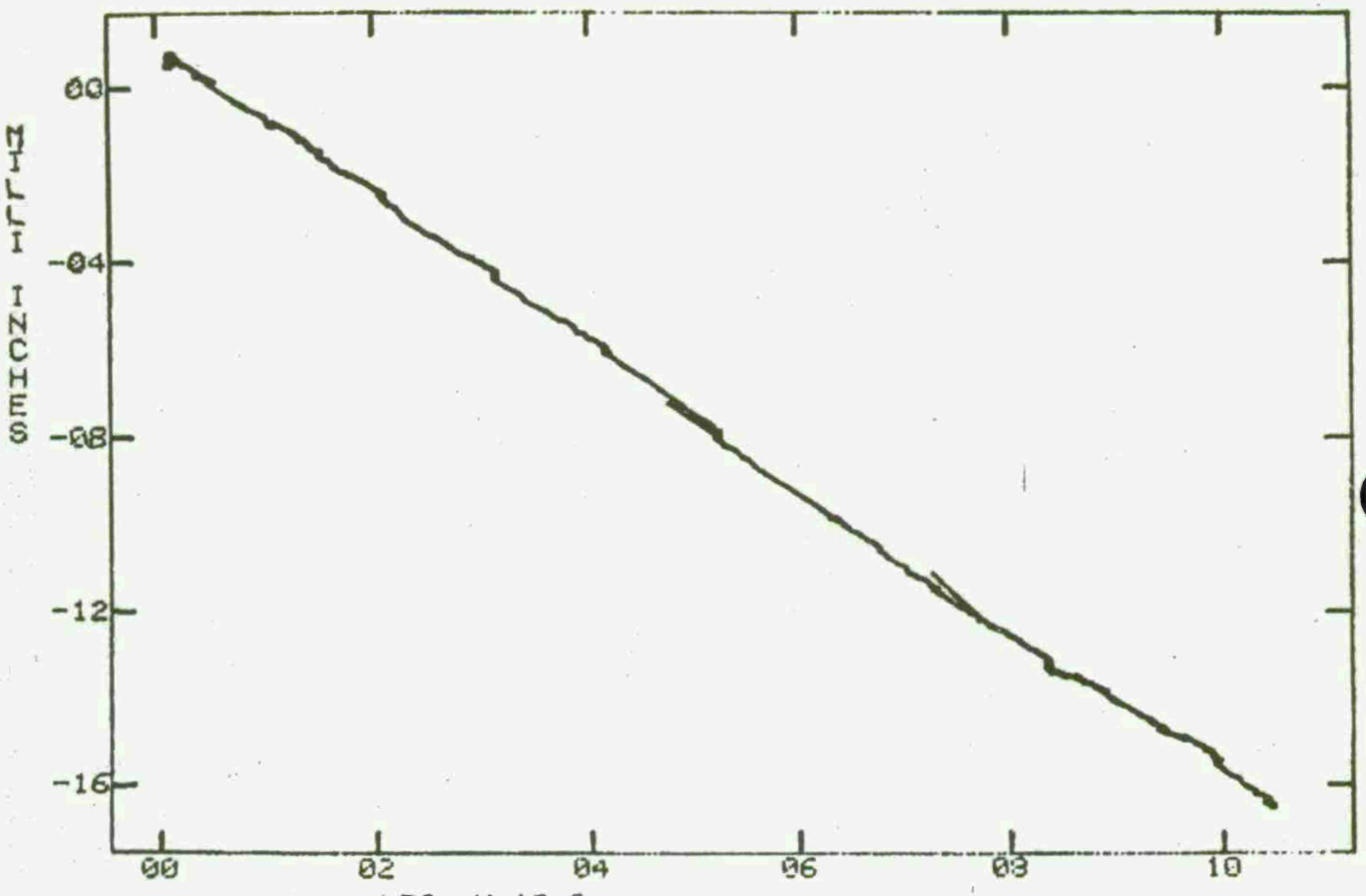
LOAD APPLIED VS VERT DEFLN - ST 268.25 L.H. X 10-1
TEST 24 (9 JUL75) AH1G BEND TEST



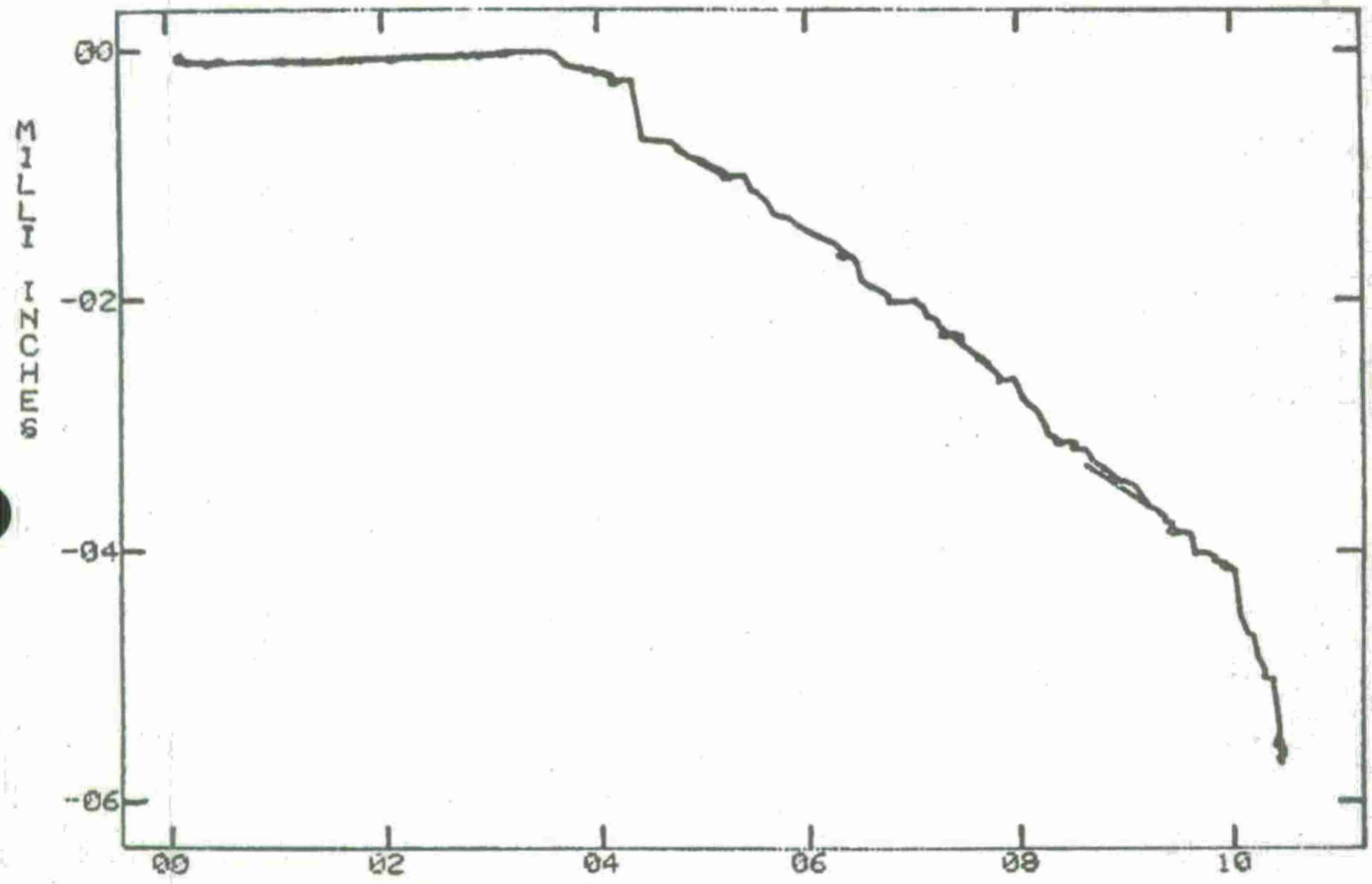
LOAD APPLIED VS VERT DEFLN - ST 93.00 R H. X 10-2
TEST 24 (9JUL75) AH1G BEND TEST



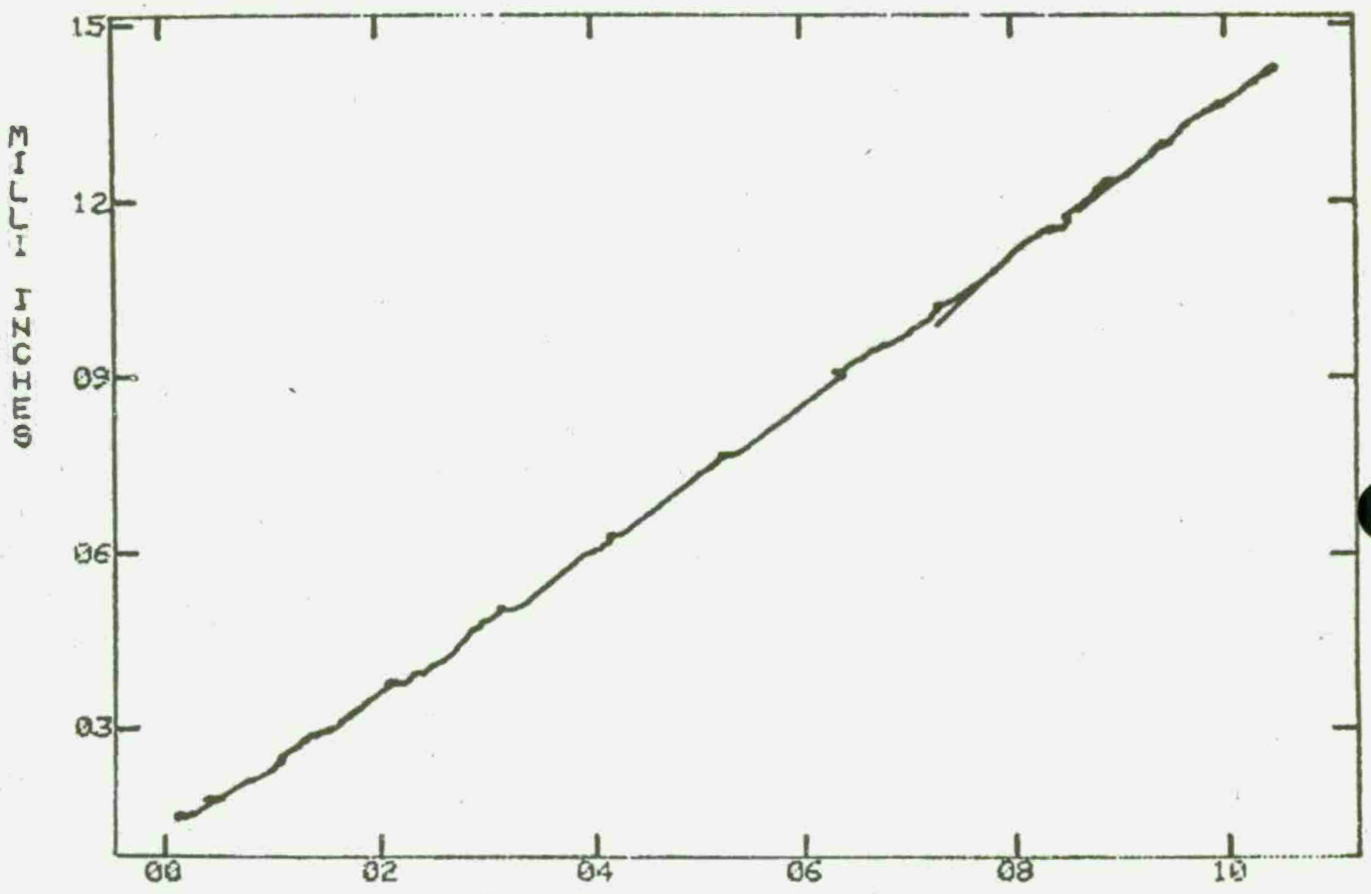
LOAD APPLIED VS VERT DEFLN – ST 140.50 R.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



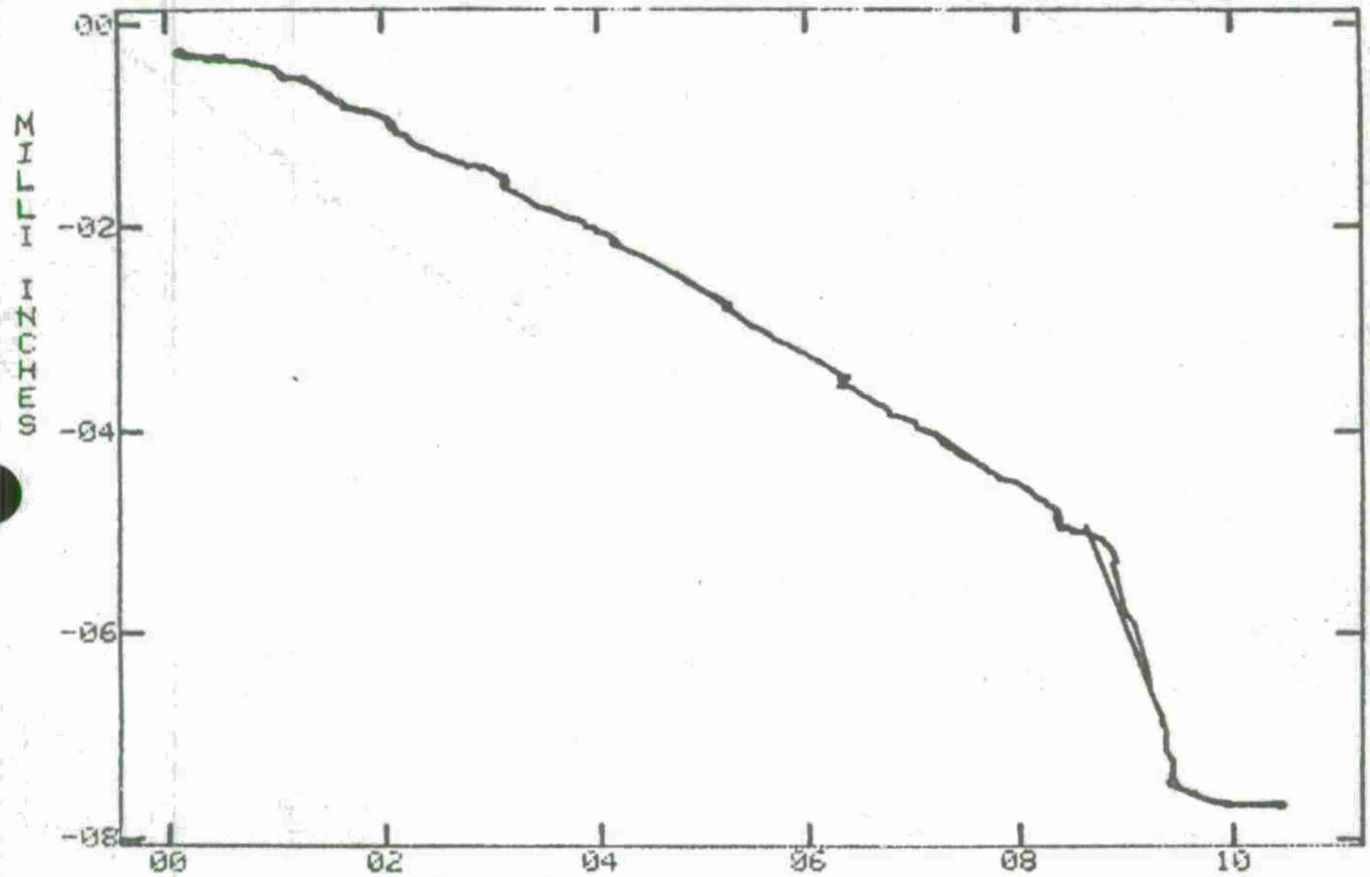
LOAD APPLIED VS VERT DEFLN - ST 213.90 R.H. X 10-1
TEST 24 (9JUL75) AH1G BEND TEST



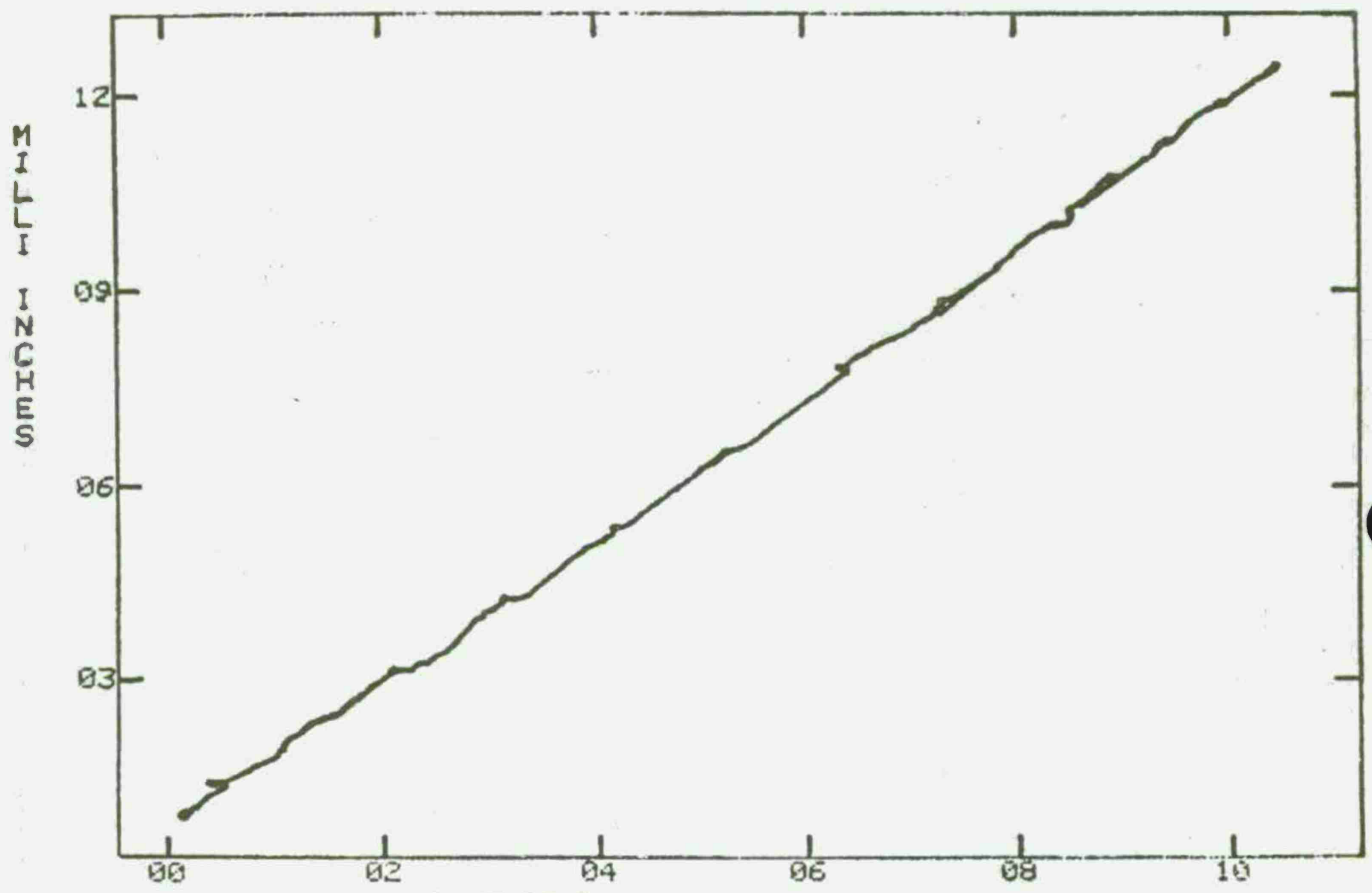
LOAD APPLIED VS BASE ROTN DEFLN - UPPER L.H. X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



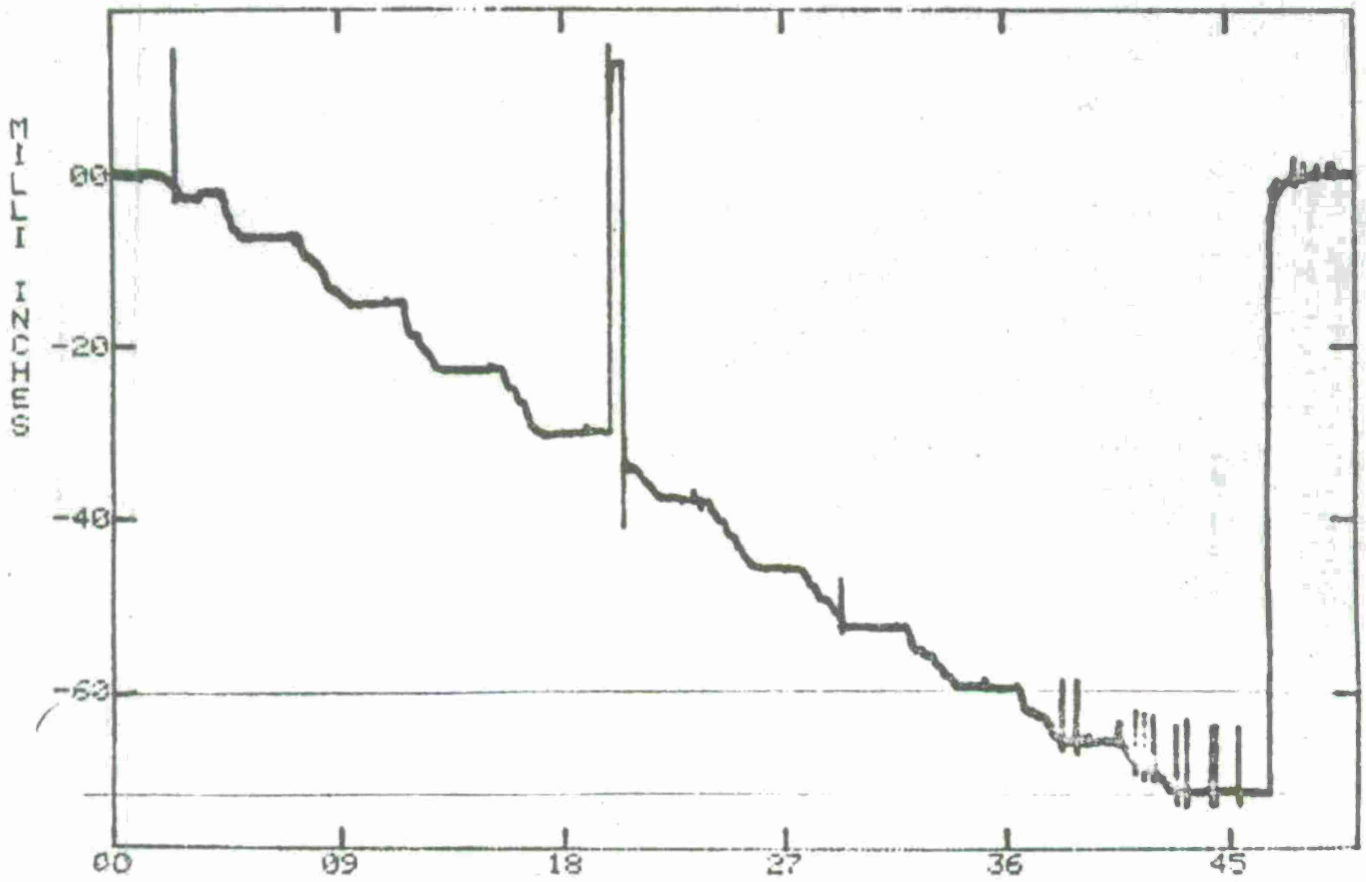
LOAD APPLIED VS BASE ROTN DEFLN - LOWER L.H. X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



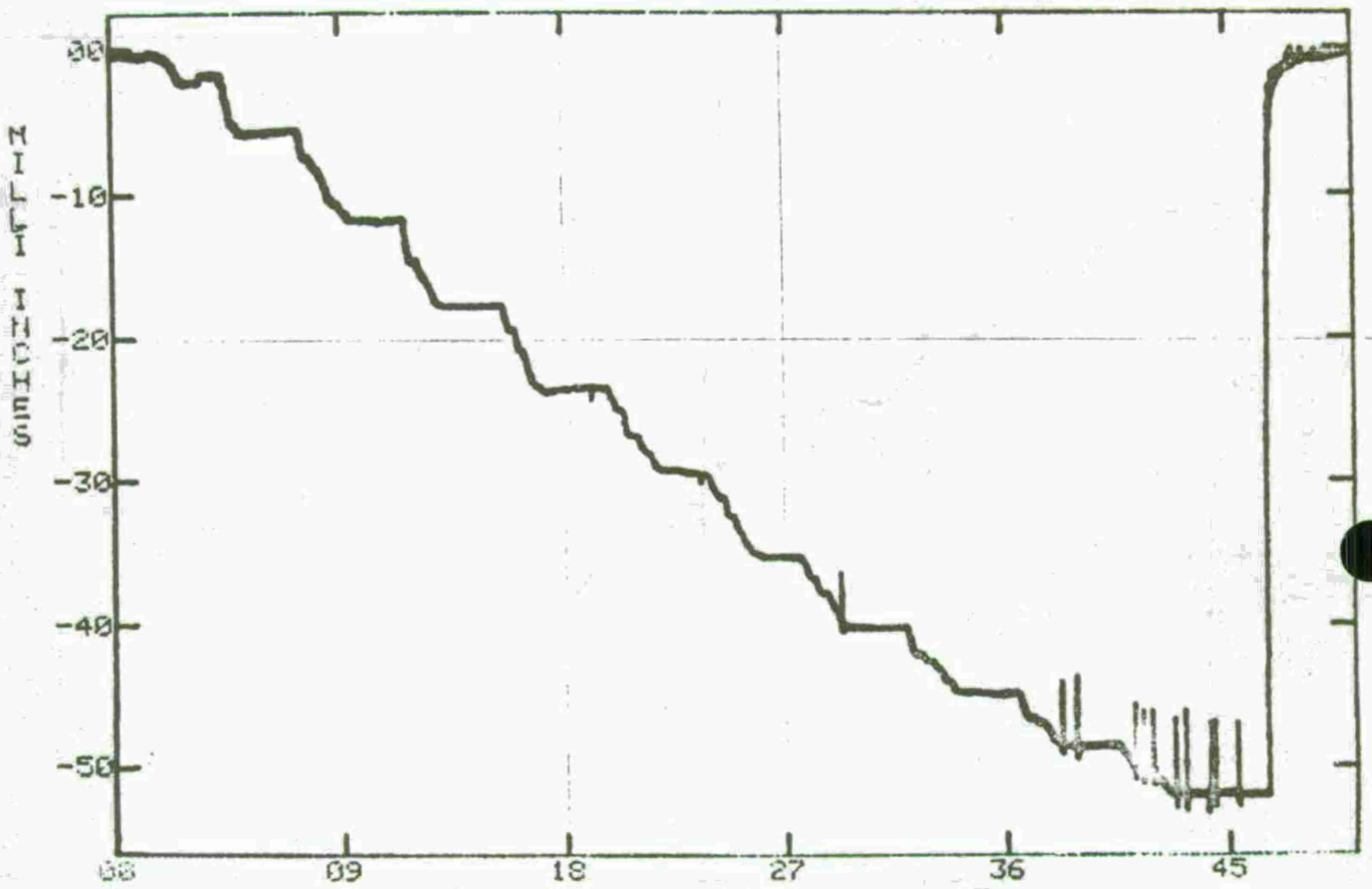
LOAD APPLIED VS BASE ROTN DEFLN - UPPER R.H. X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



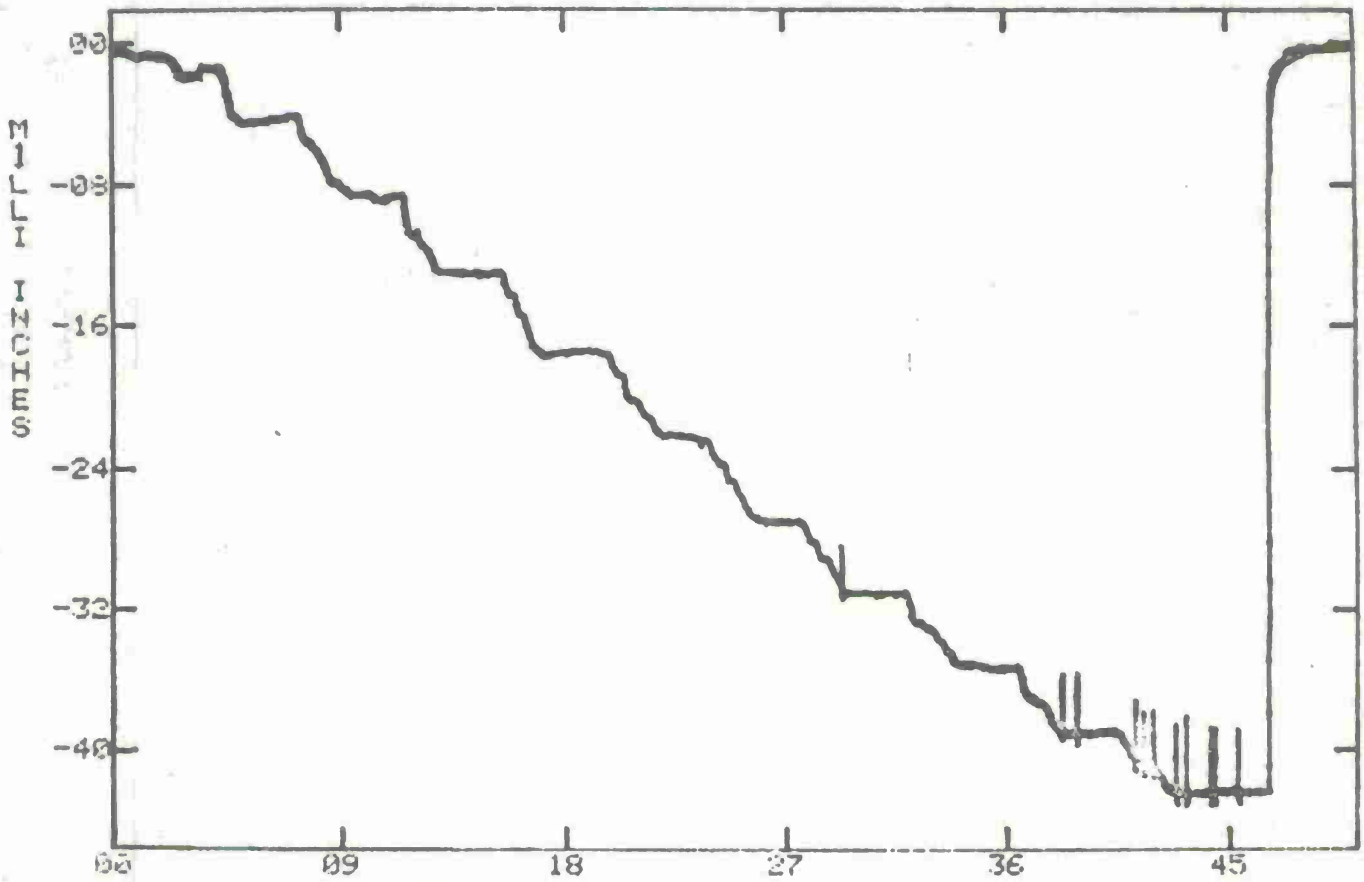
LOAD APPLIED VS BASE ROTN DEFLN - LOWER R.H. X 10+0
TEST 24 (9JUL75) AH1G BEND TEST



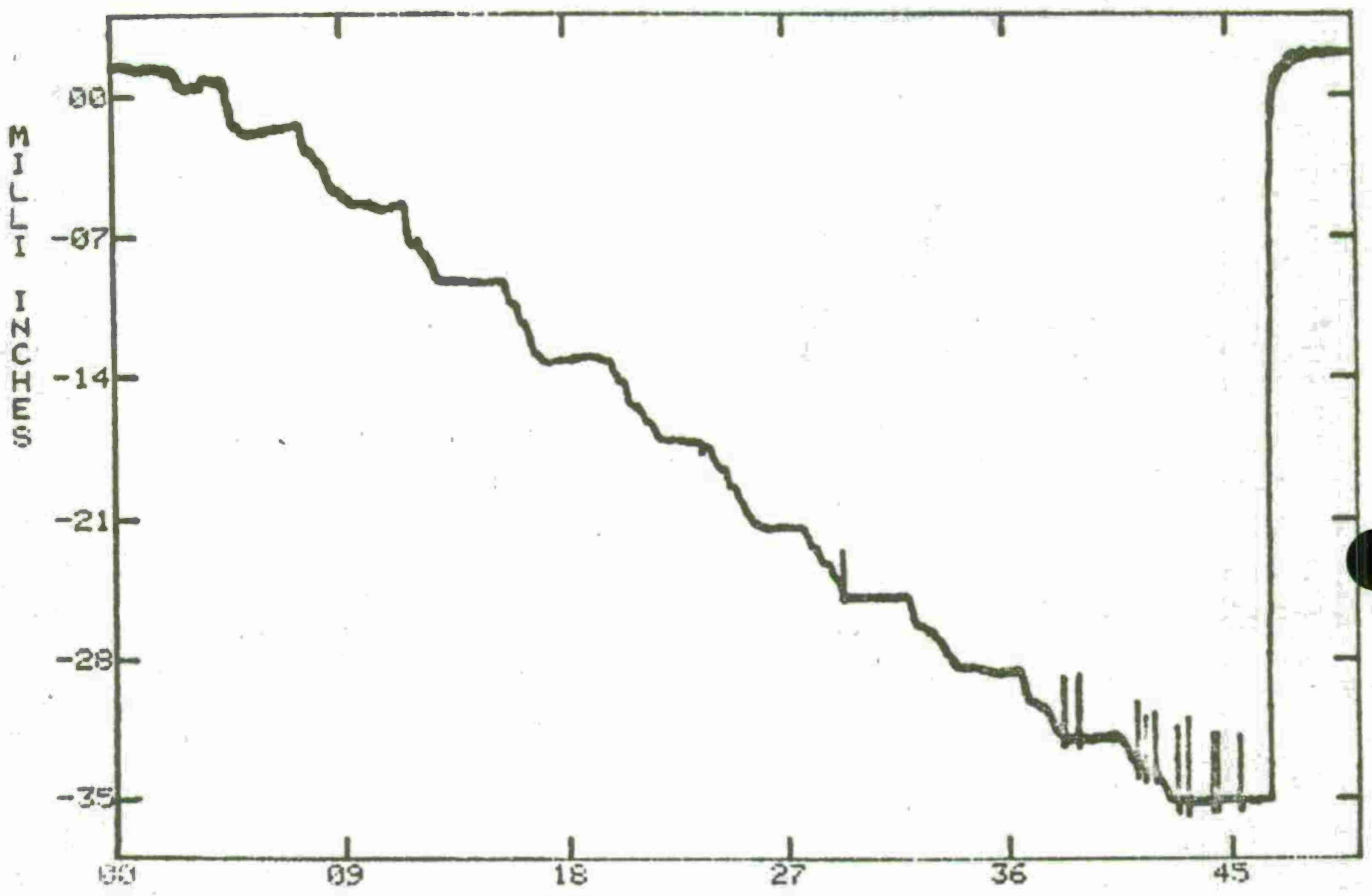
CH 1 VERT DEFLECTION - ST 61.25 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



CH 2 VERT DEFLECTION - ST 93.00 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 3 VERT DEFLECTION - ST 138.70 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST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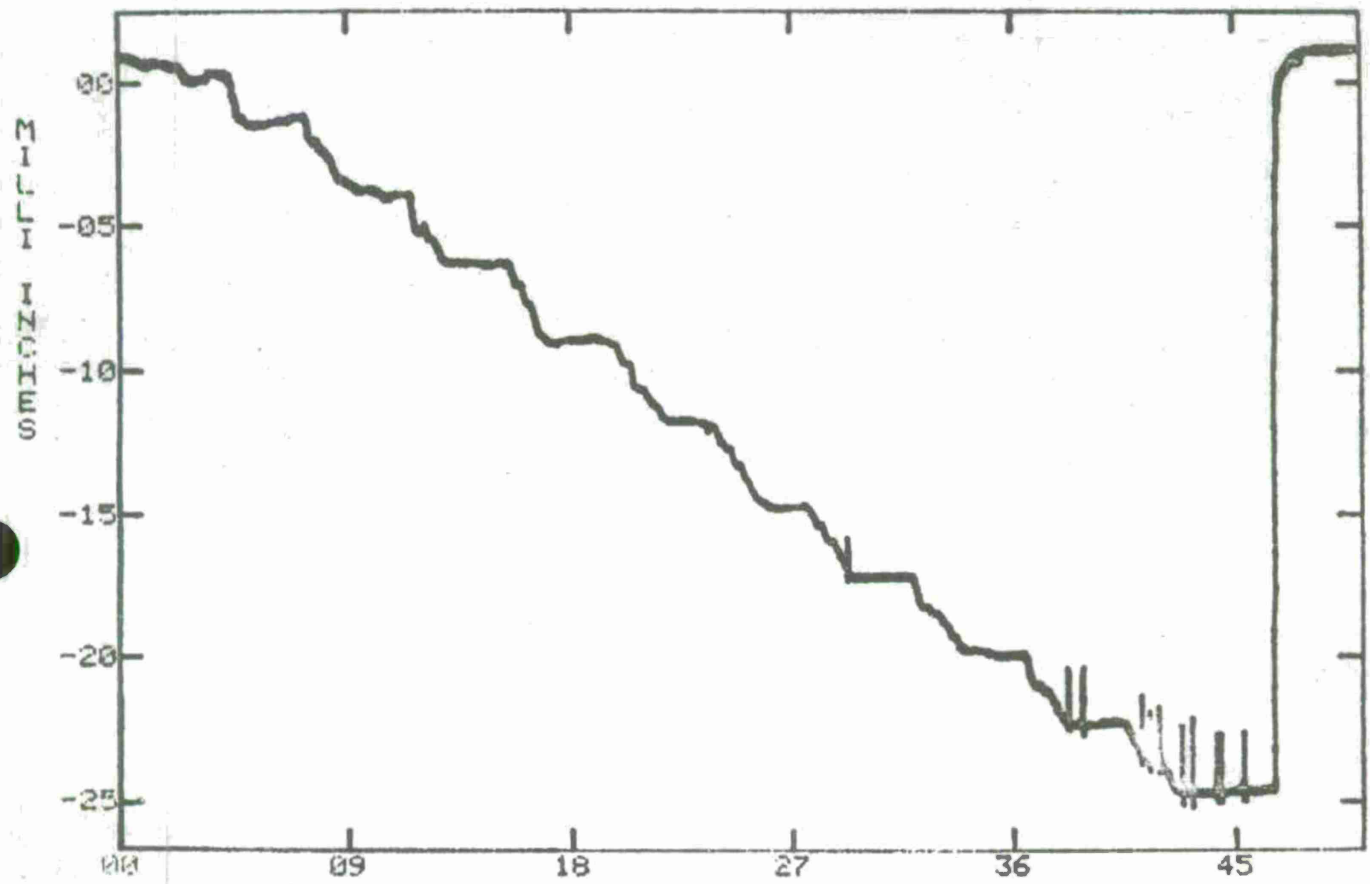
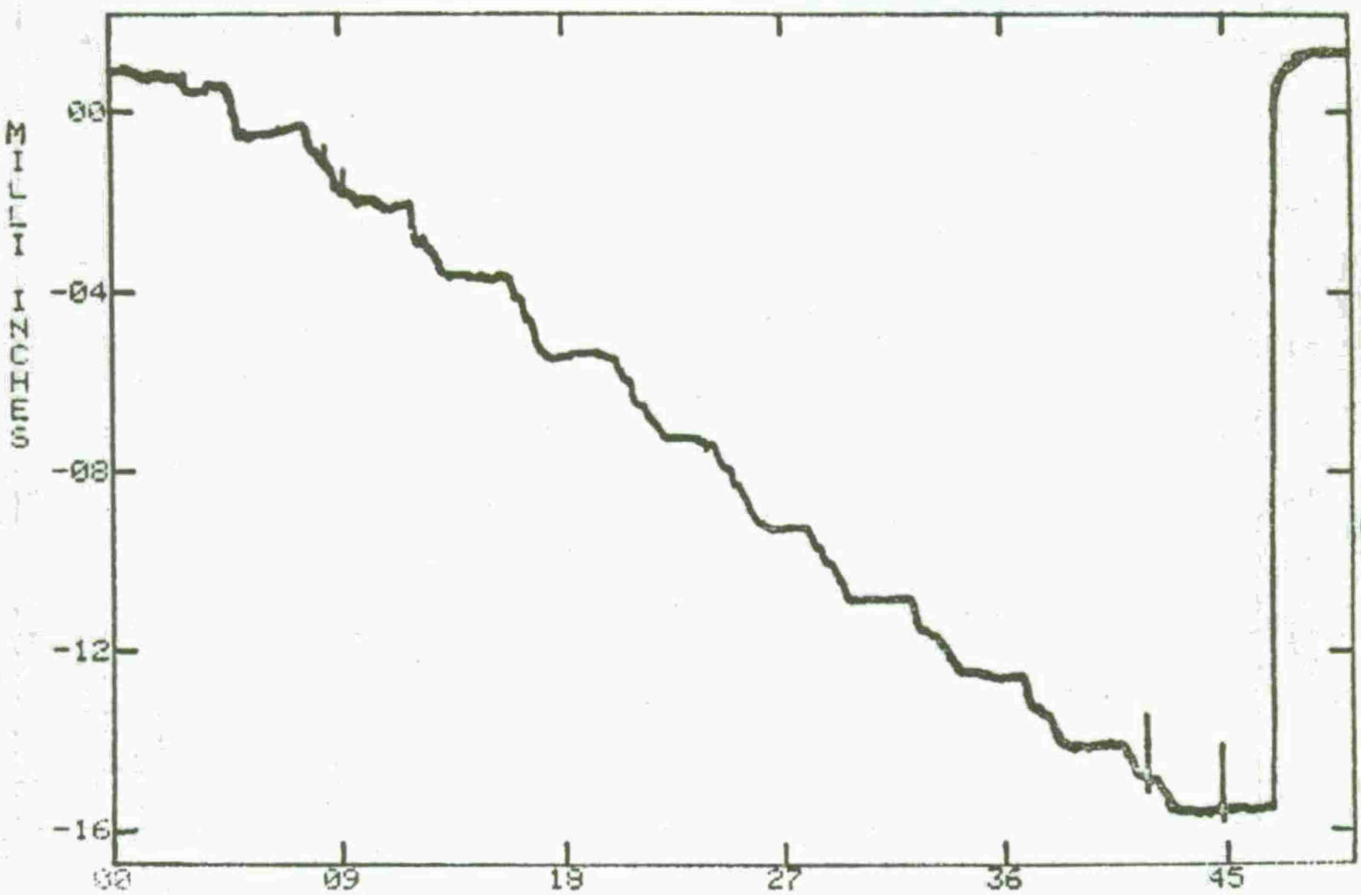
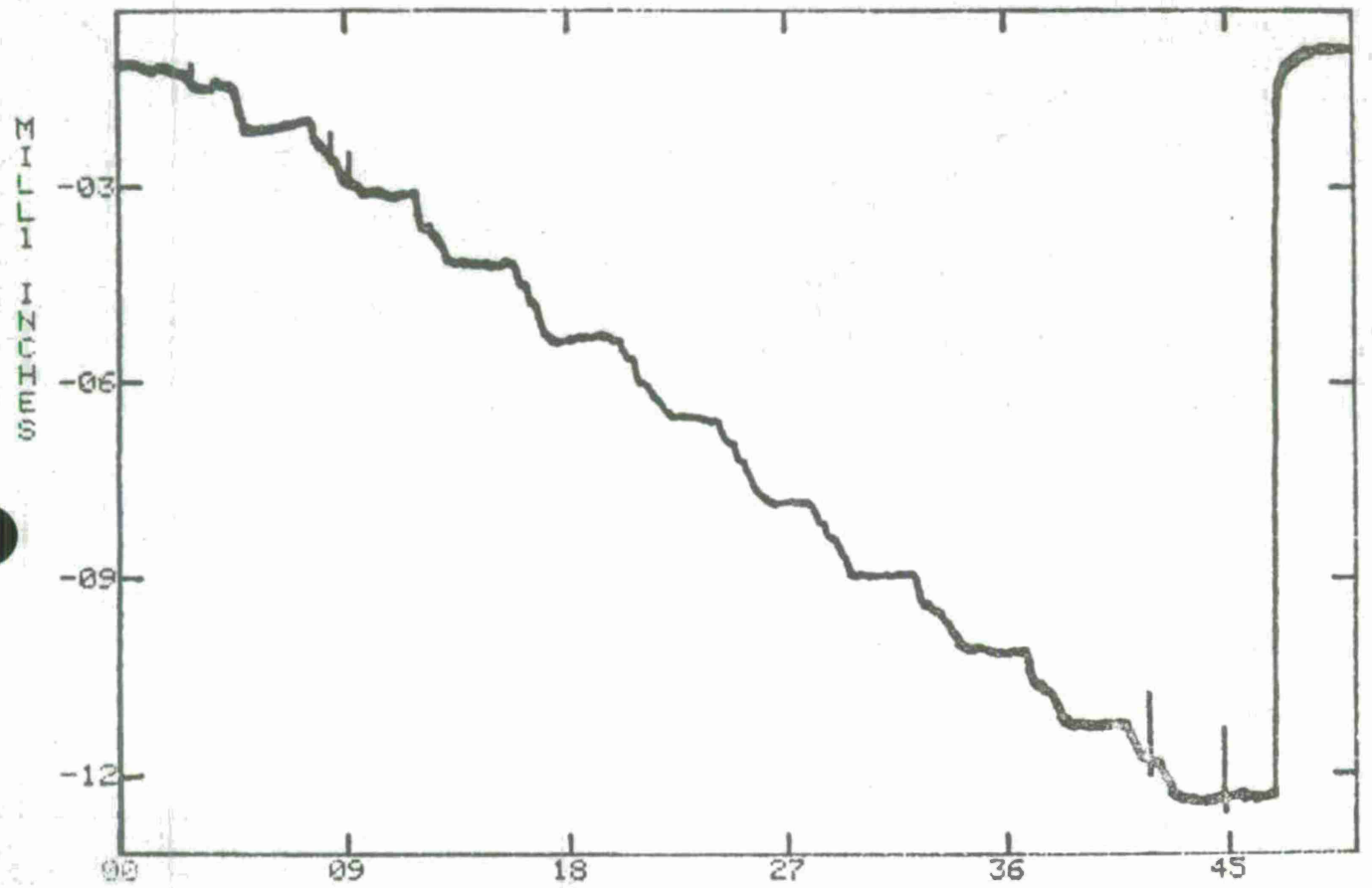
TIME IN SECONDS X 10-1
CH 4 VERT DEFLECTION - ST 148.50 L.H X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



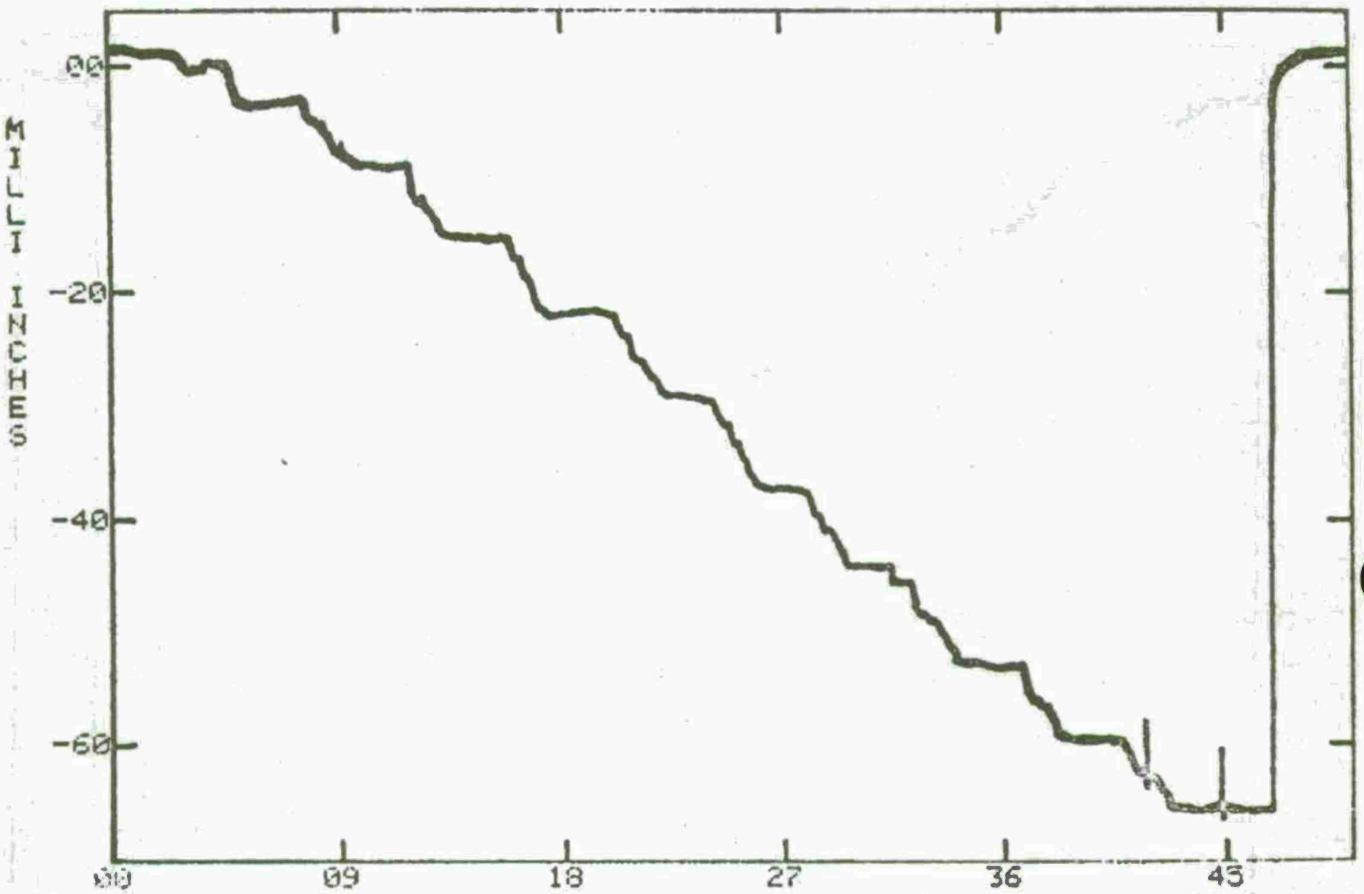
CH 5 VERT DEFLECTION - ST 186.25 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



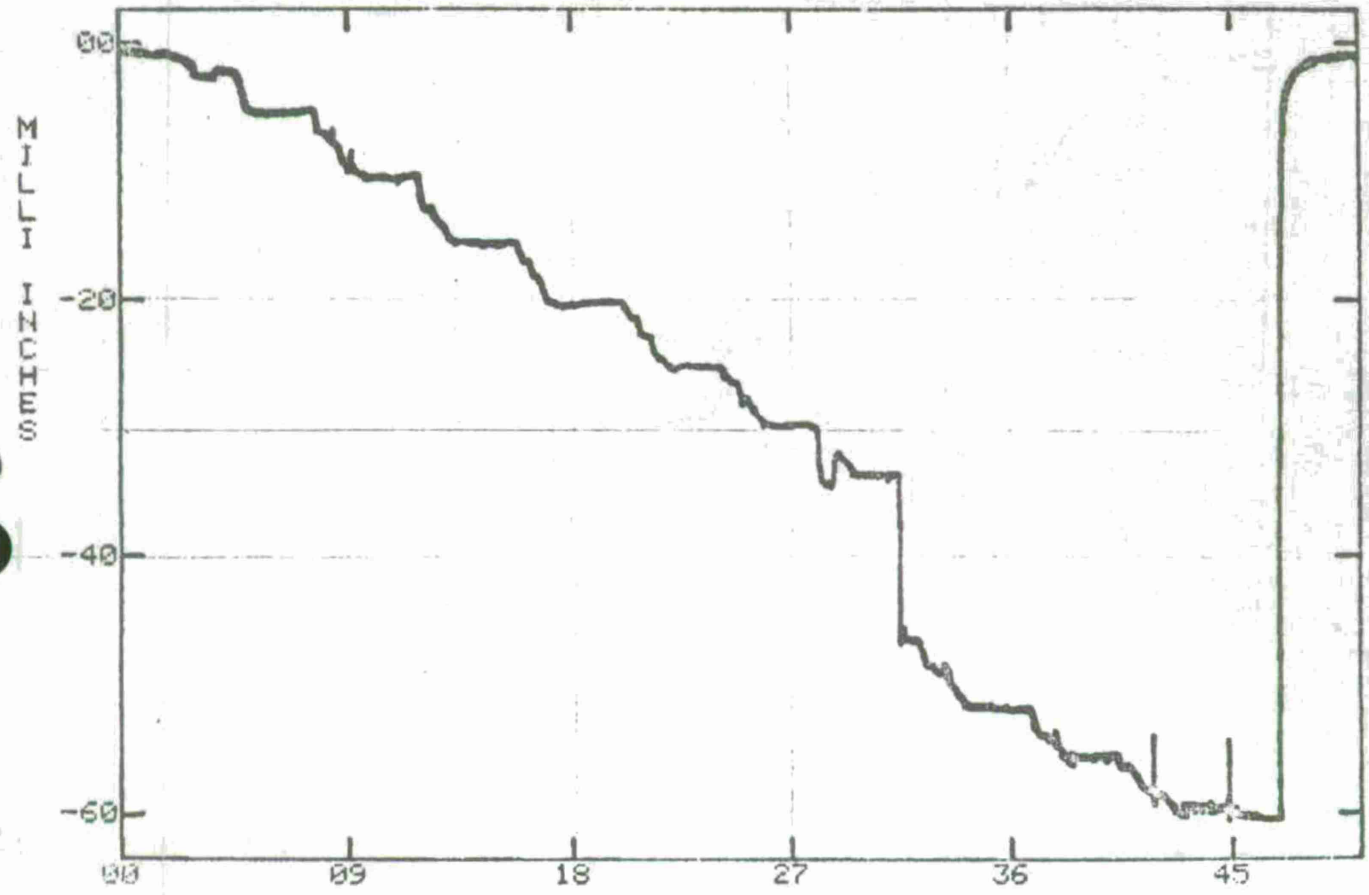
CH 6 VERT DEFLECTION - ST 213.90 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



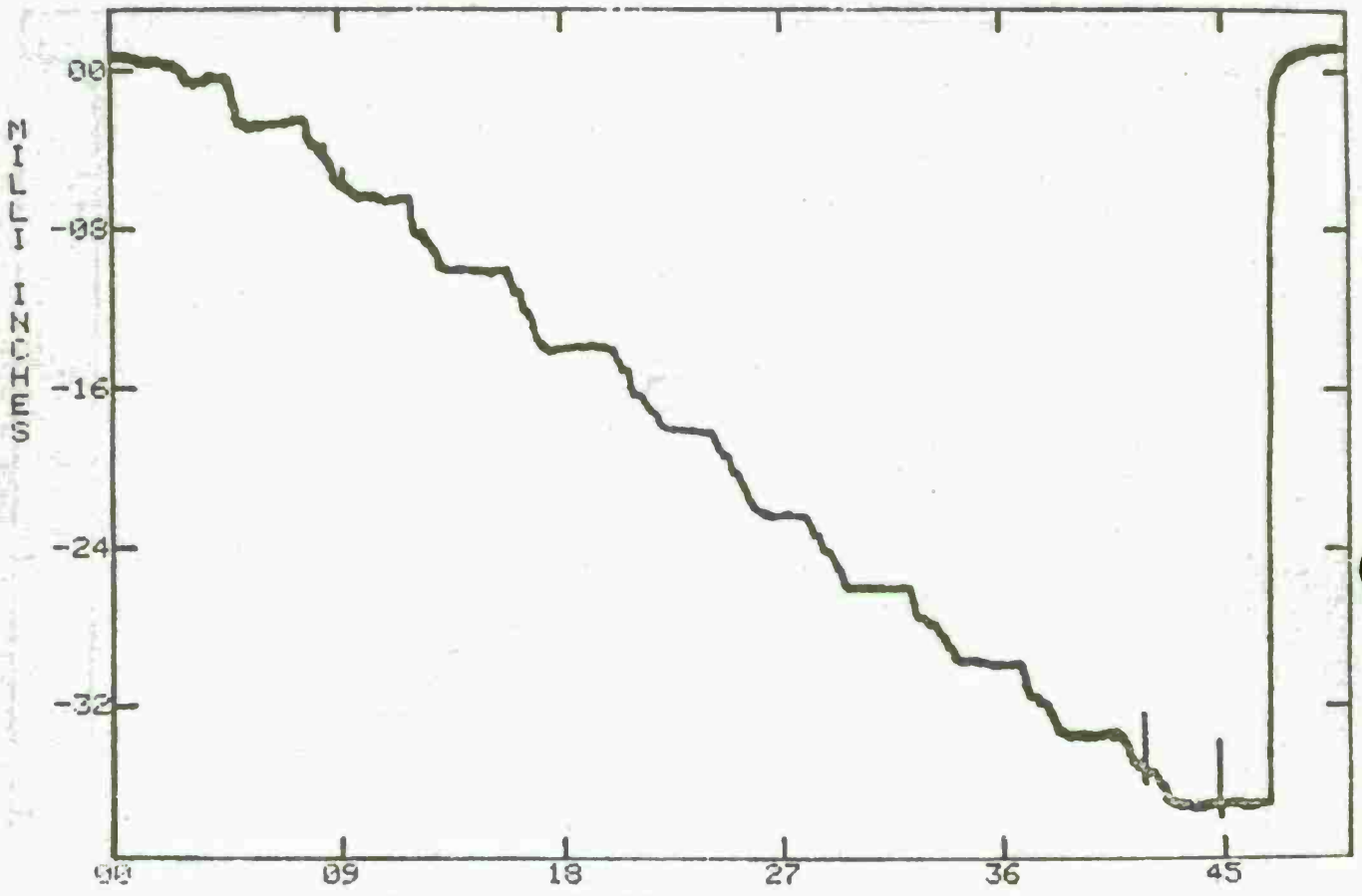
CH 7 VERT DEFLECTION - ST 250.00 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



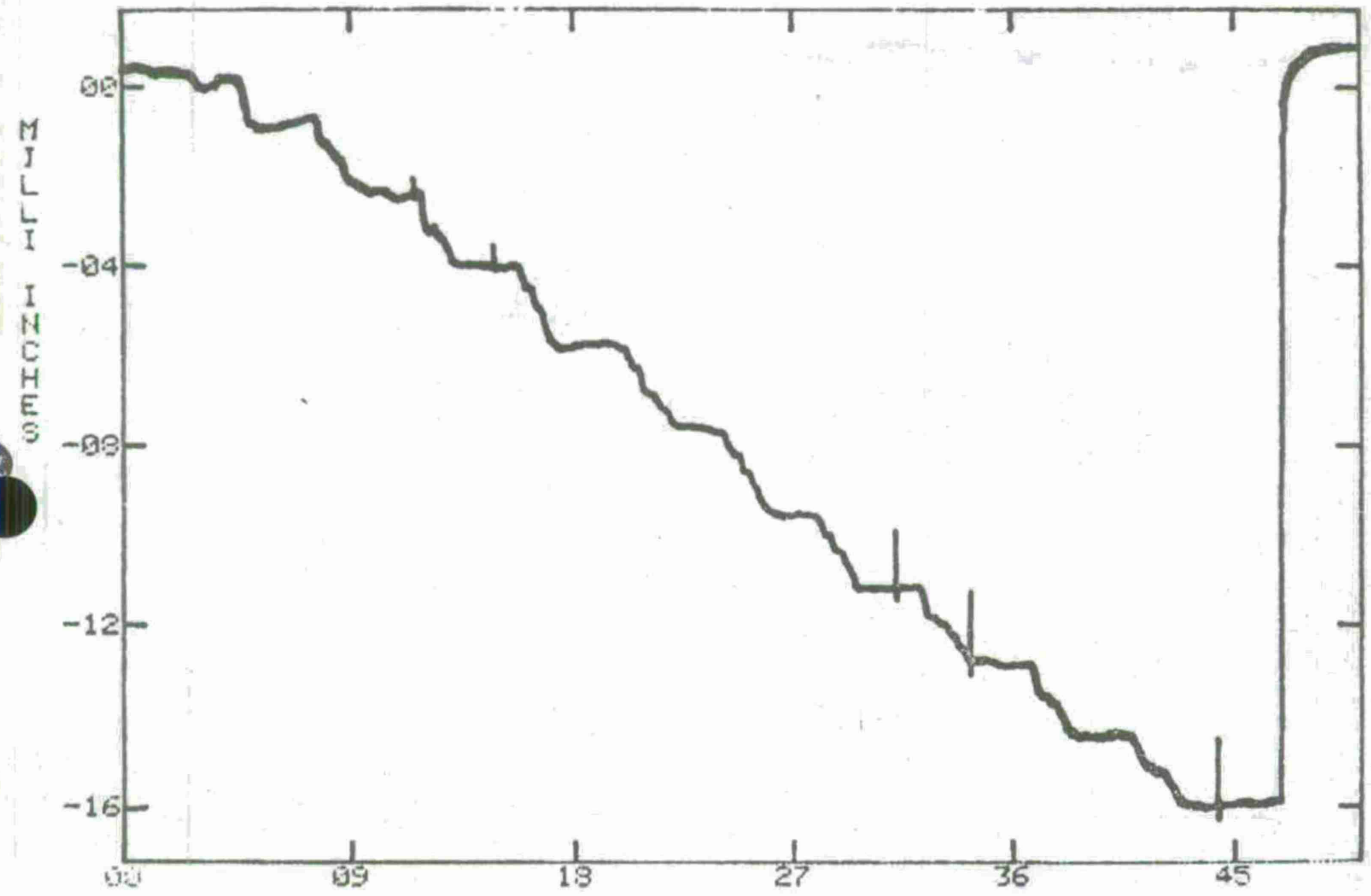
CH 8 VERT DEFLECTION - ST 268.25 L.H. X 10+0
TEST 25 (9JUL75) AH1G BEND TEST



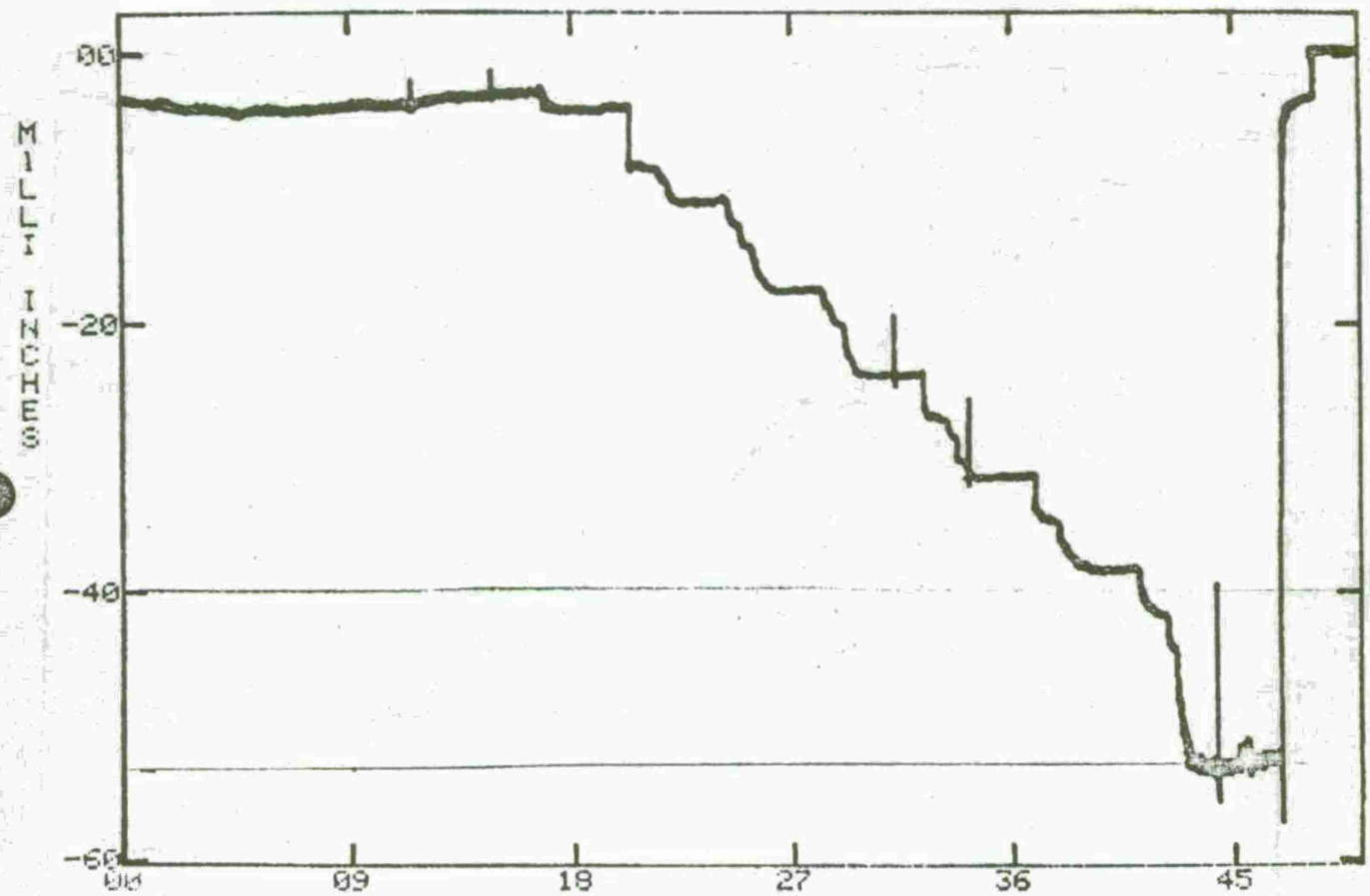
CH 9 VERT DEFLECTION - ST 93.00 R.H X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



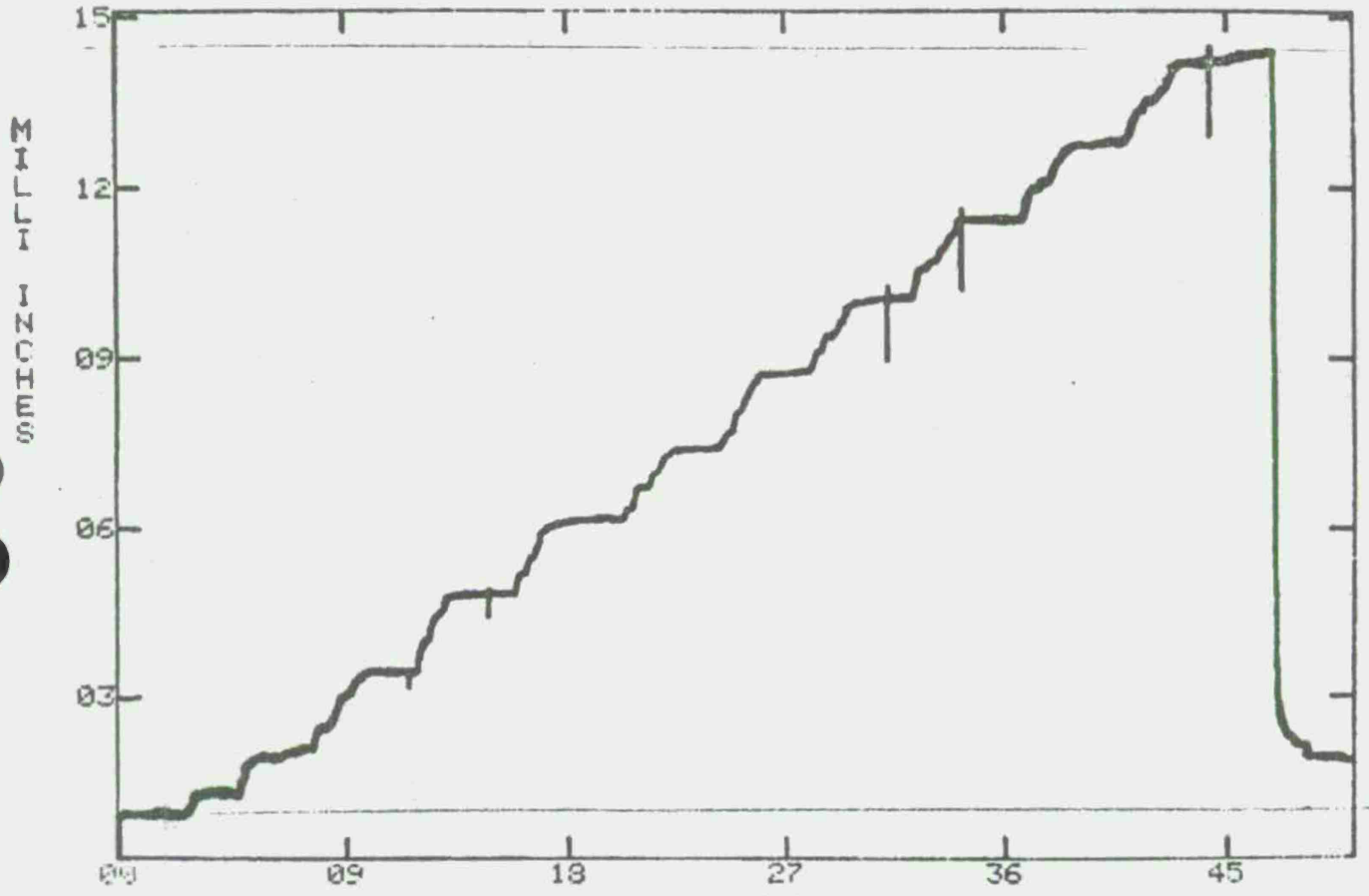
CH 10 VERT DEFLECTION - ST 148.50 R.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



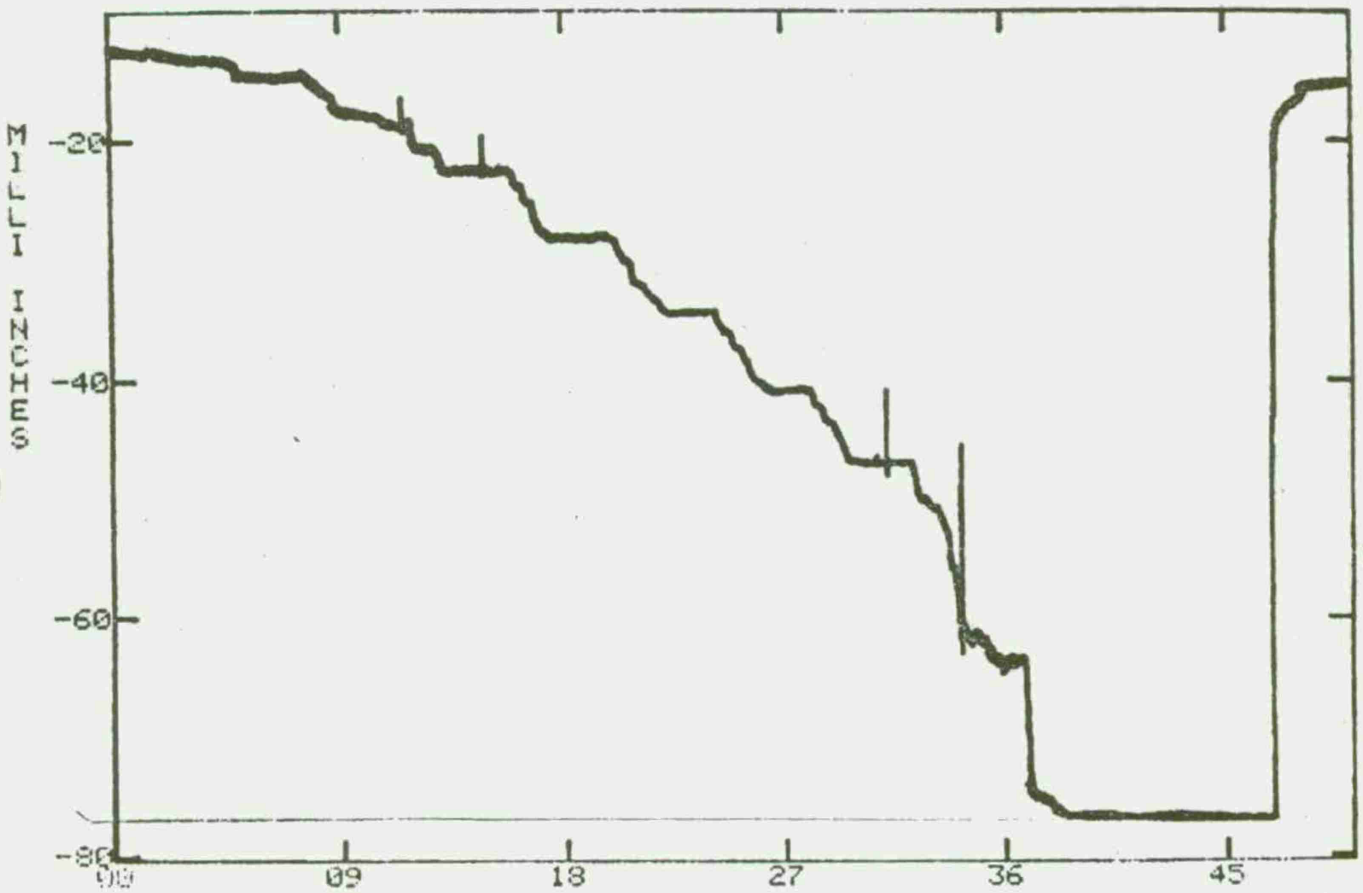
CH 11 VERT DEFLECTION - ST 213.90 R.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



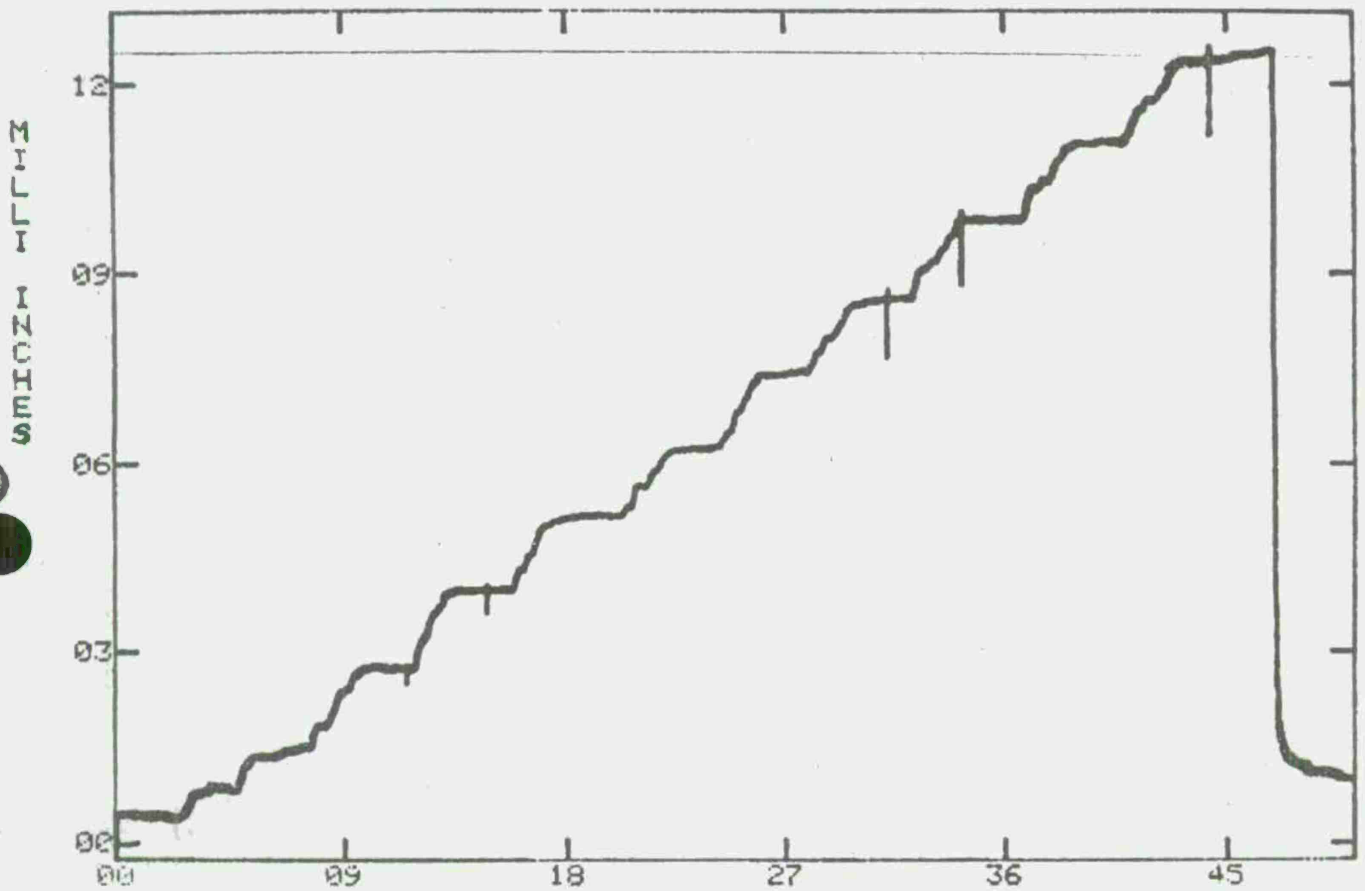
CH 12 BASE ROTATION - UPPER L.H. DEFLECTION - BED FIXTURE X 10
+1 TEST 25 (9JUL75) AH1G BEND TEST



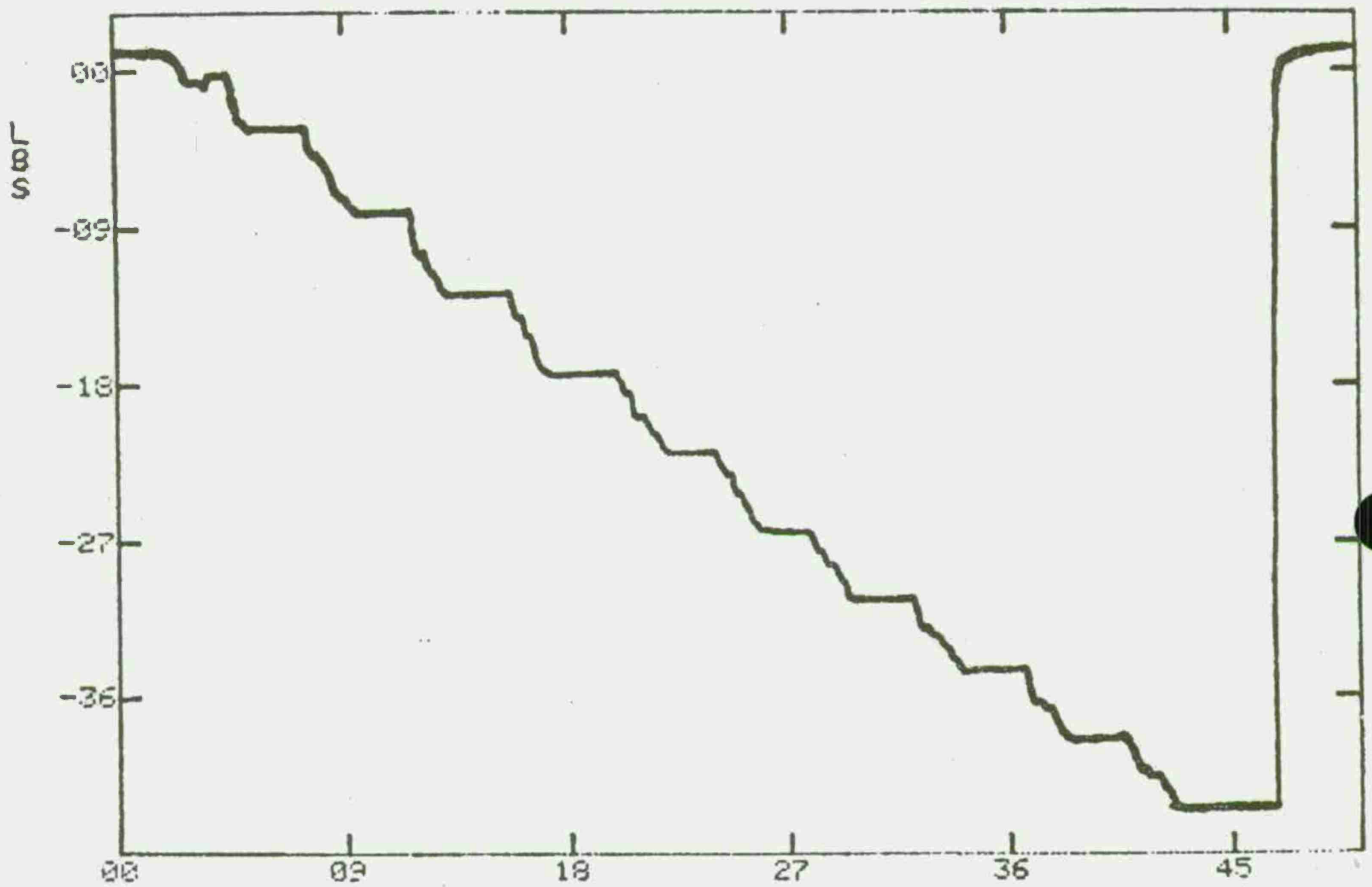
CH 13 BASE ROTATION - LOWER L.H. DEFLECTION - BED FIXTURE X 10
+0 TEST 25 (9JUL75) AH1G BEND TEST



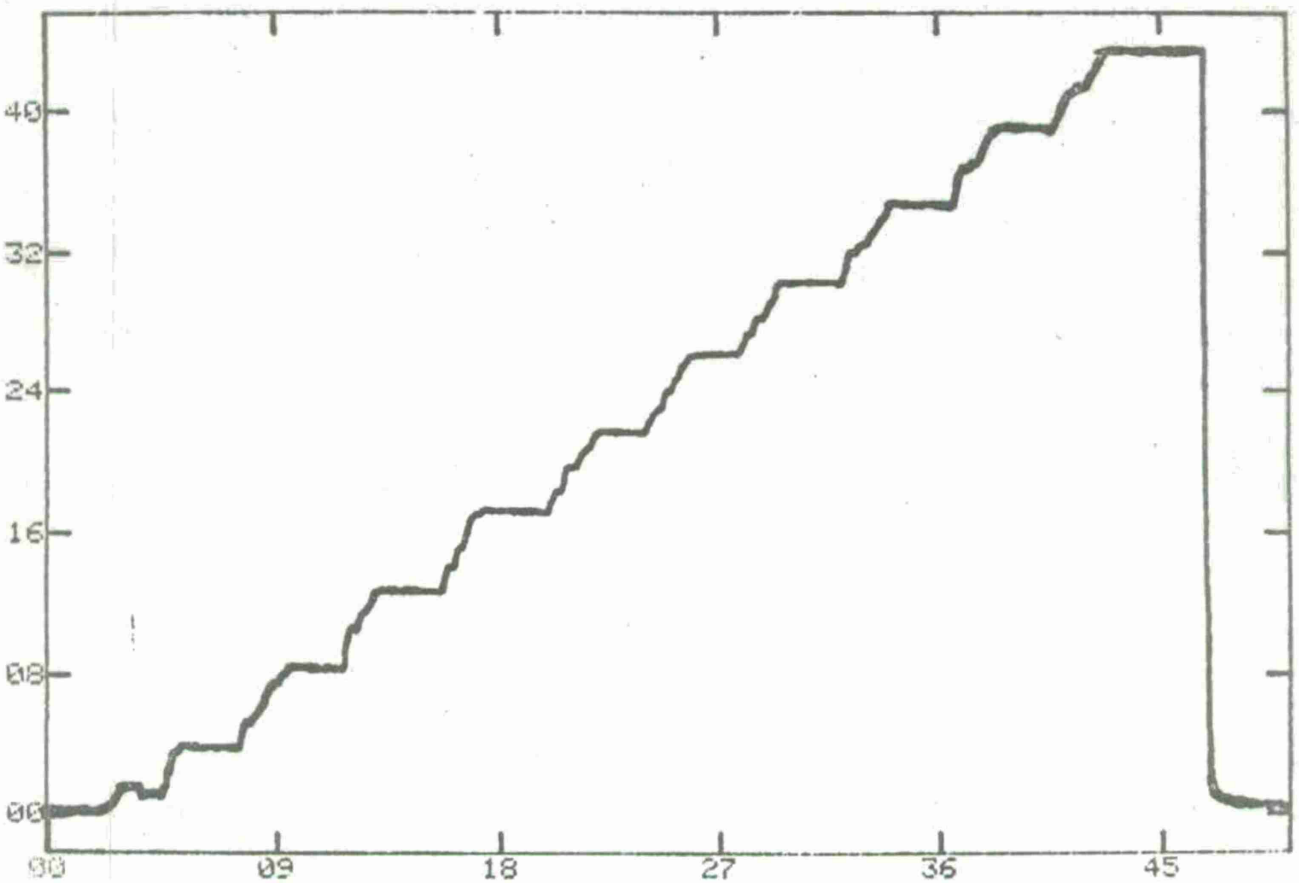
CH 14 BASE ROTATION - UPPER R.H. DEFLECTION - FUSELAGE X 10+1
TEST 25 (9JUL75) AH1G BEND TEST



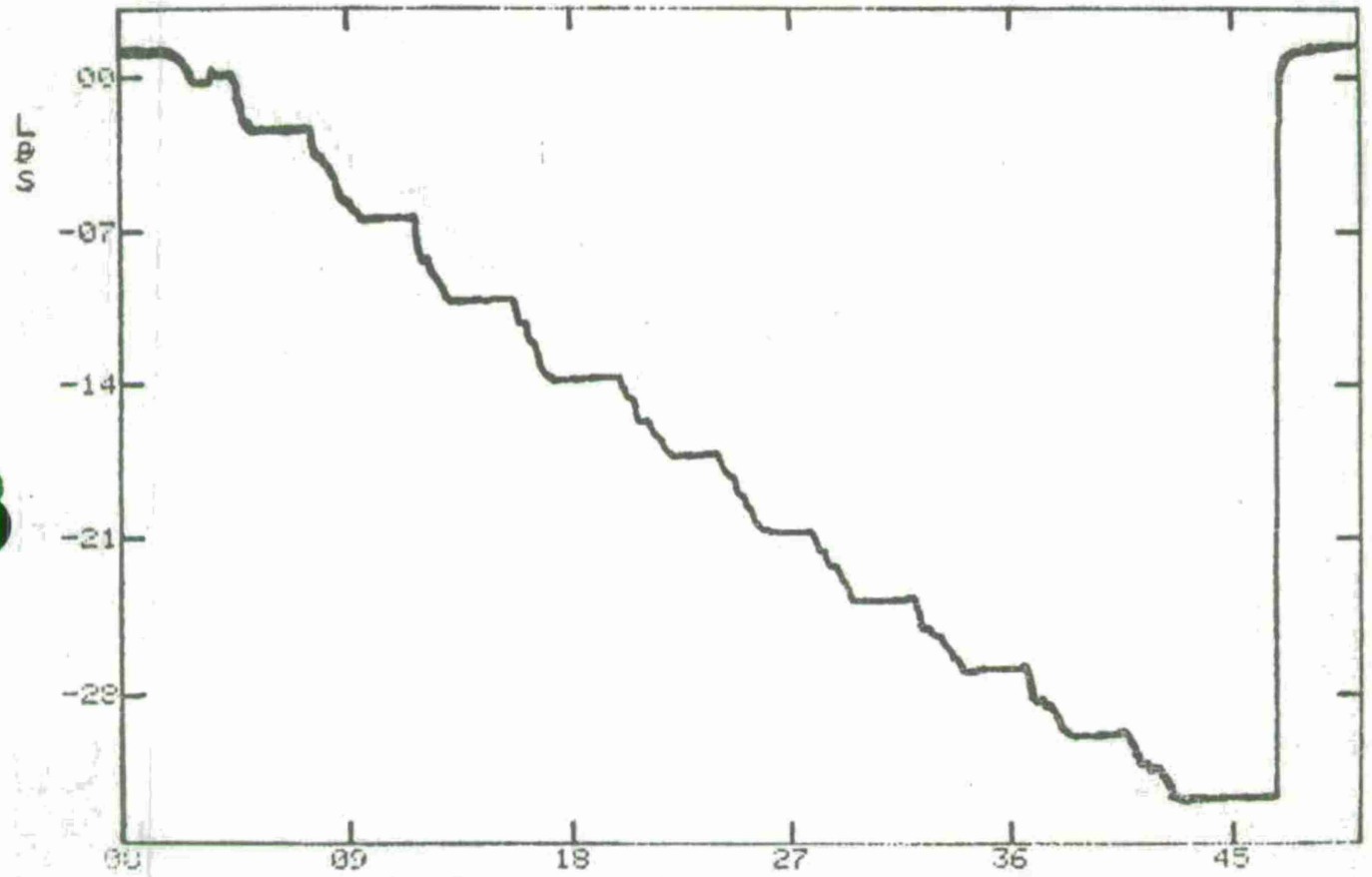
CH 15 BASE ROTATION - LOWER R.H. DEFLECTION - FUSELAGE X 10+0
TEST 25 (9JUL75) AH1G BEND TEST



CH 17 LOAD - L.H. TOP X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



CH 18 LOAD - L H. BOTTOM X 10-2
TEST 25 (9JUL75) AH1G BEND TEST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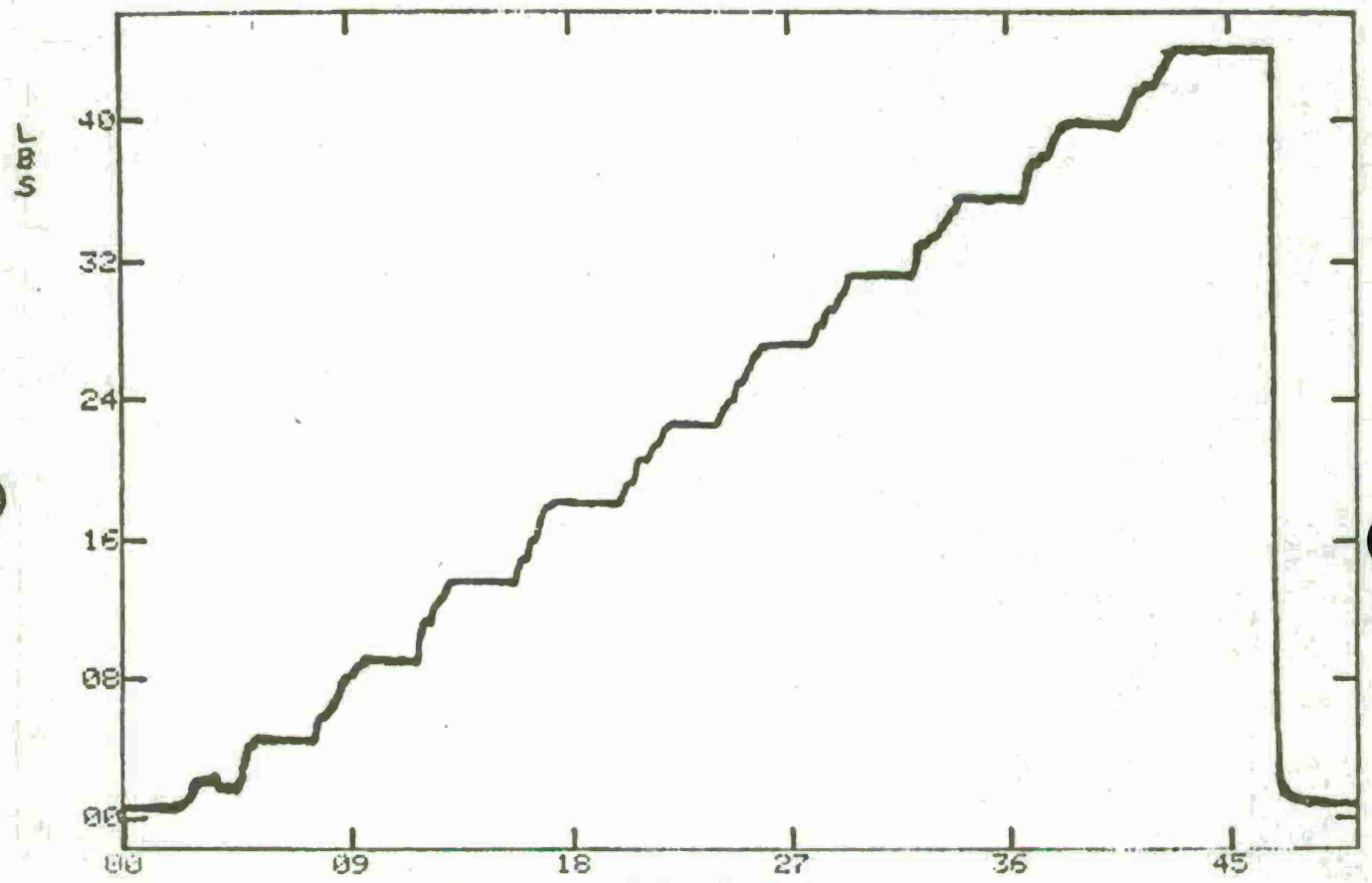
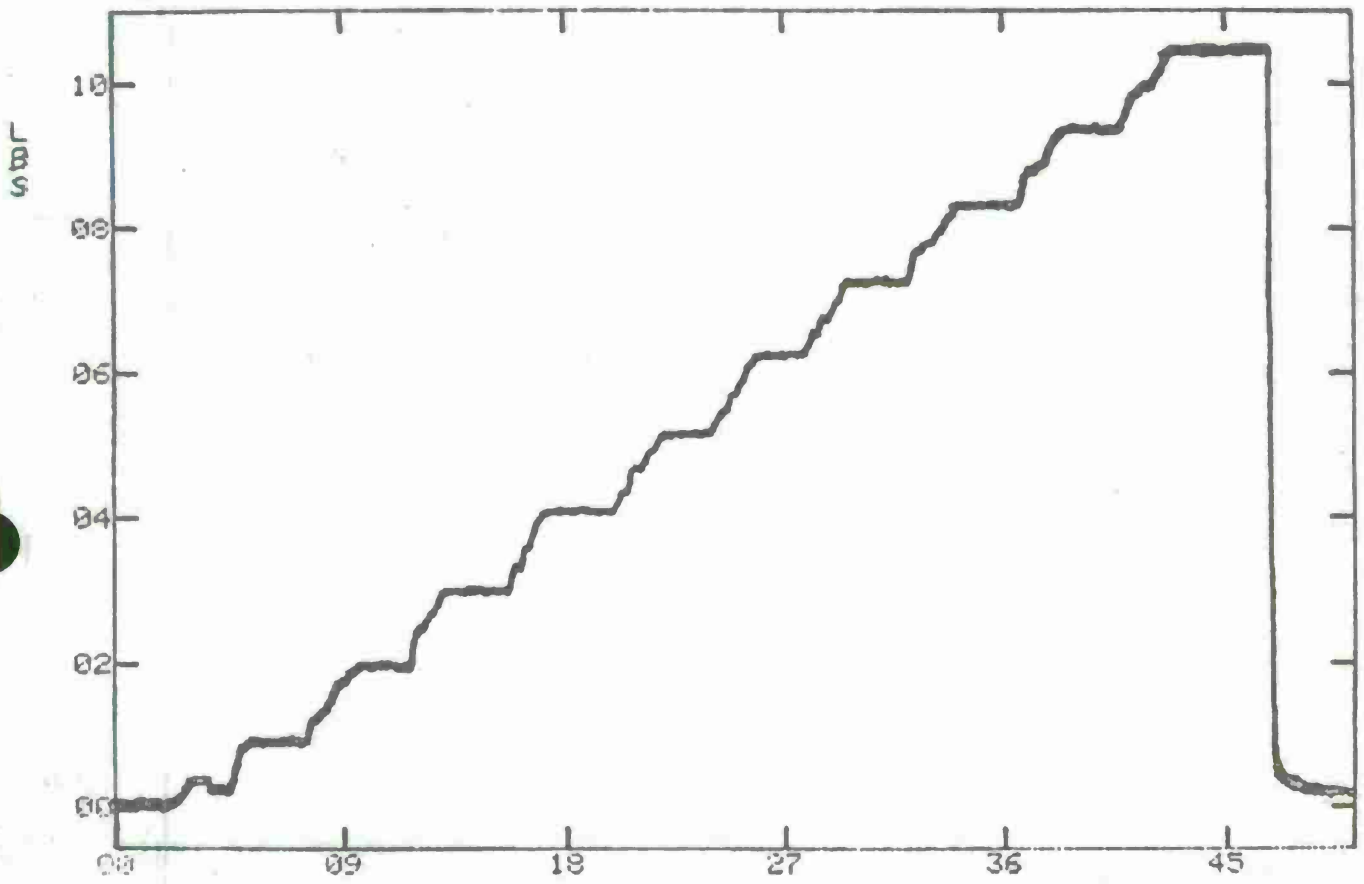
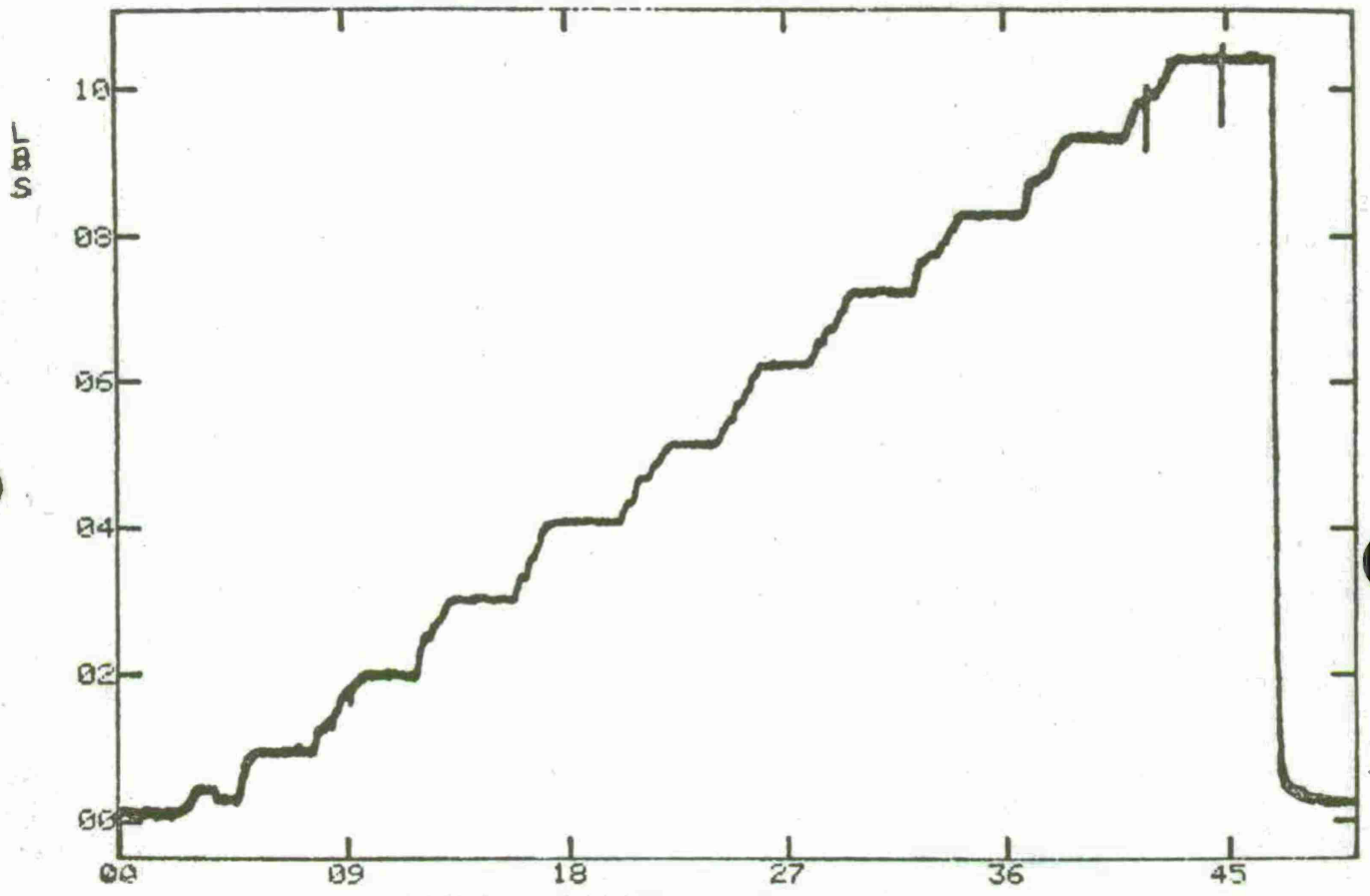
TIME IN SECONDS X 10-1
CH 19 LOAD - R H TOP X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



CH 20 LOAD - R.H. BOTTOM X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



CH 21 LOAD APPLIED (CH 17/20) X 10-2
TEST 25 (9JUL75) AH1G BEND TEST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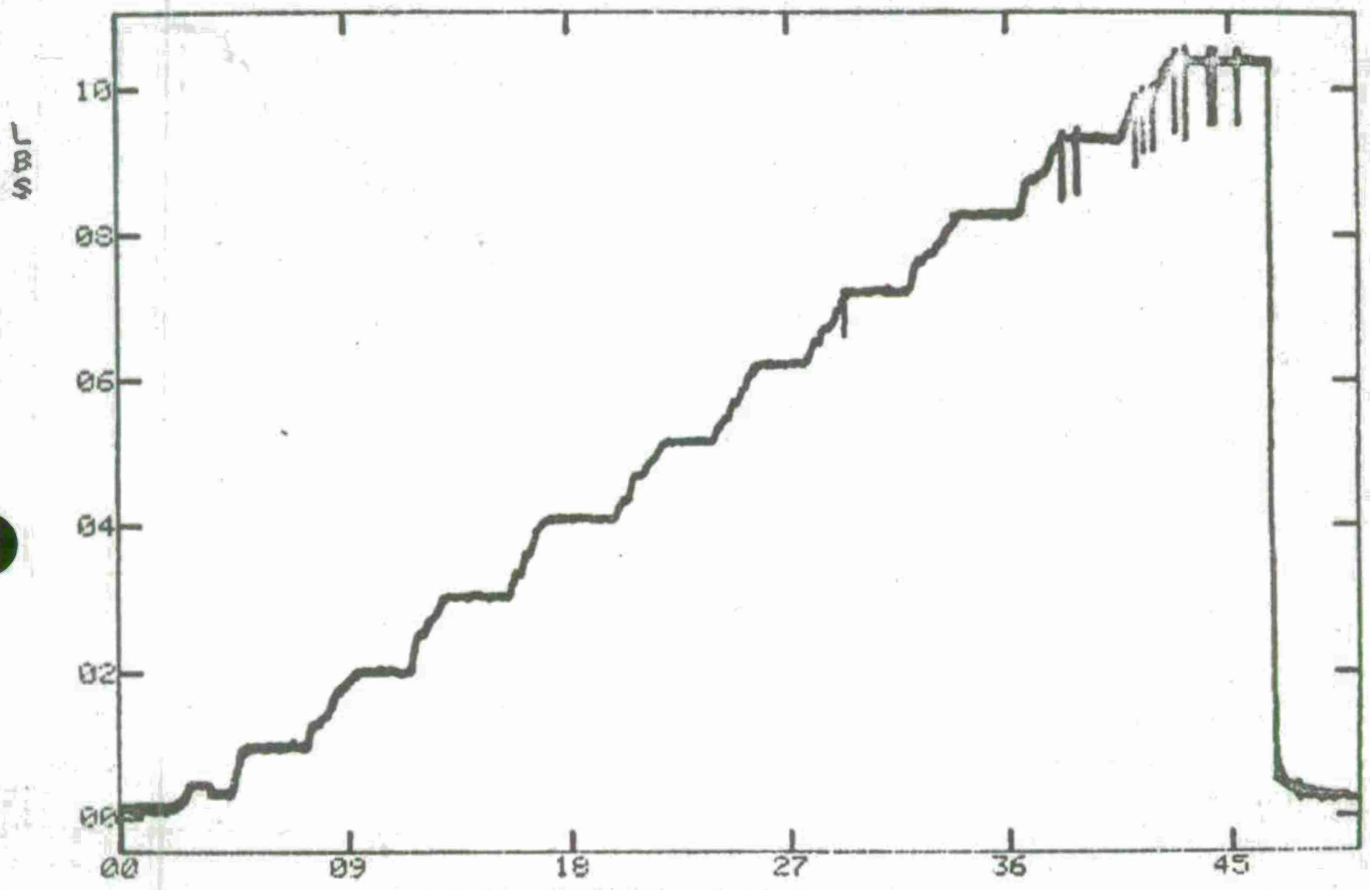
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 6/10) X 10-2
TEST 25 (9JUL75) AH1G BEND TEST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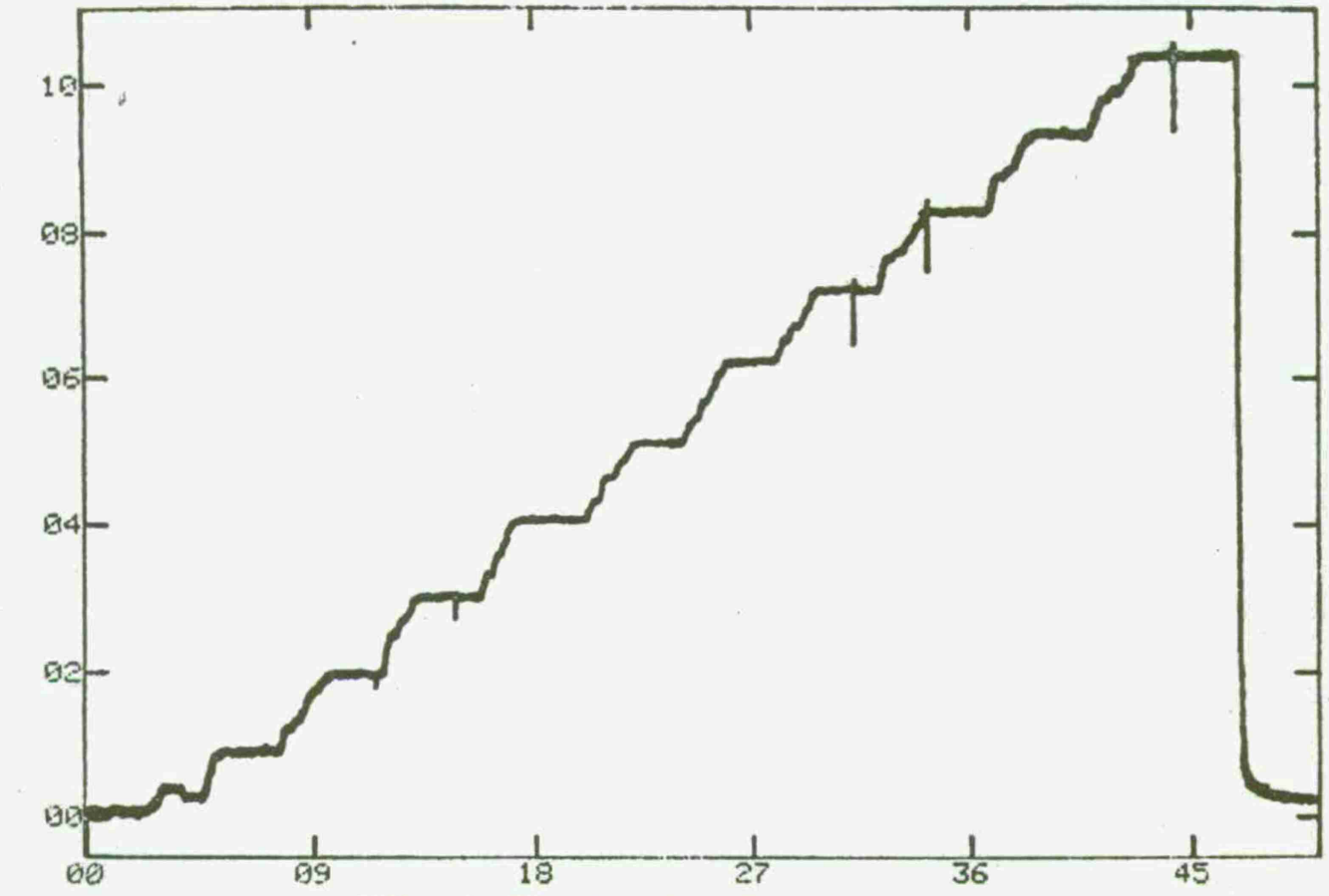
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 1/5) X 10-2
TEST 25 (9JUL75) AH1G BEND TEST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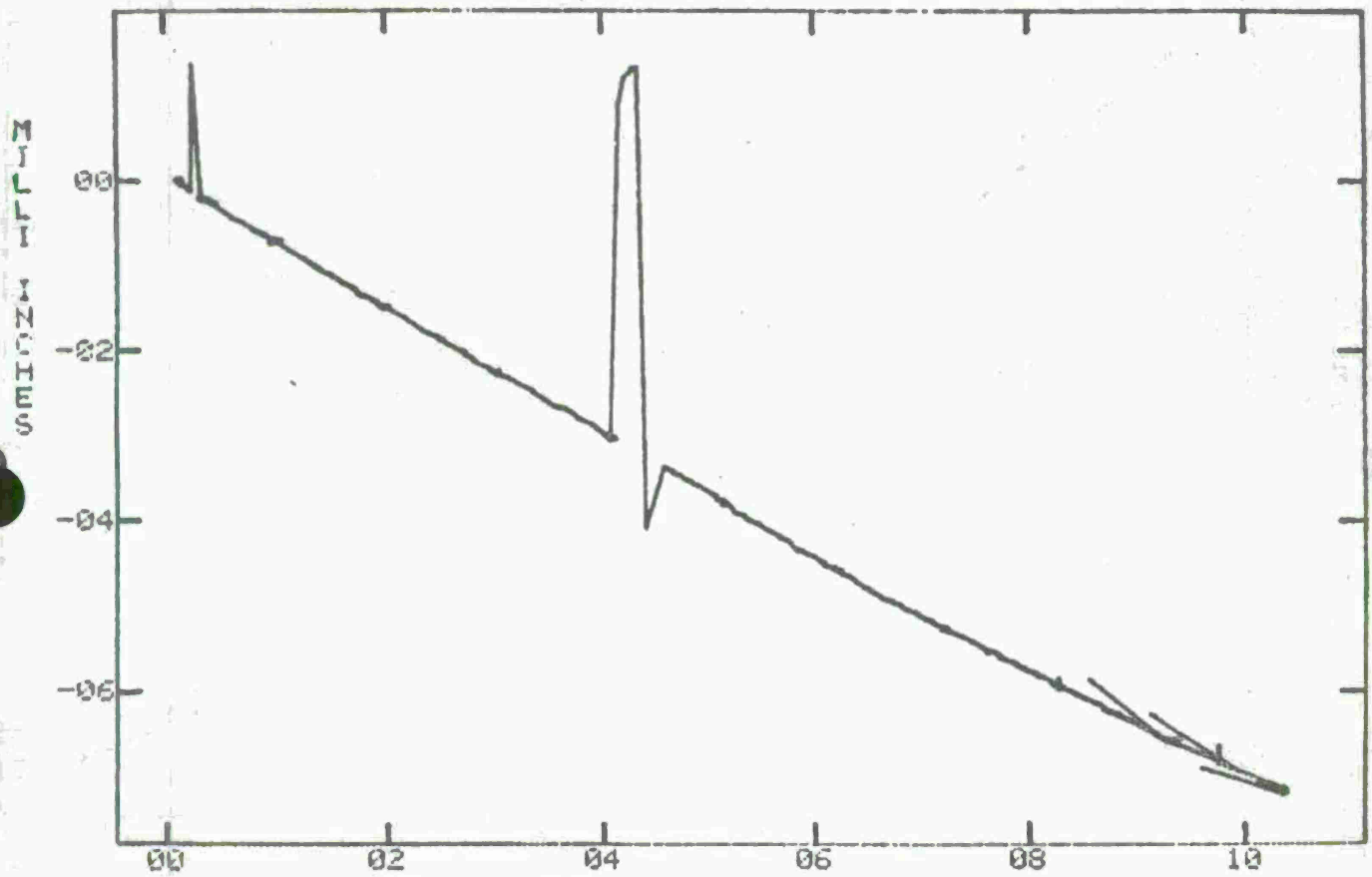
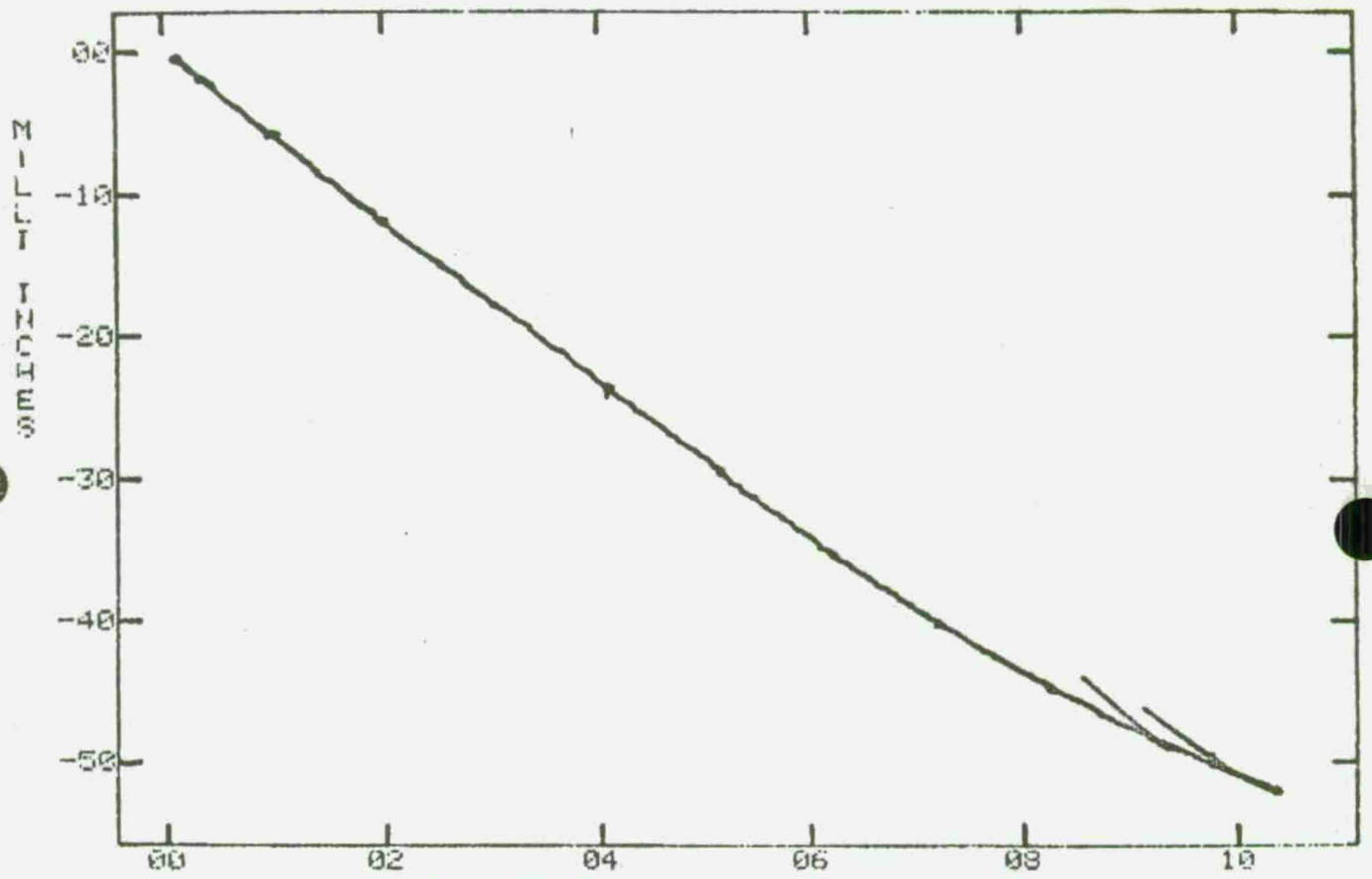
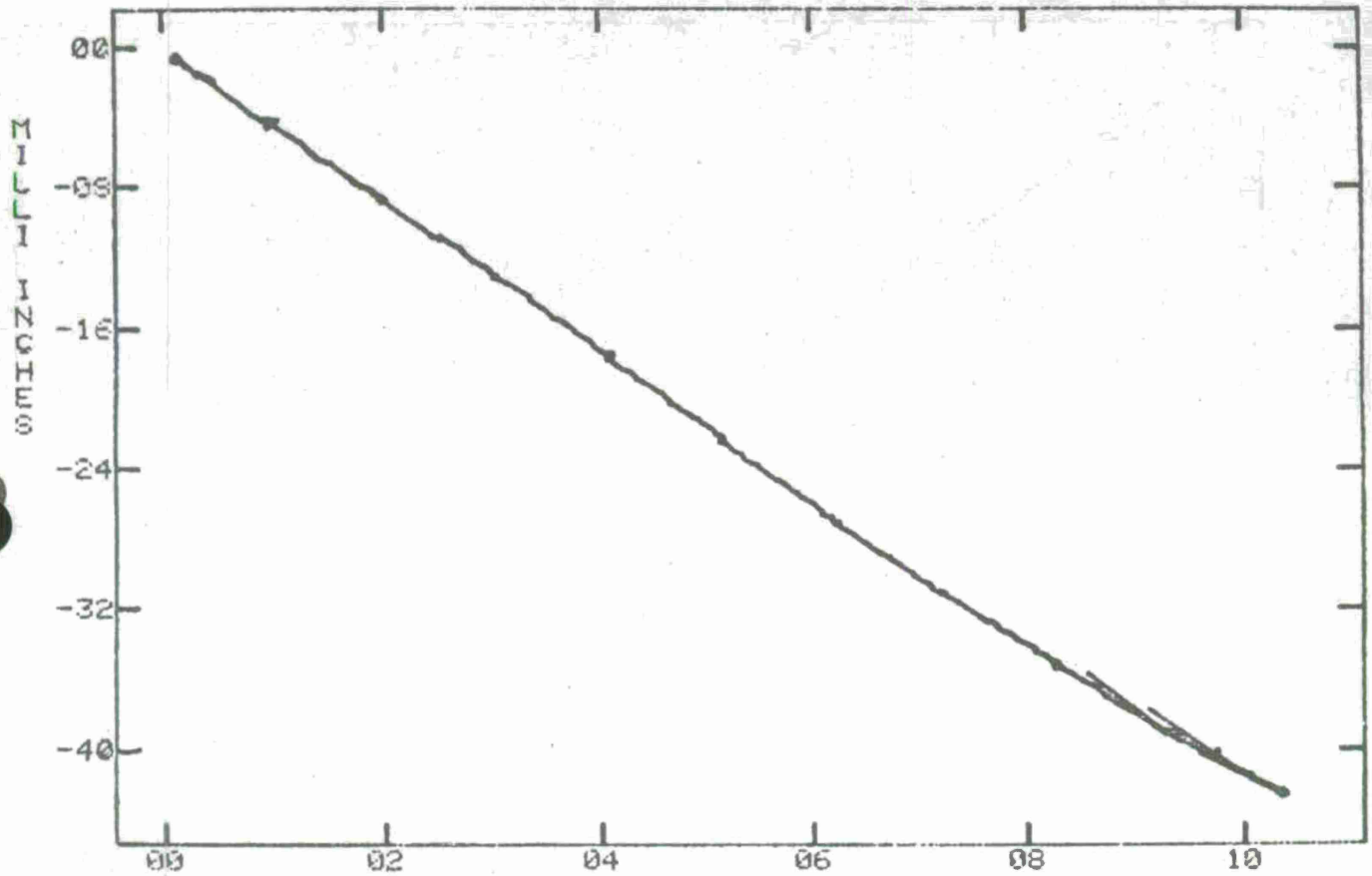
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED (CH 11/15) X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



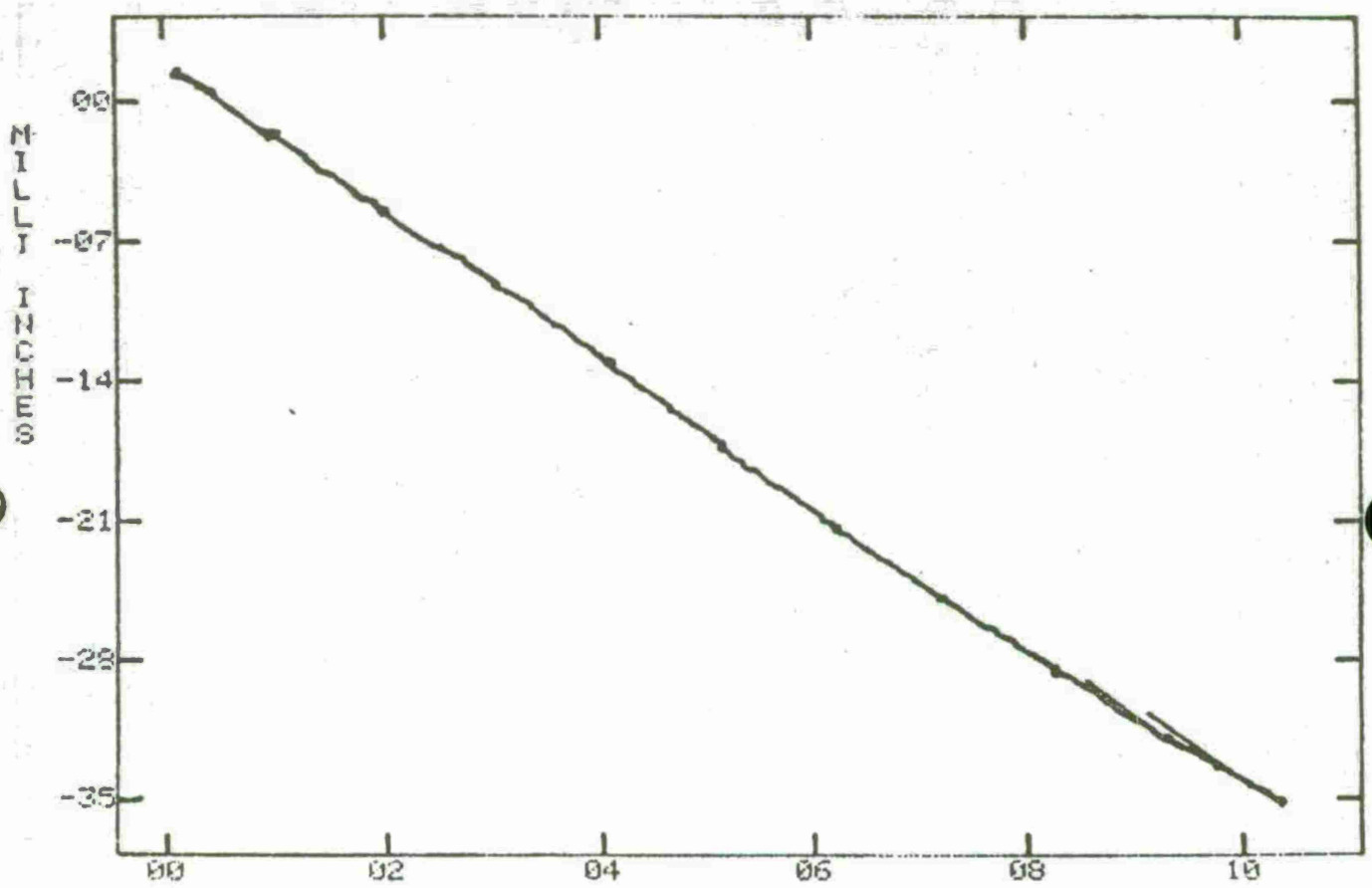
LOAD APPLIED VS VERT DEFLN - ST 61.25 L.H. X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



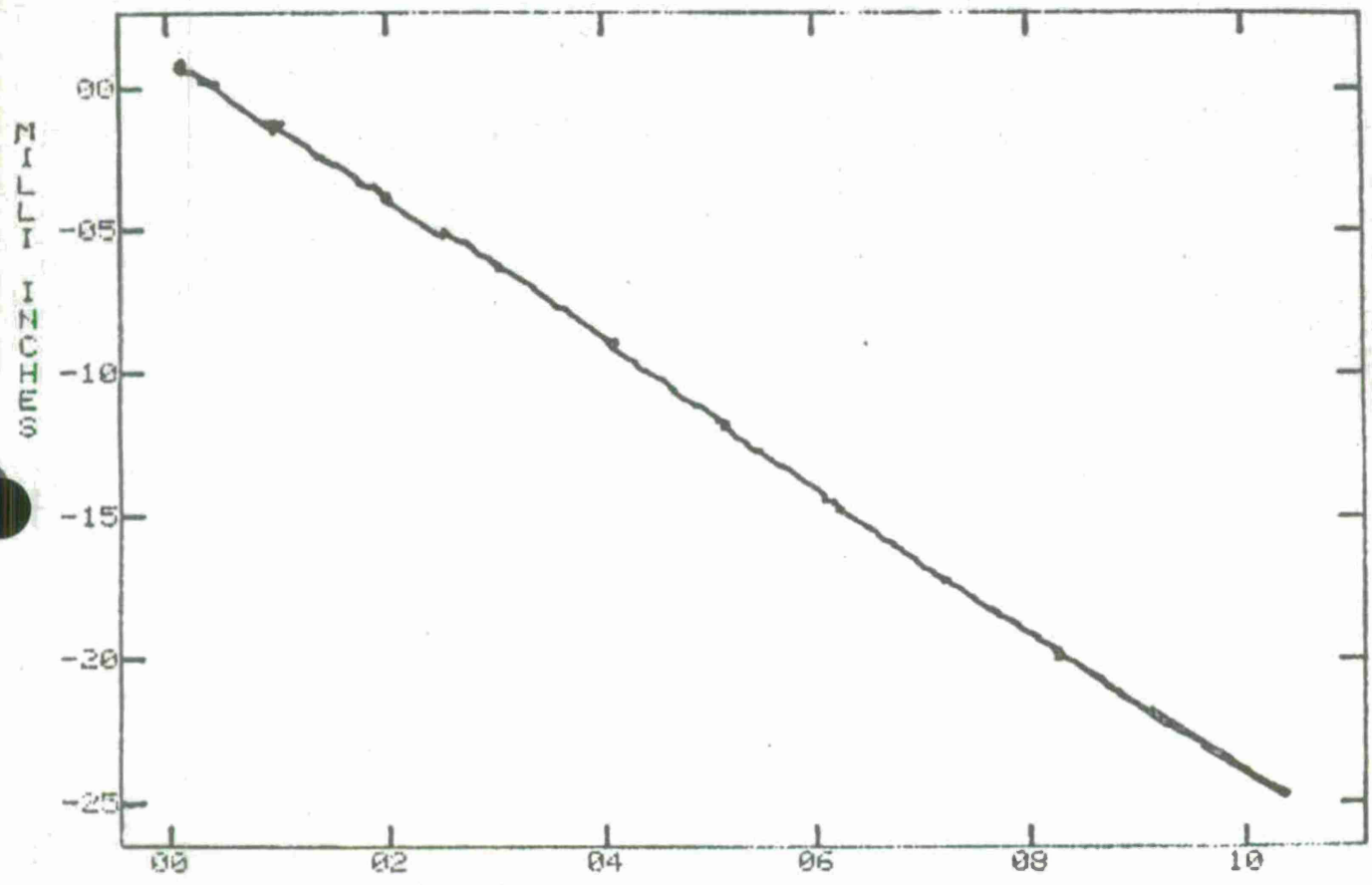
LOAD APPLIED VS VERT DEFLN - ST 93.00 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



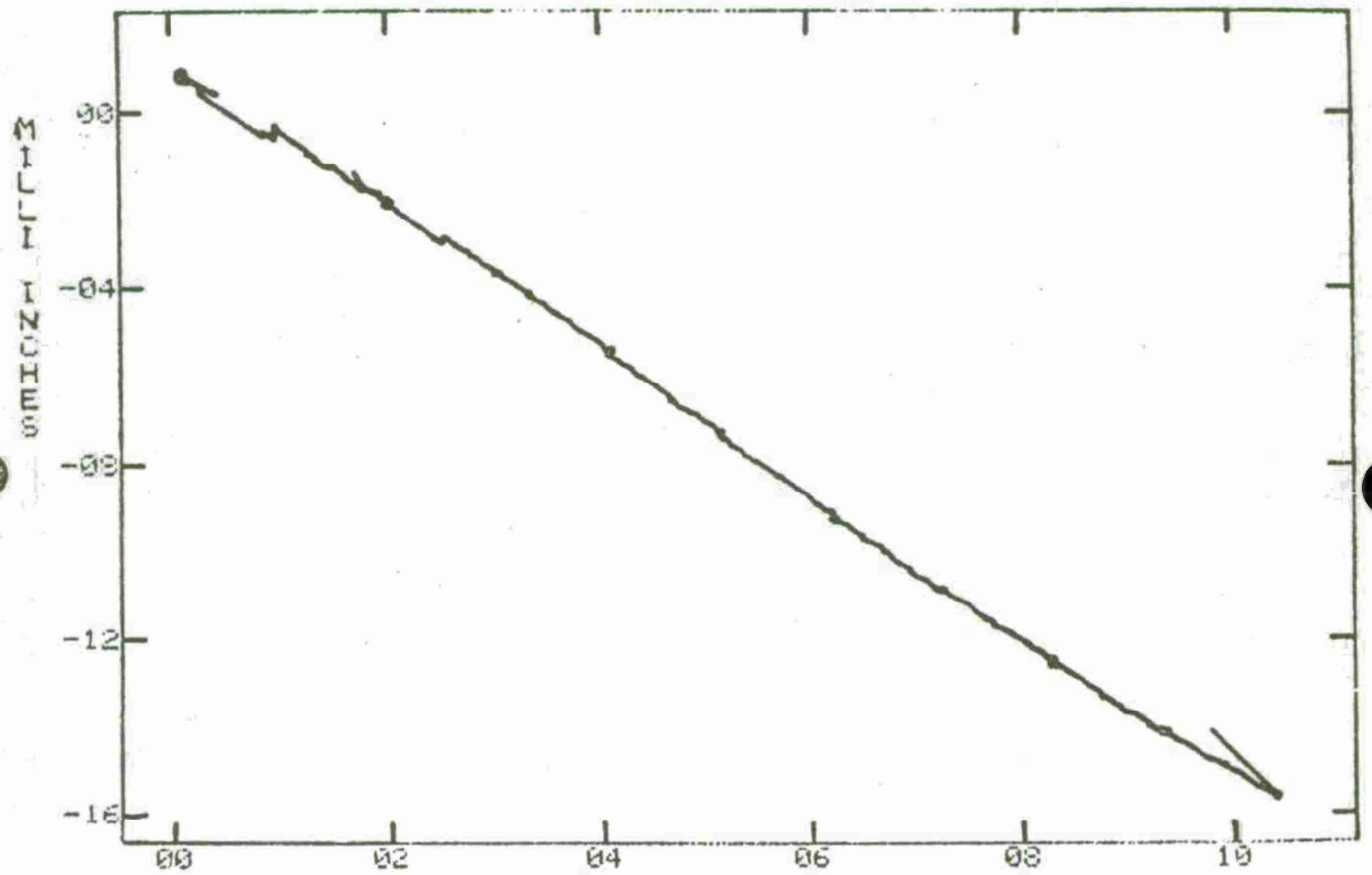
LOAD APPLIED VS VERT DEFLN - ST 138.70 L.H. X 10-1
TEST 25 (9JUL75) AHIG BEND TEST



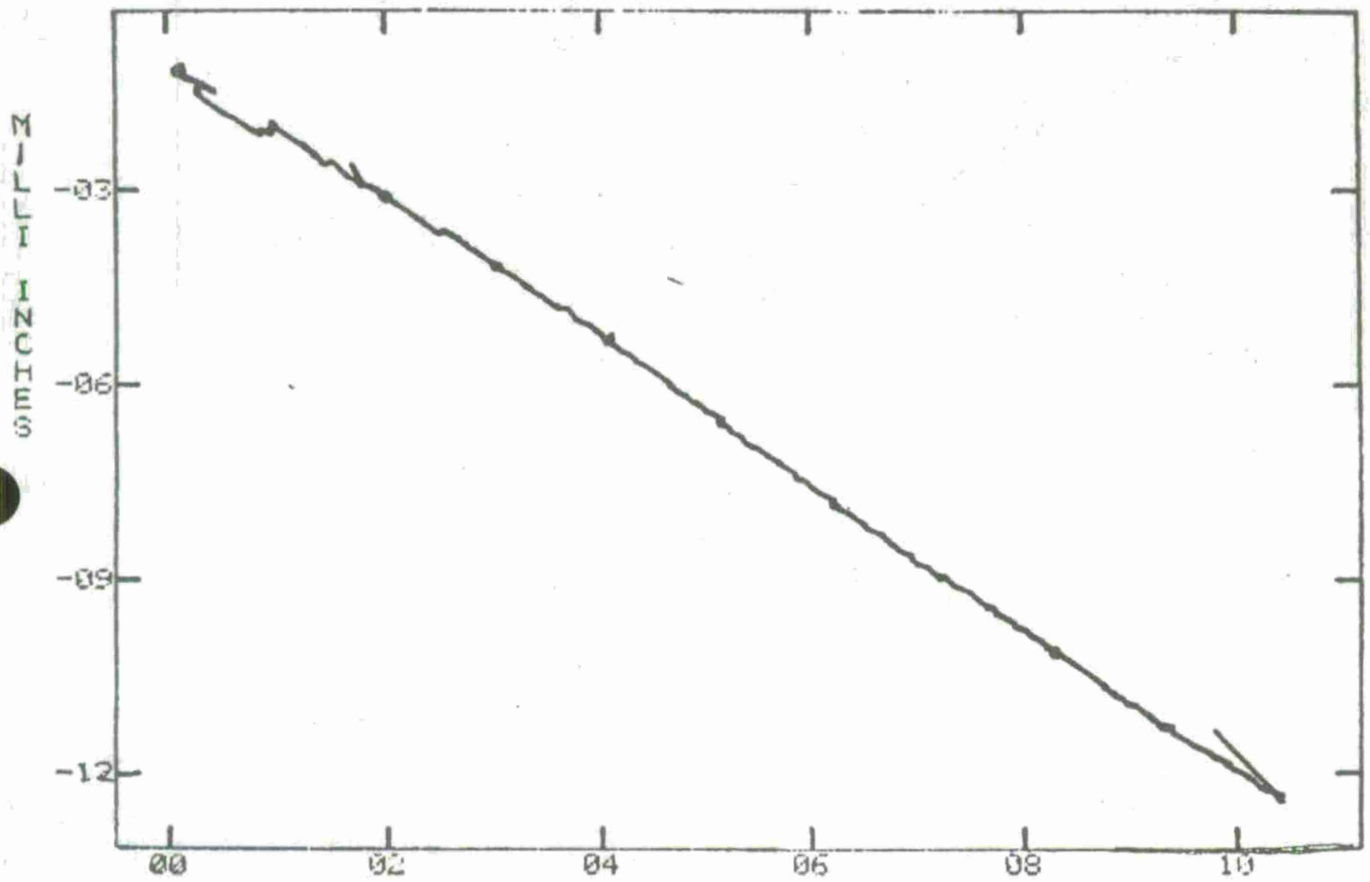
LOAD APPLIED VS VERT DEFLN - ST 148.50 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



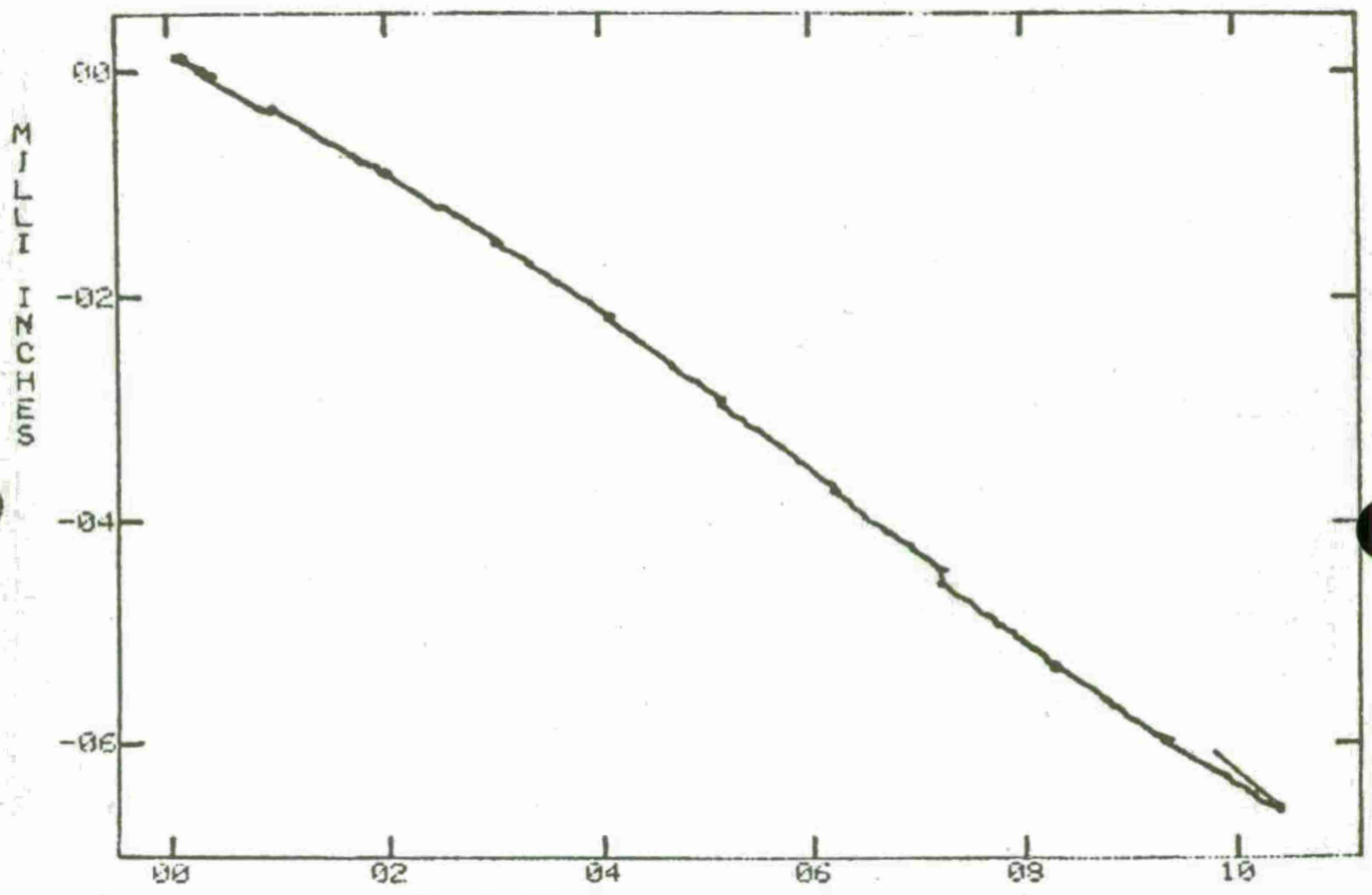
LOAD APPLIED VS VERT DEFLN - ST 186.25 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



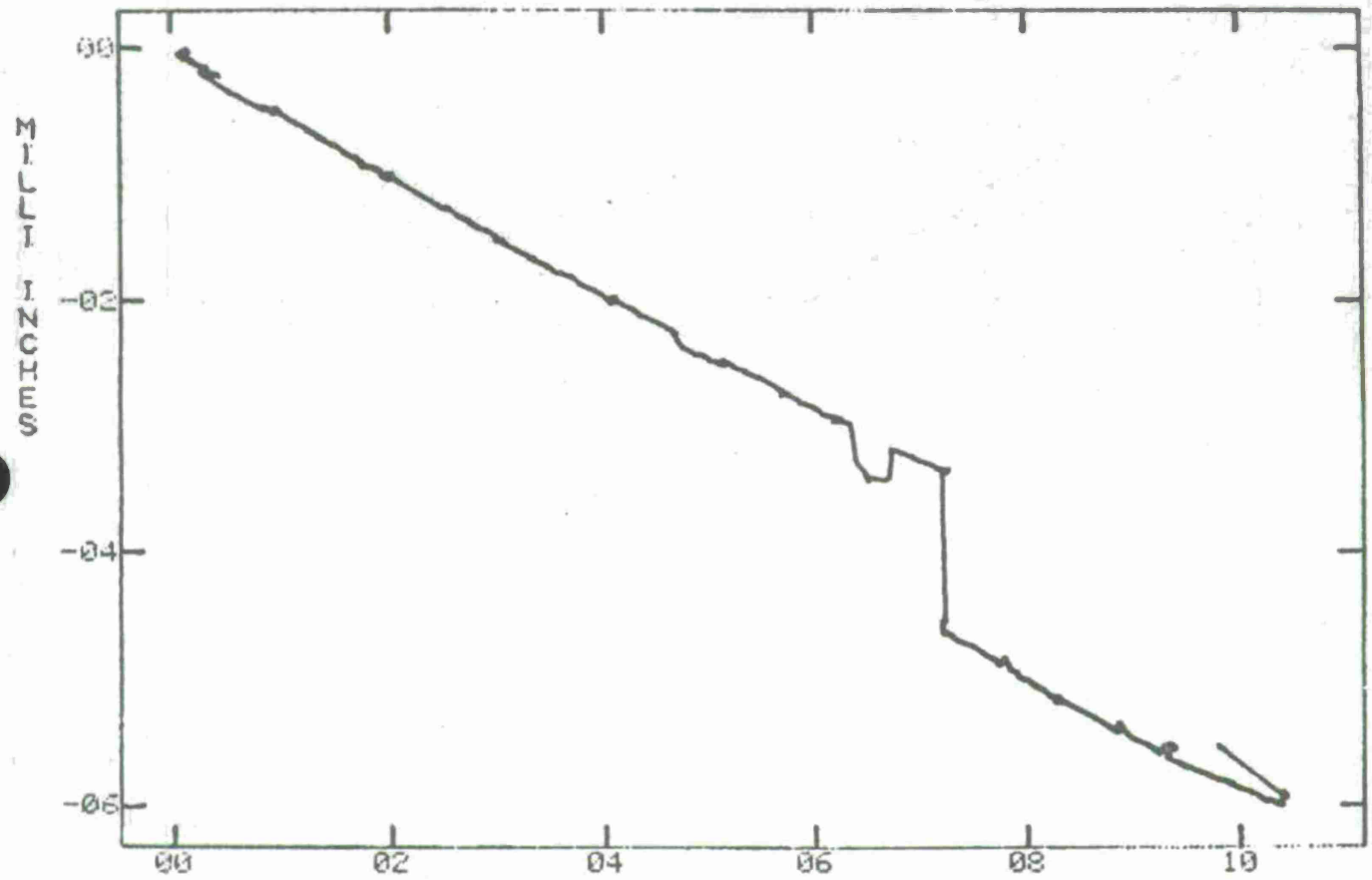
LOAD APPLIED VS VERT DEFLN - ST 213.90 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



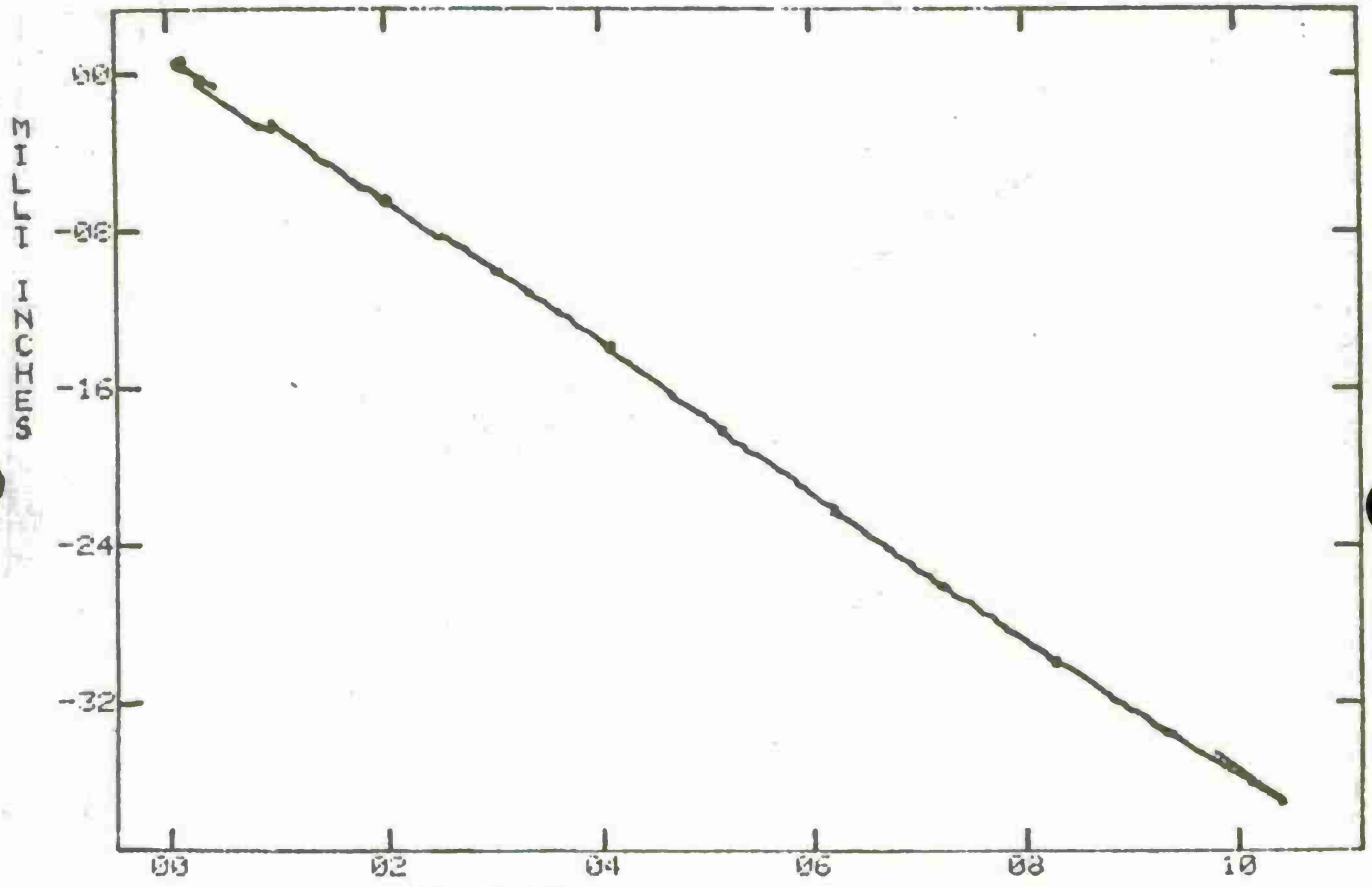
LOAD APPLIED VS VERT DEFLN – ST 250.00 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



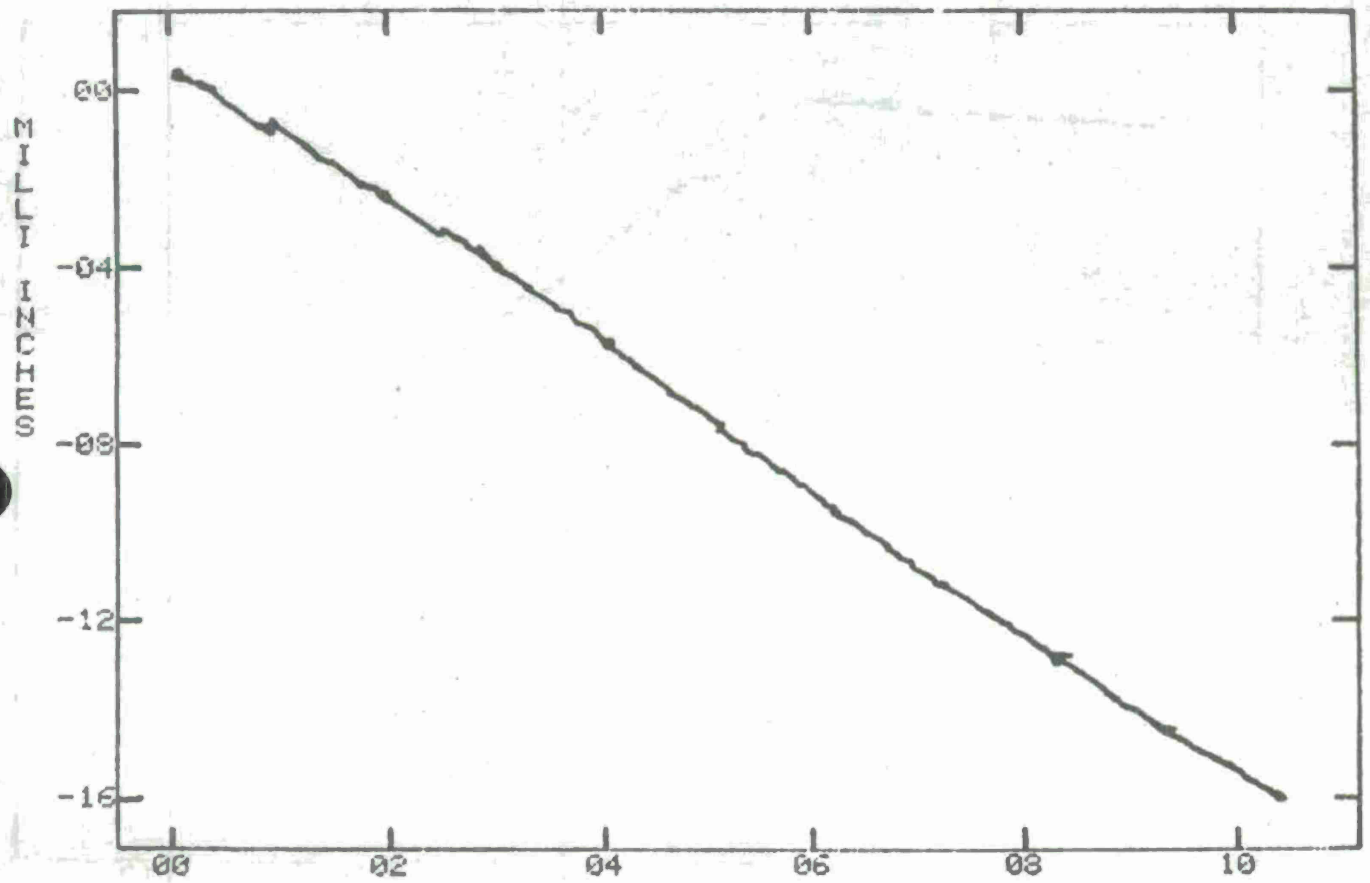
LOAD APPLIED VS VERT DEFLN - ST 268.25 L.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



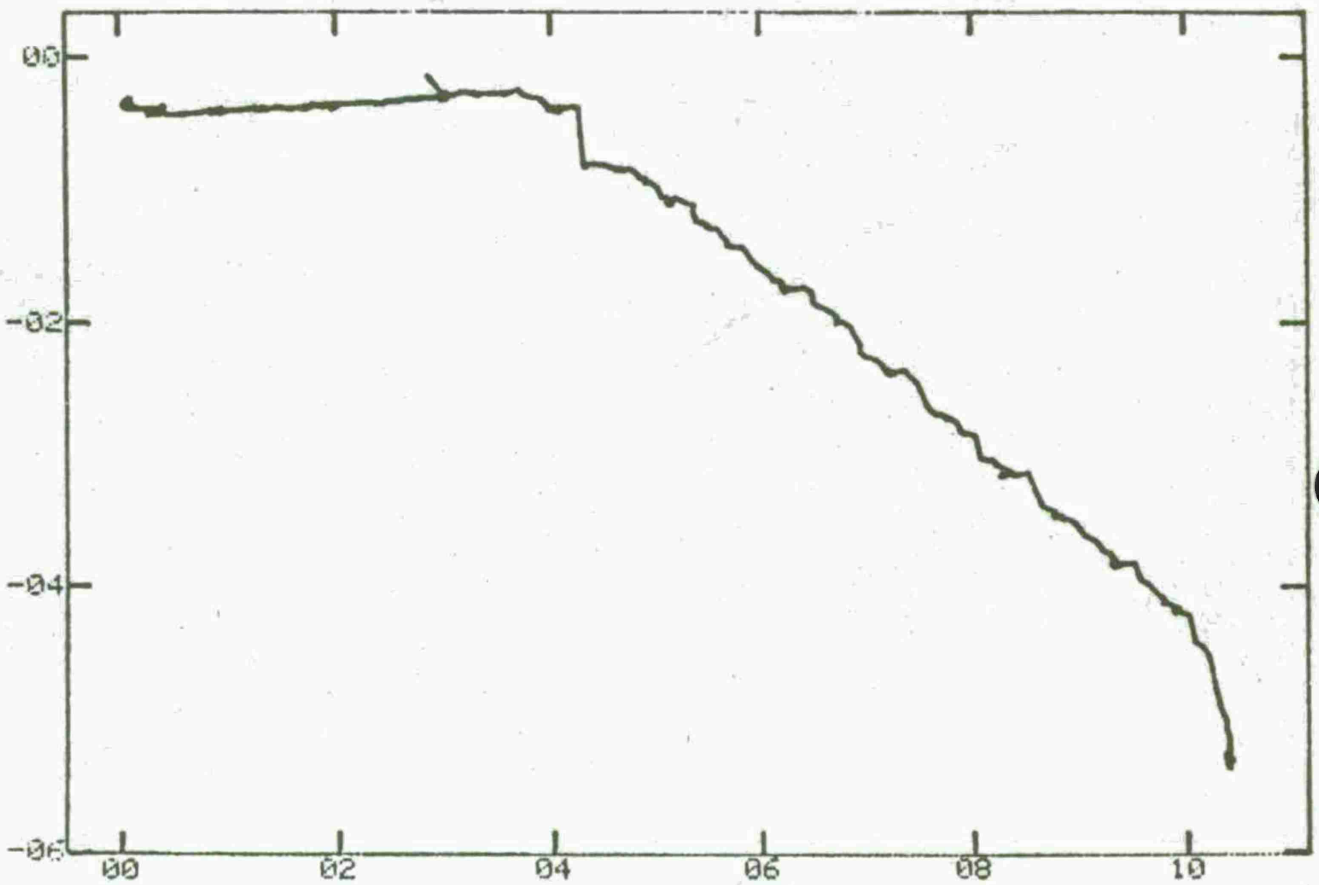
LOAD APPLIED VS VERT DEFLN - ST 93.00 R.H. X 10-2
TEST 25 (9JUL75) AH1G BEND TEST



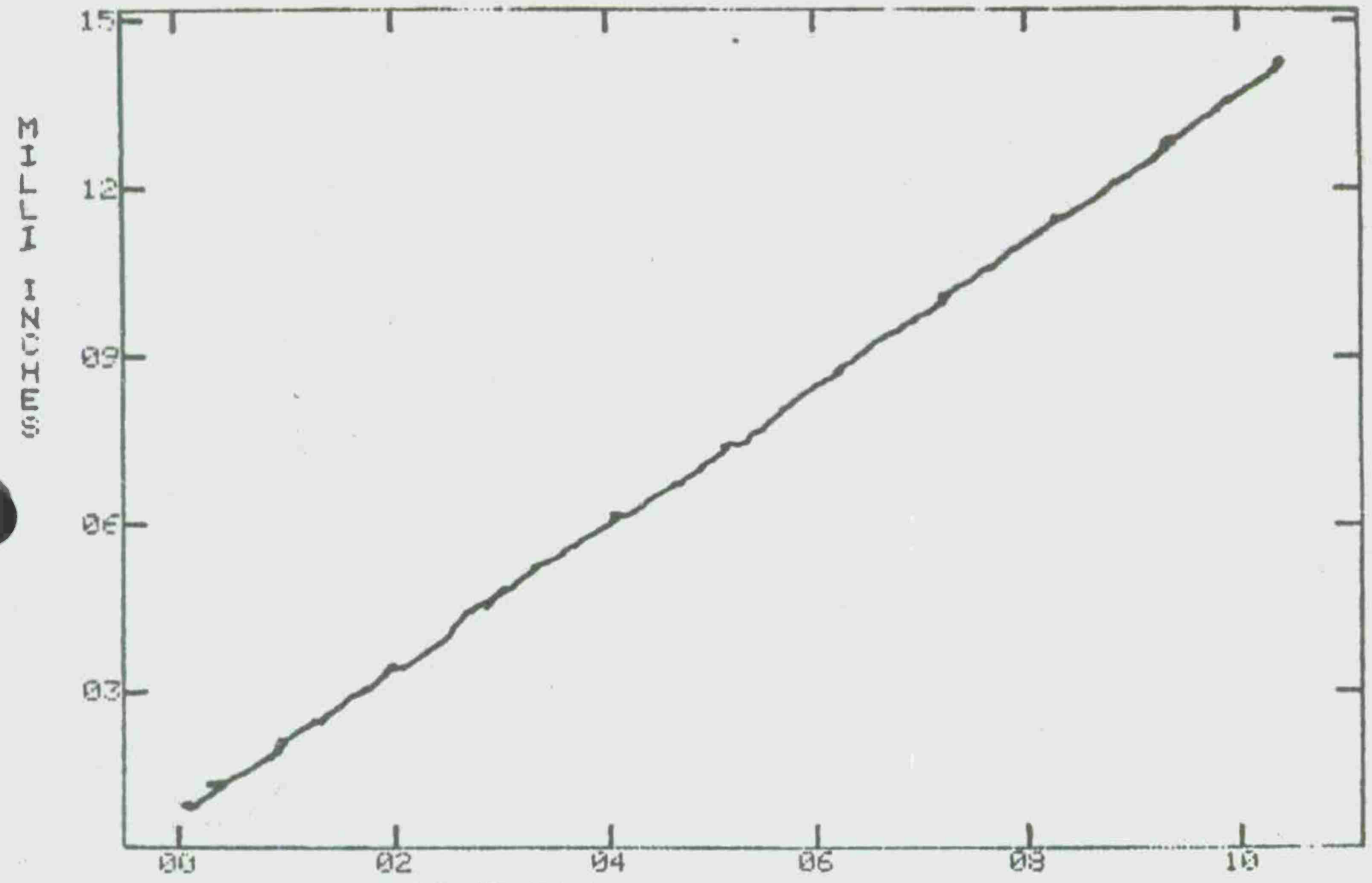
LOAD APPLIED VS VERT DEFLN - ST 148.50 R.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



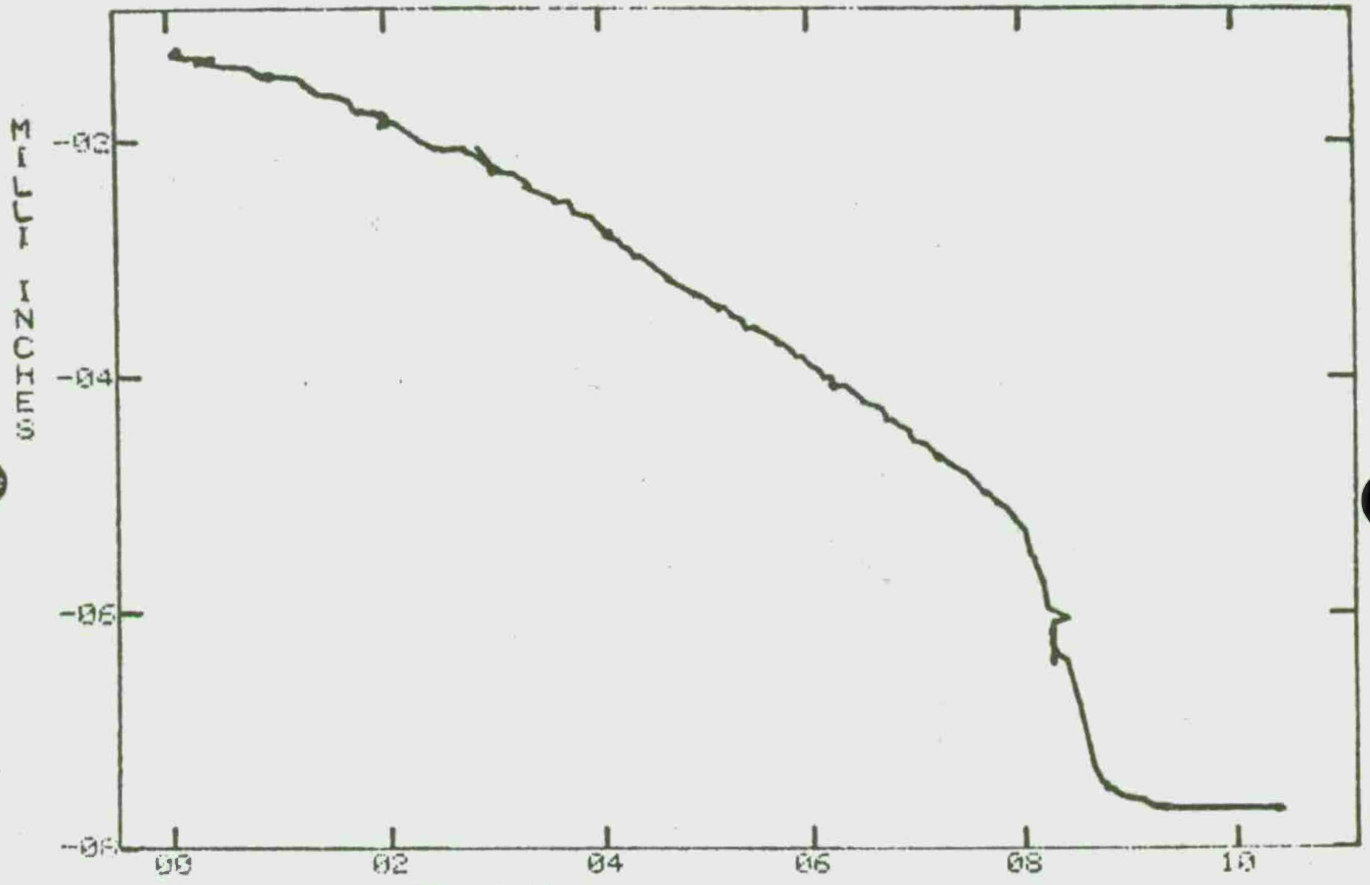
LOAD APPLIED VS VERT DEFLN - ST 213.90 R.H. X 10-1
TEST 25 (9JUL75) AH1G BEND TEST



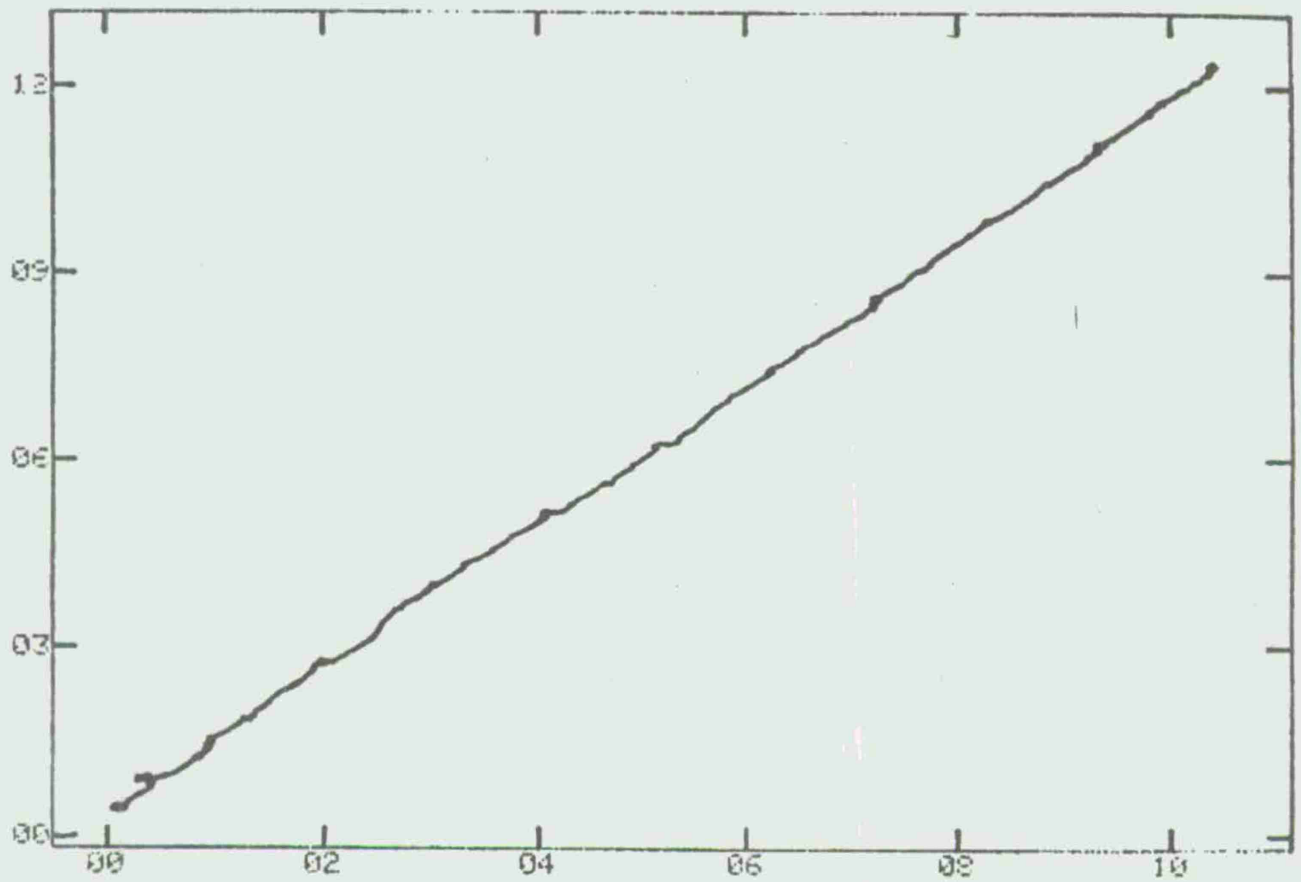
LOAD APPLIED VS BASE ROTN DEFLN - UPPER L.H. X 10+0
TEST 25 (9JUL75) AH1G BEND TEST



LOAD APPLIED US BASE ROTN DEFLN - LOWER L.H. X 10+0
TEST 25 (9JUL75) AH1G BEND TEST



LOAD APPLIED VS BASE ROTN DEFLN - UPPER R.H X 10+0
TEST 25 (9JUL75) AH1G BEND TEST



LOAD APPLIED VS BASE RTN DEFLN - LOWER R.H. X 10+0
TEST 25 (9JUL75) AH1G BEND TEST

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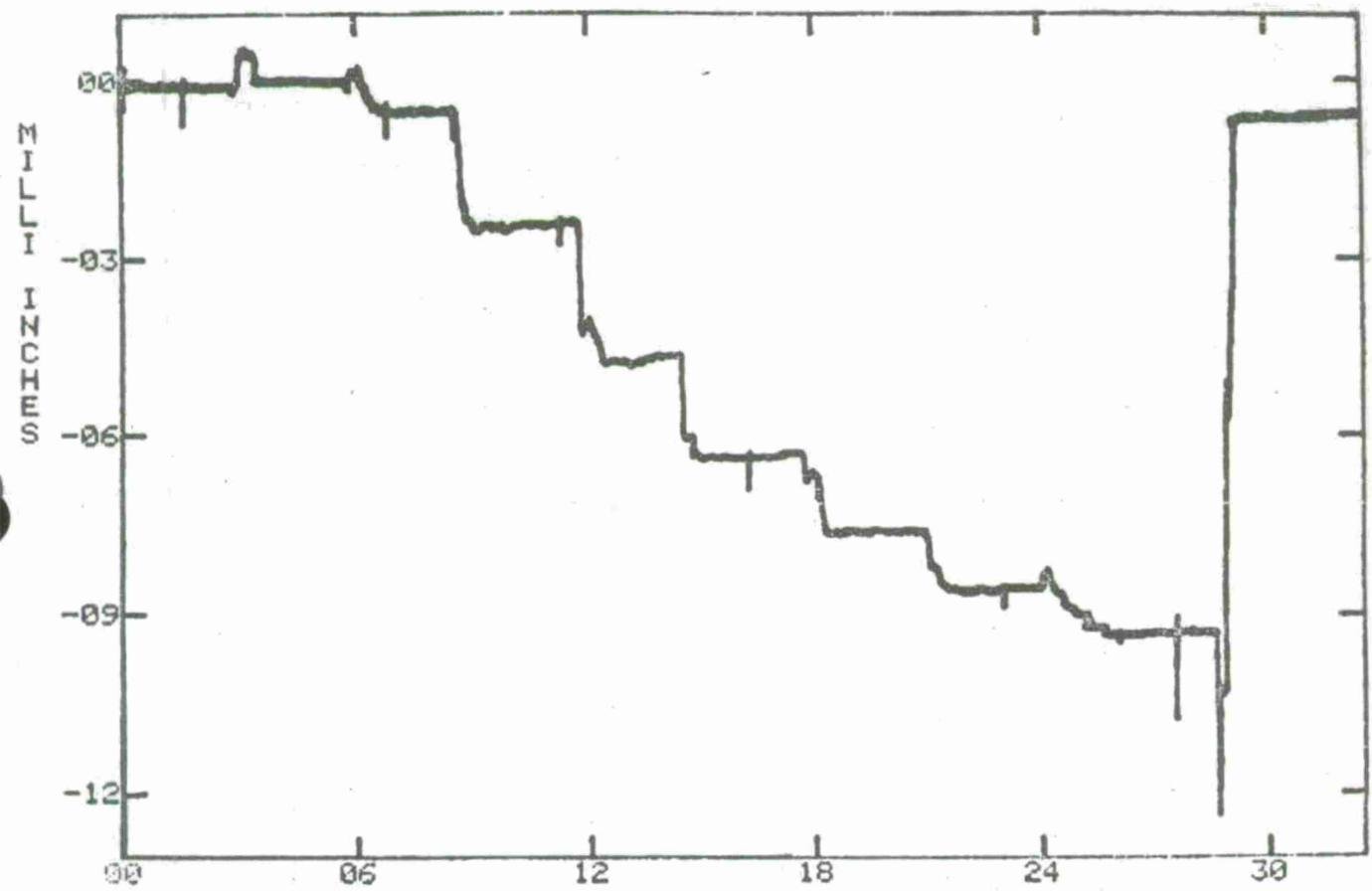
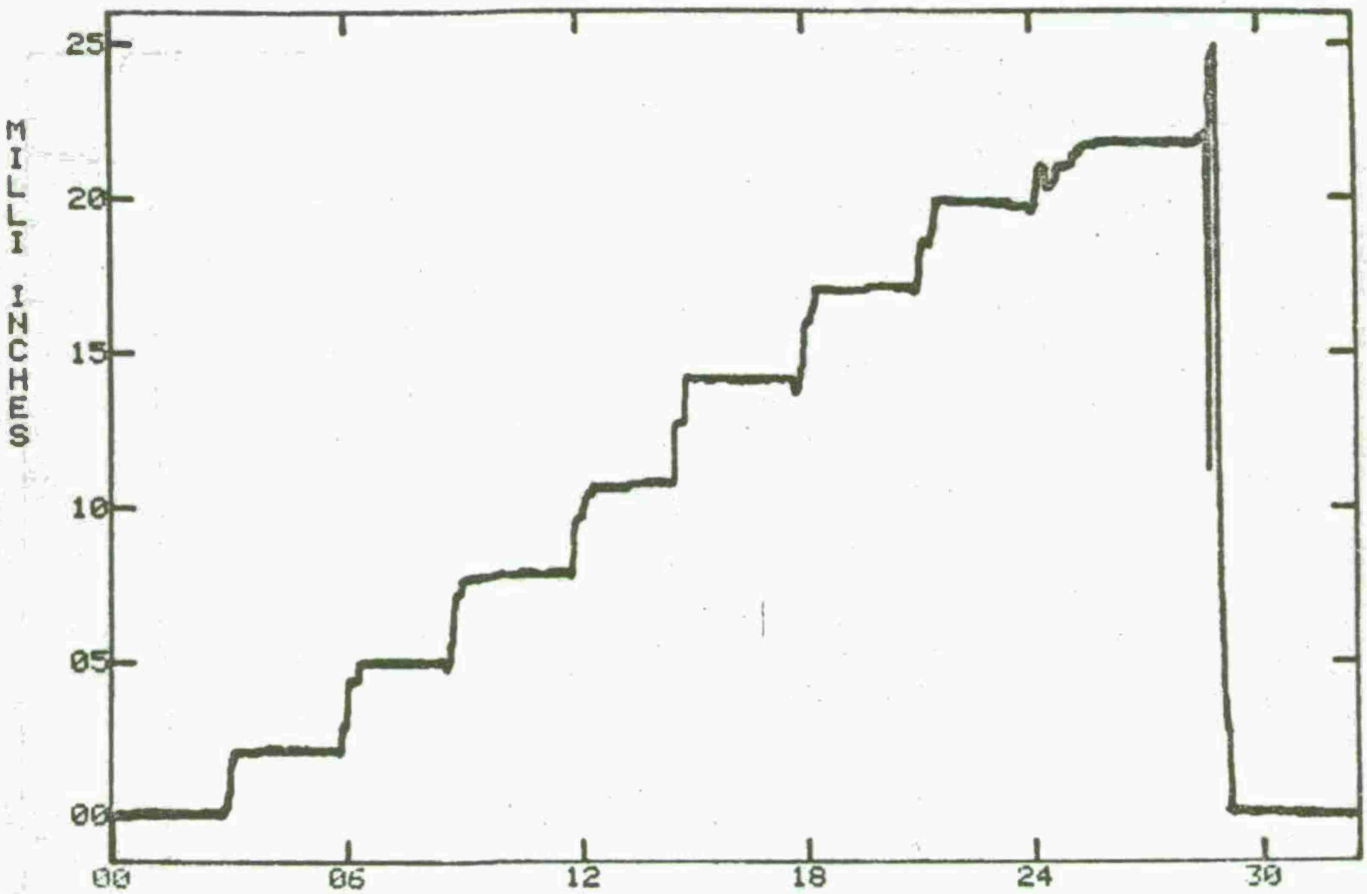
APPENDIX C

Data Sheets for Torsion Loading at Nose



CH 1 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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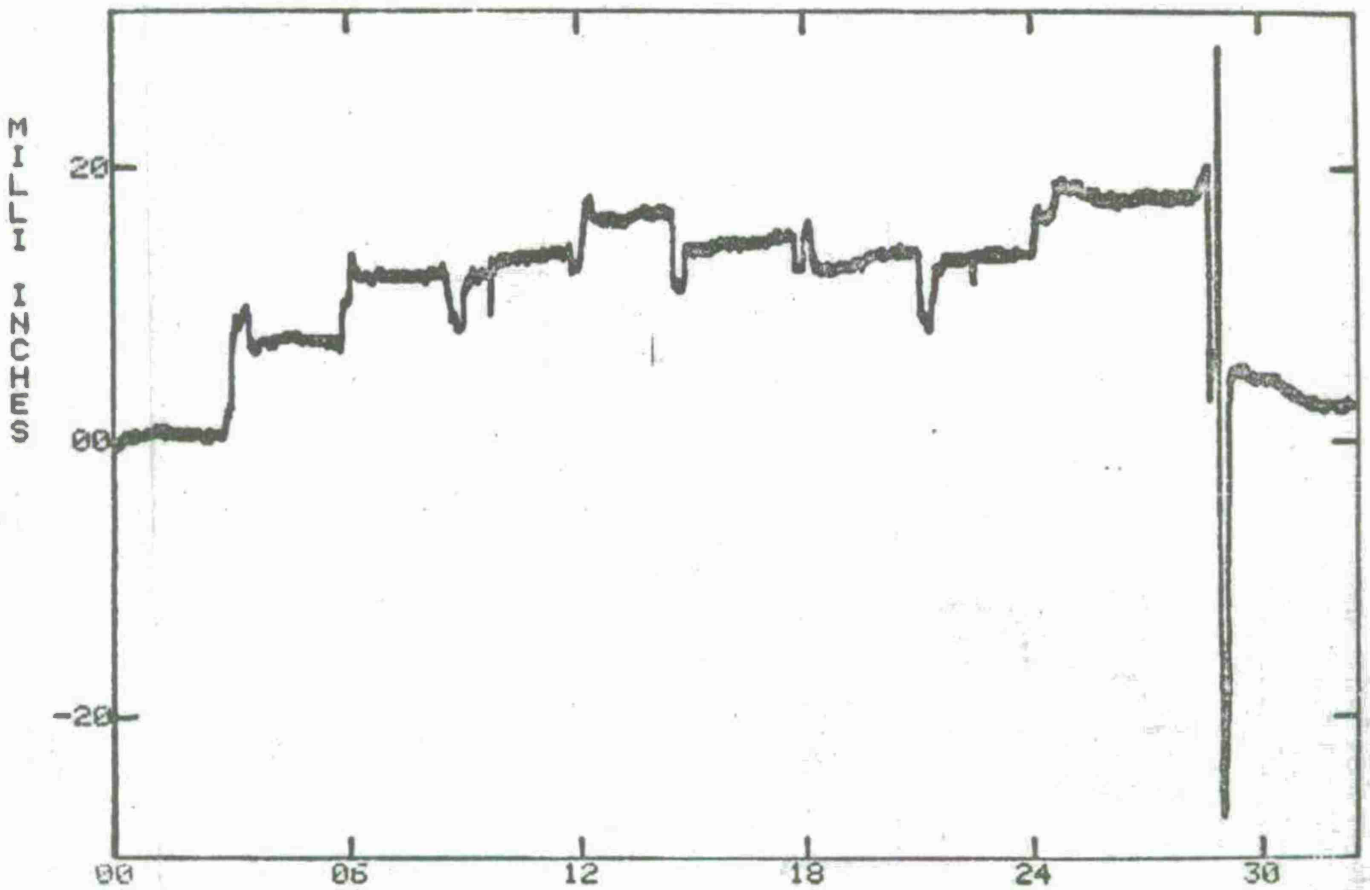
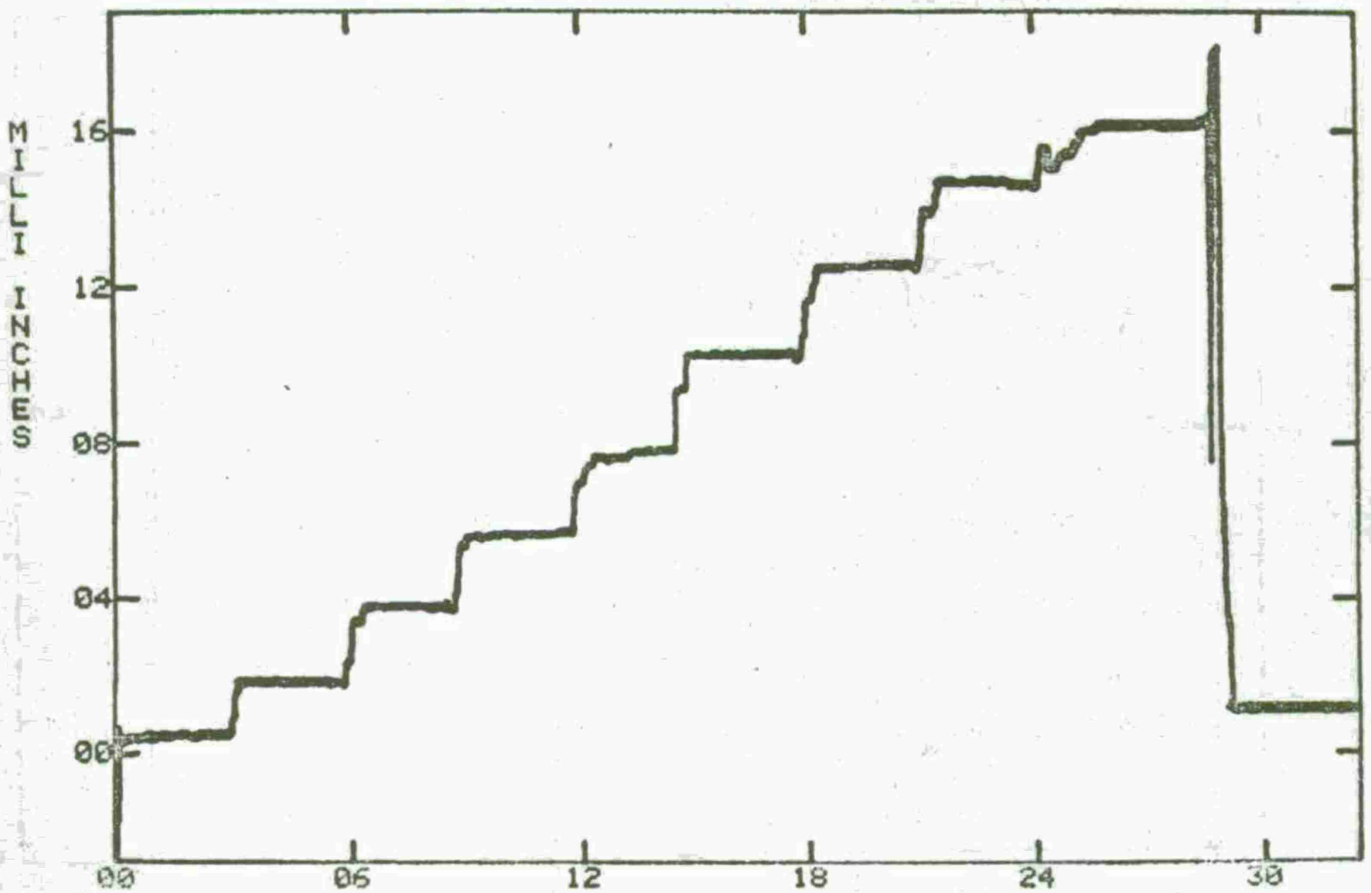
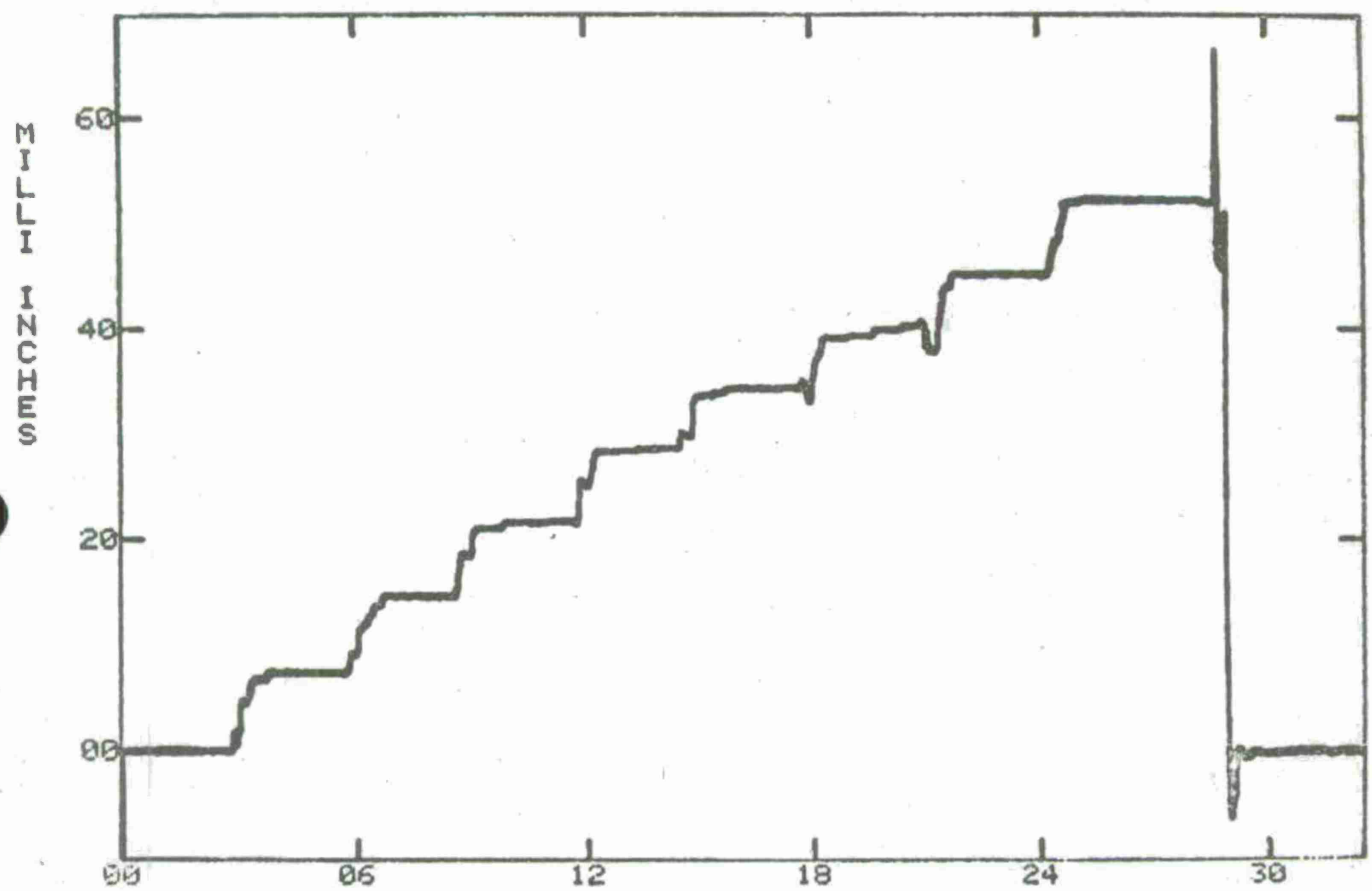
TIME IN SECONDS X 10-1
CH 2 WING TRQ DEFLN - ST 212.63 - WS 59 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 3 WING TRQ DEFLN - ST 191.075 - WS 42.5 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 4 WING TRQ DEFLN - ST 212.63 - WS 42.5 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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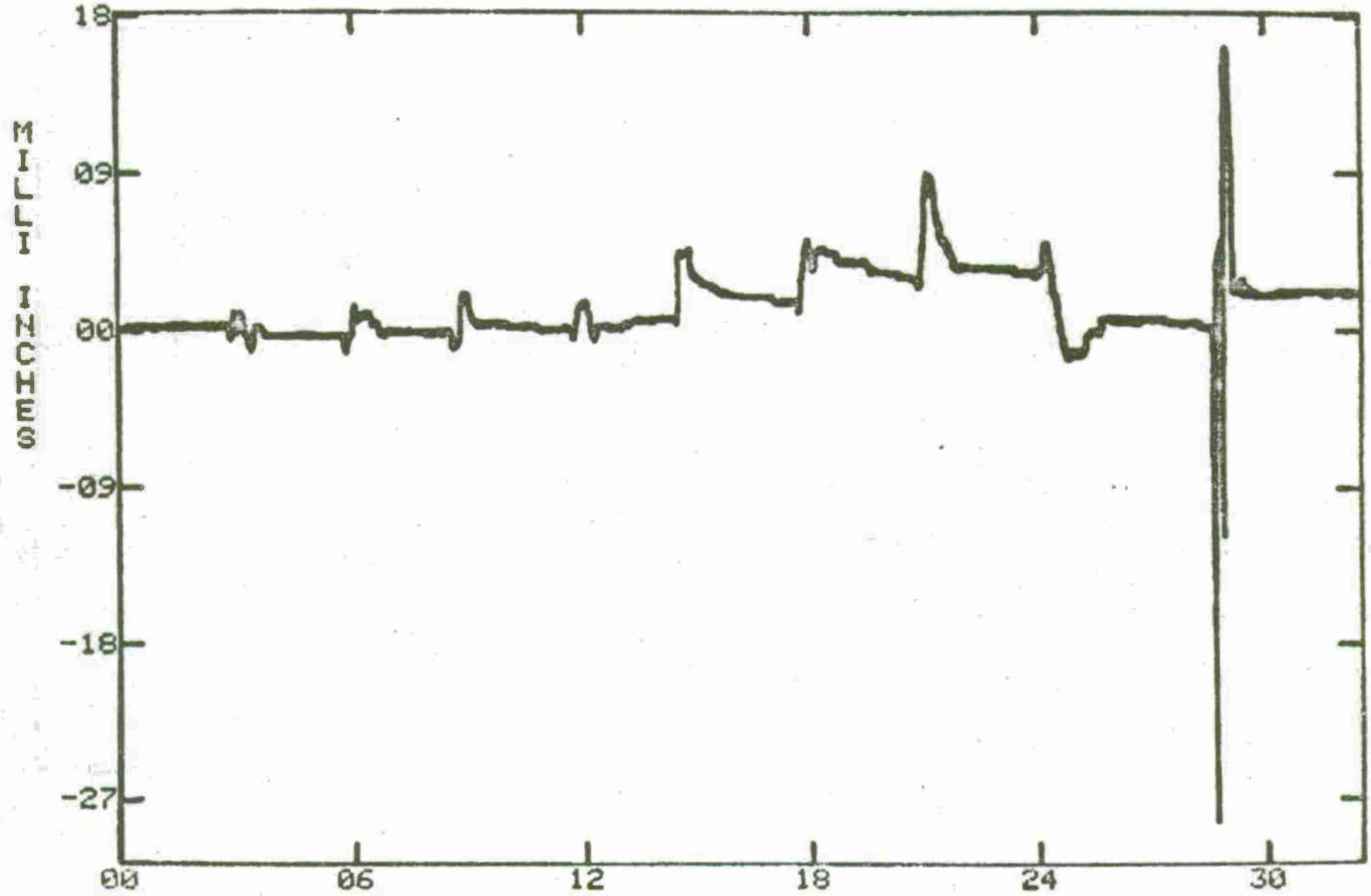
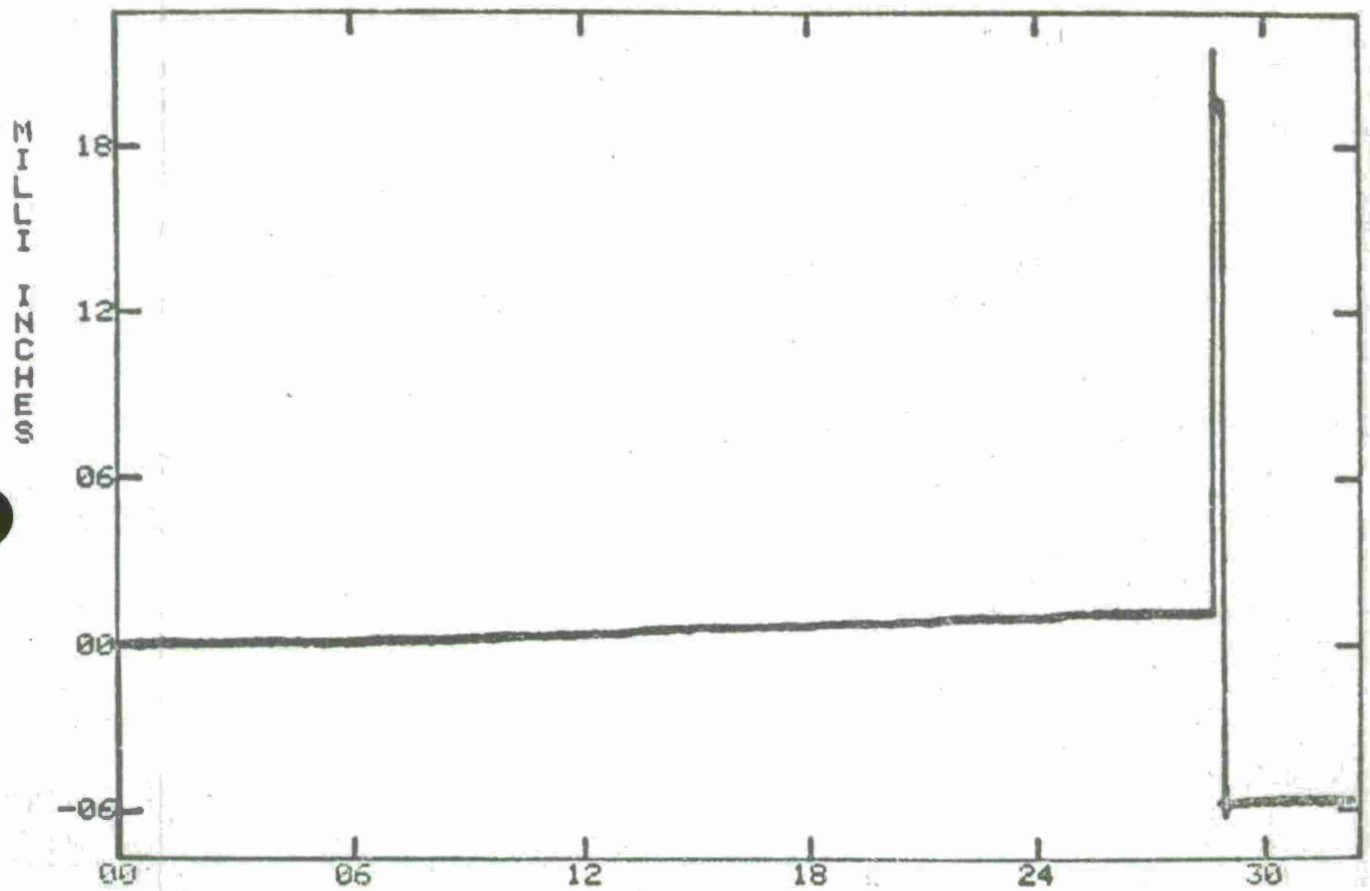
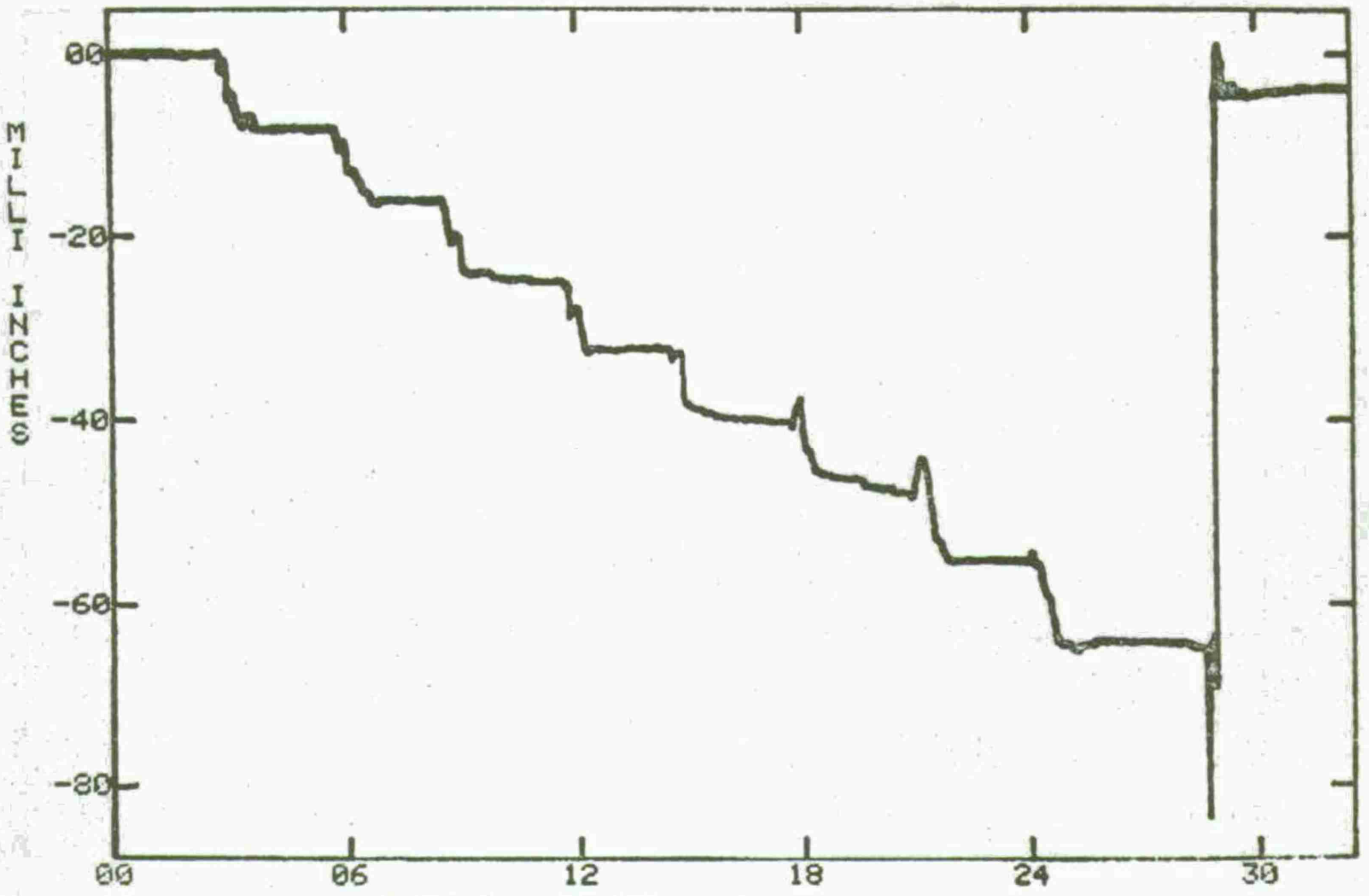
TIME IN SECONDS X 10-1
CH 5 WING TRQ DEFLN - ST 187.50 - WS 21.38 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



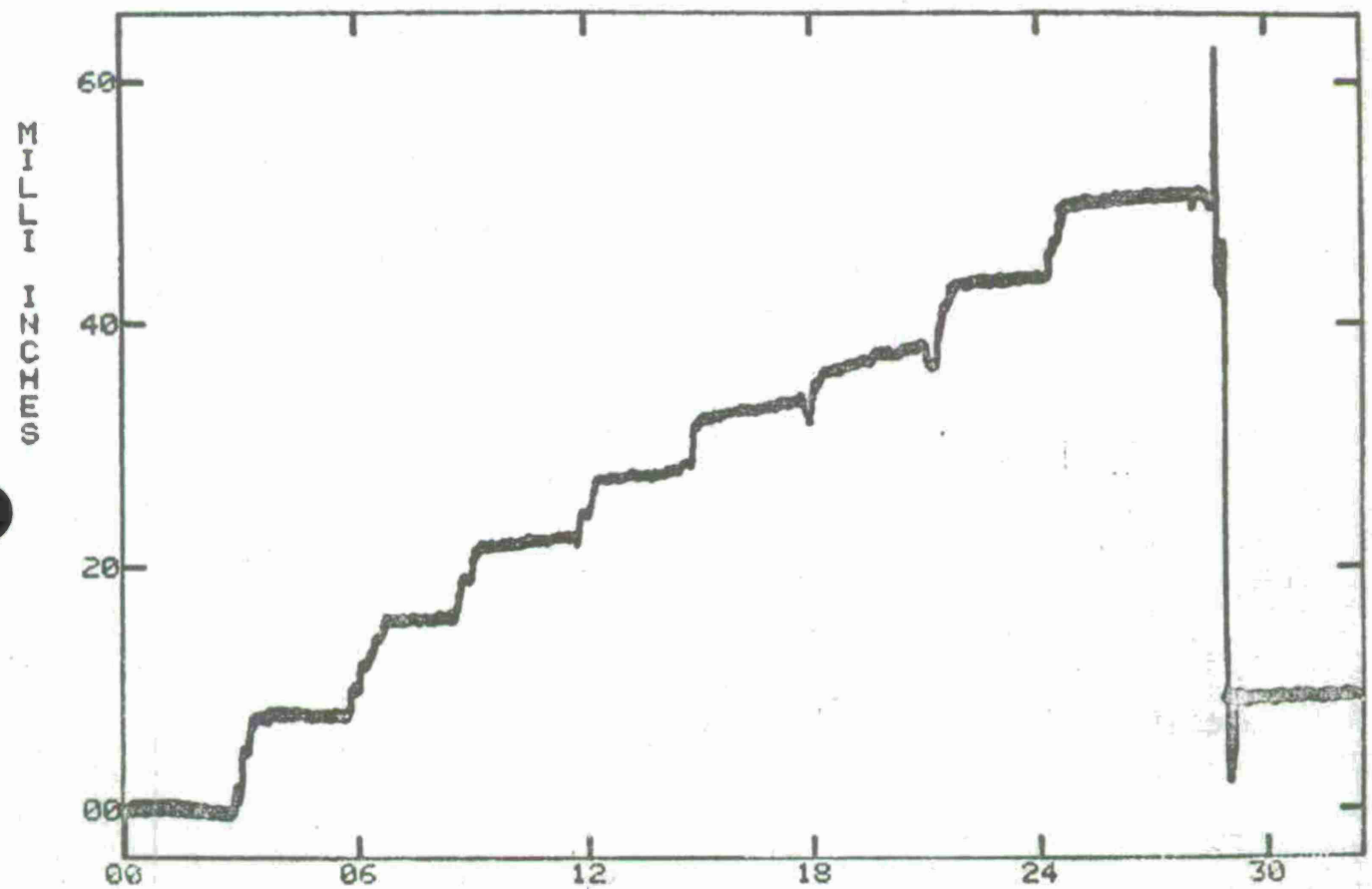
CH 6 WING TRQ DEFLN - ST 212.63 - WS 21.38 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 7 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 8 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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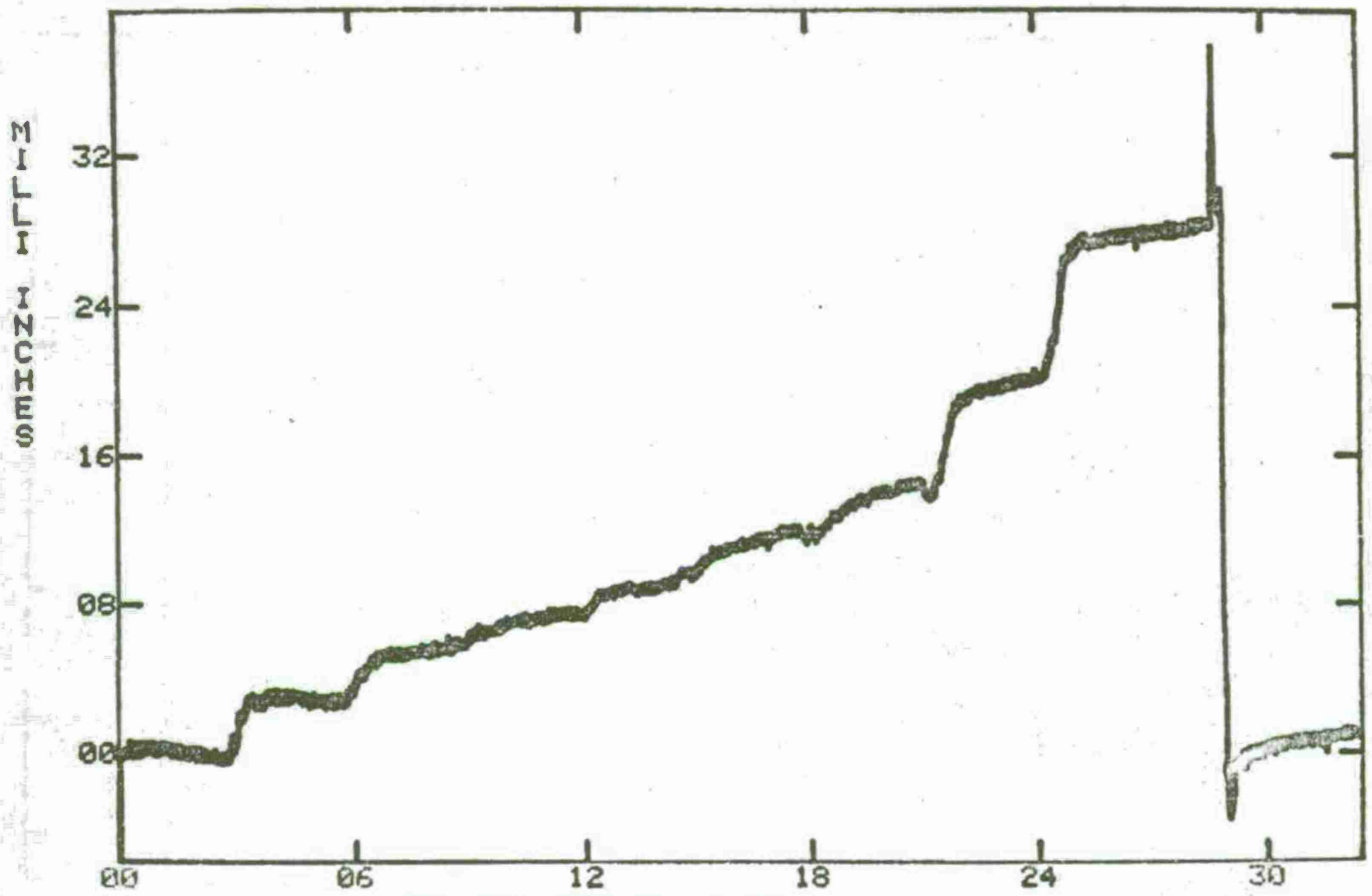
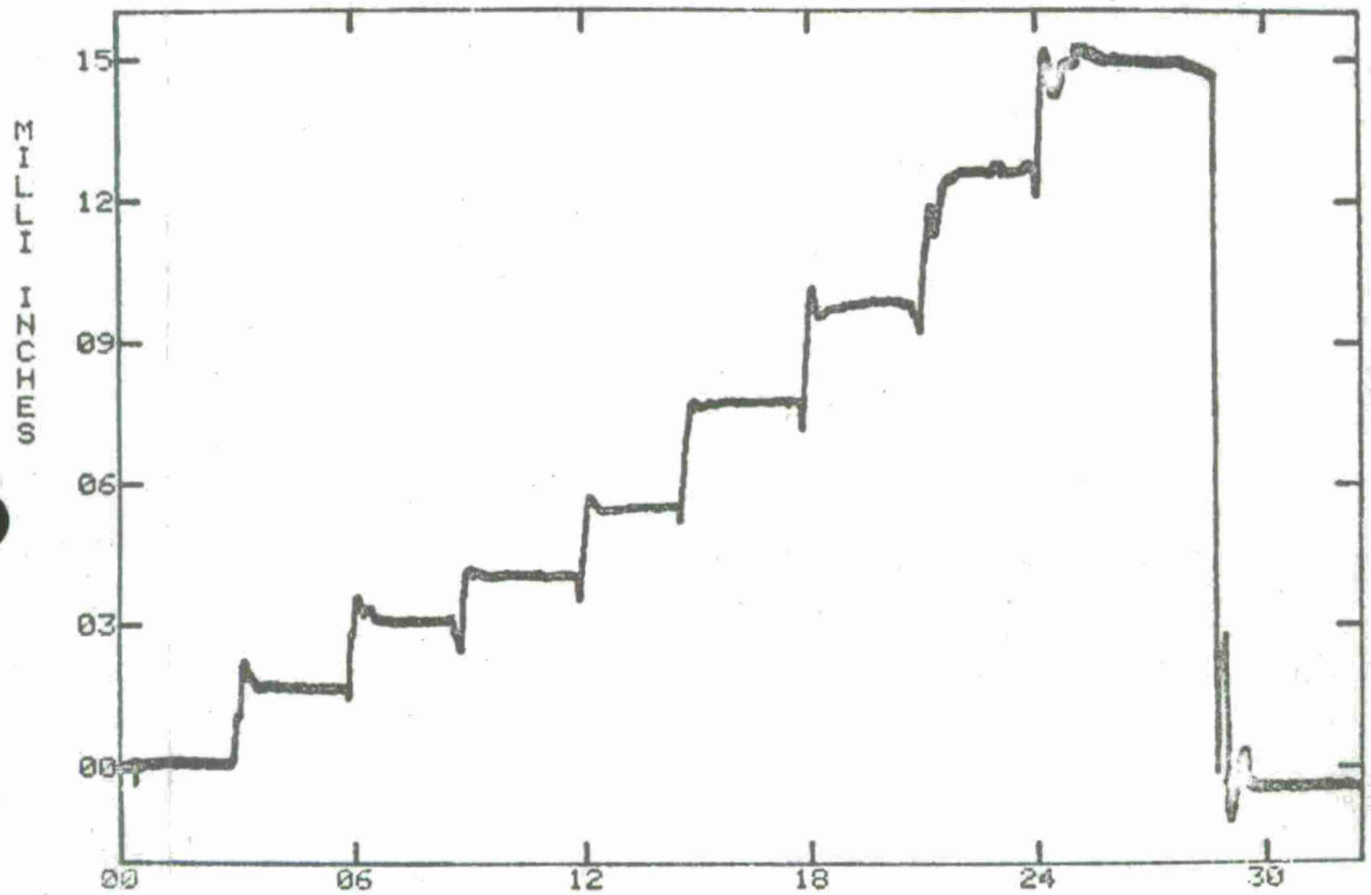
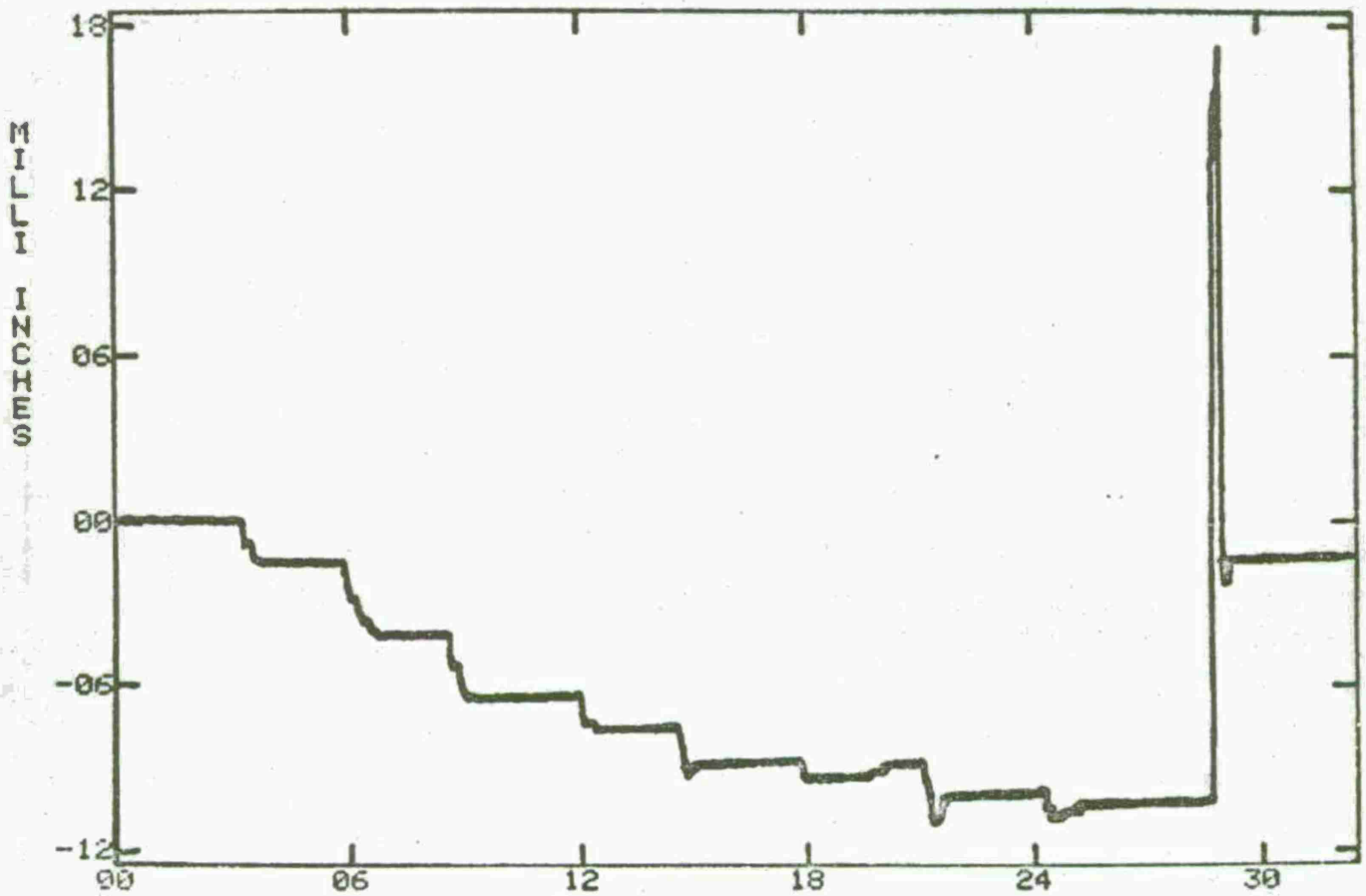
TIME IN SECONDS X 10-1
CH 9 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



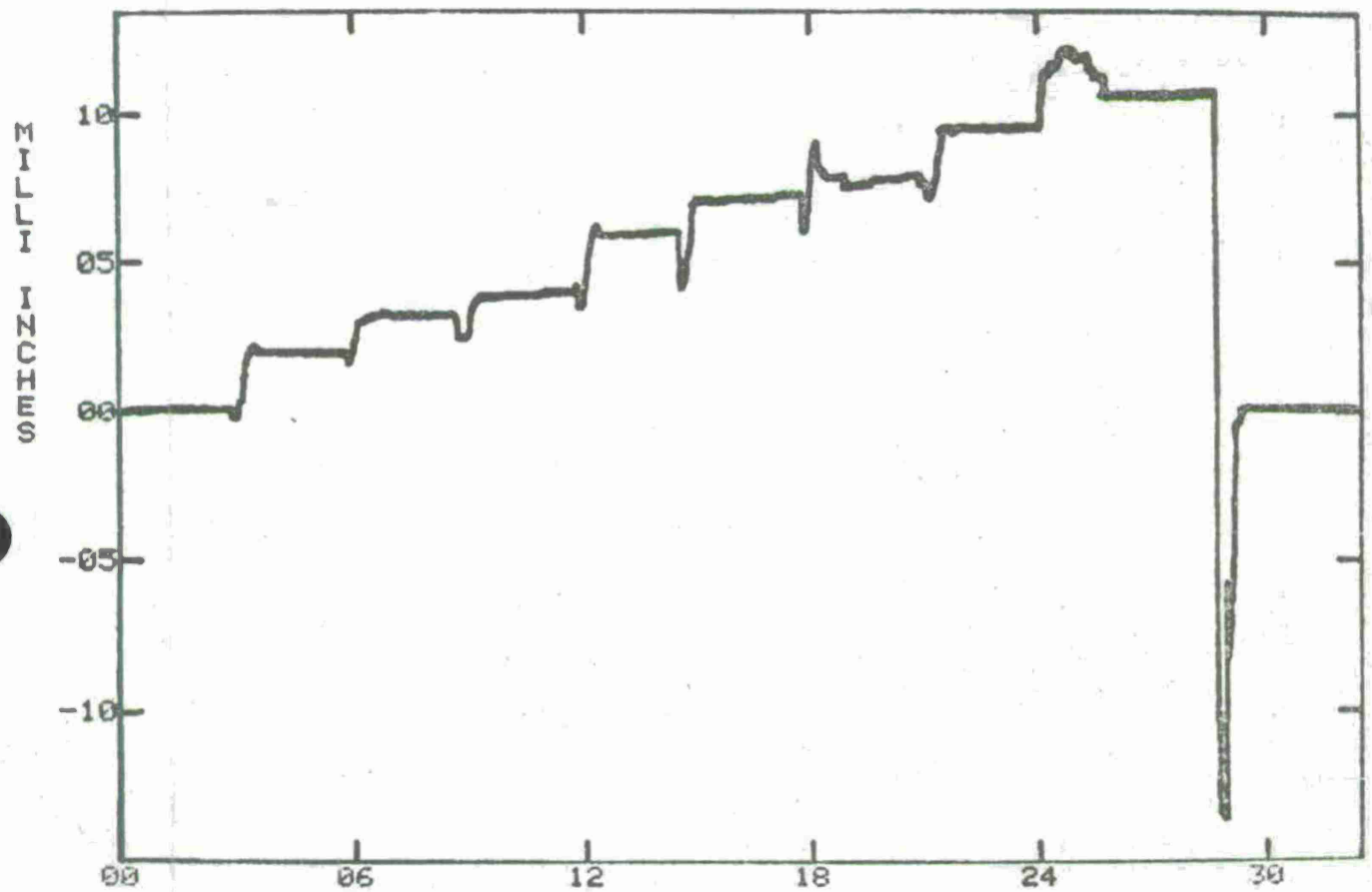
CH 10 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



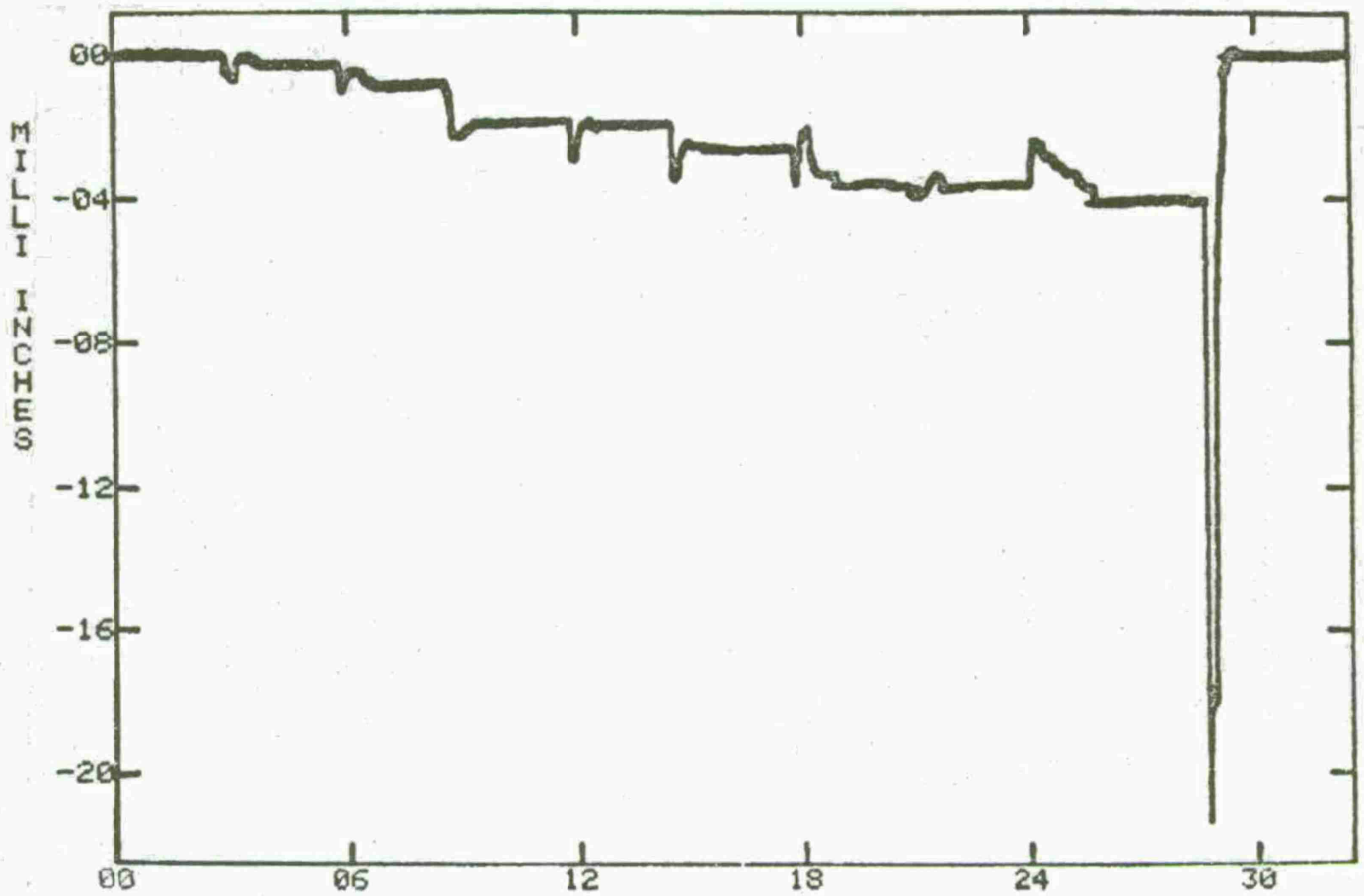
CH 11 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



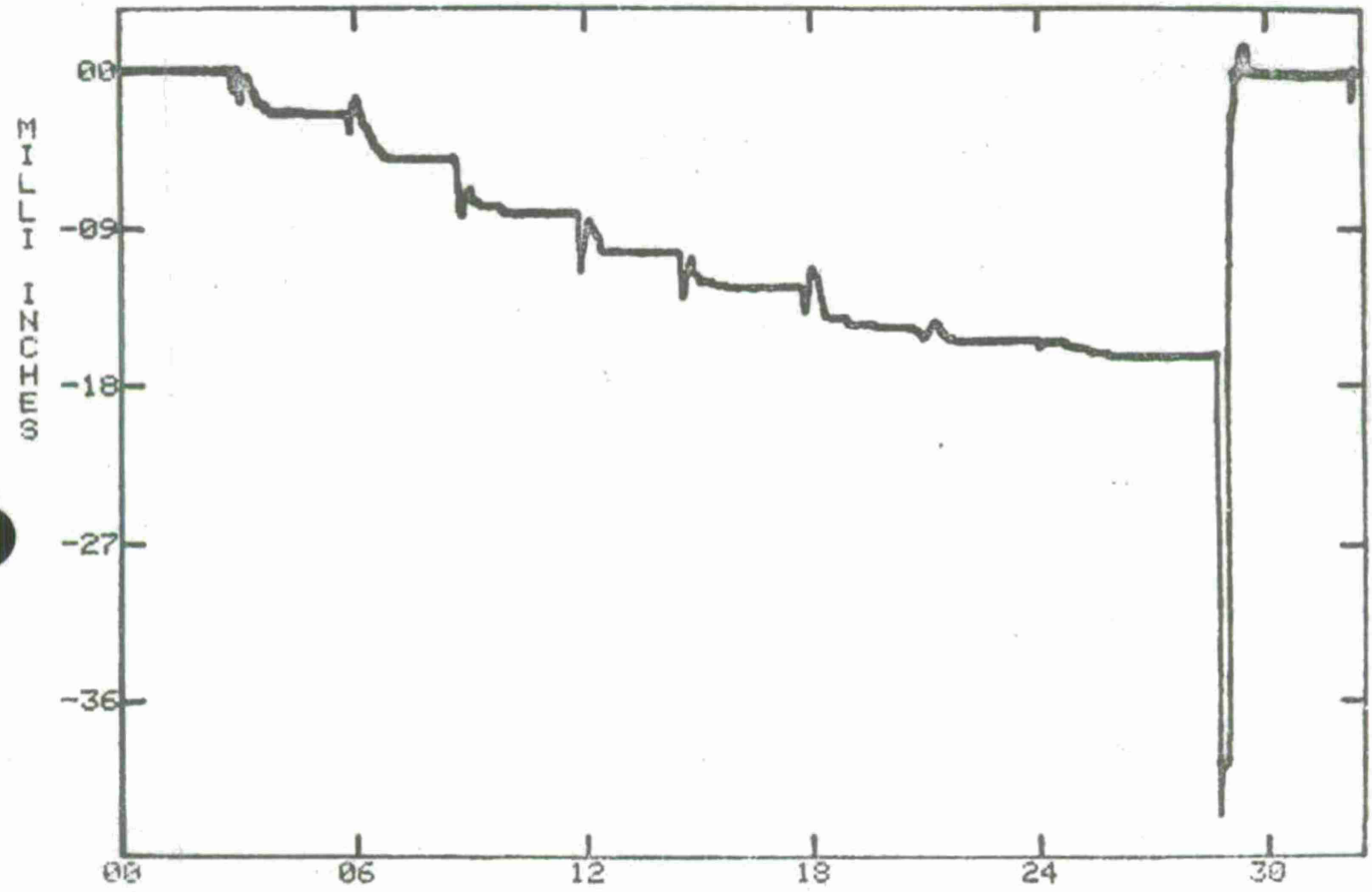
CH 12 WING TRQ DEFLN - ST 212.634 - WS 59 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



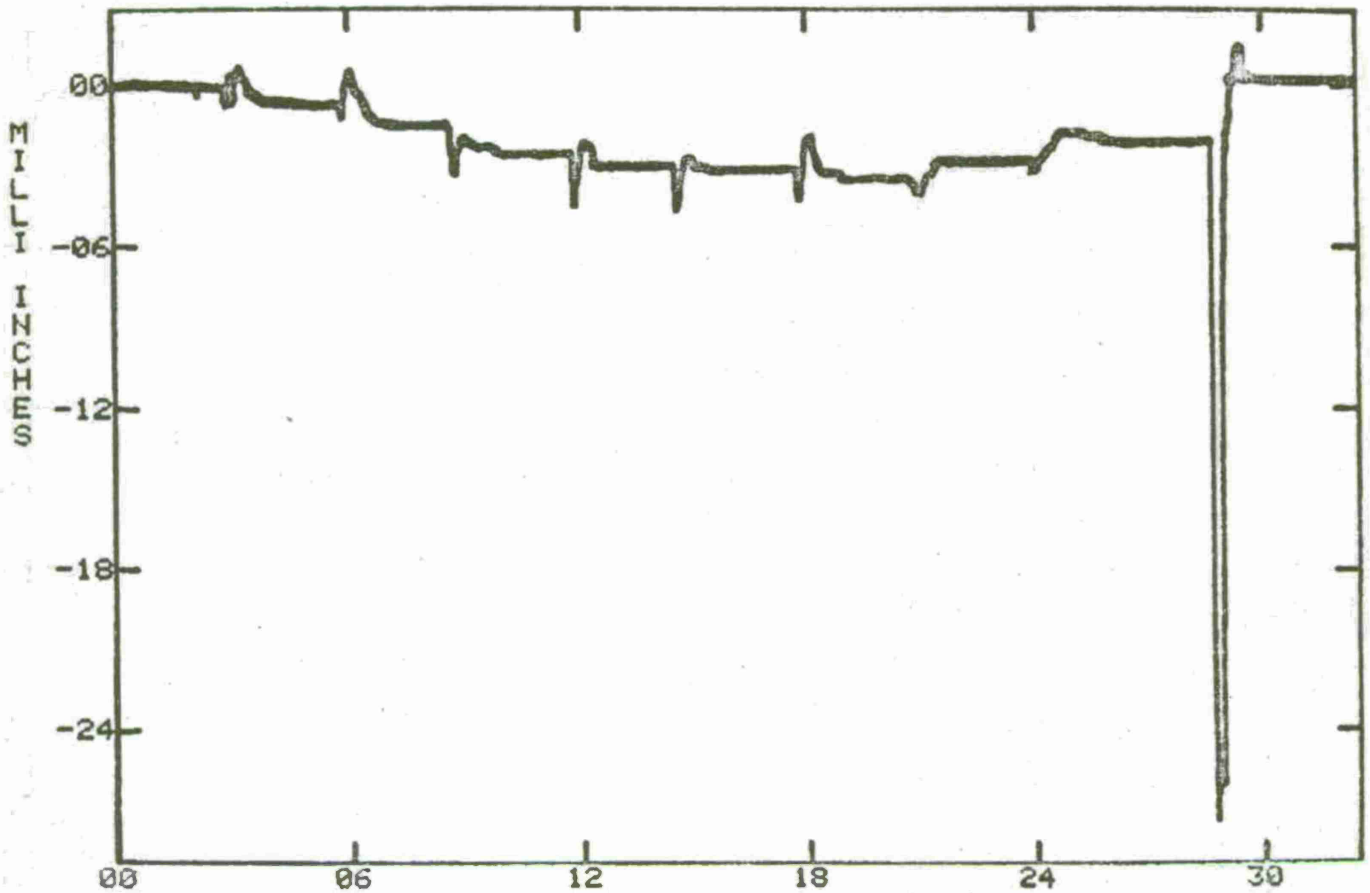
CH 13 GROUND REF - R.H. TOP X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



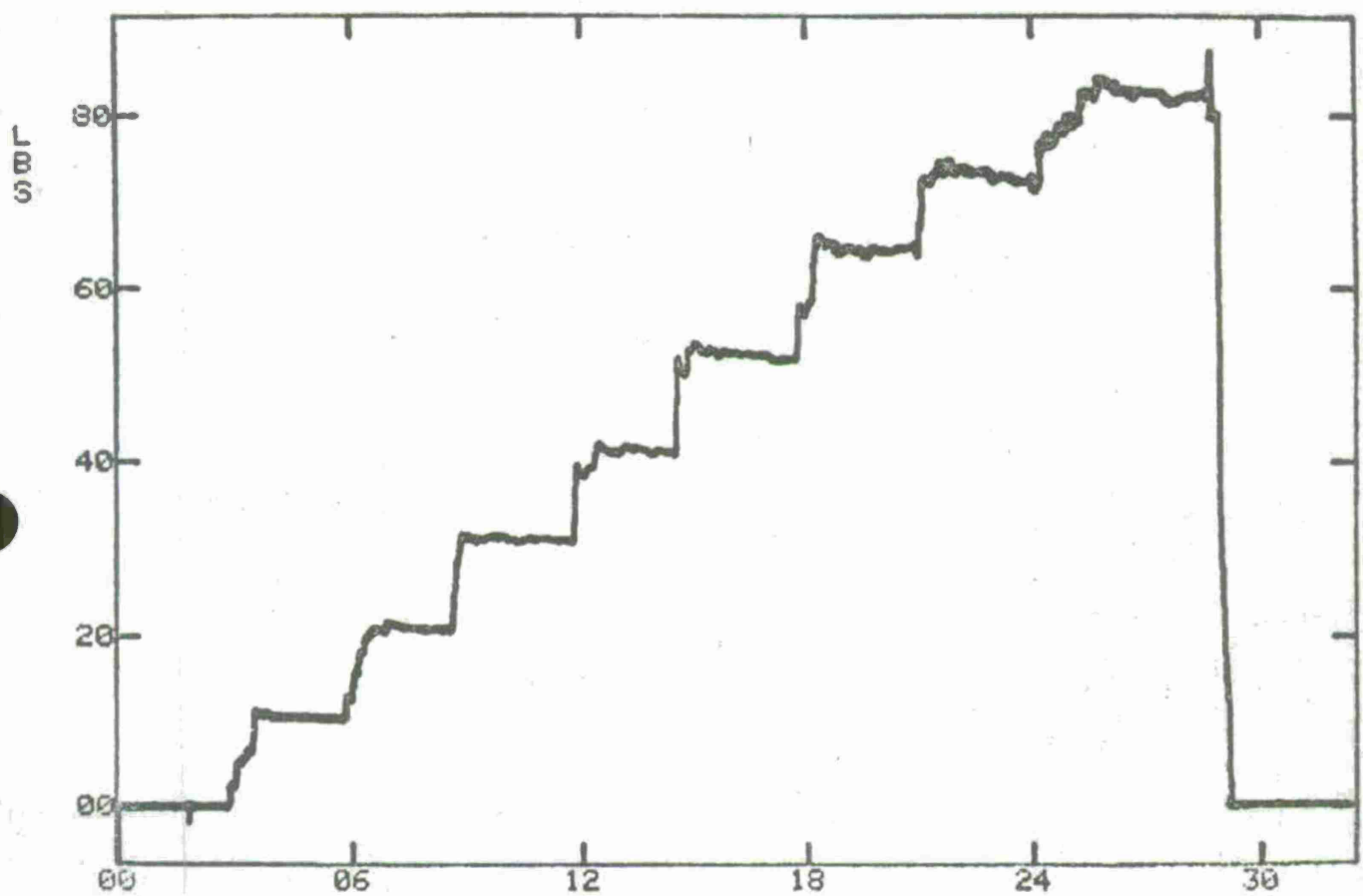
CH 14 GROUND REF - R.H. BOTTOM X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



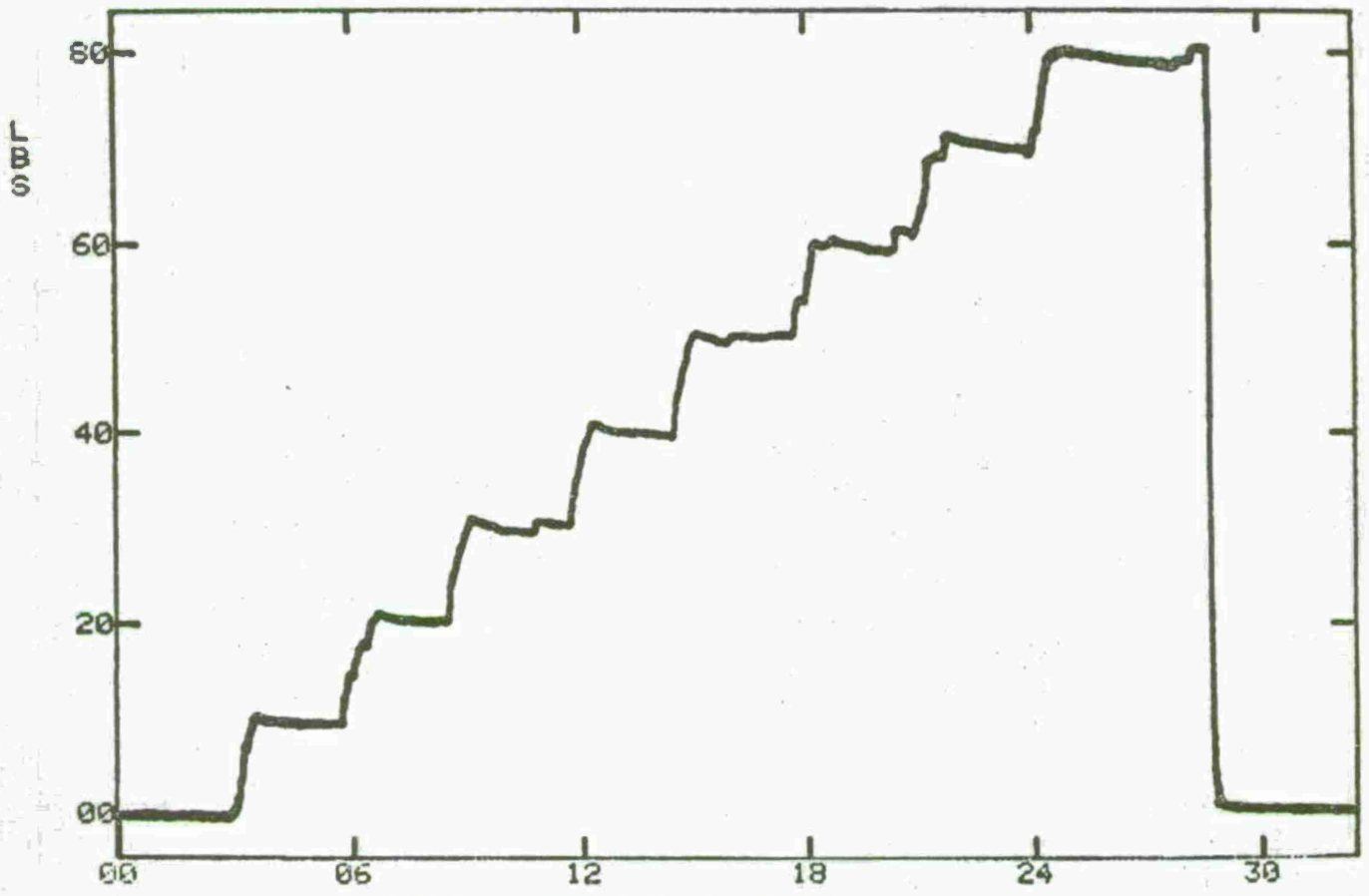
CH 15 GROUND REF - L.H. TOP X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 17 GROUND REF - L.H. BOTTOM X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 18 LOAD APPLIED - L.H. DN X 10-1
TEST 33 (22AUG75) AH1G BEND TESTS


80
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LBS
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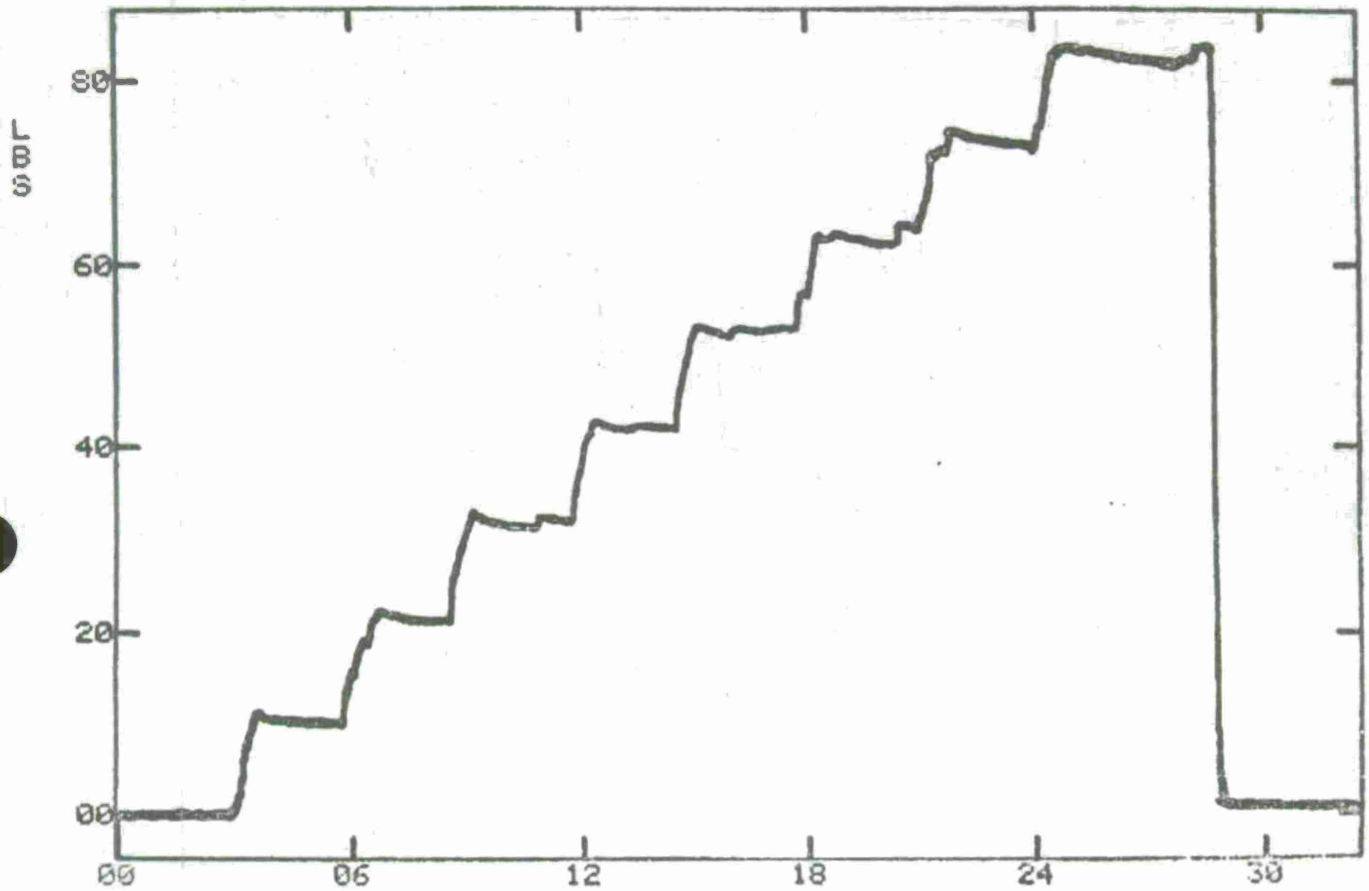
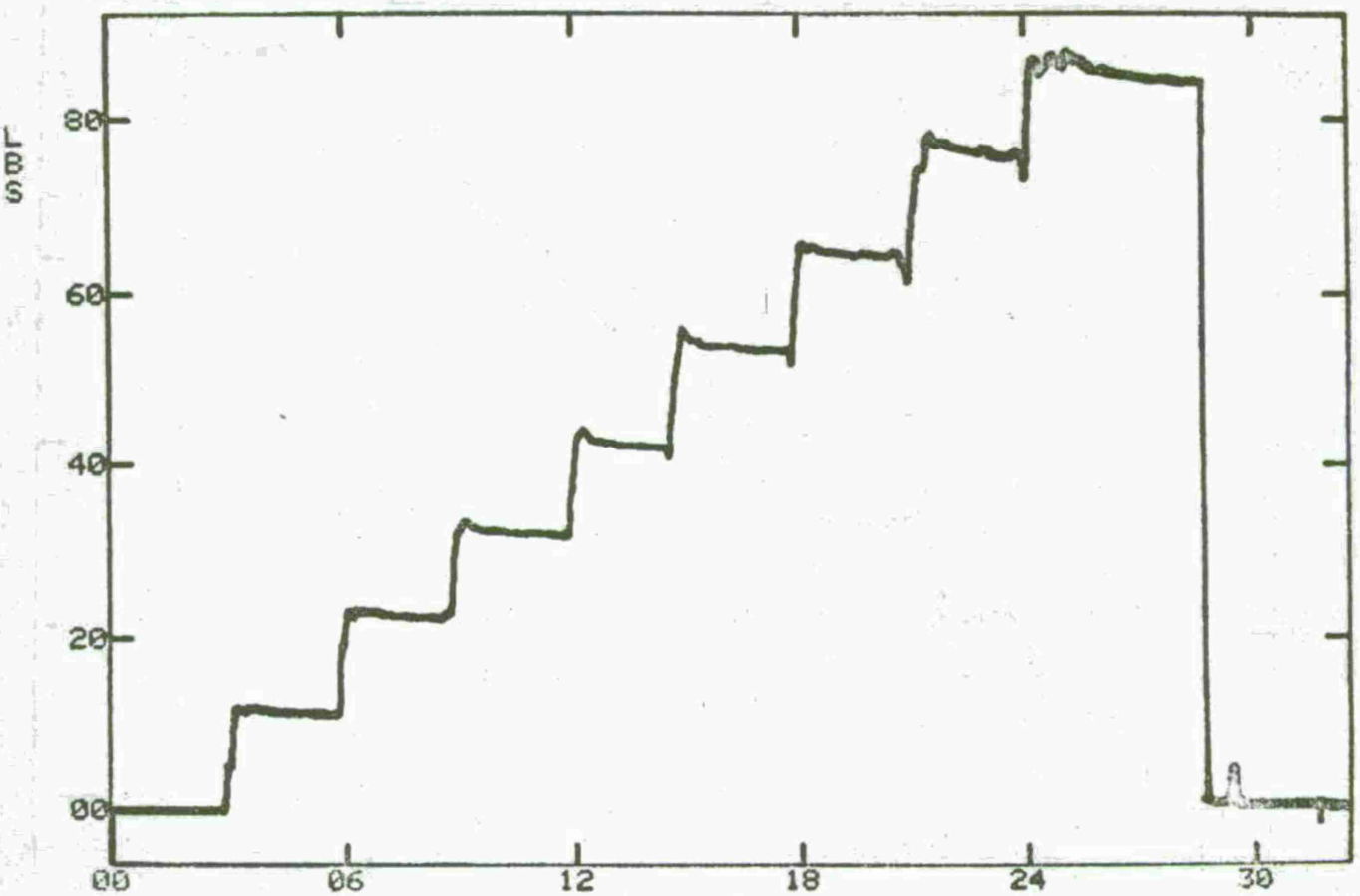
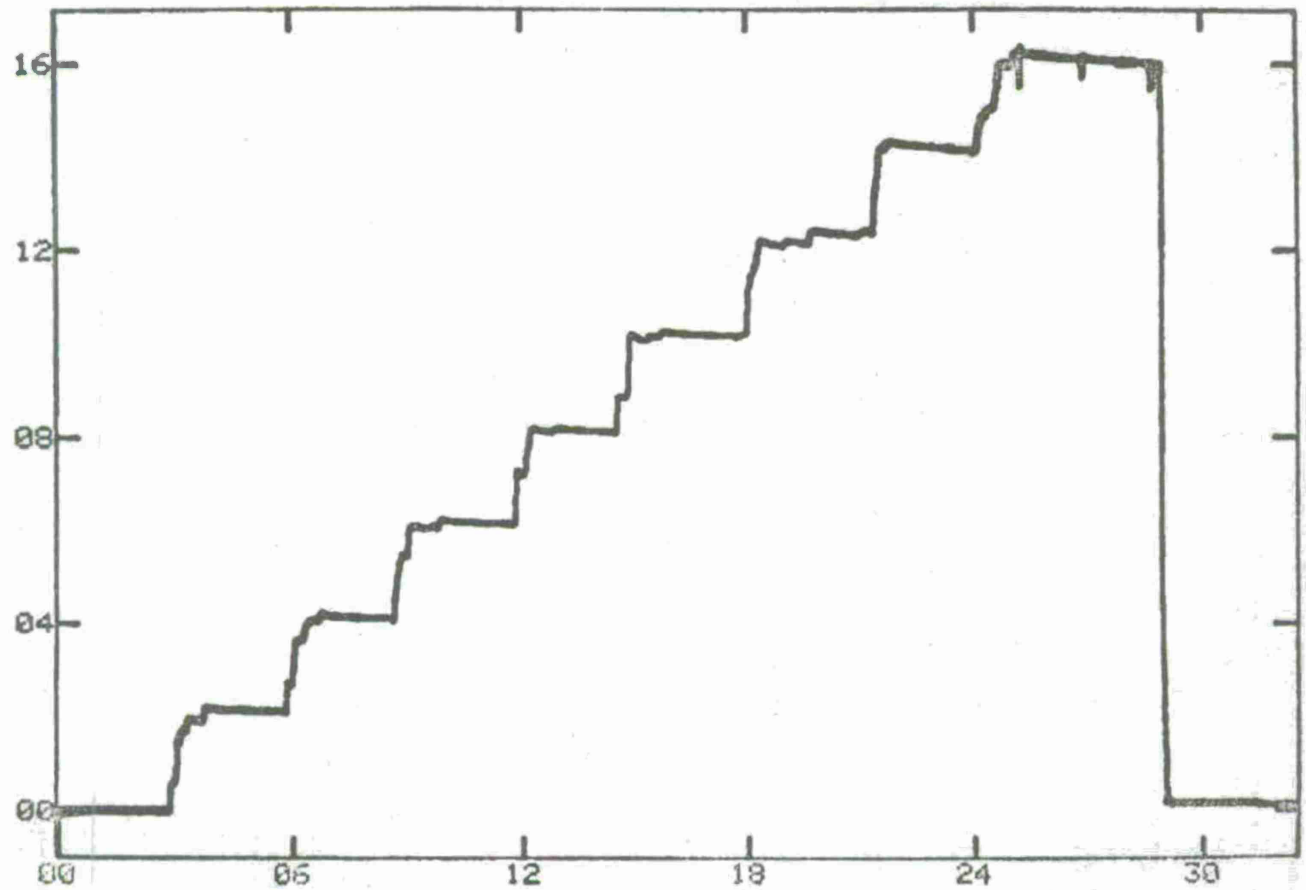
24
30
TIME IN SECONDS X 10-1
CH 19 LOAD APPLIED - R.H. DN (CHS 1/10) X 10-1
TEST 33 (22AUG75) AH1G BEND TESTS



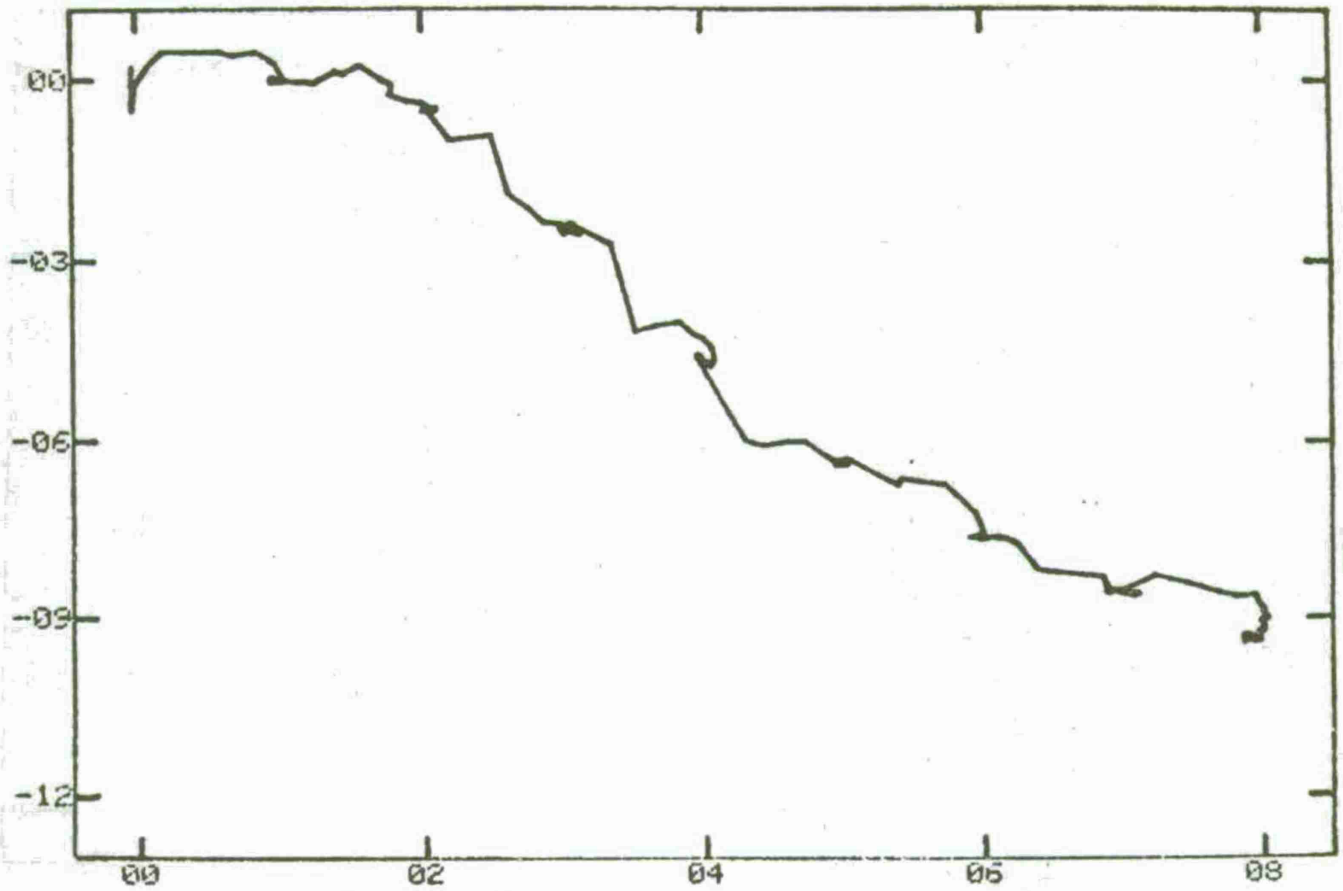
TIME IN SECONDS X 10-1
CH 19 LOAD APPLIED - R.H. DN (CHS 11/21) X 10-1
TEST 33 (22AUG75) AH1G BEND TESTS



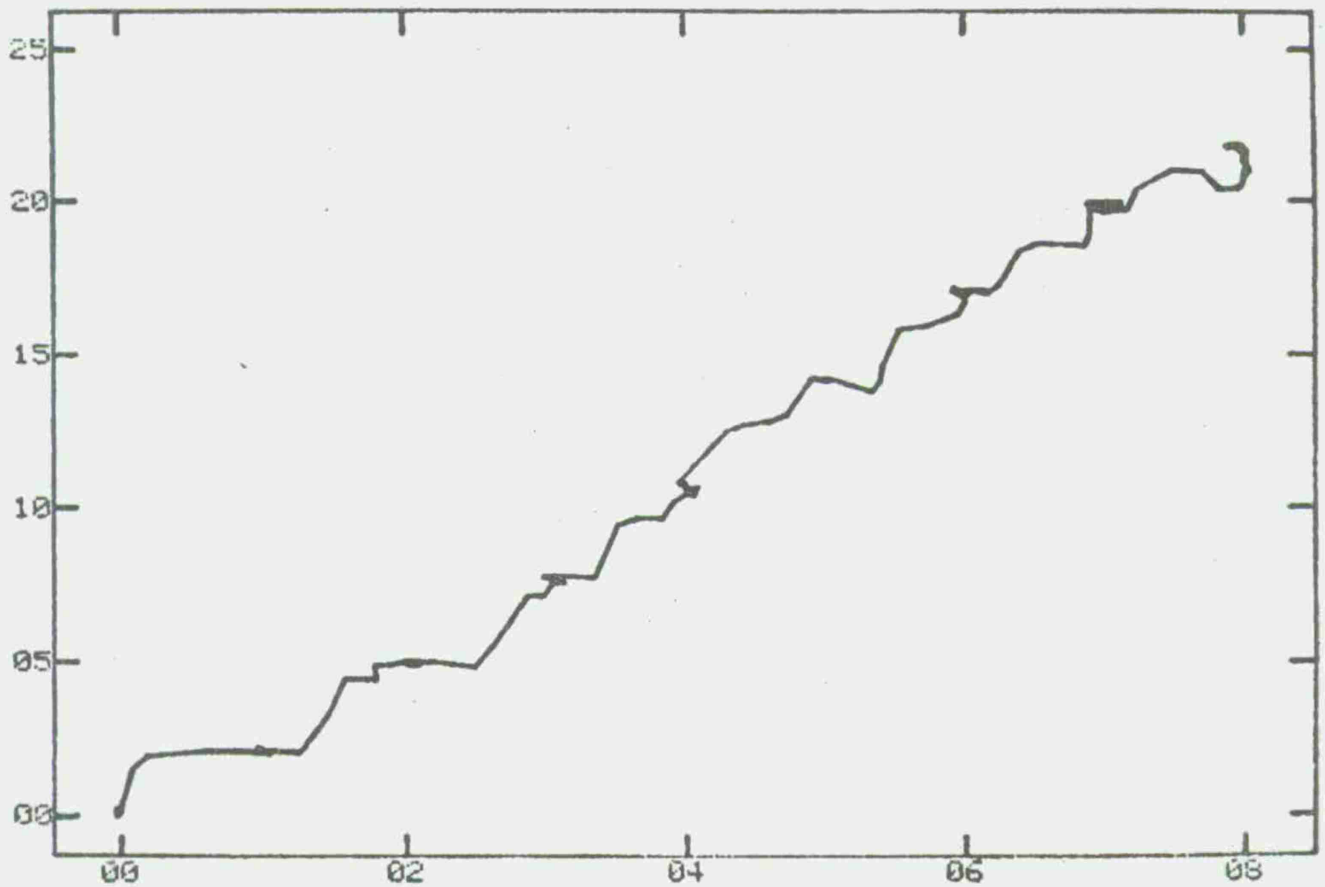
CH 20 LOAD APPLIED - R.H. UP X 10-1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 21 LOAD APPLIED - L.H. UP X 10-2
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 1 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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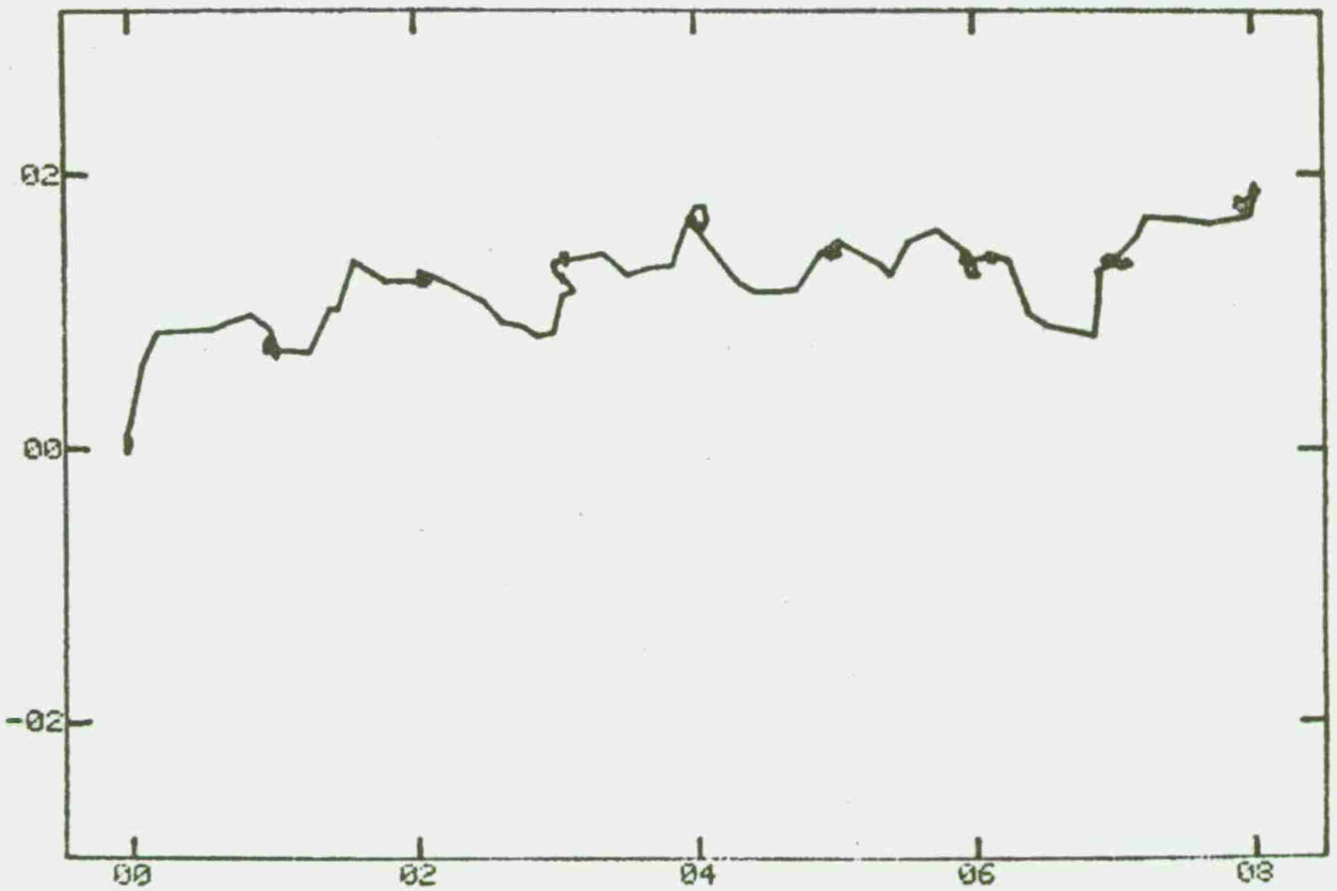
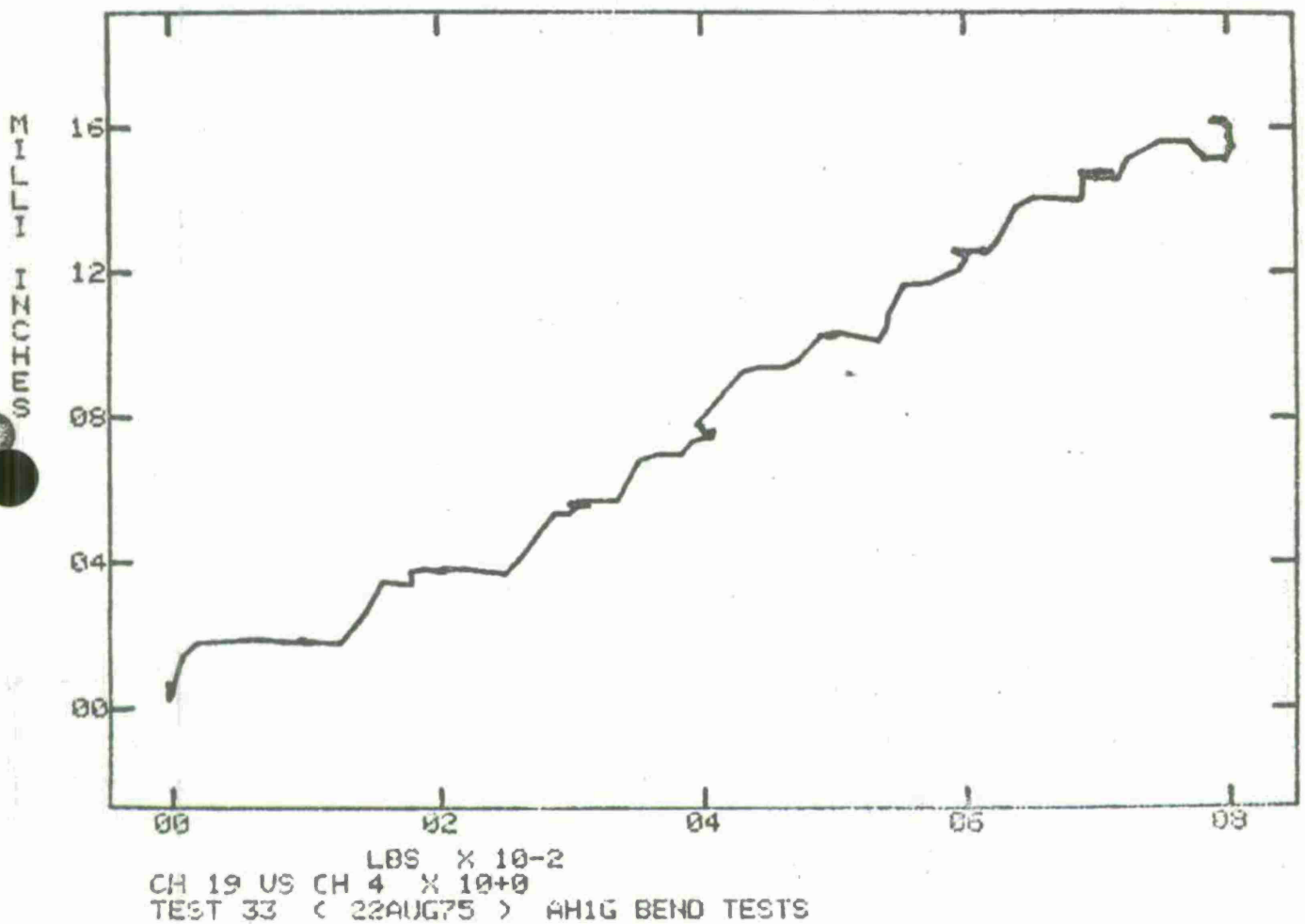
LBS X 10-2
CH 19 VS CH 2 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 3 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
16
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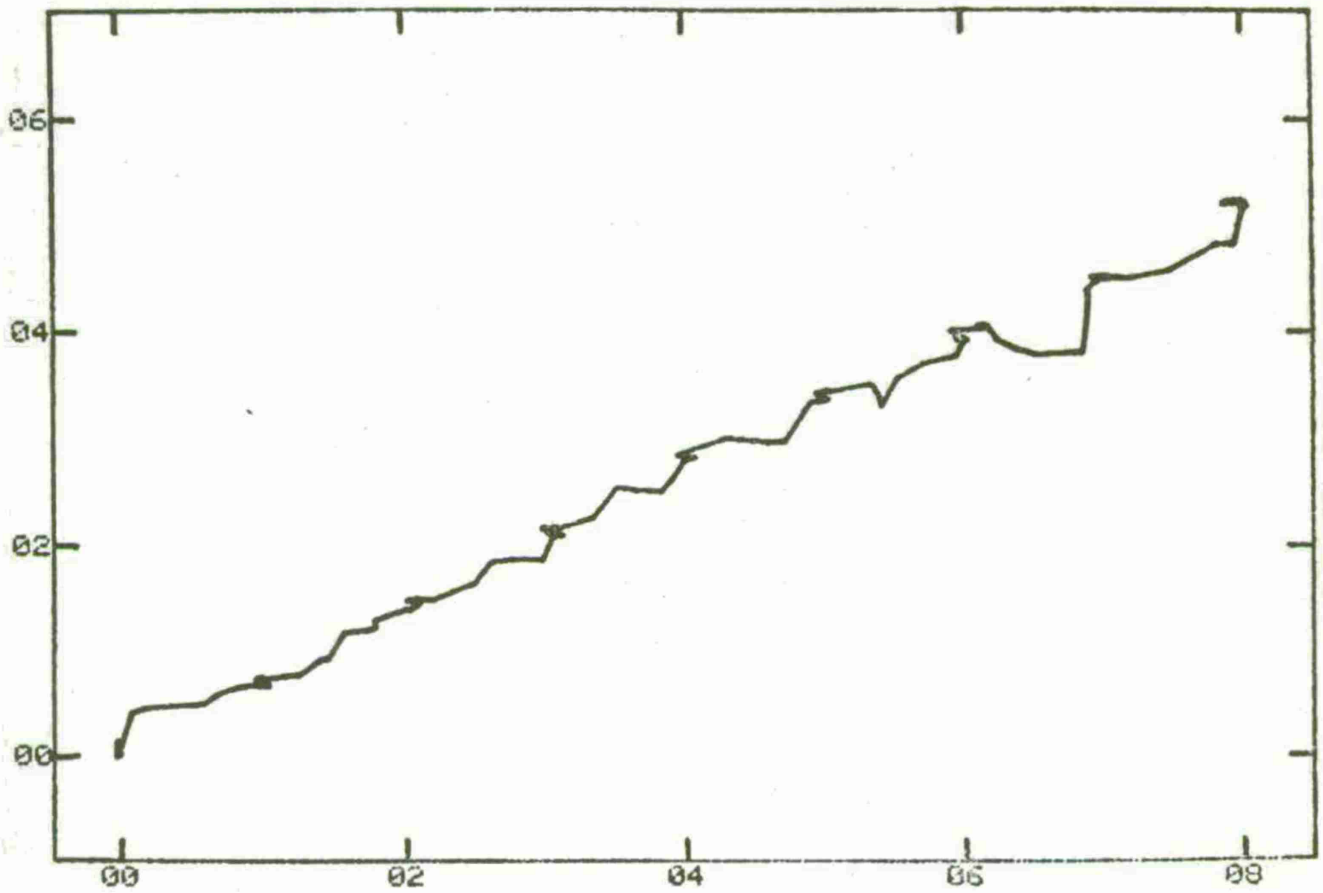
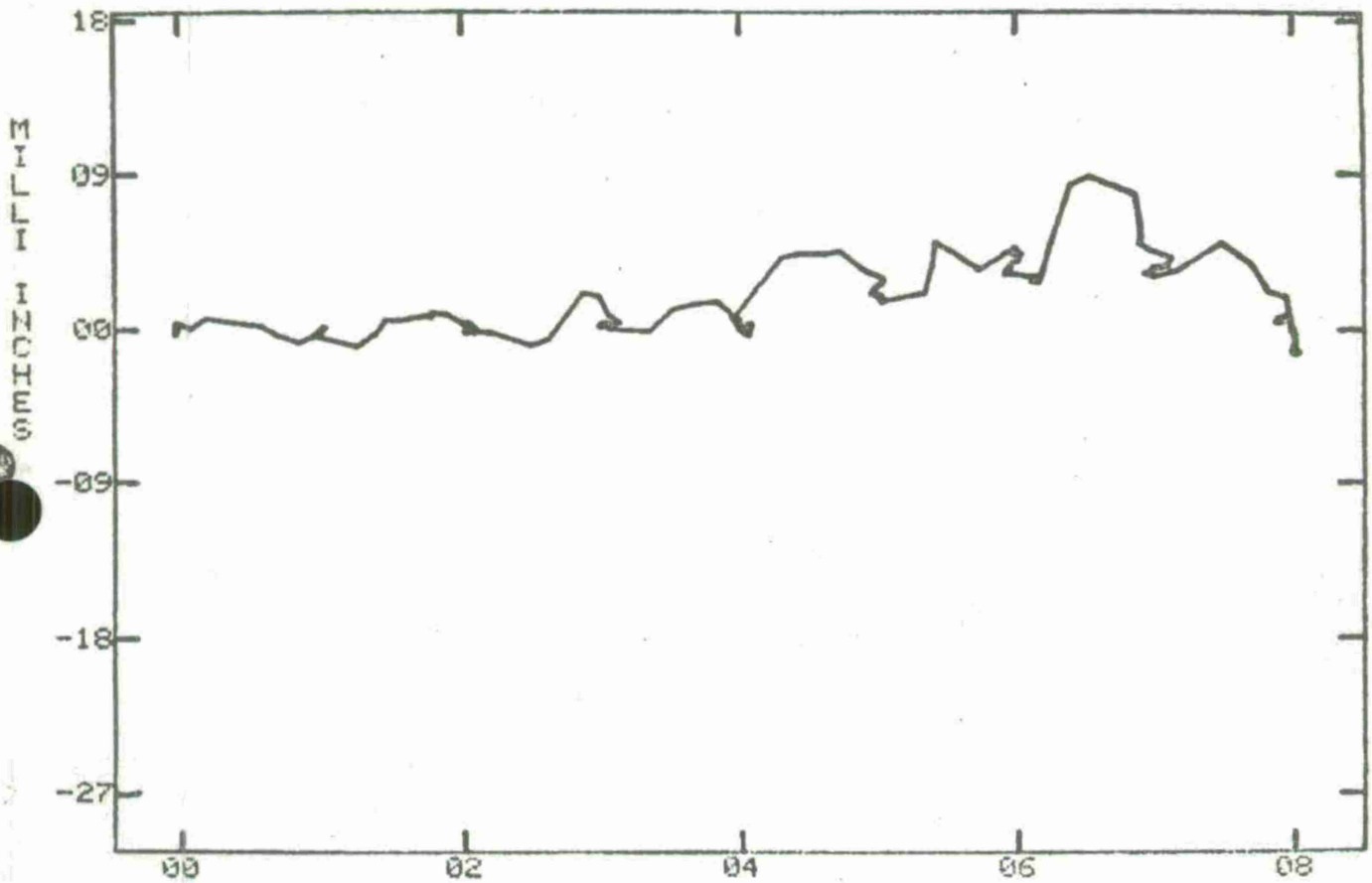
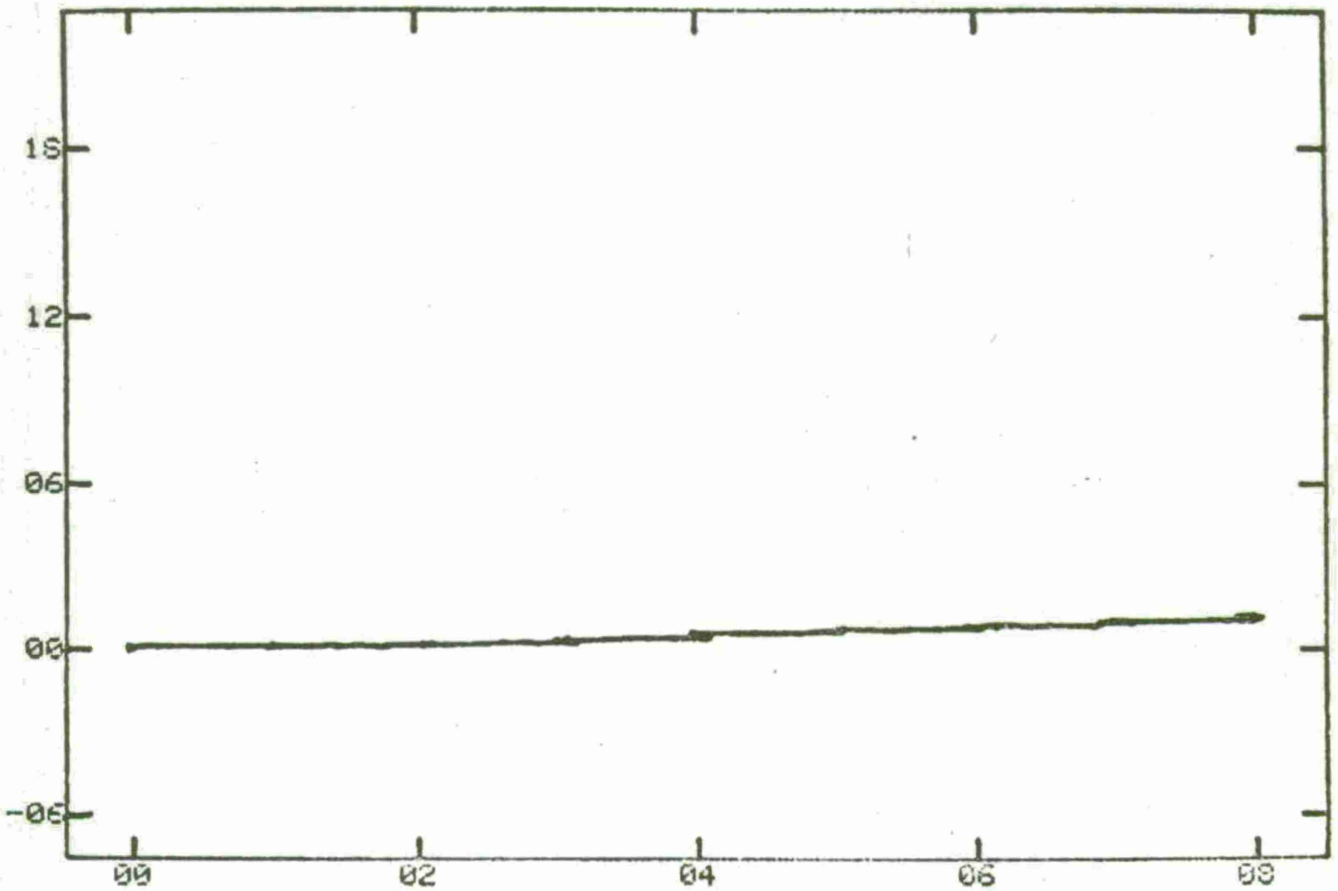
LBS X 10-2
CH 19 VS CH 4 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



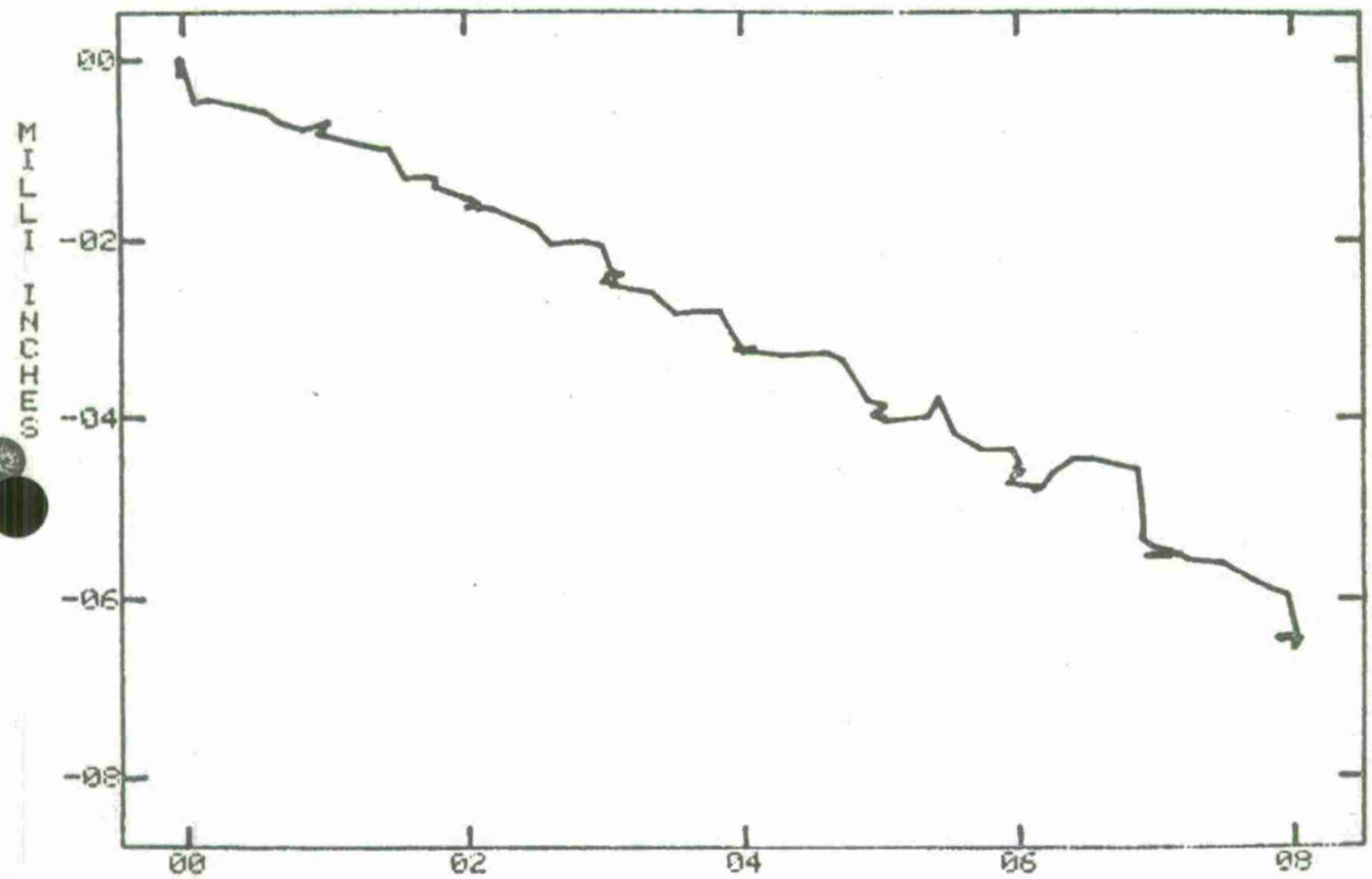
CH 19 VS CH 5 X 10+0
TEST 32 (22AUG75) AH1G BEND TESTS



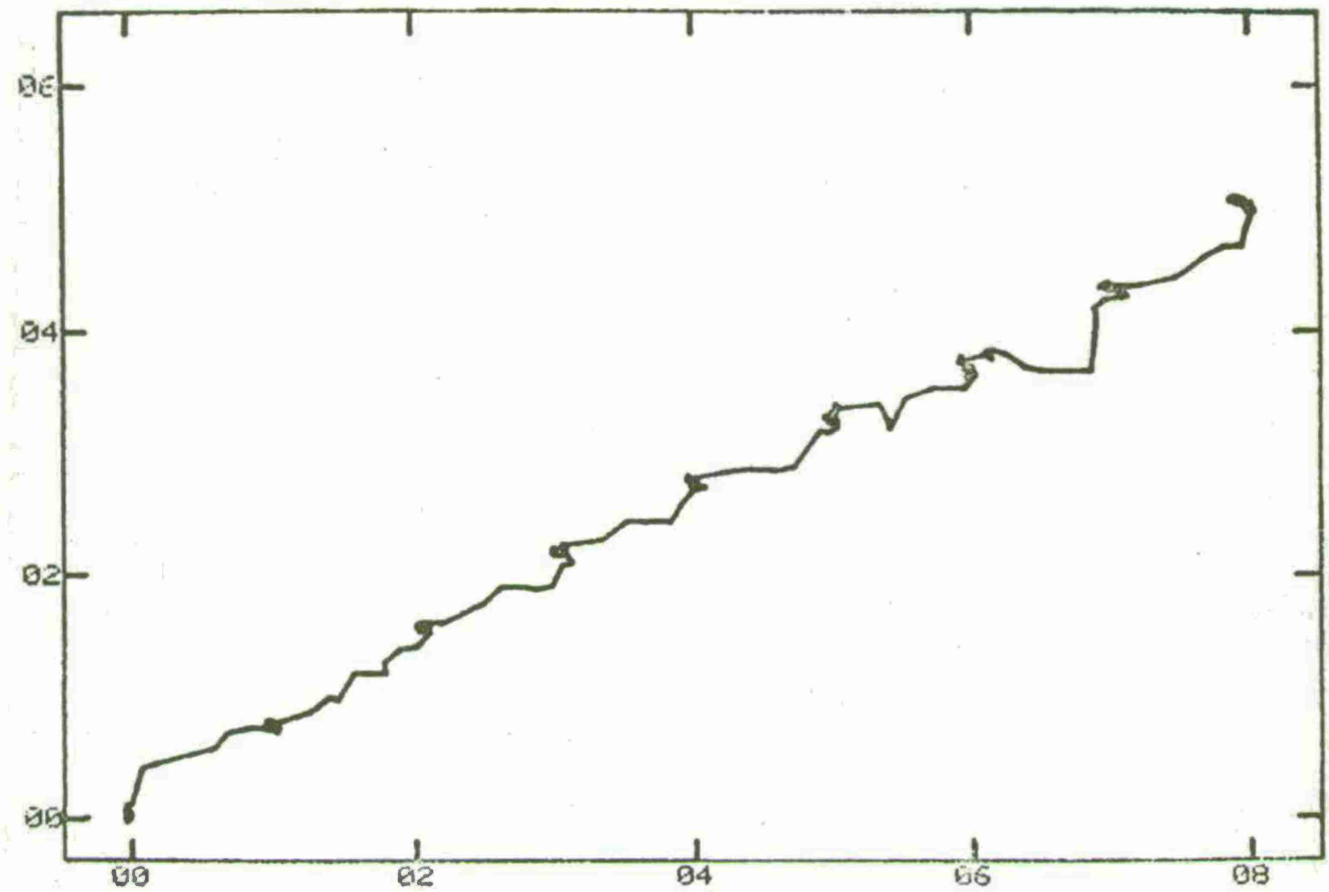
CH 19 VS CH 6 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



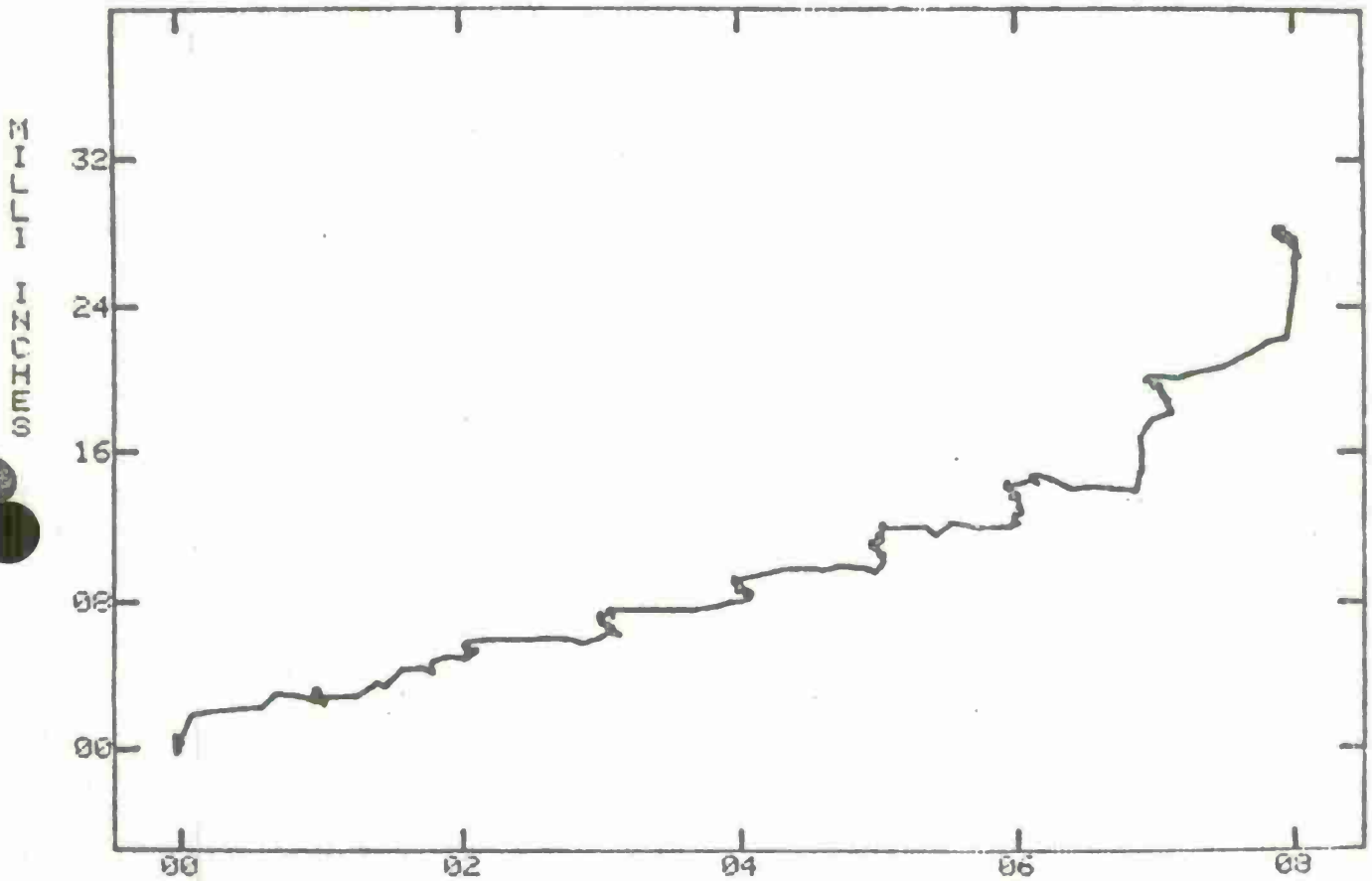
CH 19 VS CH 7 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 8 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 9 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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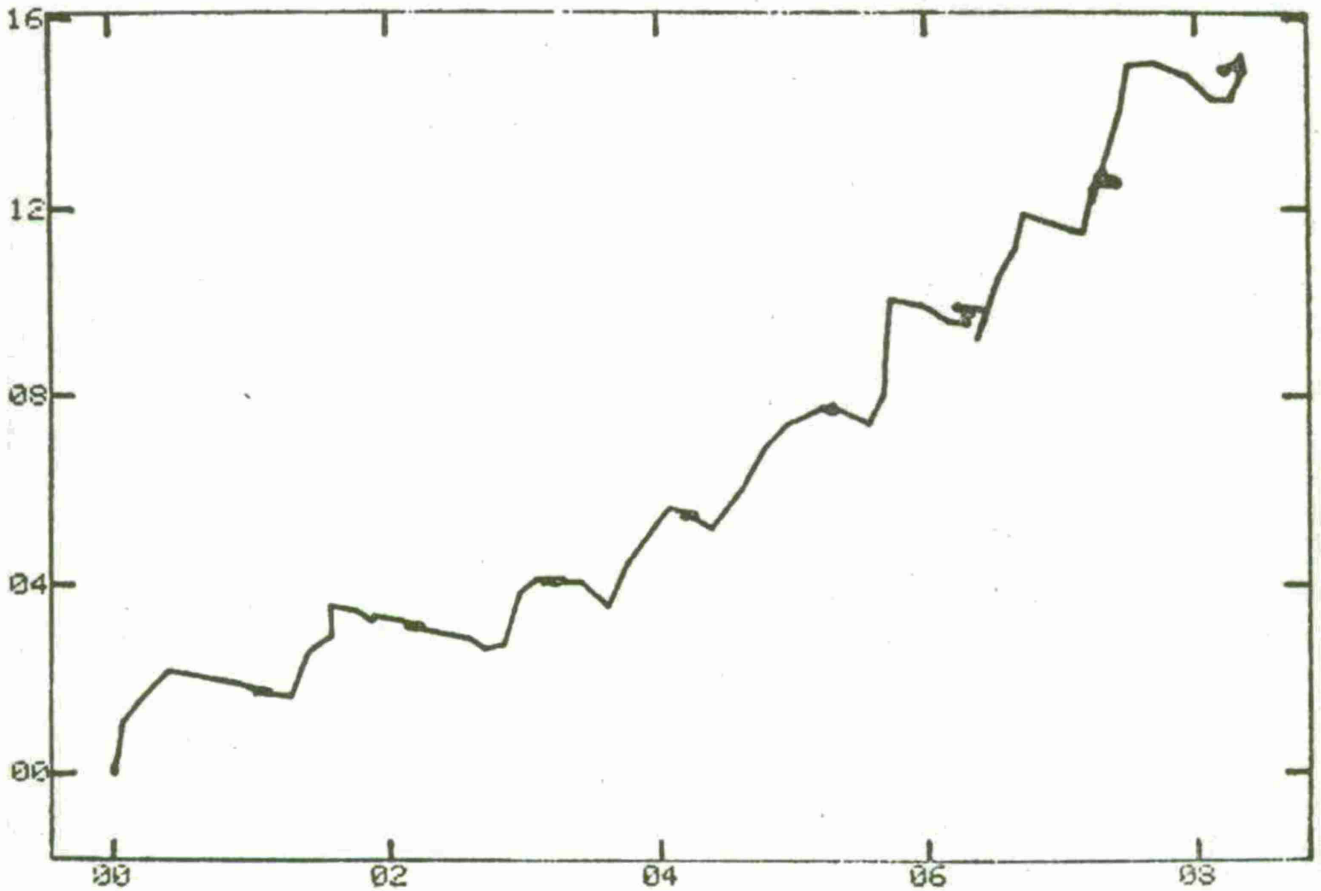
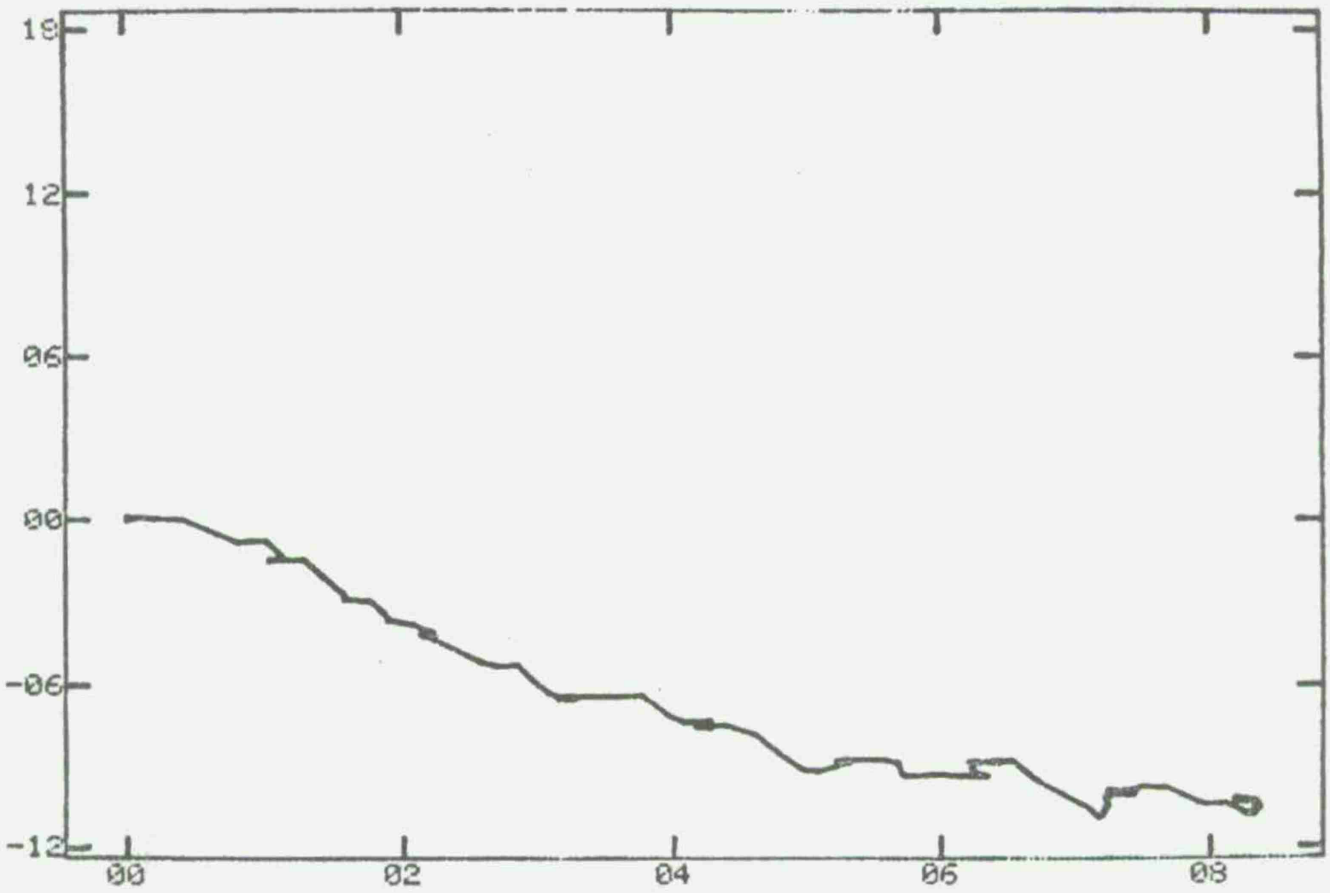
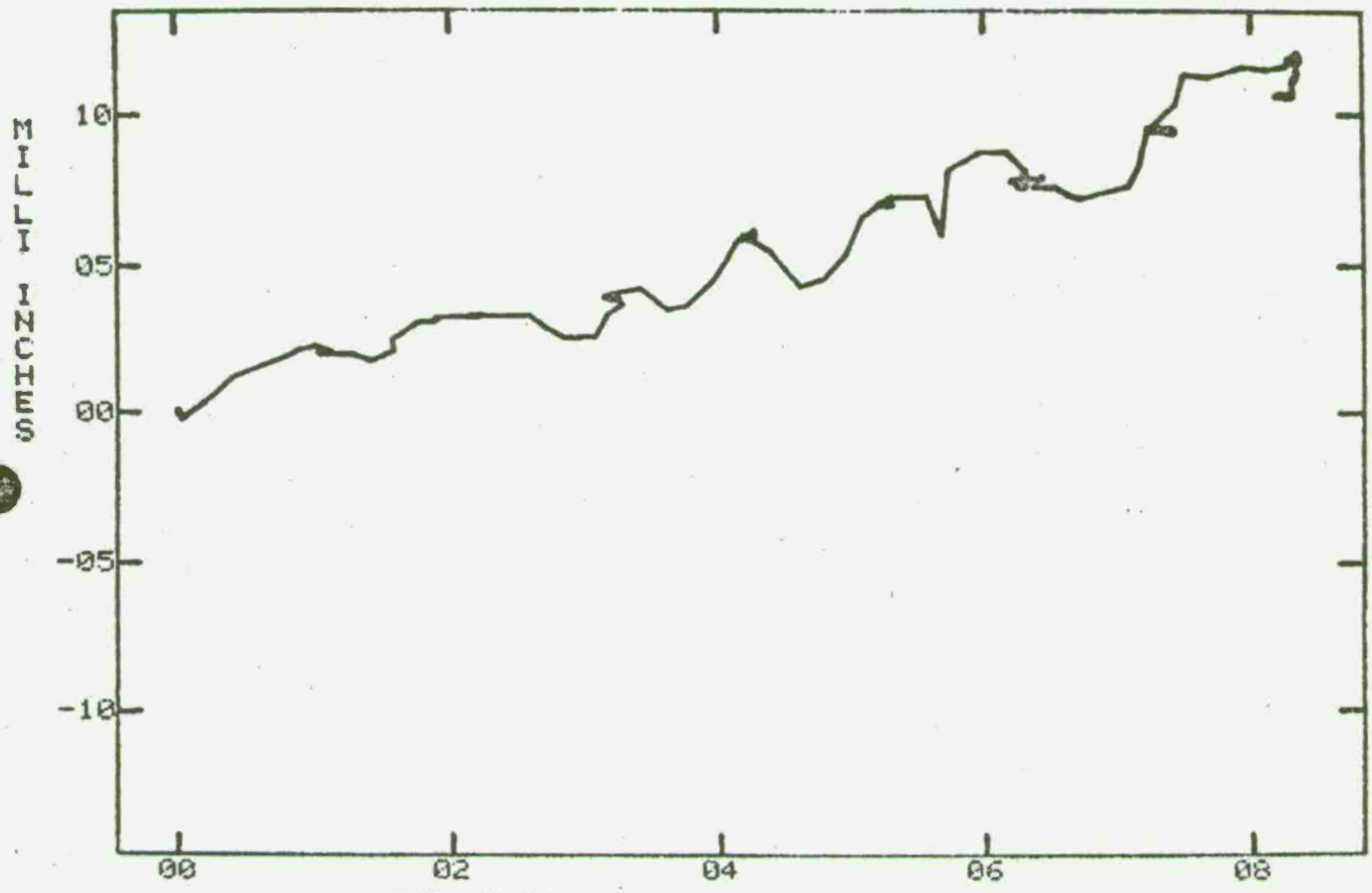
LBS X 10-2
CH 19 VS CH 10 X 10+1
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 11 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 12 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
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-05
-10
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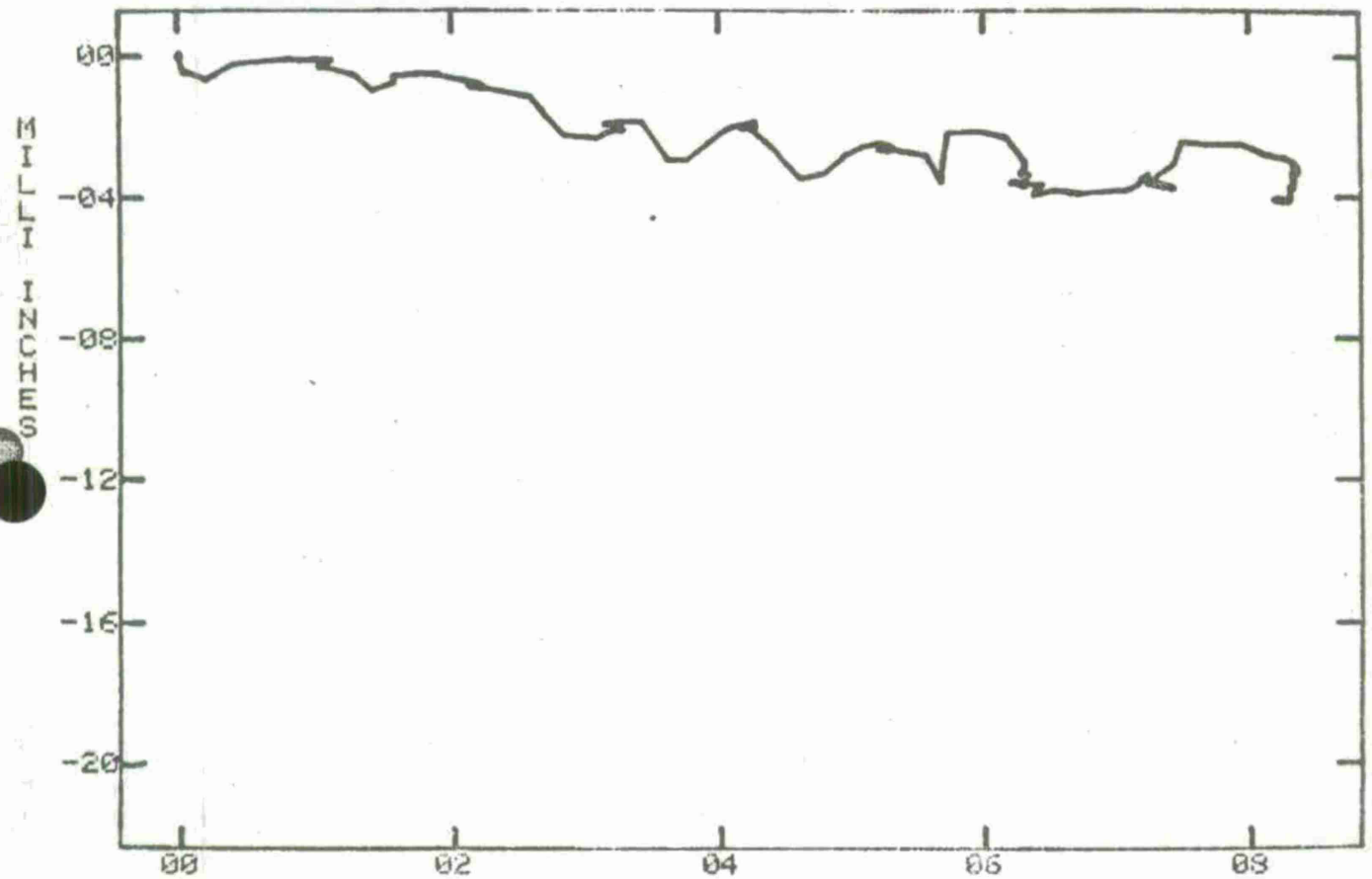
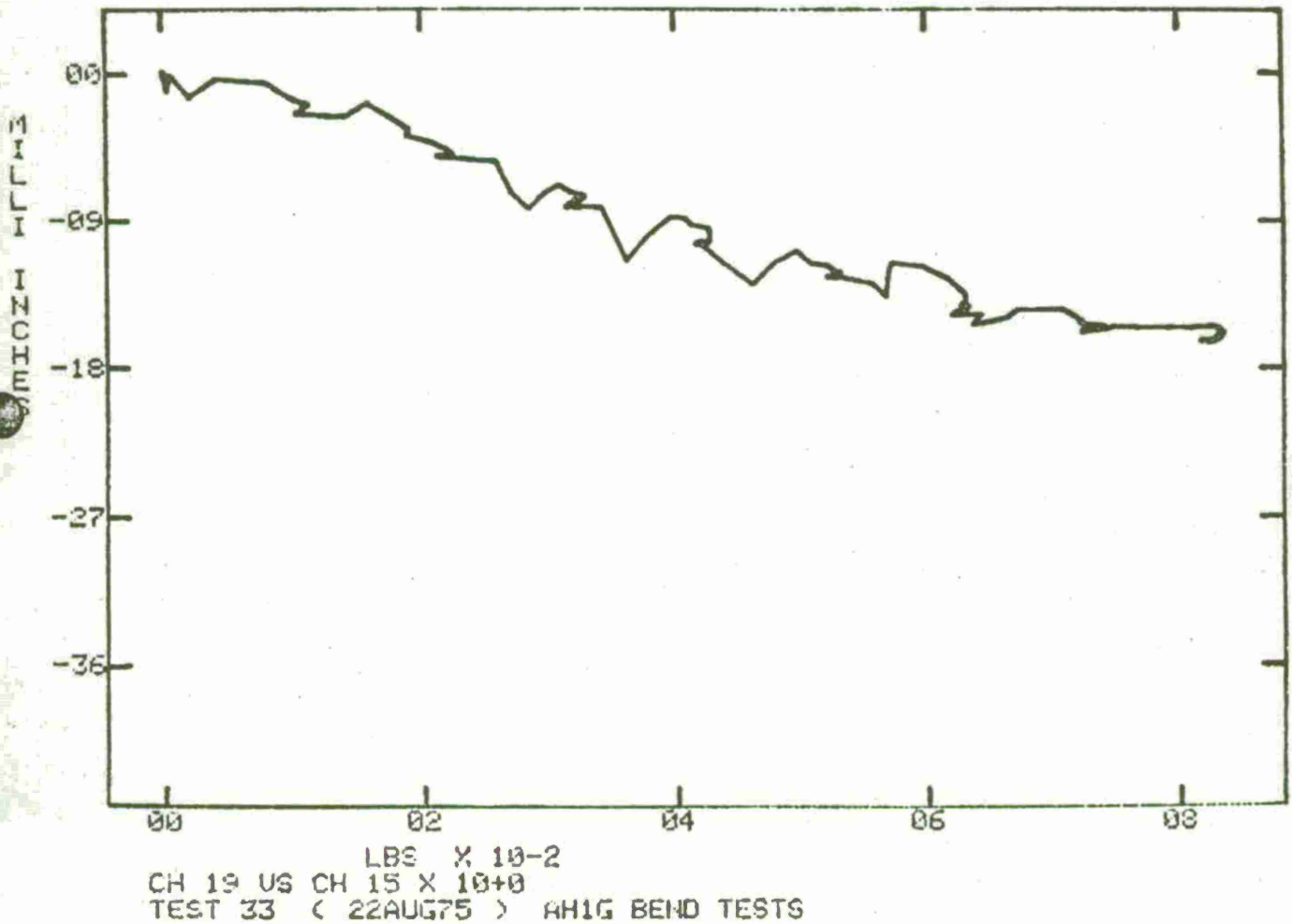
LBS X 10-2
CH 19 VS CH 13 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 14 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS


MILLI INCHES
00
-09
-18
-27
-36
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02
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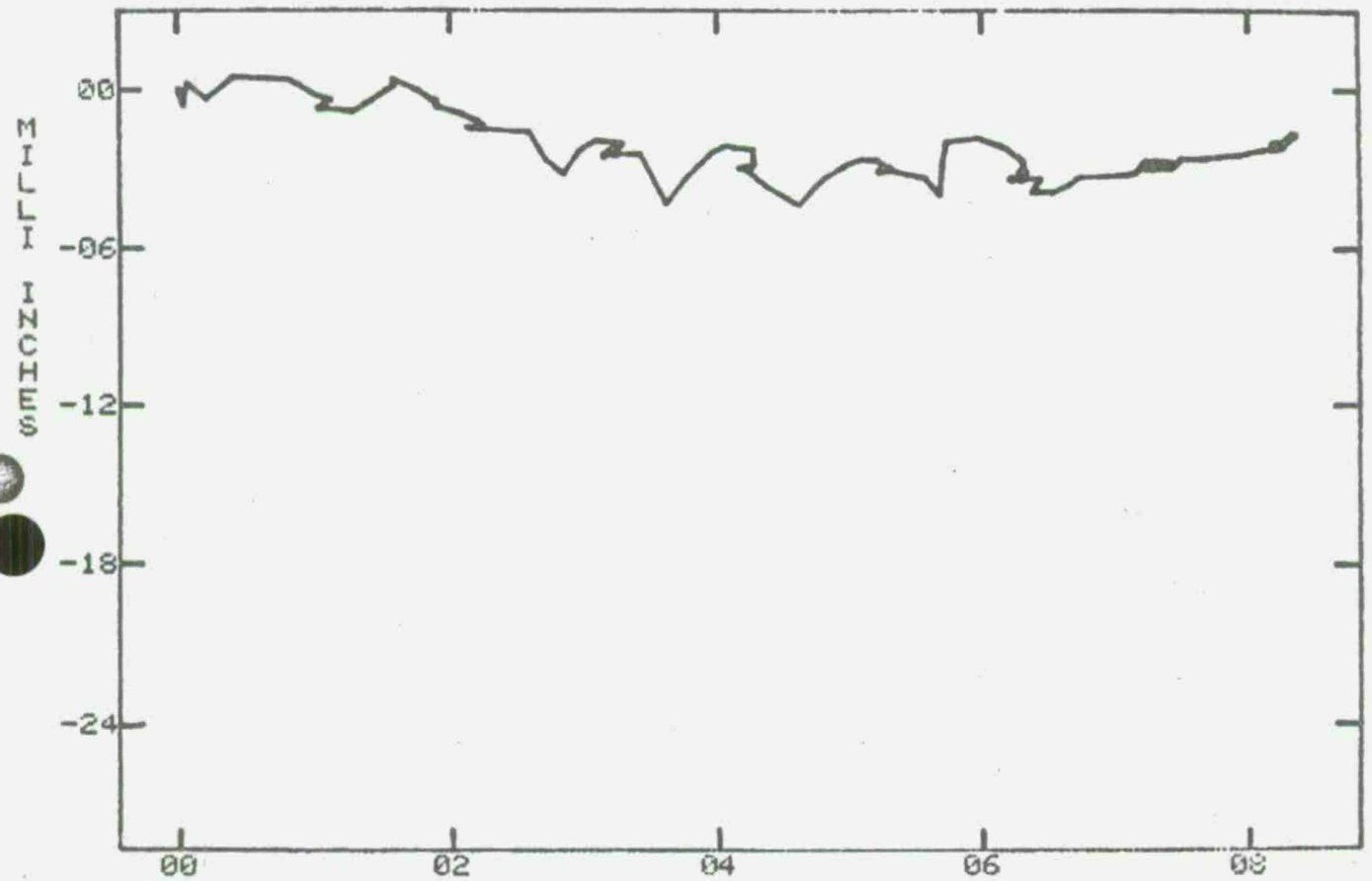
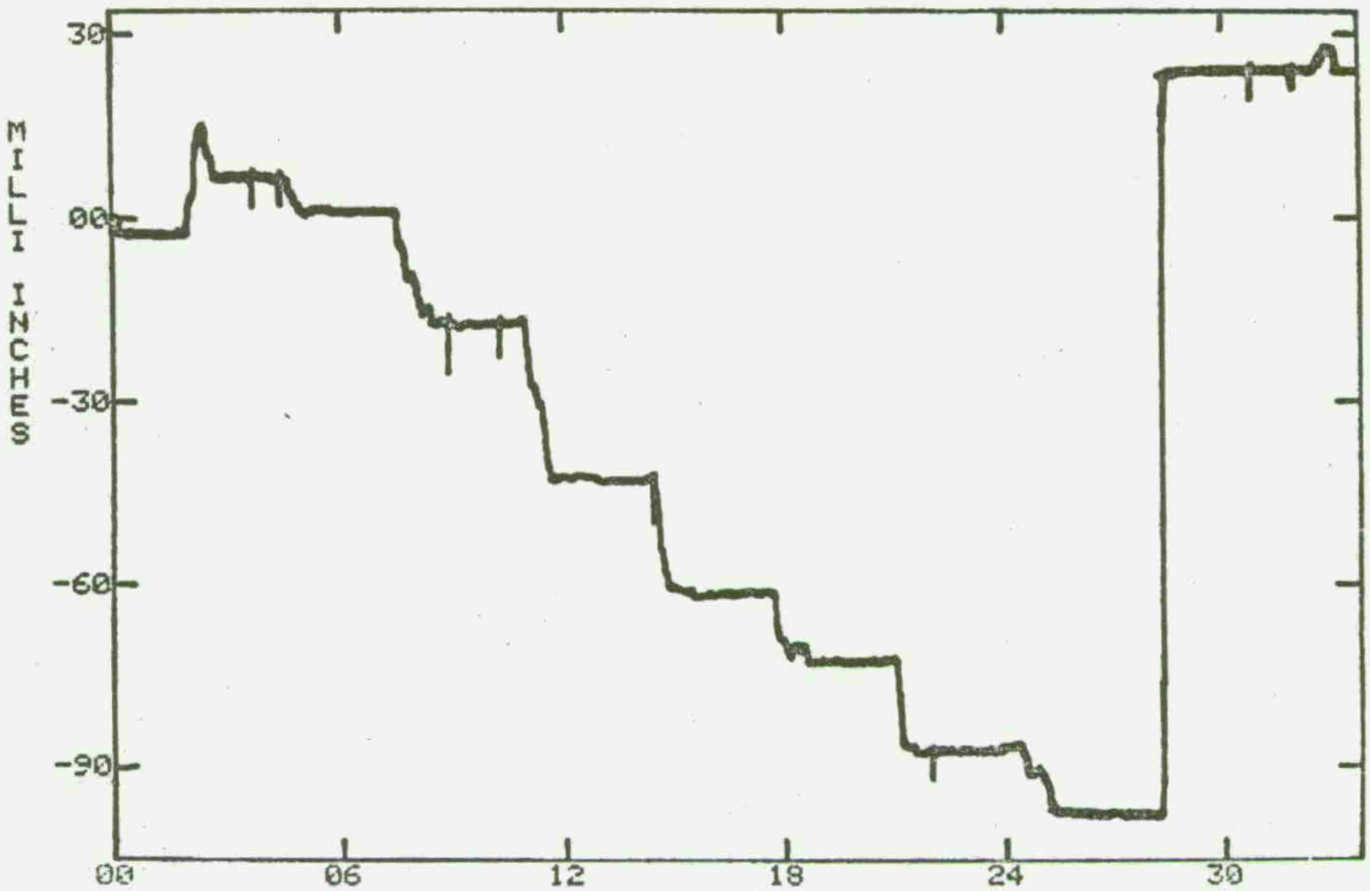
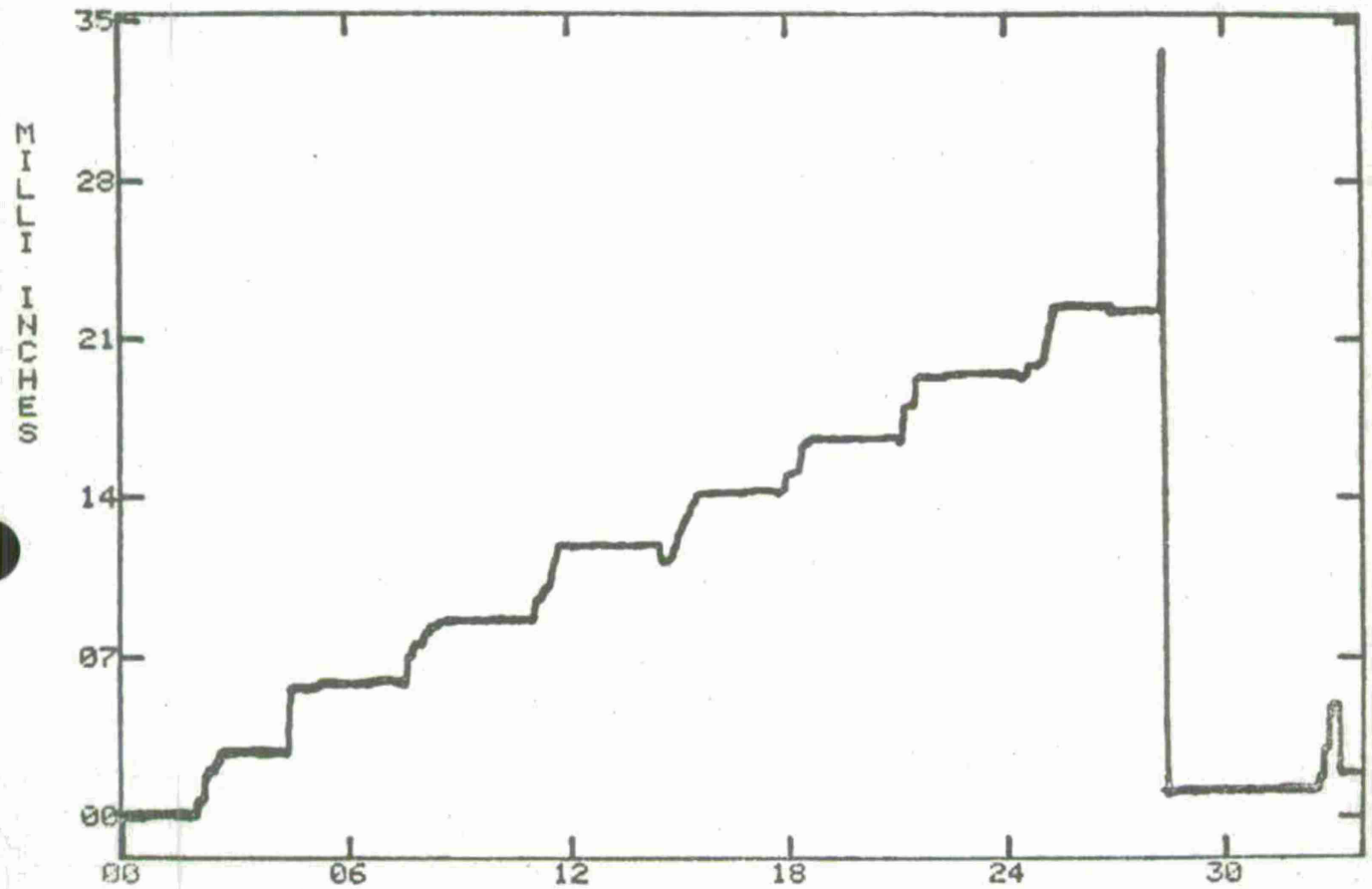
LBS X 10-2
CH 19 VS CH 15 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



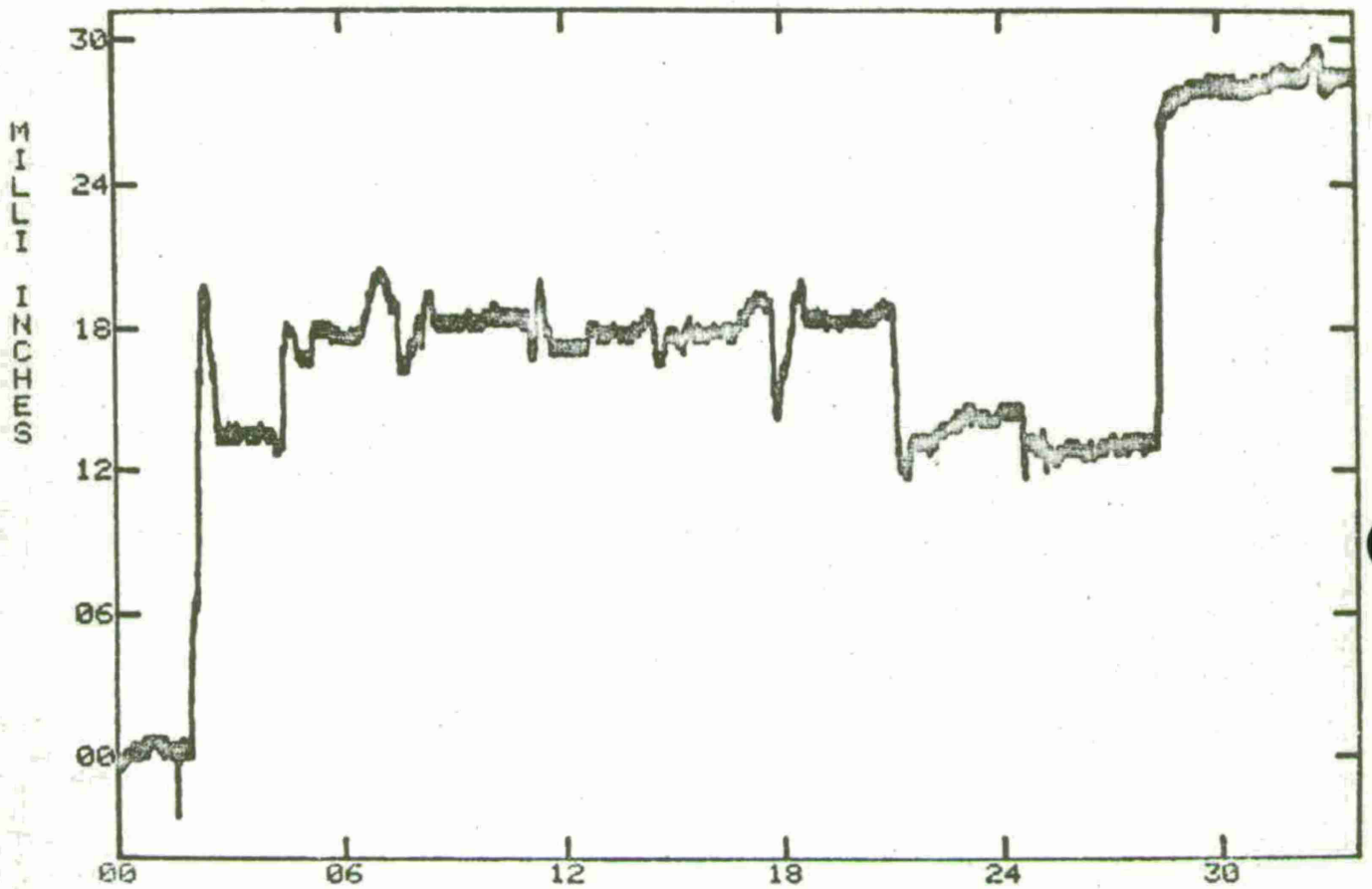
CH 19 VS CH 17 X 10+0
TEST 33 (22AUG75) AH1G BEND TESTS



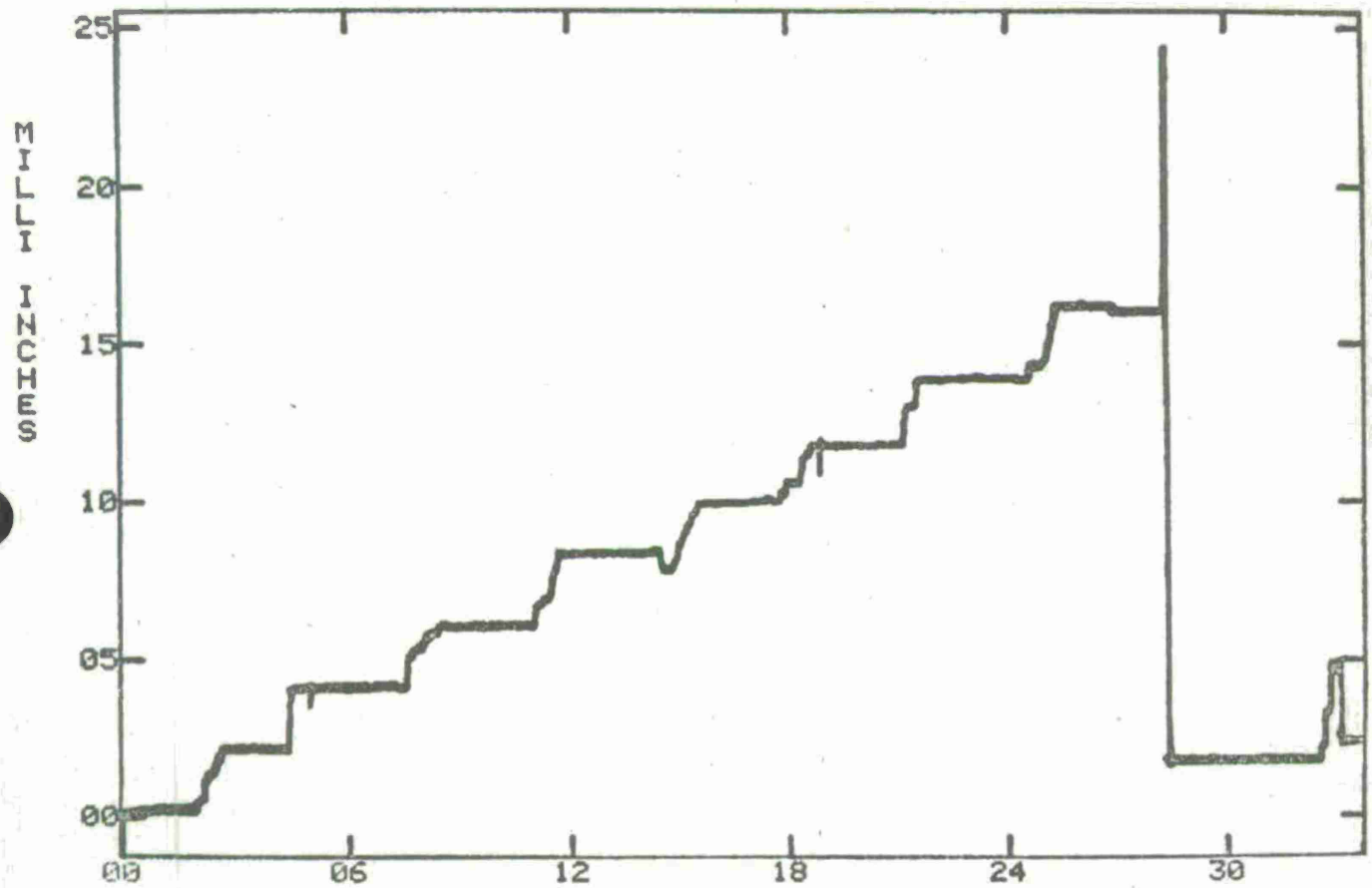
CH 1 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



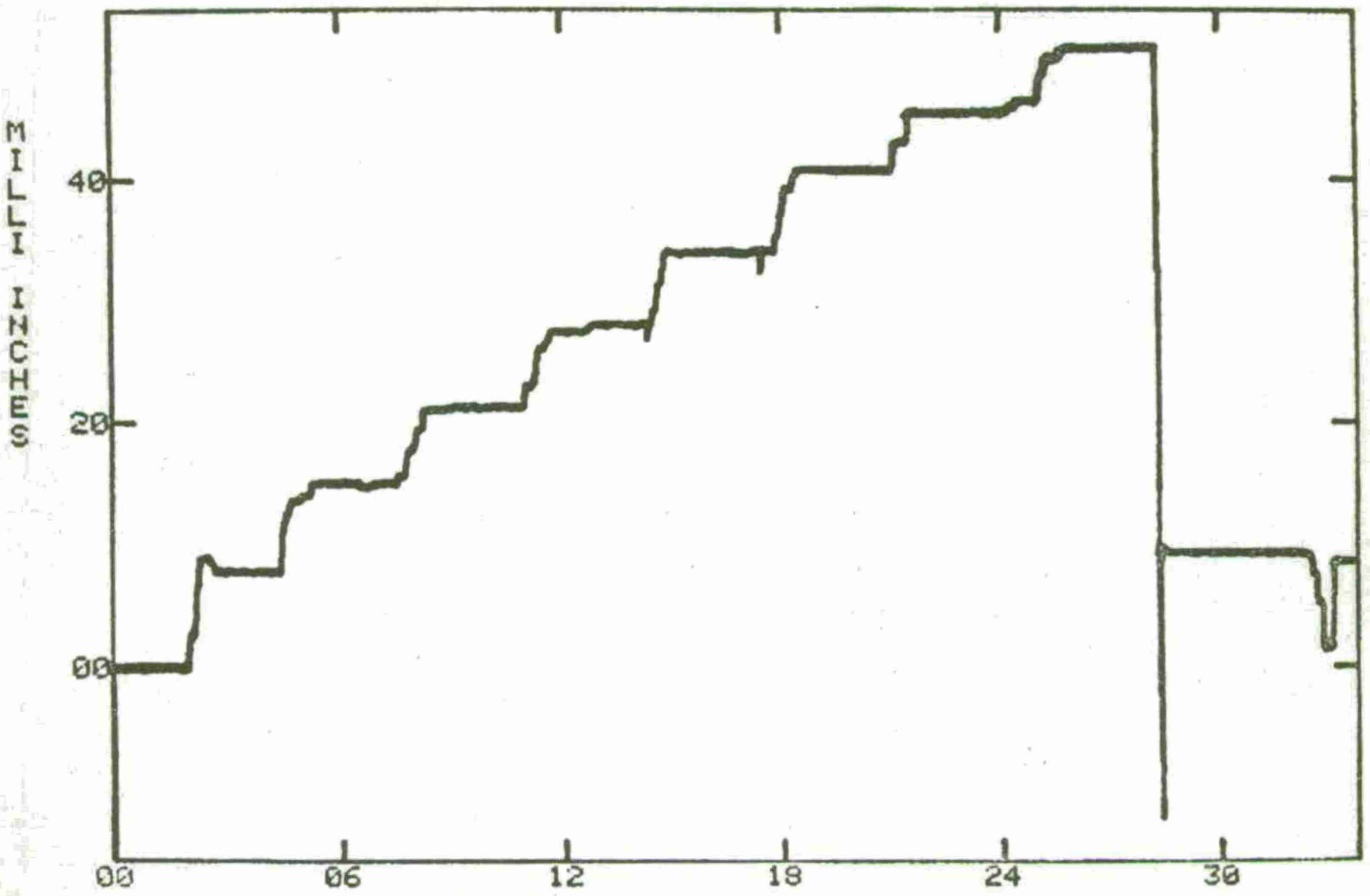
CH 2 WING TRQ DEFLN - ST 212.63 - WS 59 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



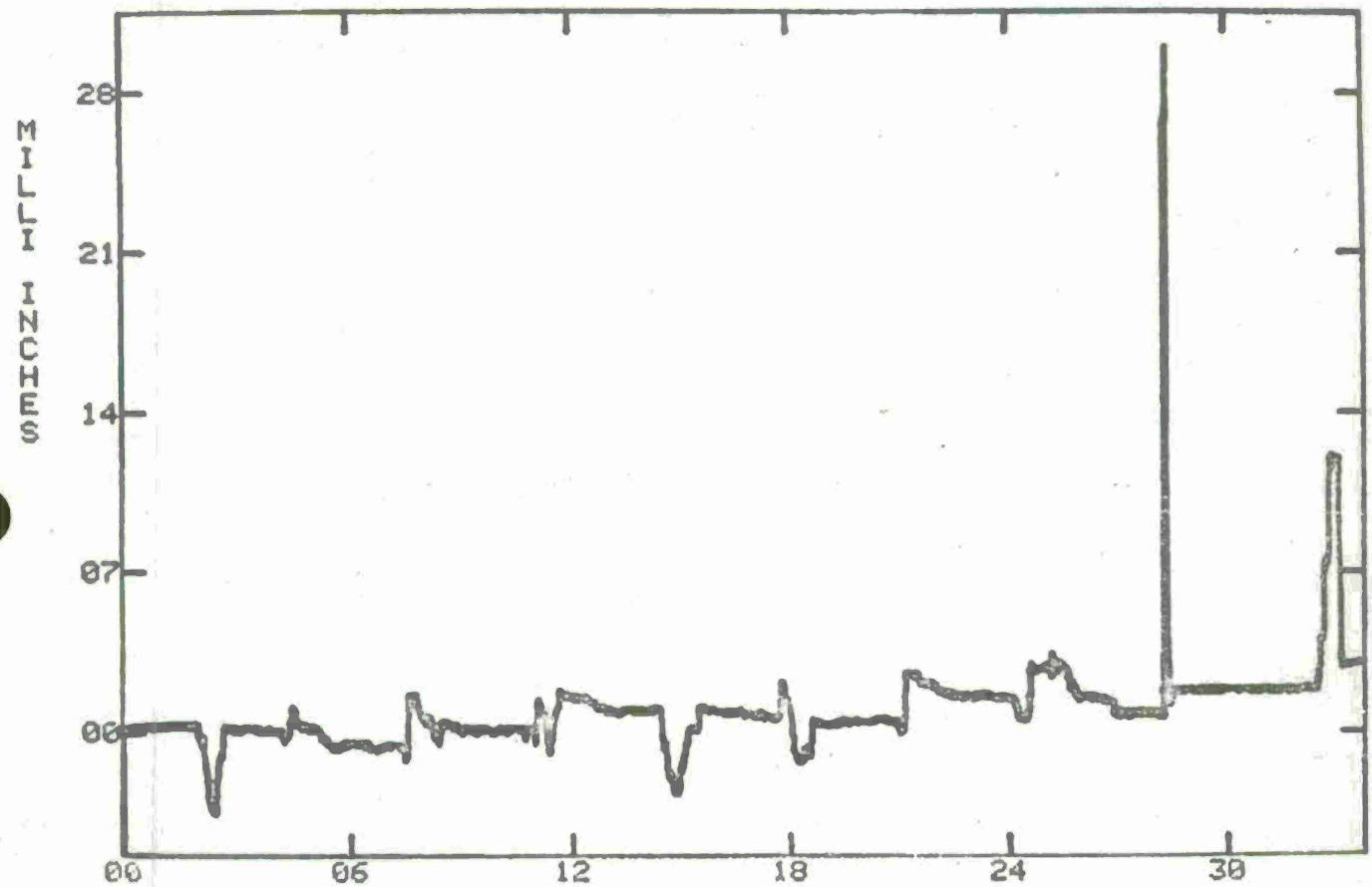
CH 3 WING TRQ DEFLN - ST 191.075 - WS 42.5 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



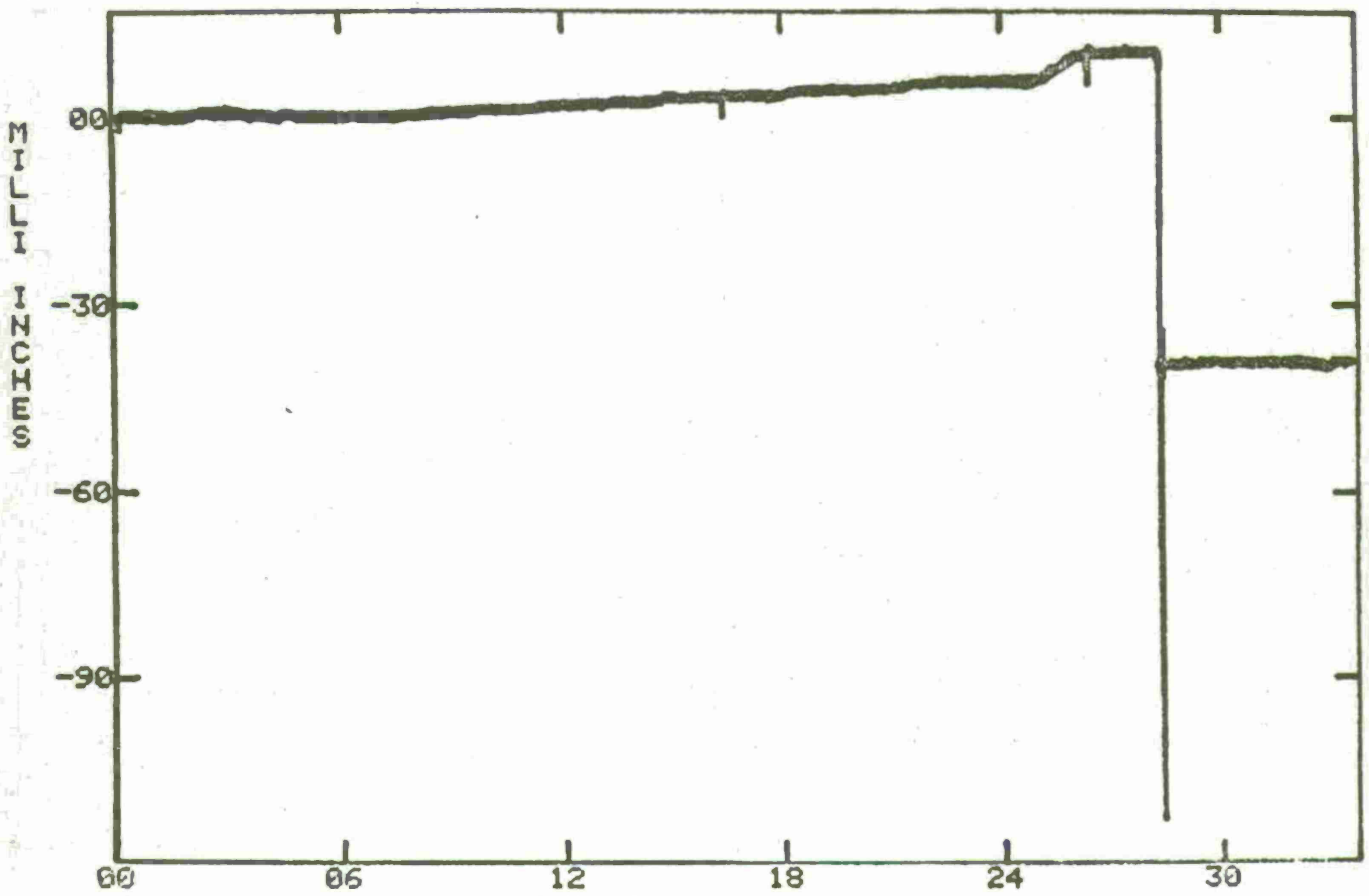
CH 4 WING TRQ DEFLN - ST 212.63 - WS 42.5 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



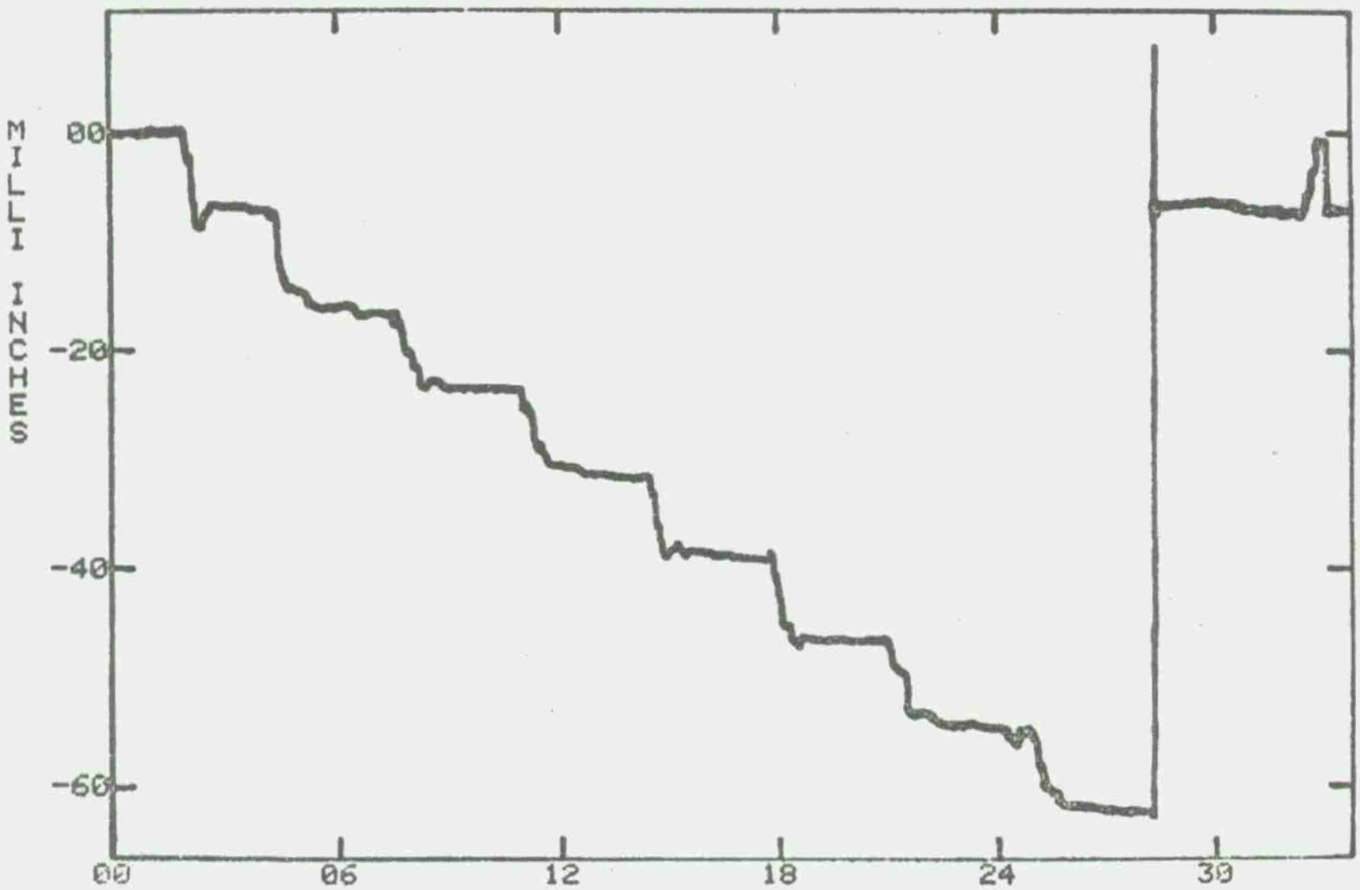
CH 5 WING TRQ DEFLN - ST 187.50 - WS 21.38 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



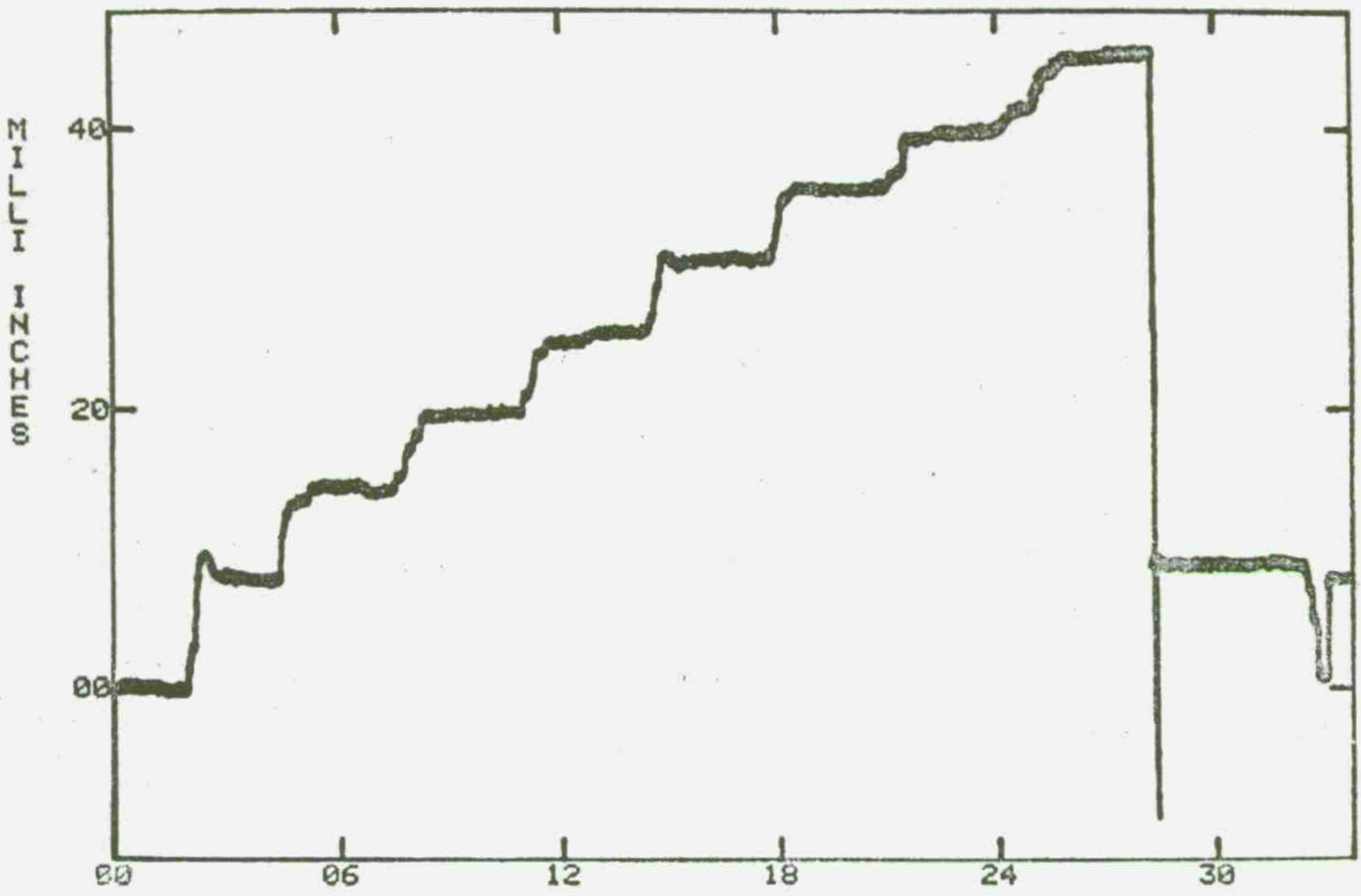
CH 6 WING TRQ DEFLN - ST 212.63 - WS 21.38 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



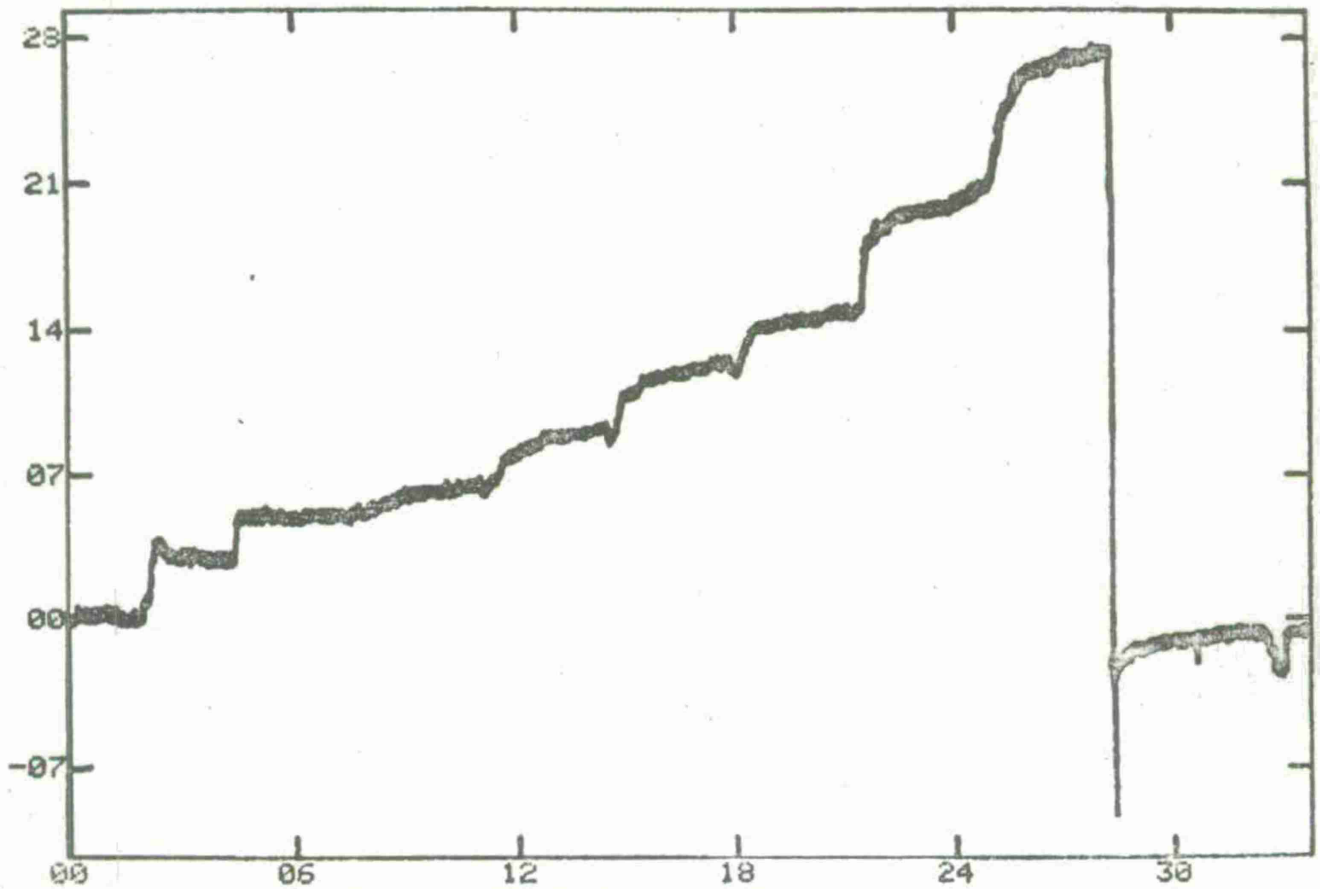
CH 7 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+2
TEST 34 (22AUG75) AH1G BEND TESTS



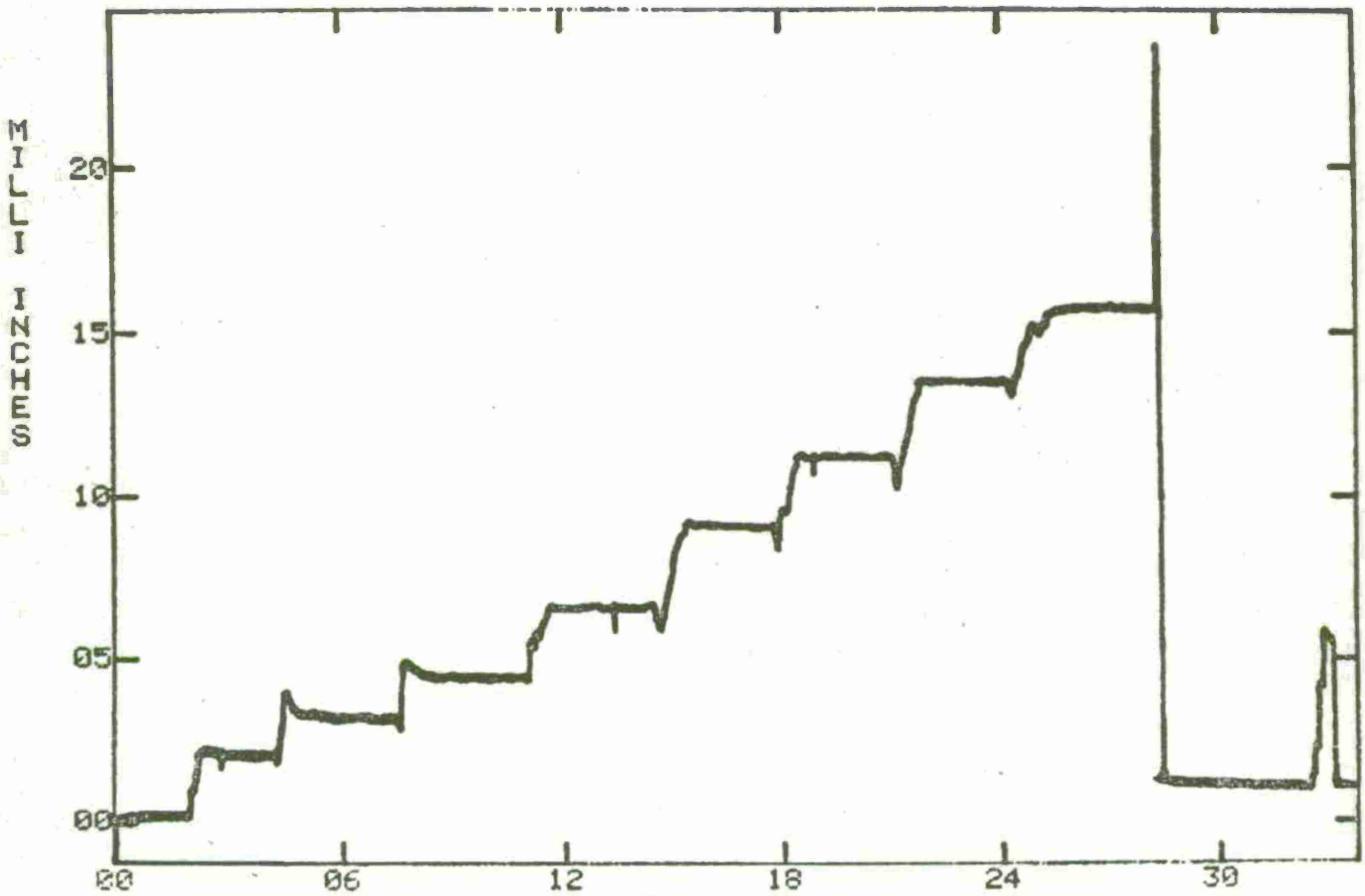
CH 8 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



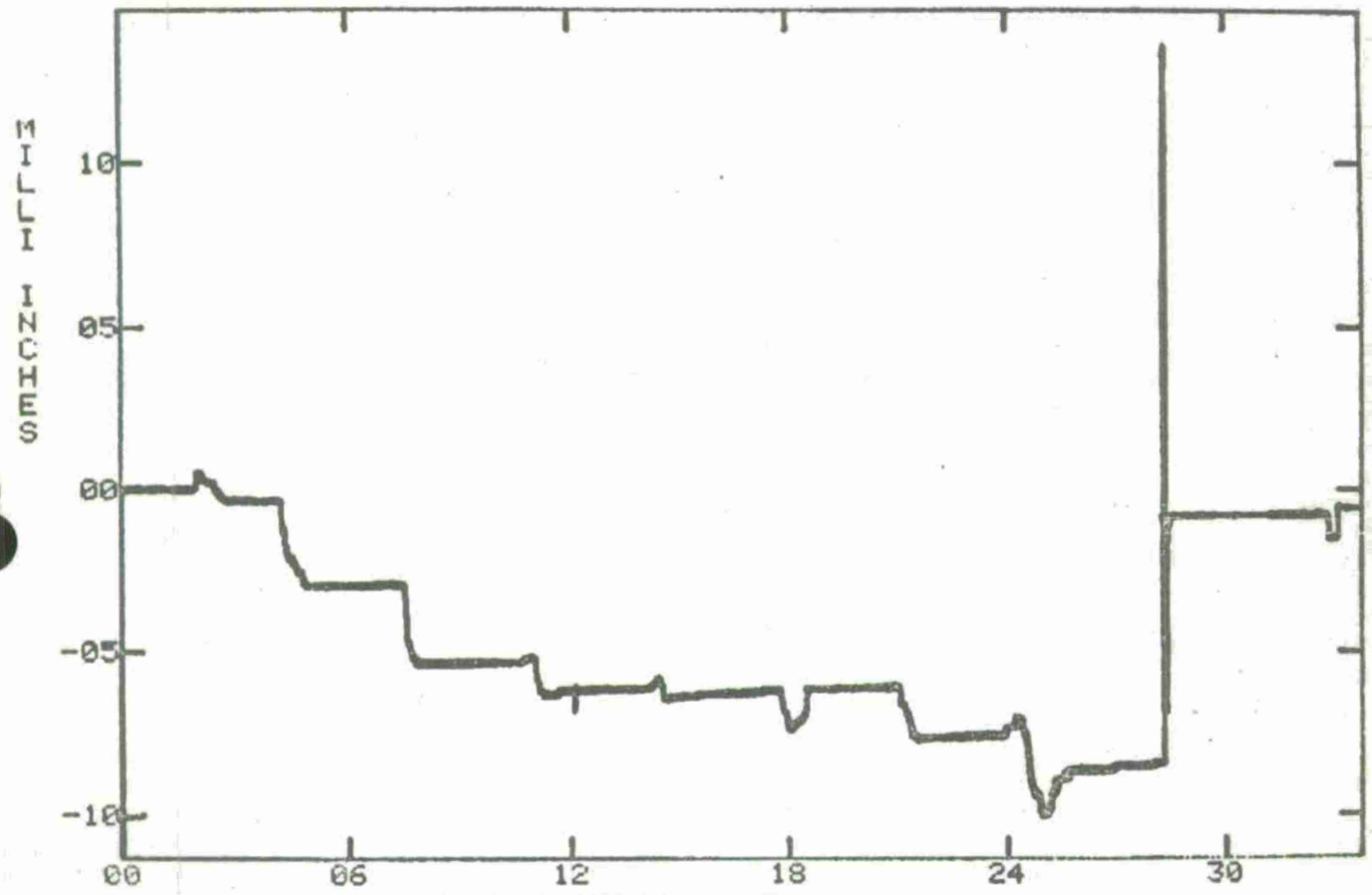
CH 9 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



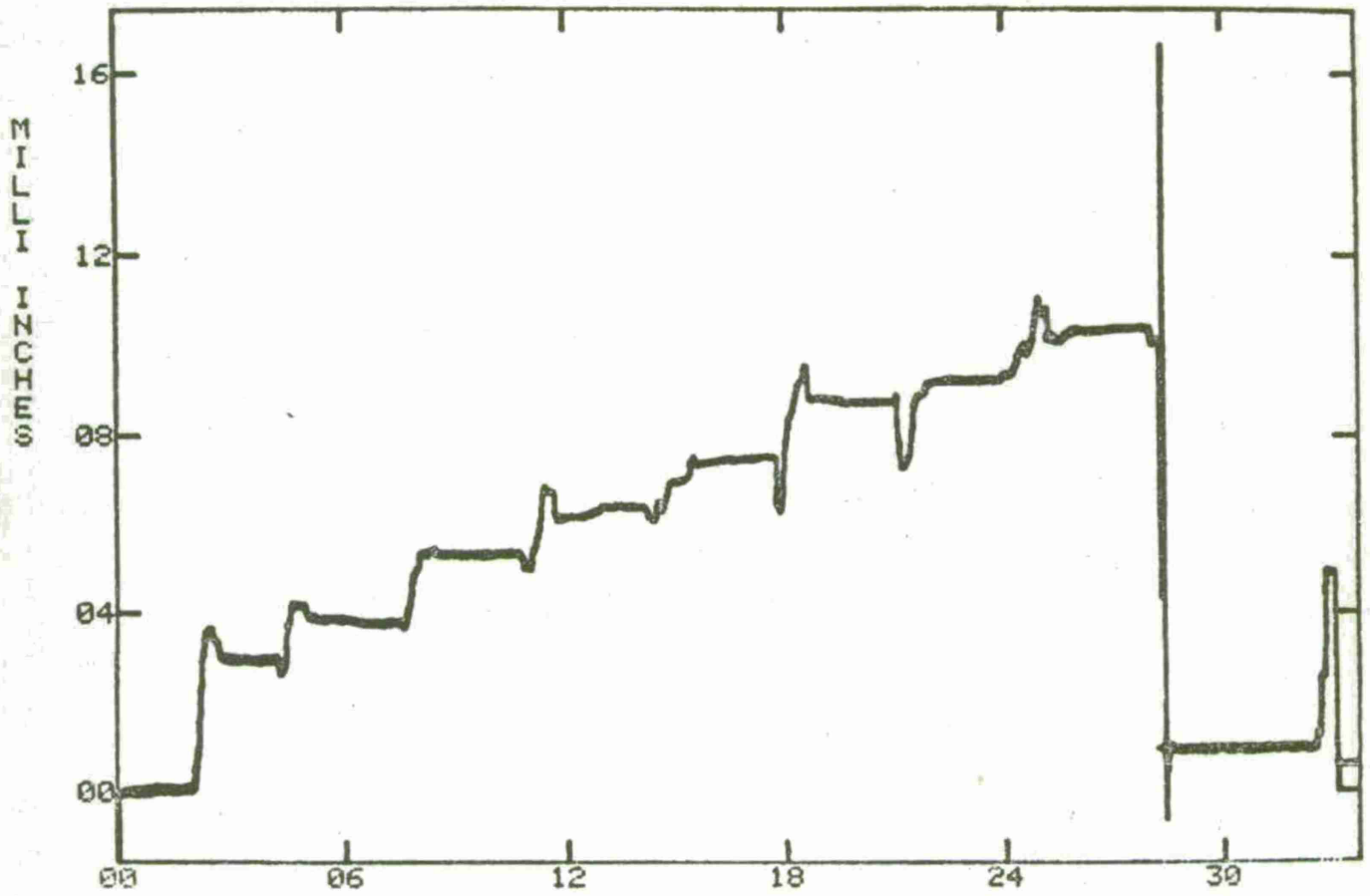
CH 10 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS



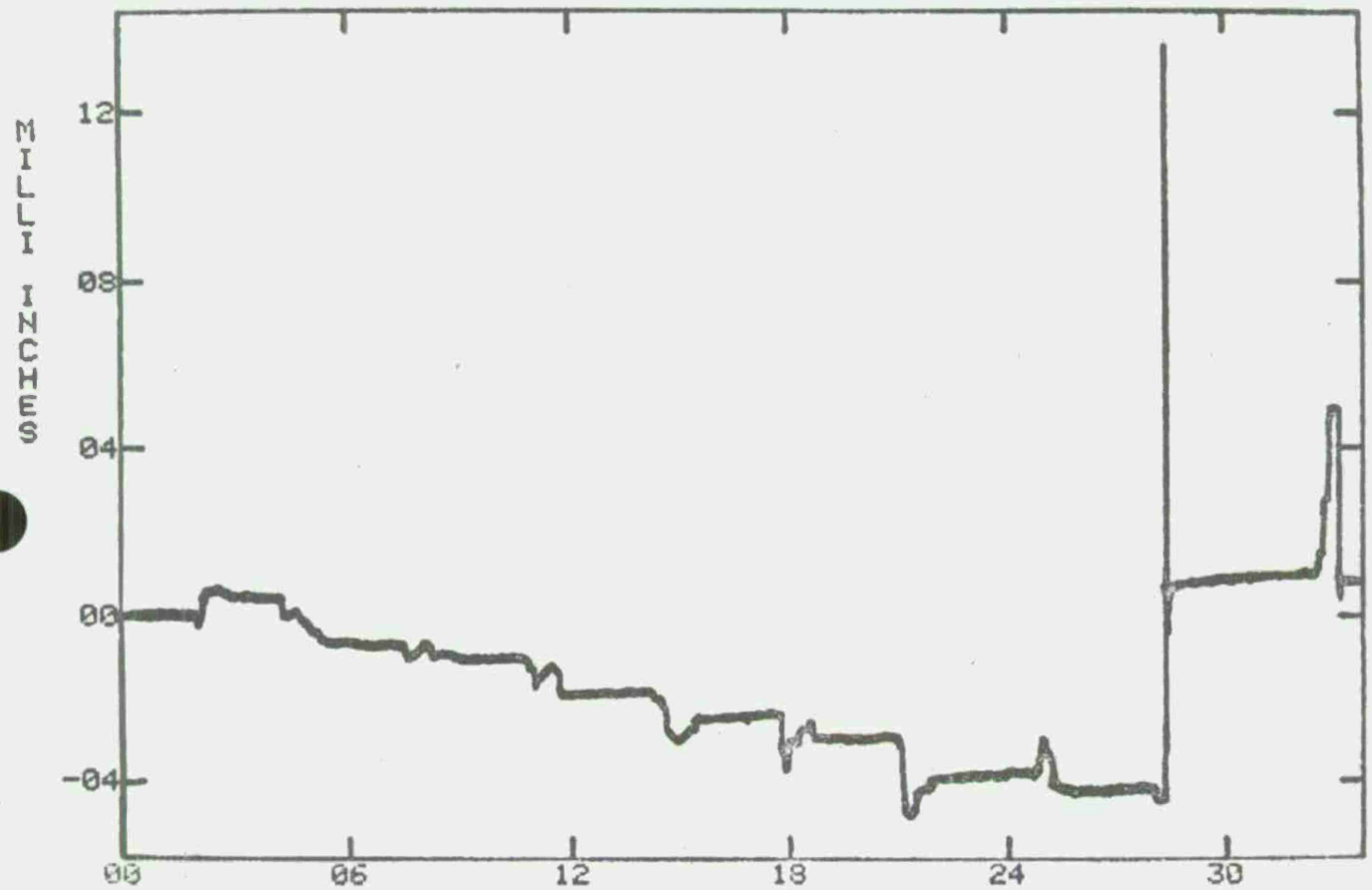
CH 11 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



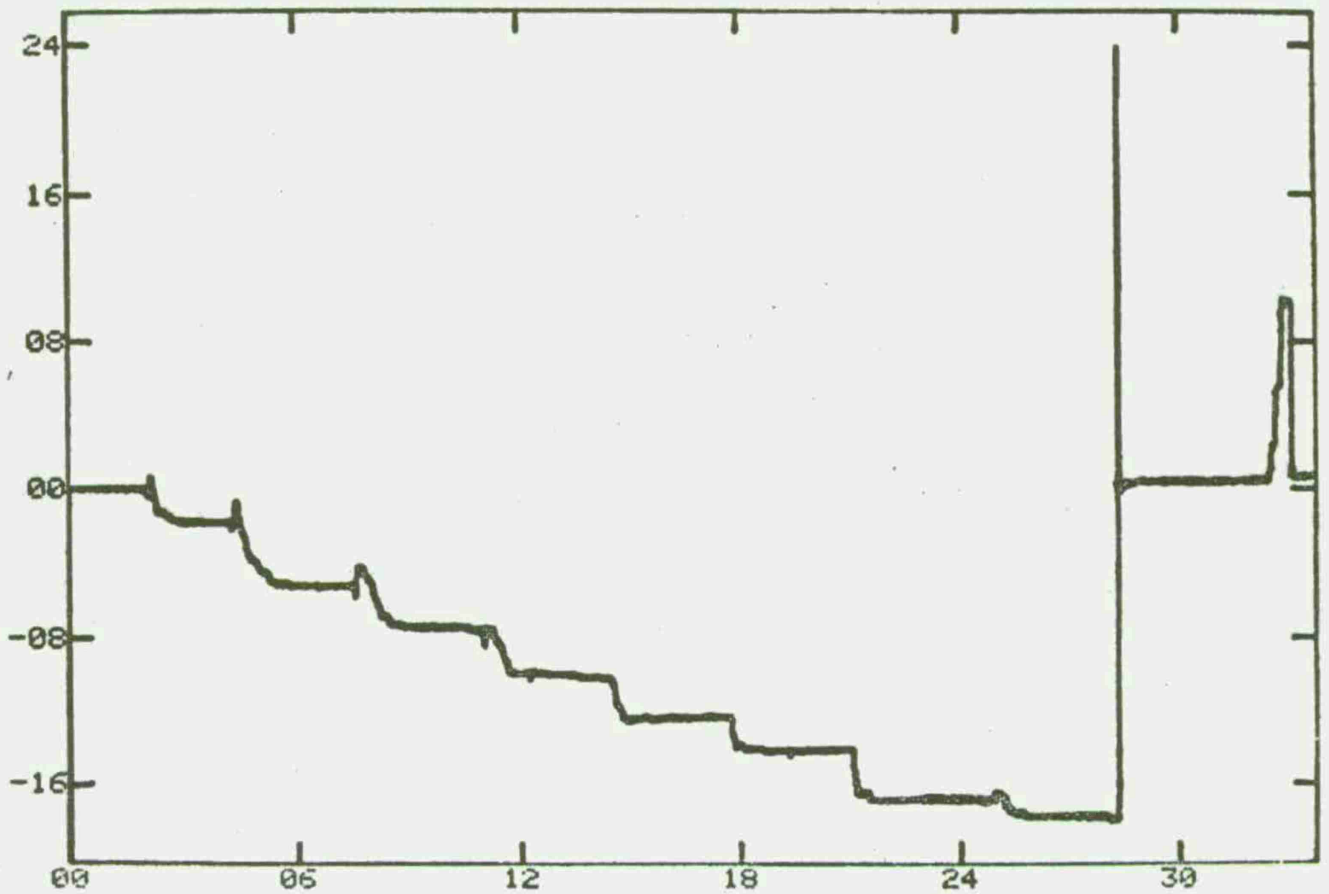
CH 12 WING TRQ DEFLN - ST 212.634 - WS 59 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



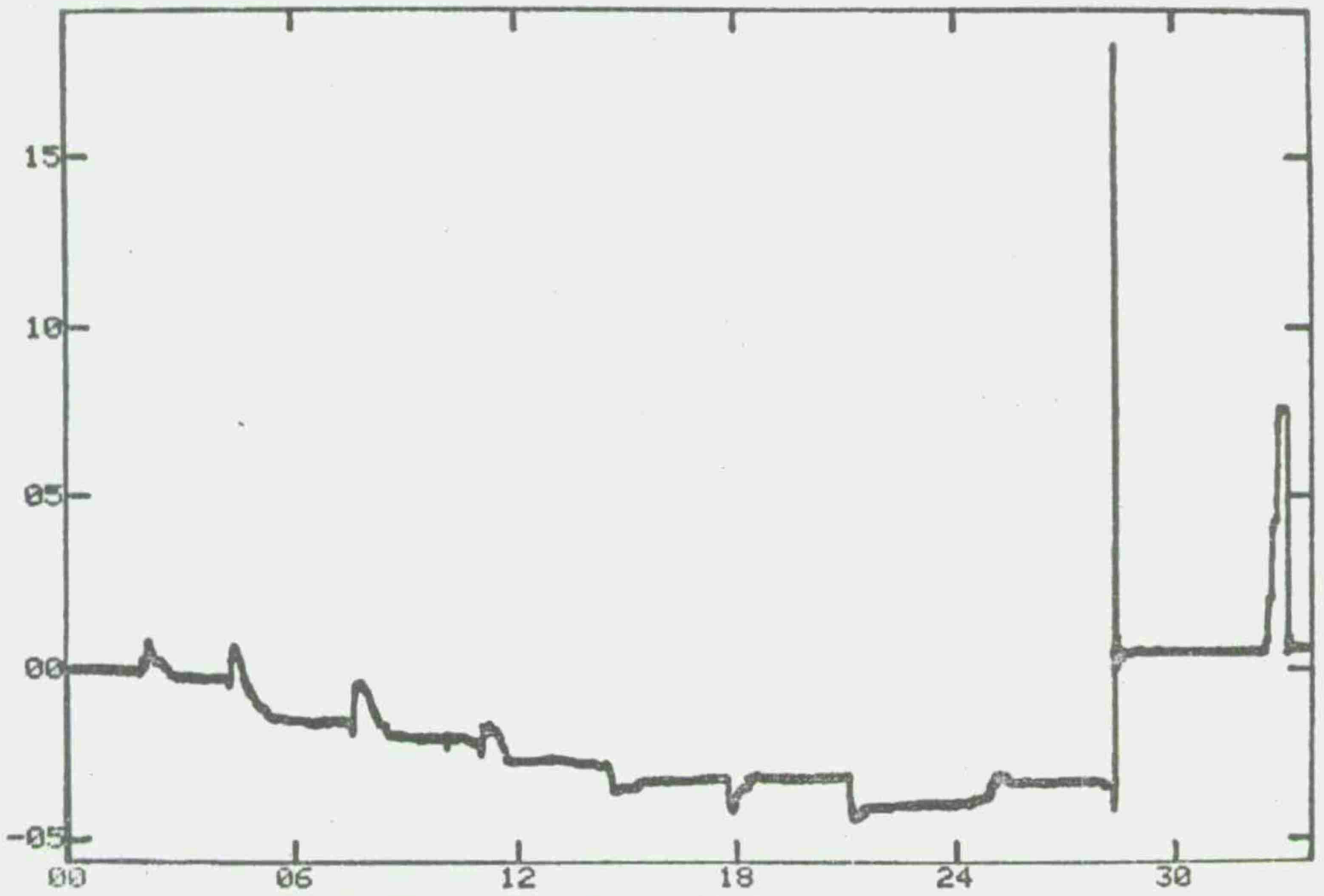
CH 13 GROUND REF - R.H. TOP X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



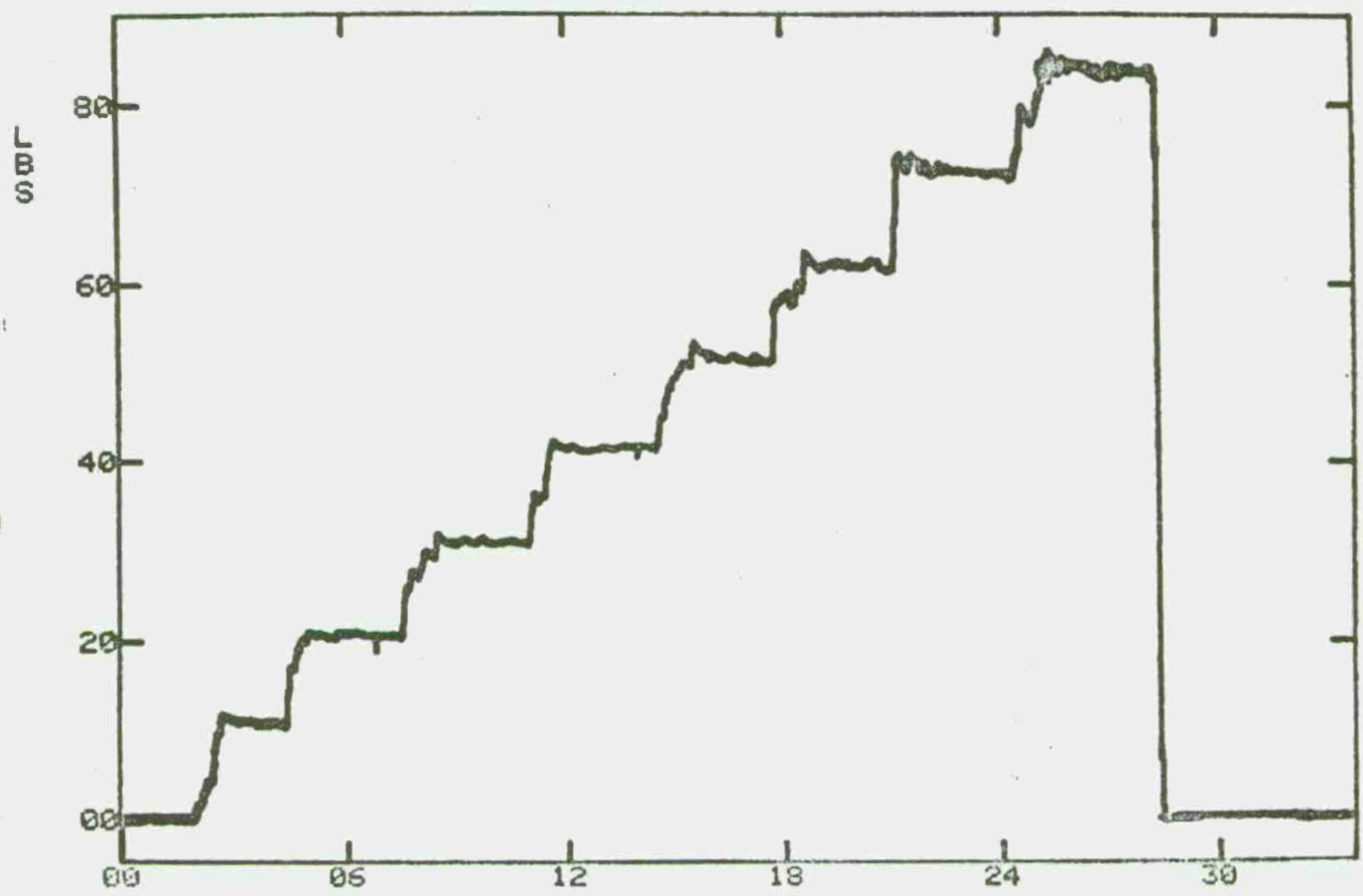
CH 14 GROUND REF - R.H. BOTTOM X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



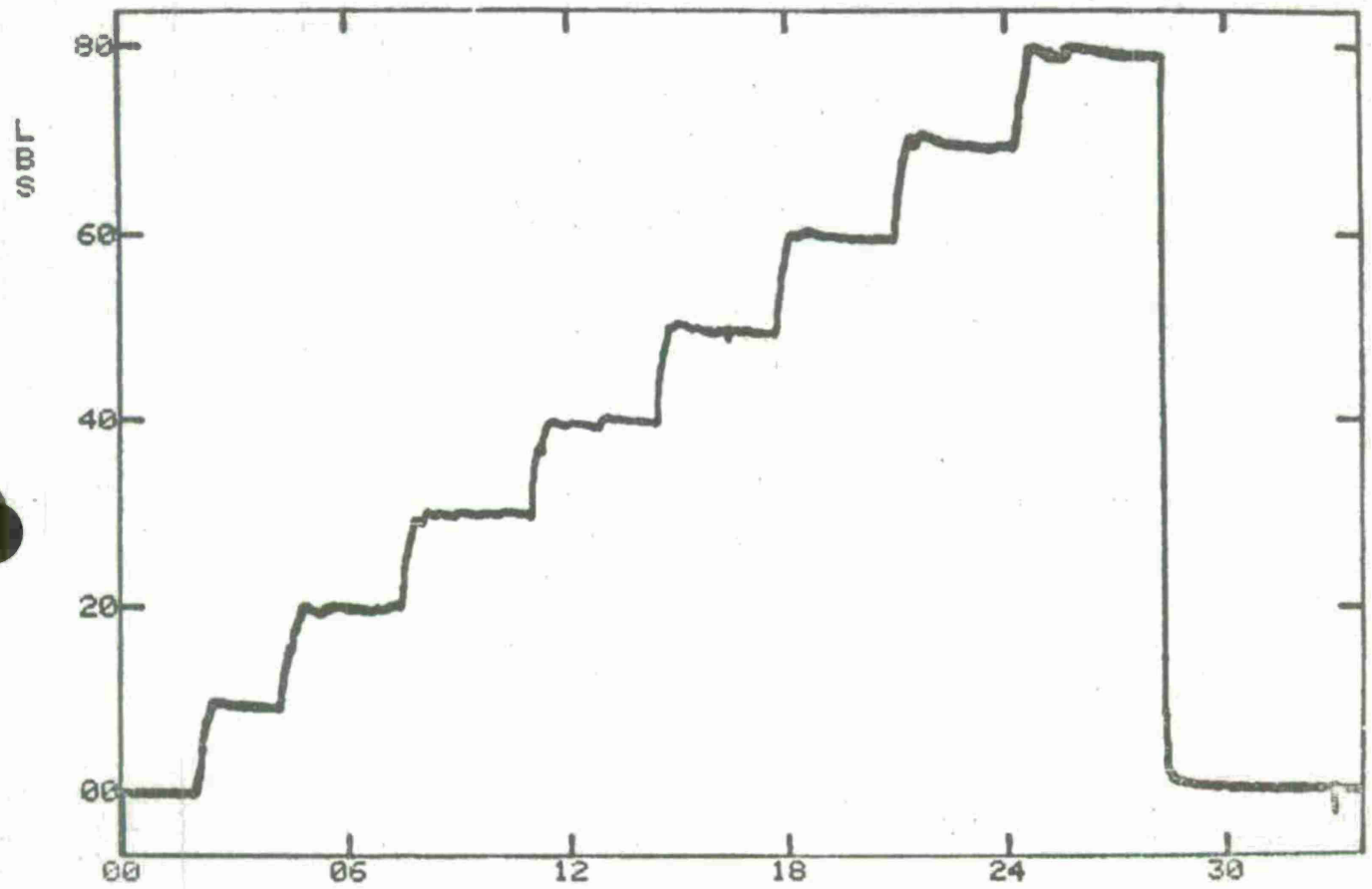
CH 15 GROUND REF - L.H. TOP X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



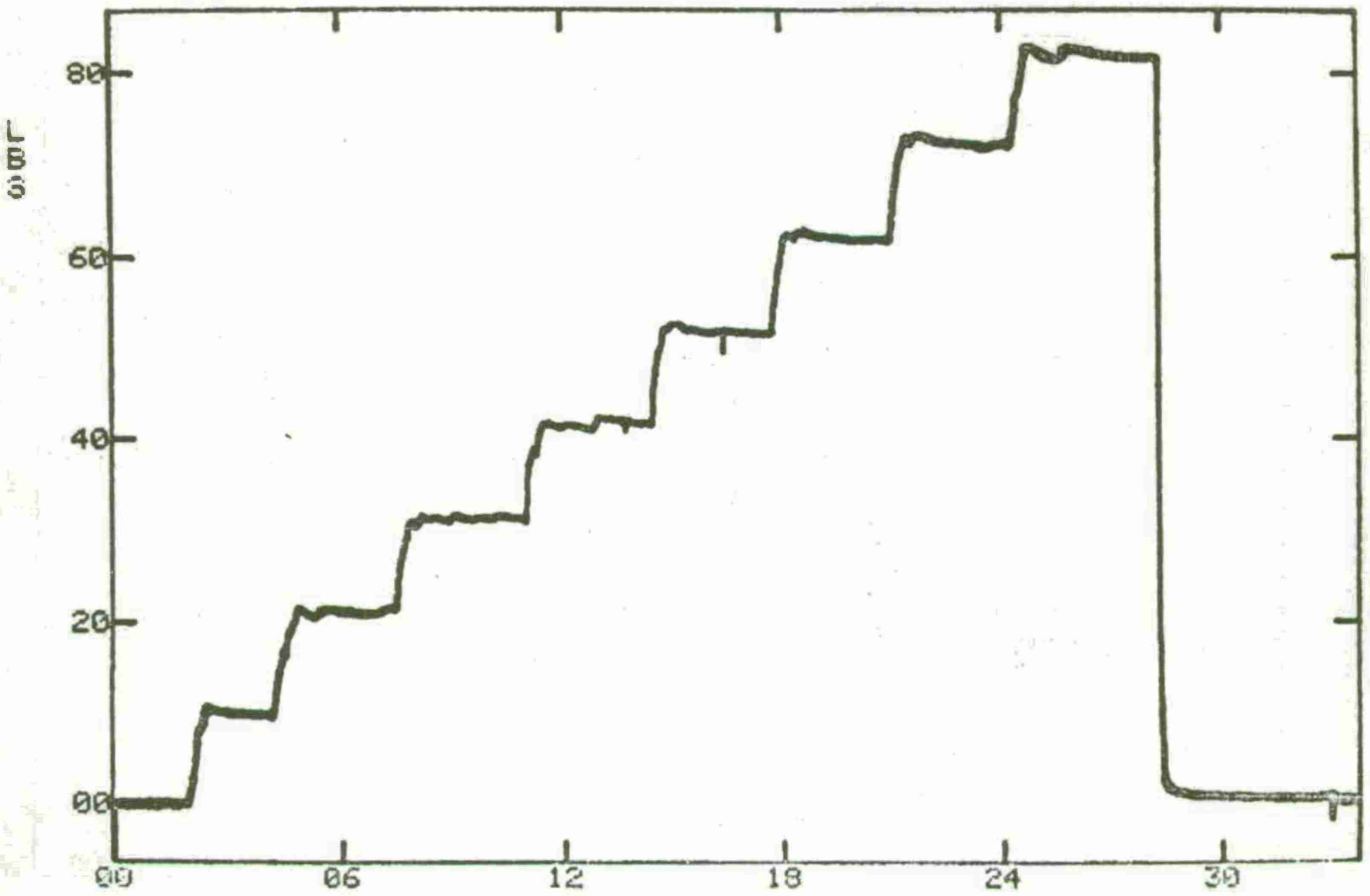
CH 17 GROUND REF - L.H. BOTTOM X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



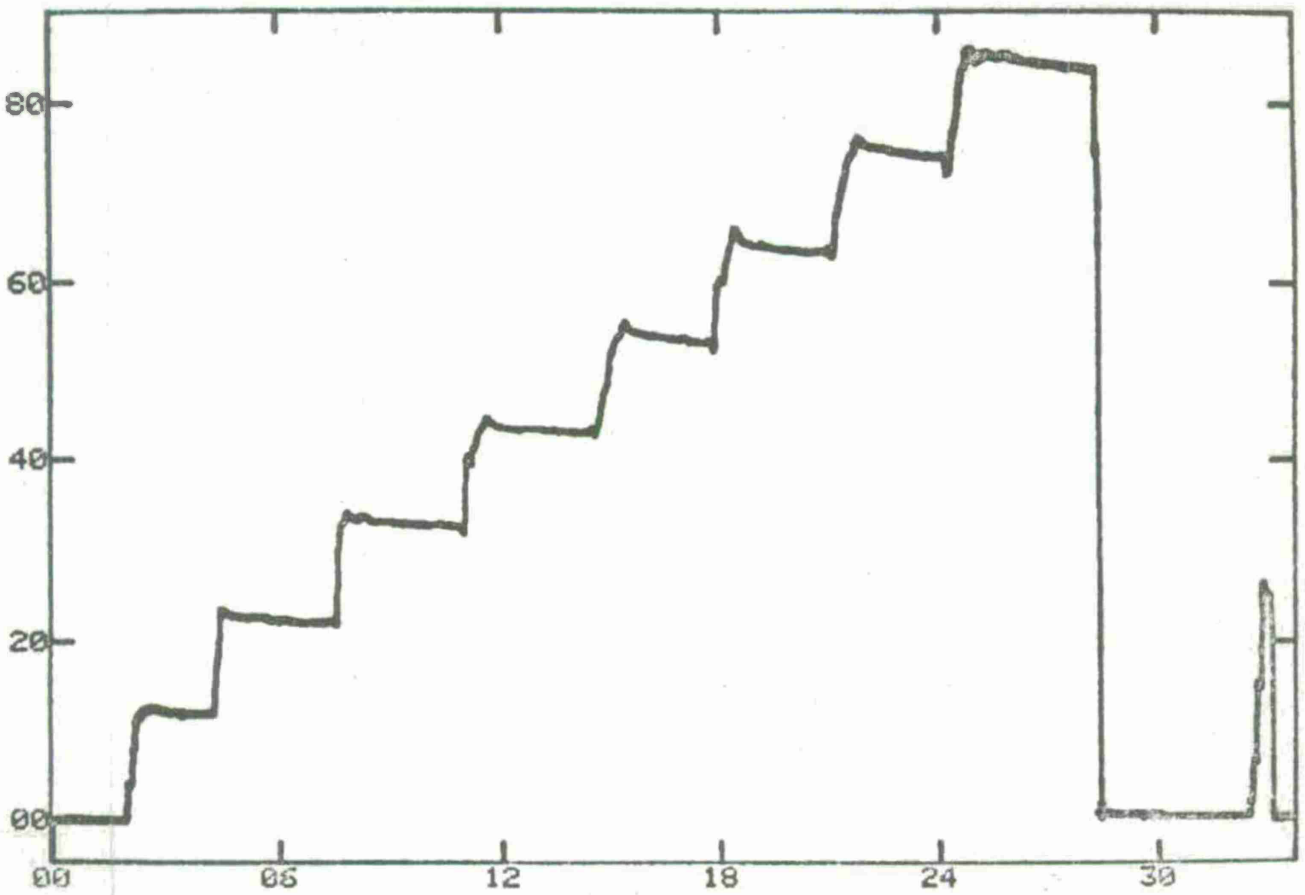
TIME IN SECONDS X 10-1
CH 18 LOAD APPLIED - L.H. DN X 10-1
TEST 34 (22AUG75) AH1G BEND TESTS



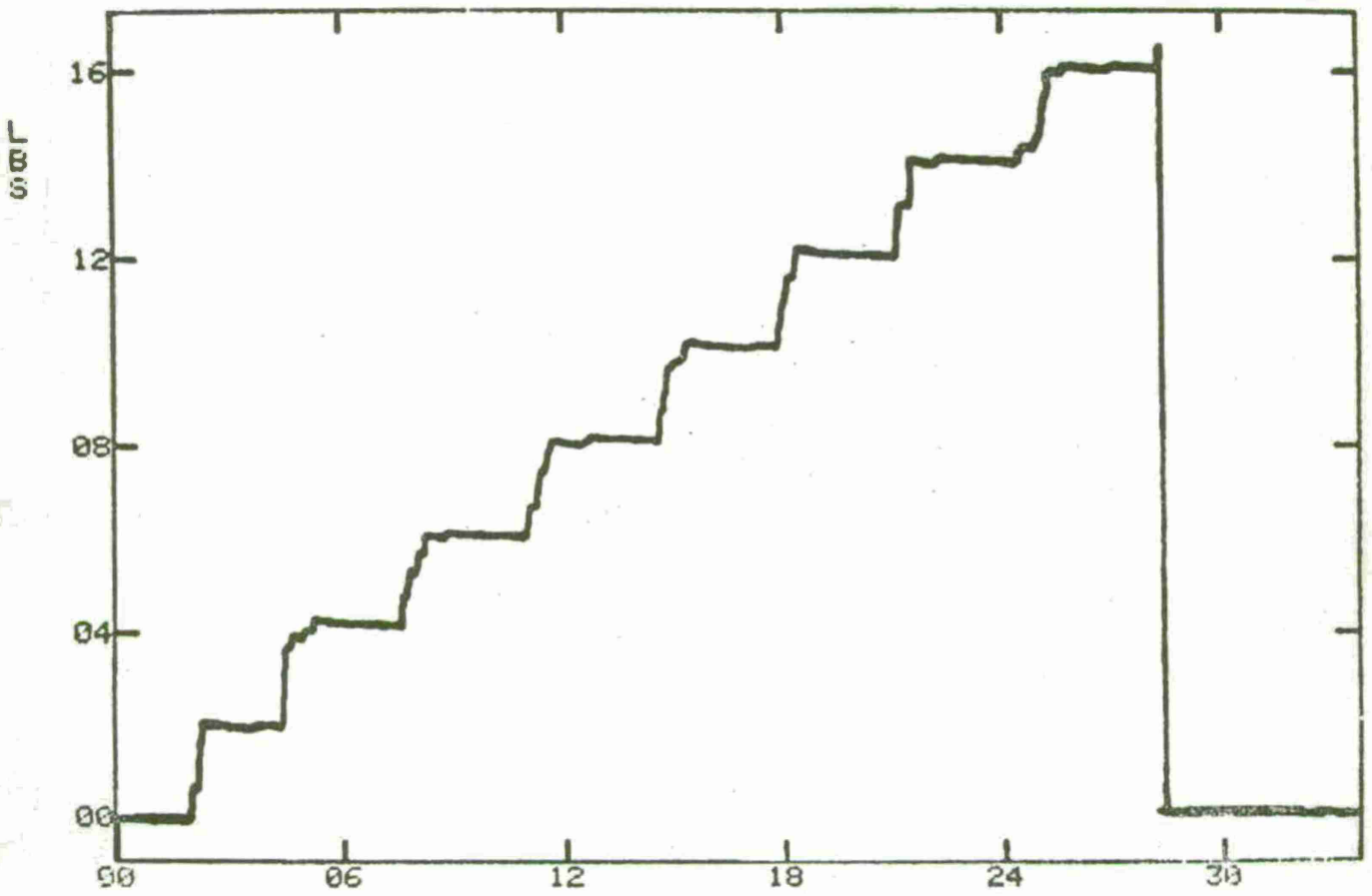
CH 19 LOAD APPLIED - R.H. DN (CHS 1/10) X 10-1
TEST 34 (22AUG75) AH1G BEND TESTS



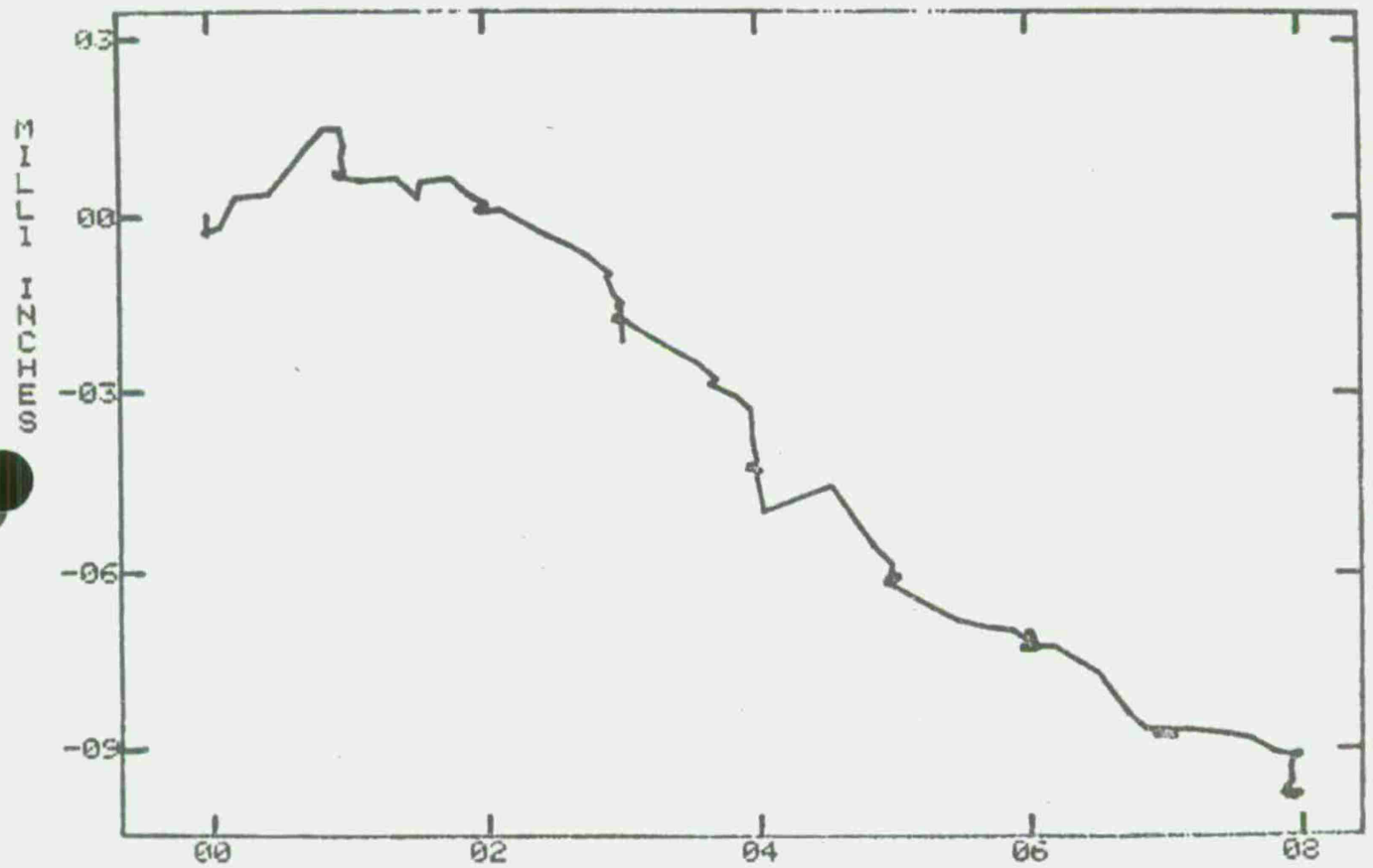
CH 19 LOAD APPLIED - R.H. DN (CHS 11/21) X 10-1
TEST 34 (22AUG75) AH1G BEND TESTS



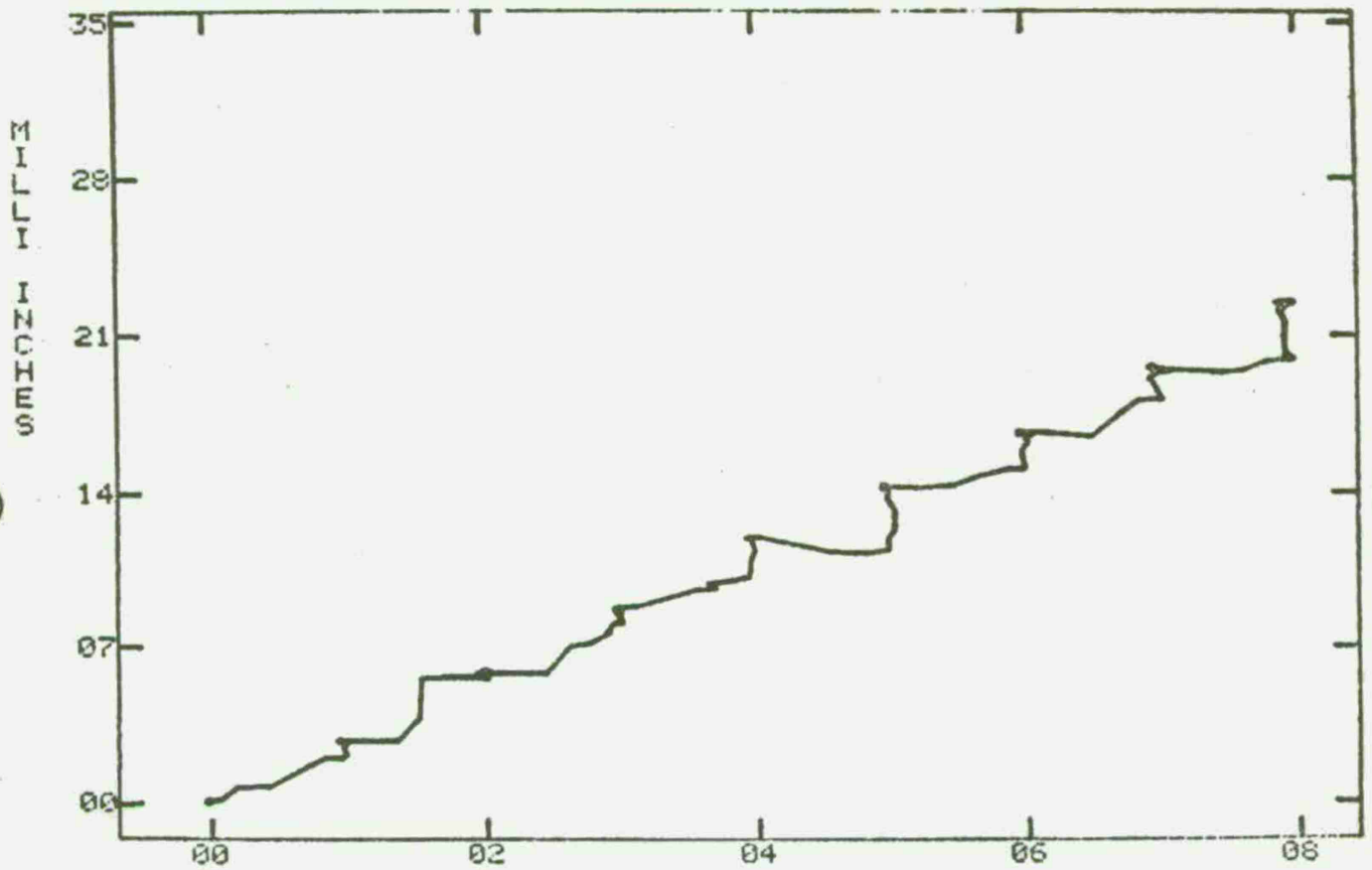
CH 20 LOAD APPLIED - R.H. UP X 10-1
TEST 34 (22AUG75) AH1G BEND TESTS

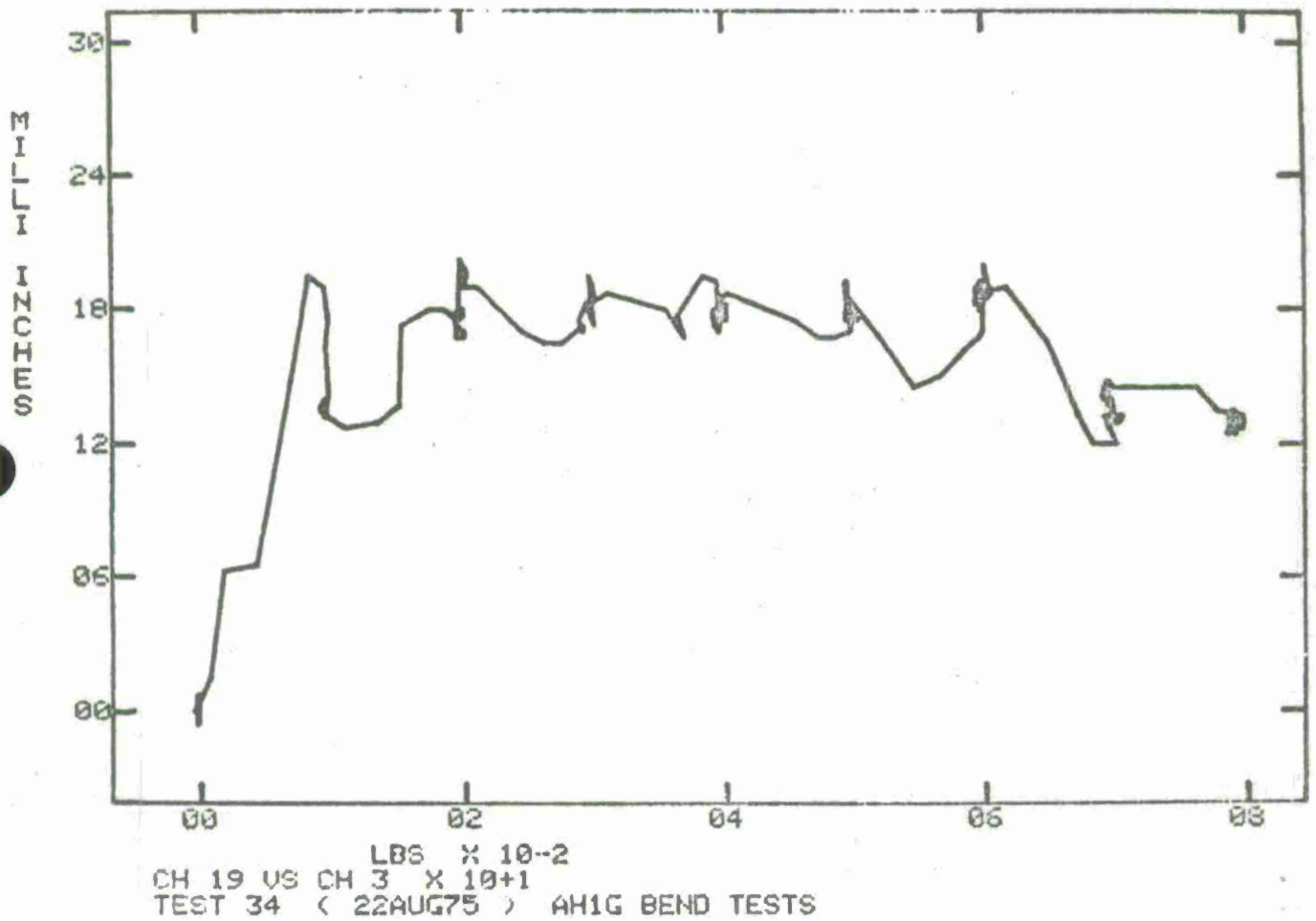


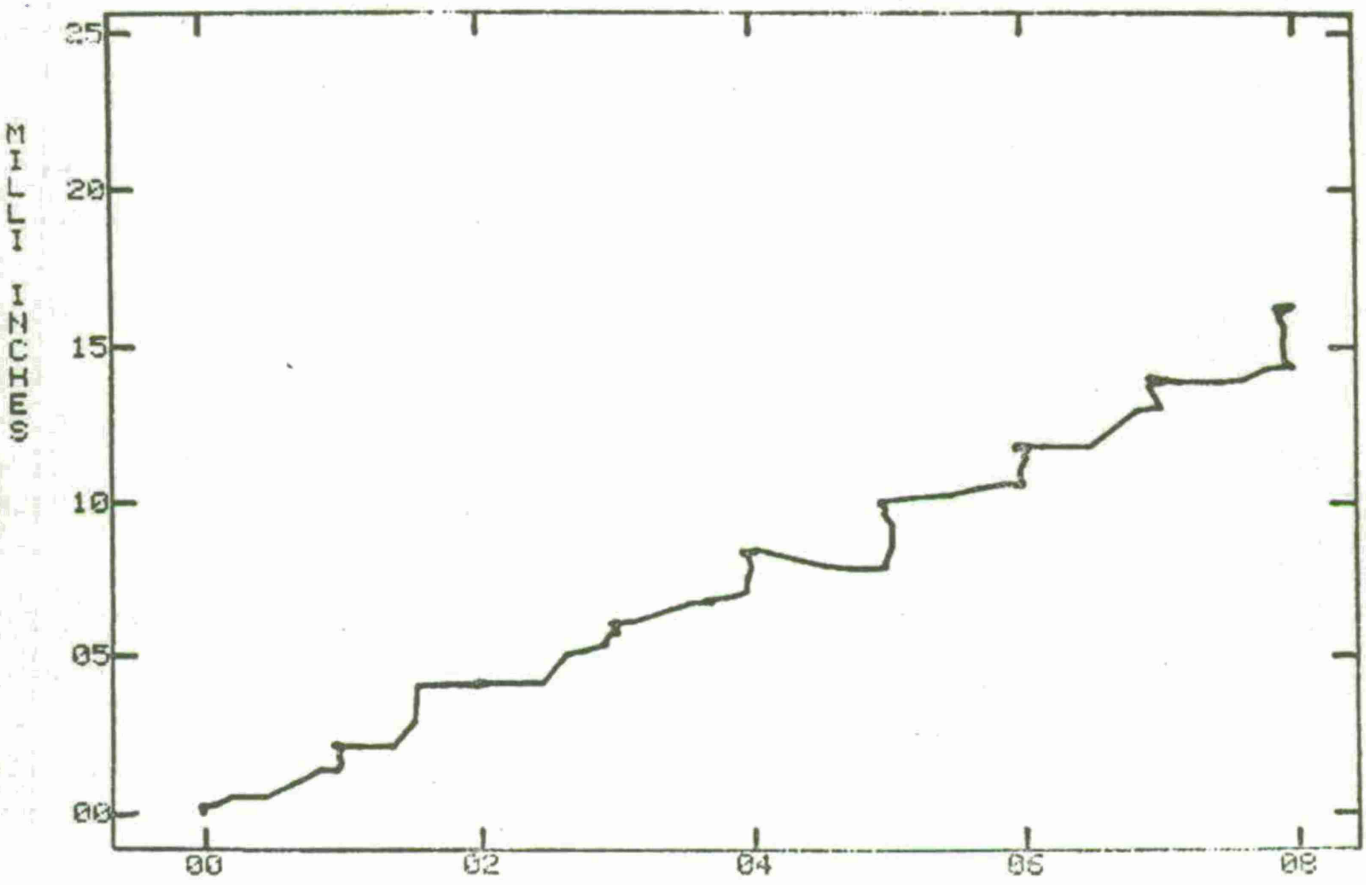
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED - L H. UP X 10-2
TEST 34 (22AUG75) AH1G BEND TESTS

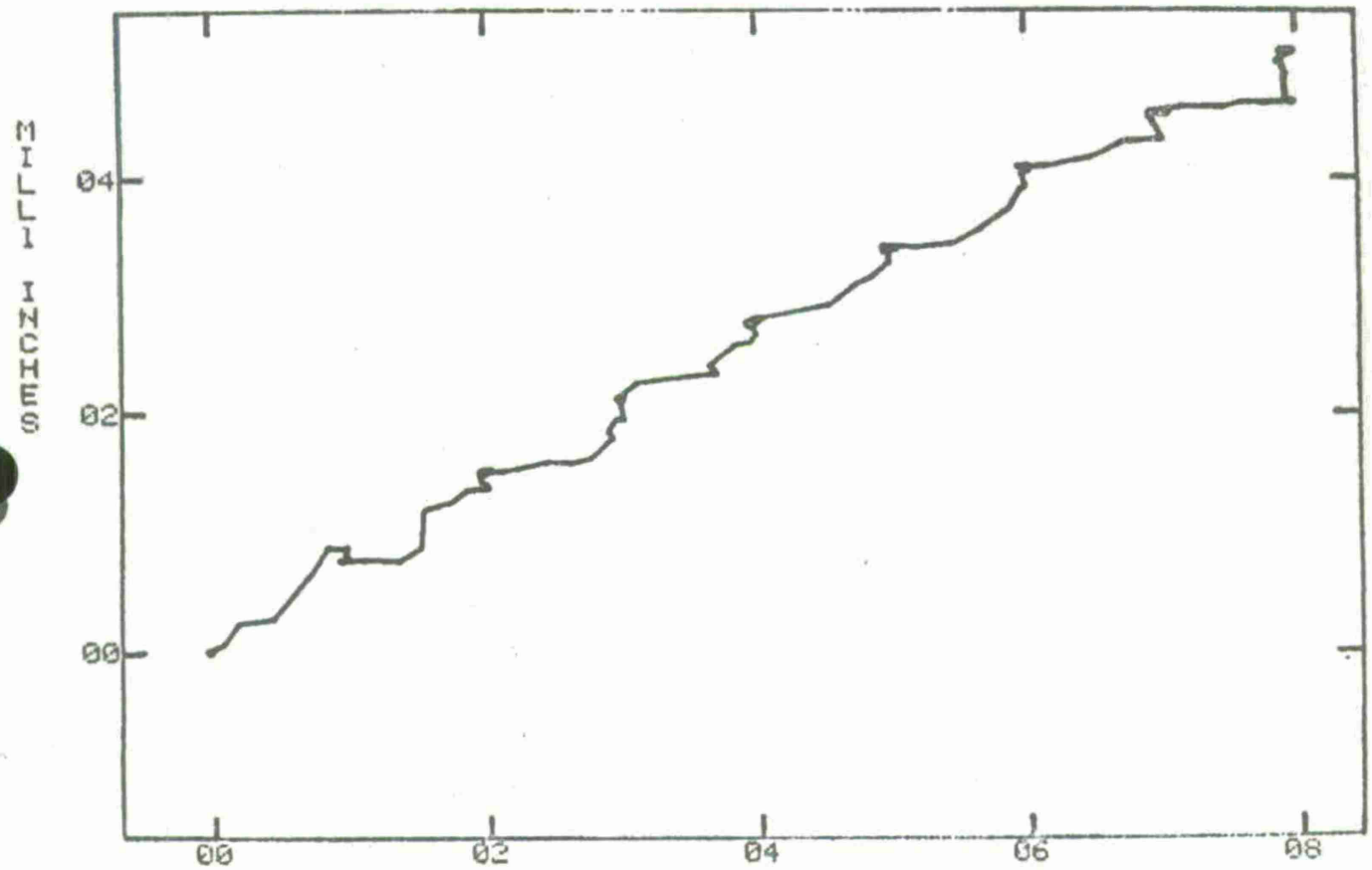


CH 19 VS CH 1 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS

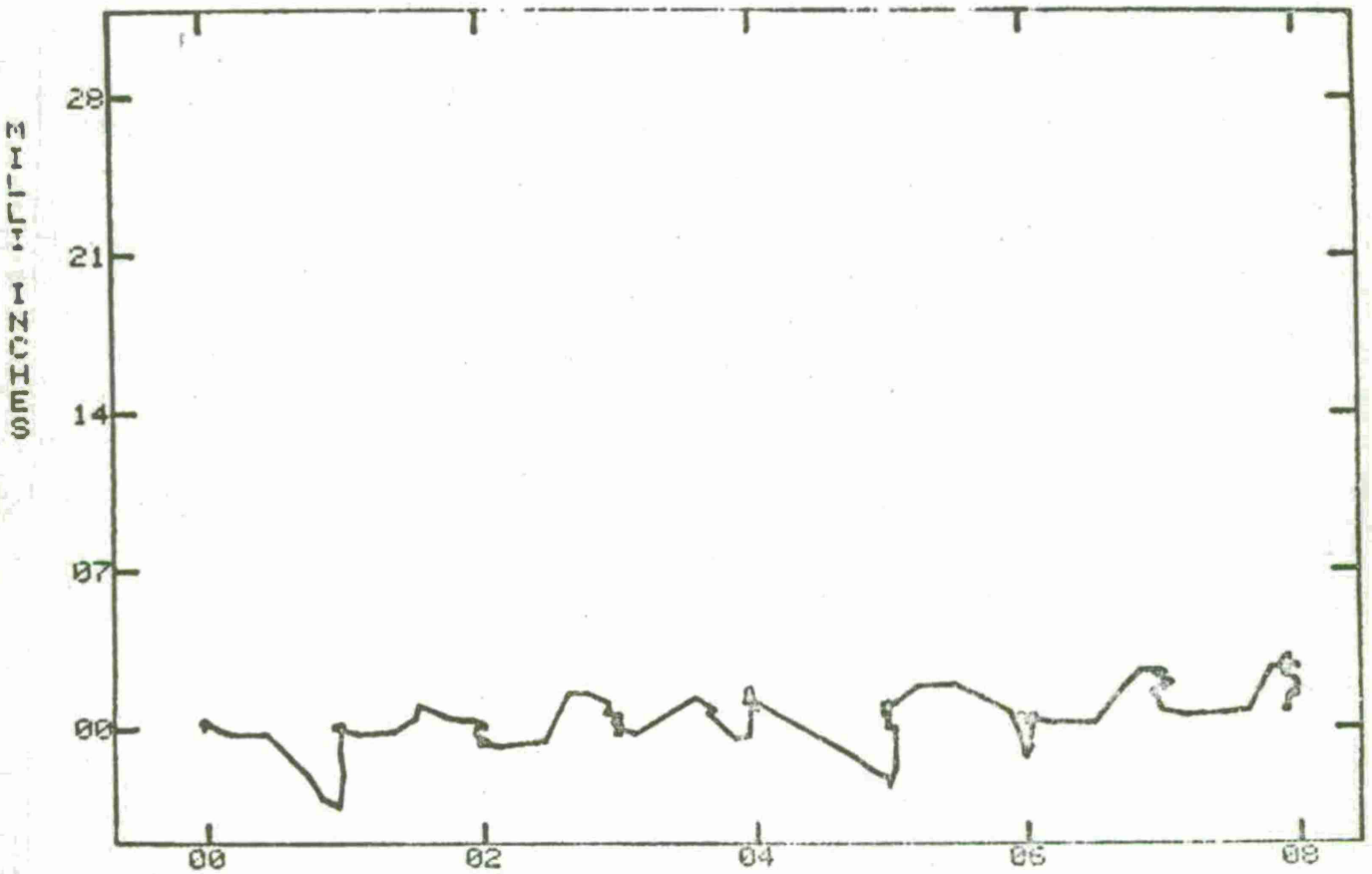

35
28
21
14
07
00
MILLI INCHES
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 2 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS


MILLI INCHES
30
24
18
12
06
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 3 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS

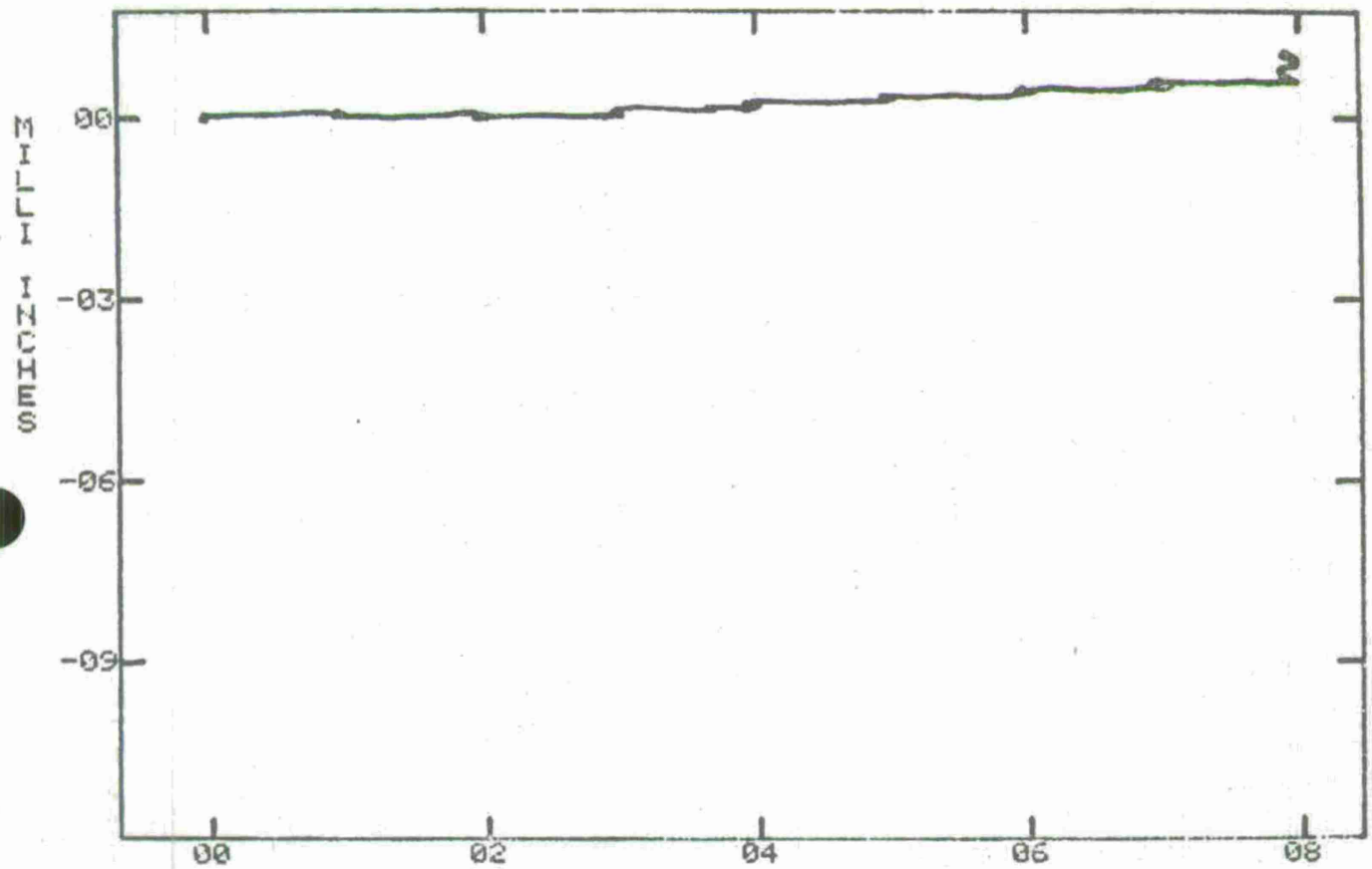

MILLI INCHES
25
20
15
10
05
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 4 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS

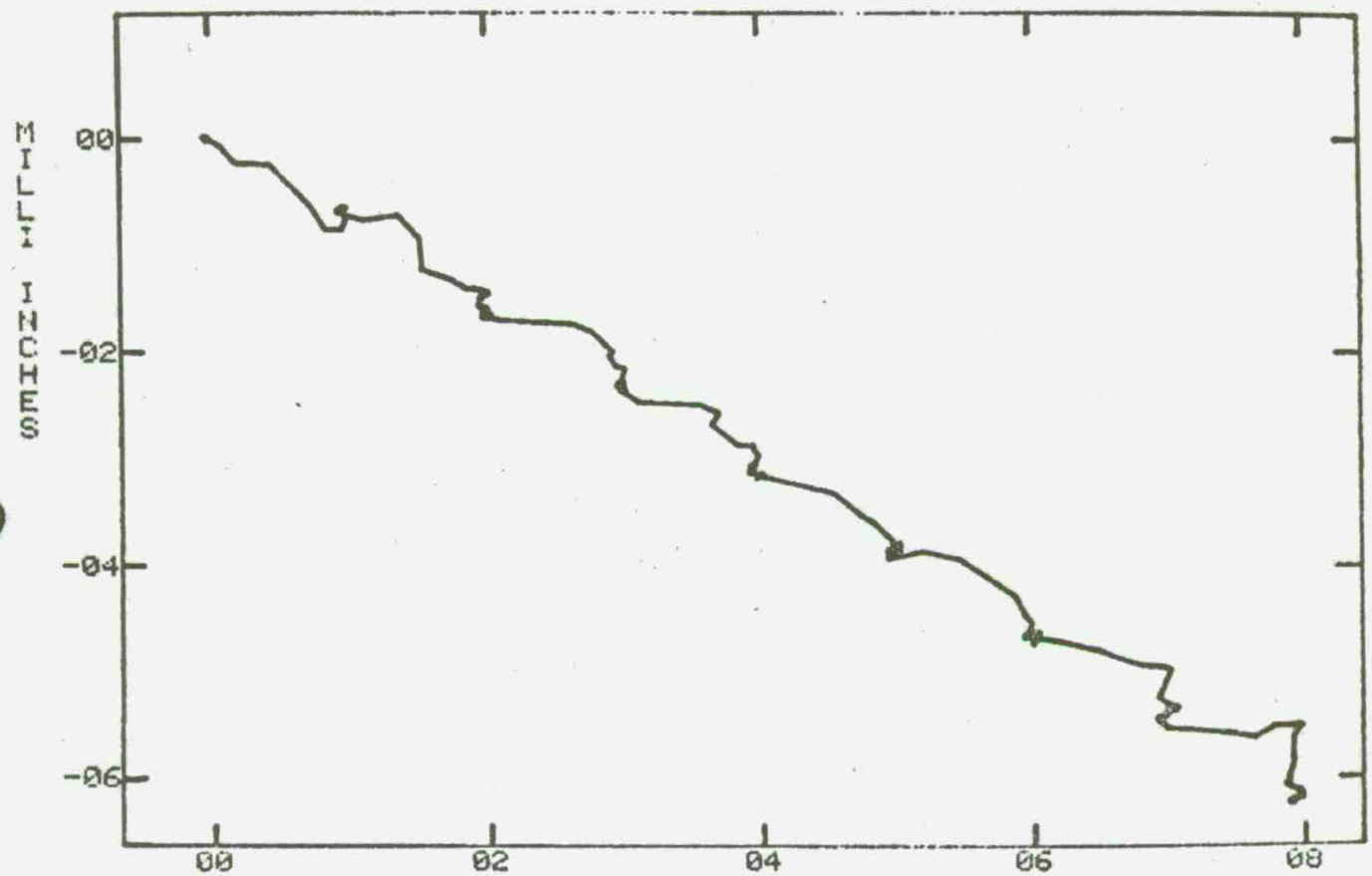


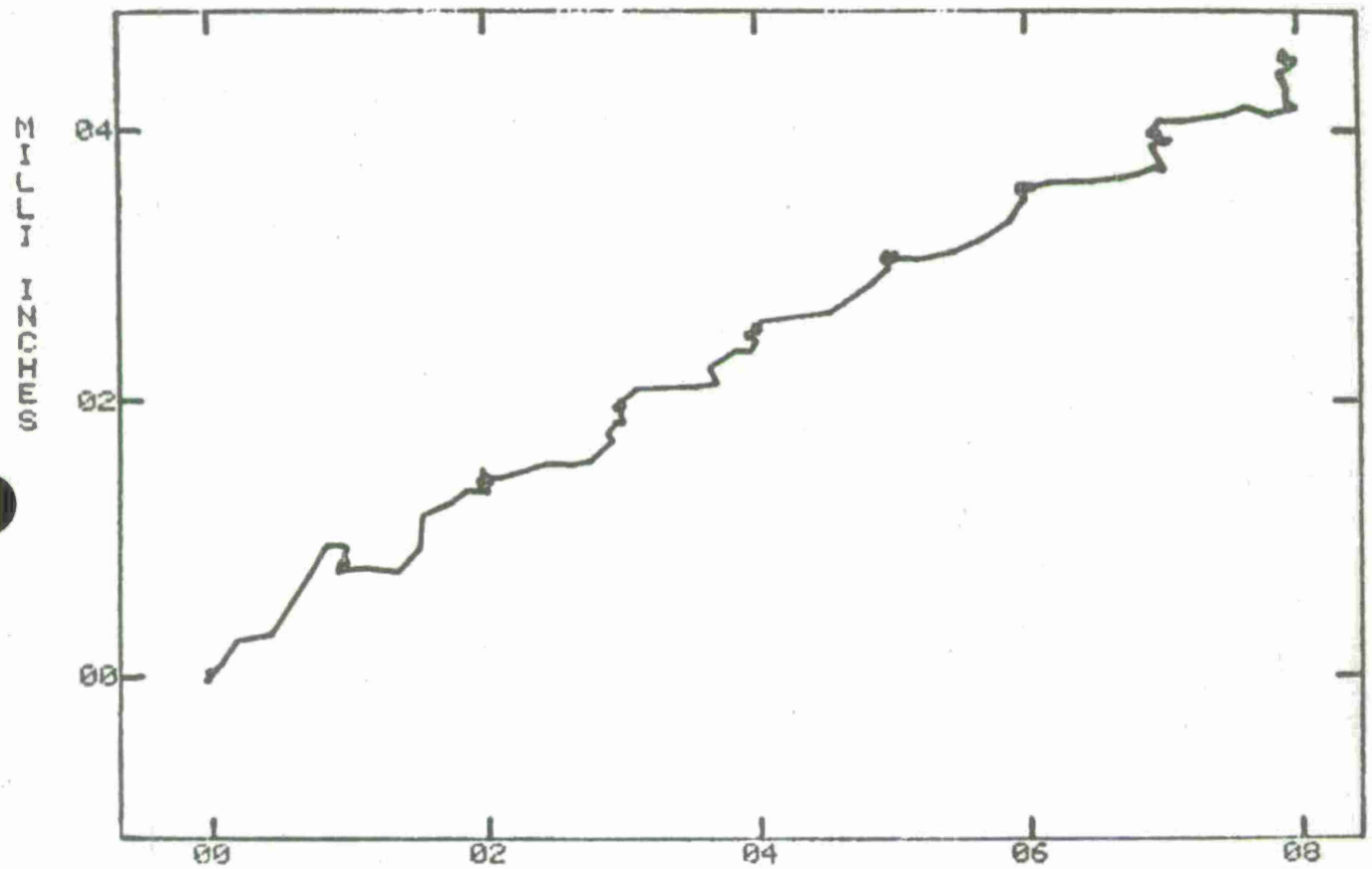
CH 19 VS CH 5 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



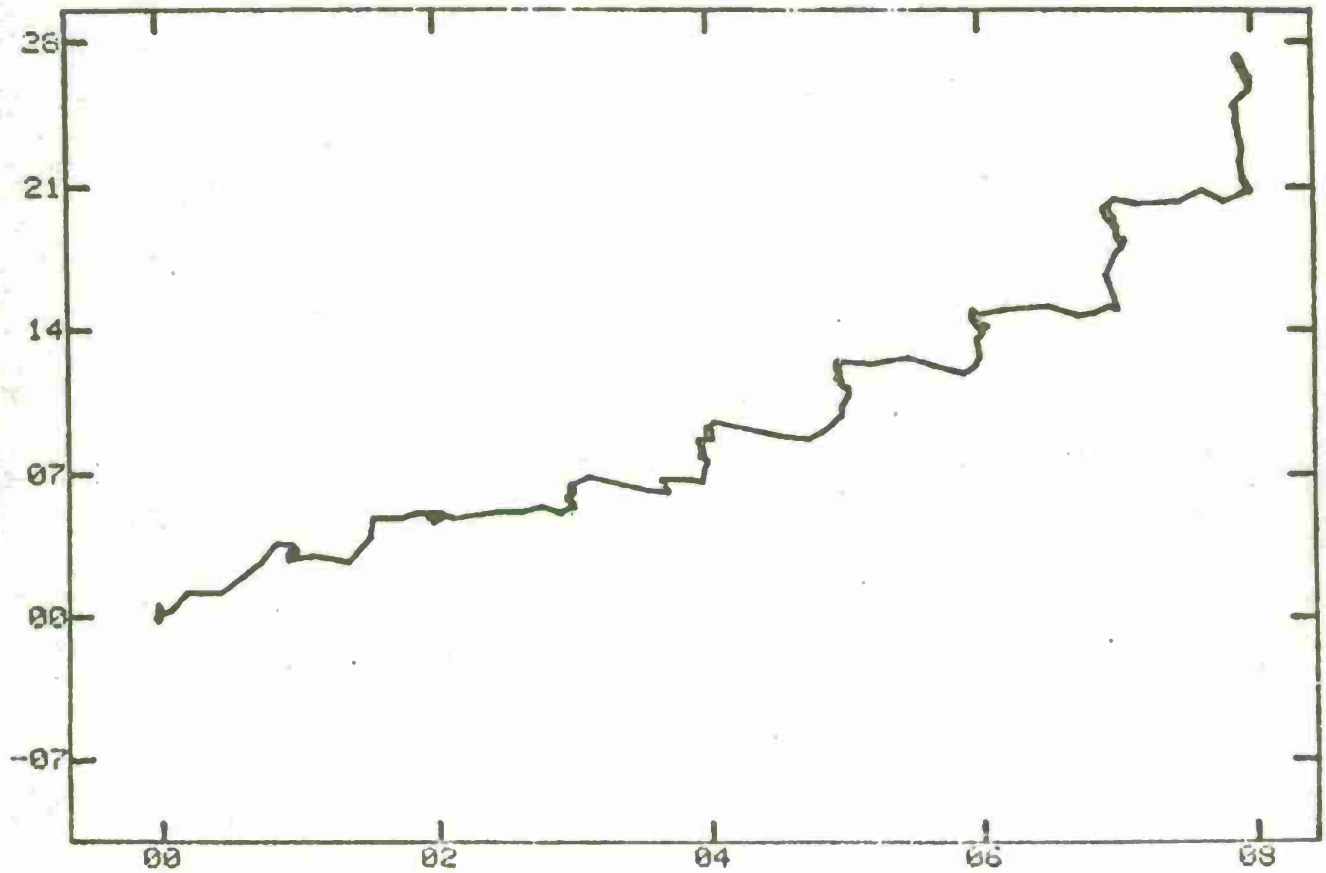
CH 19 VS CH 6 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS


MILLI INCHES
00
-03
-06
-09
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 7 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS

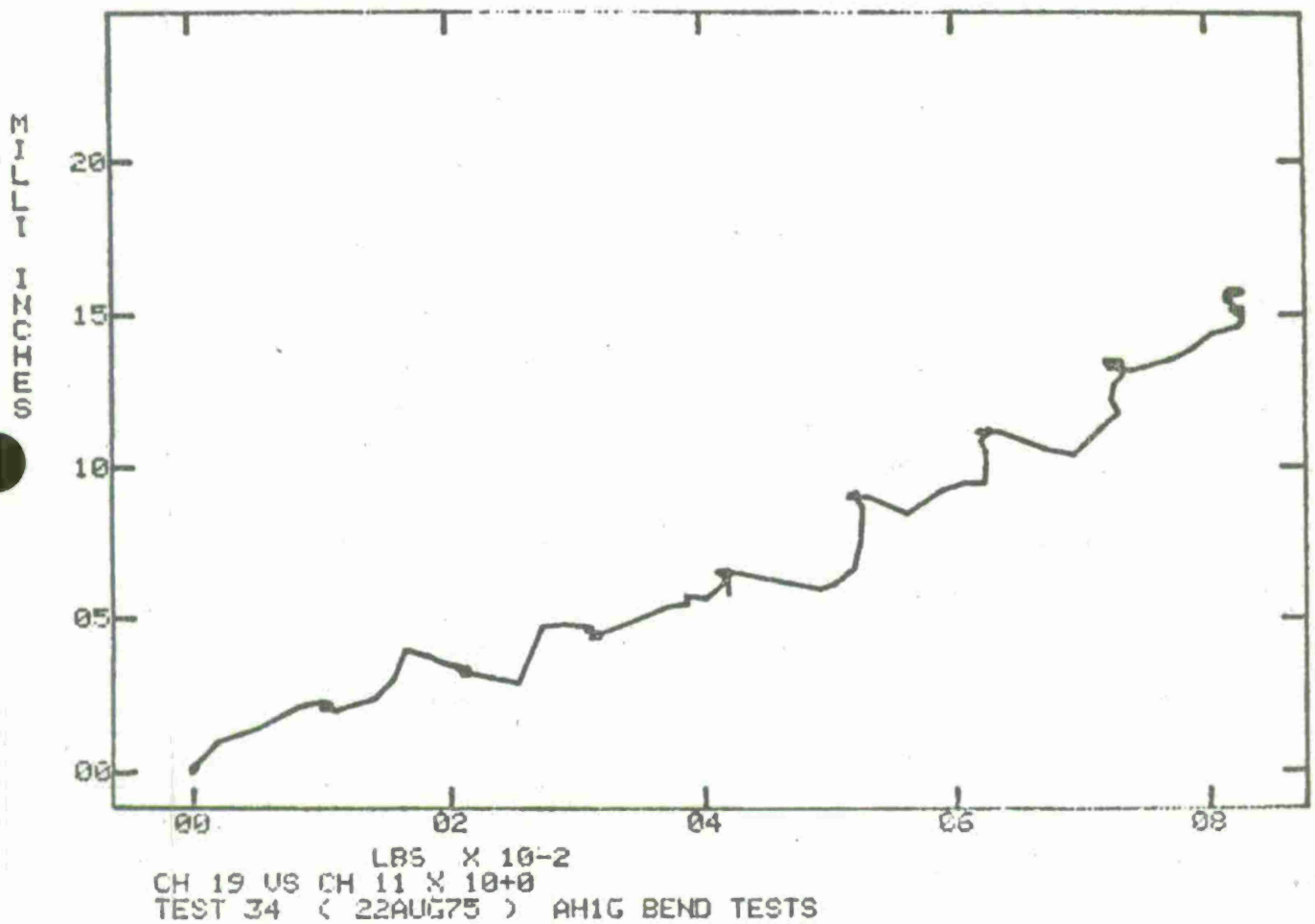

MILLI INCHES
00
-02
-04
-06
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 0 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



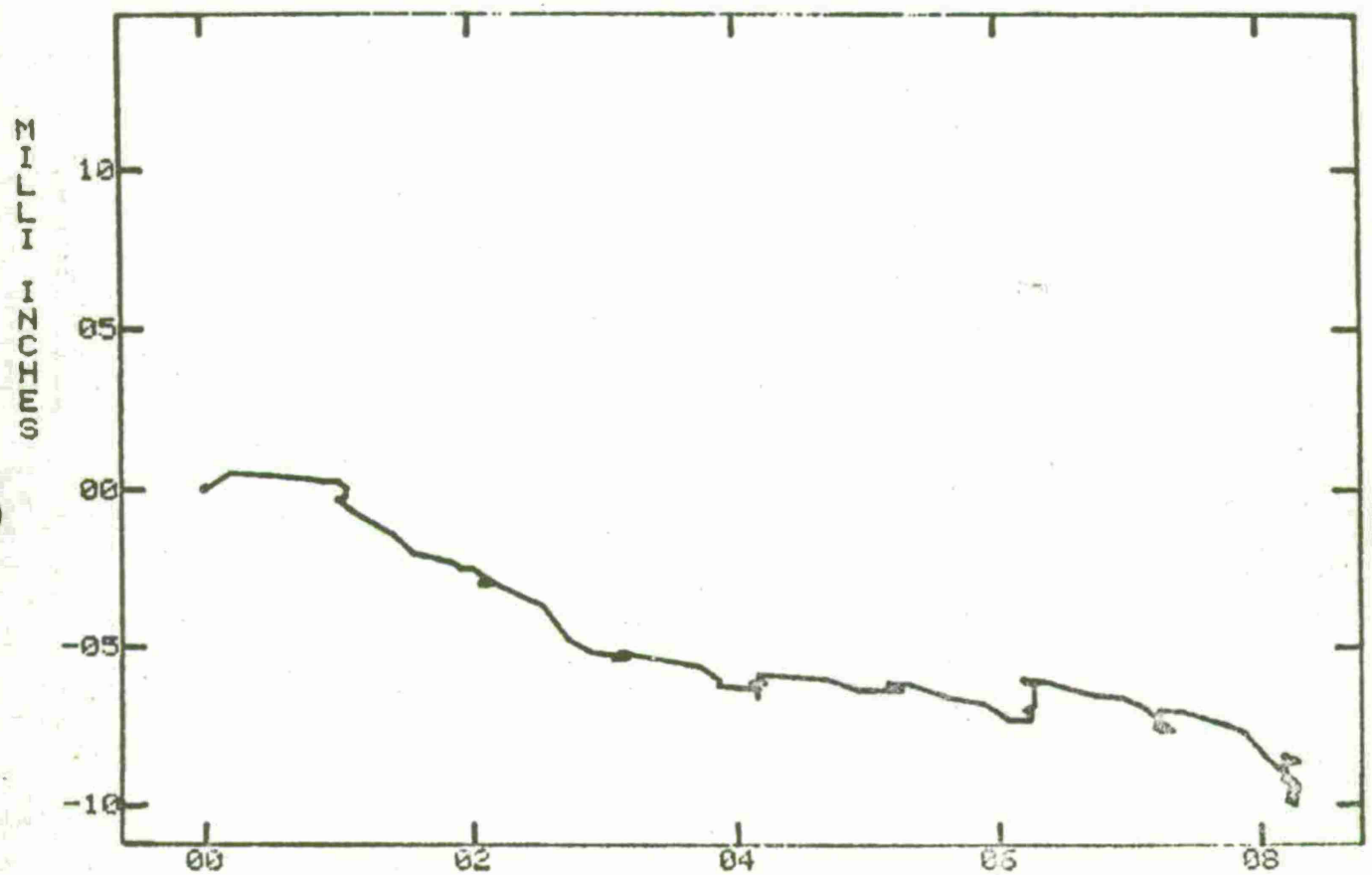
CH 19 VS CH 9 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



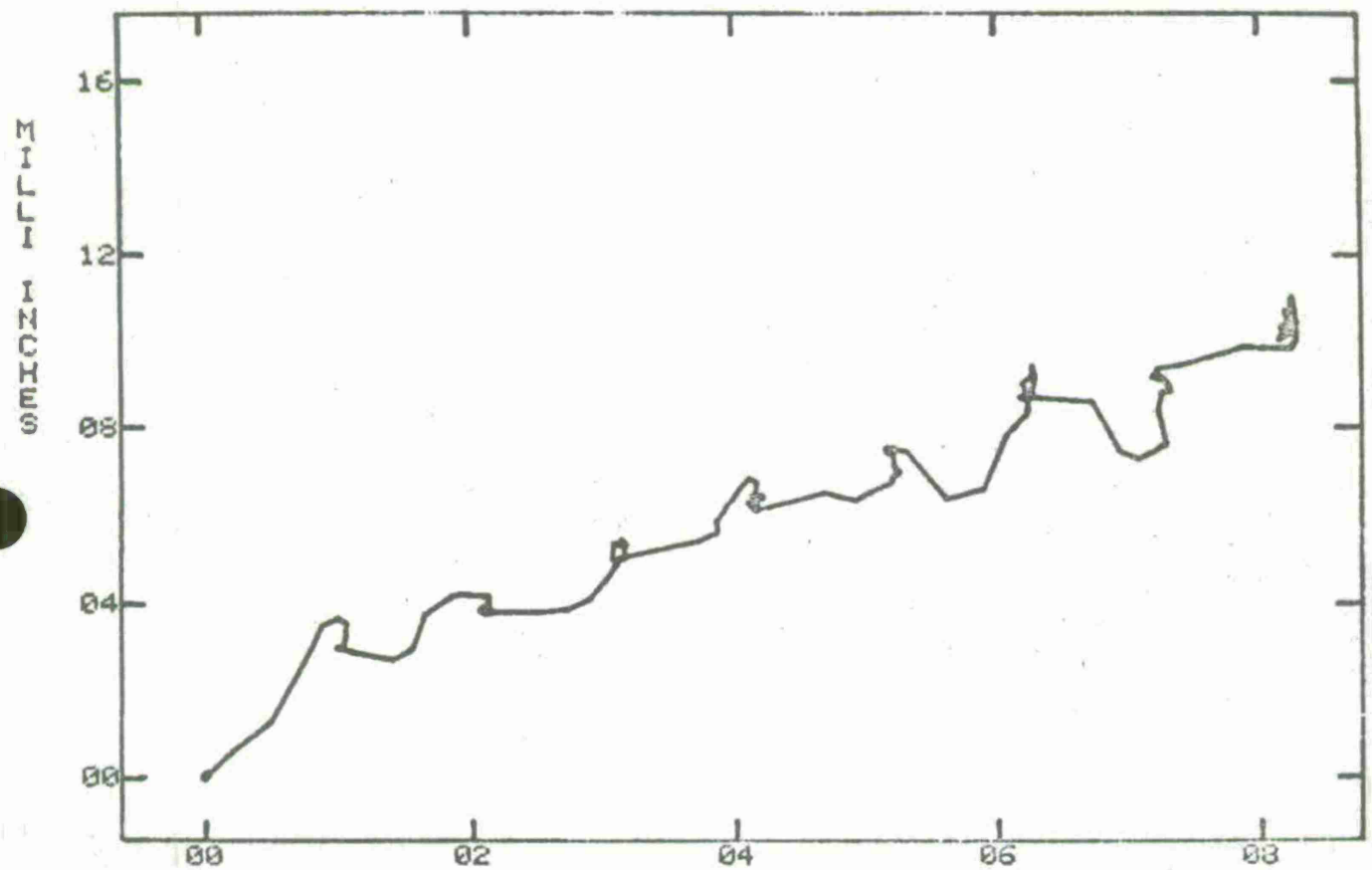
CH 19 VS CH 10 X 10+1
TEST 34 (22AUG75) AH1G BEND TESTS

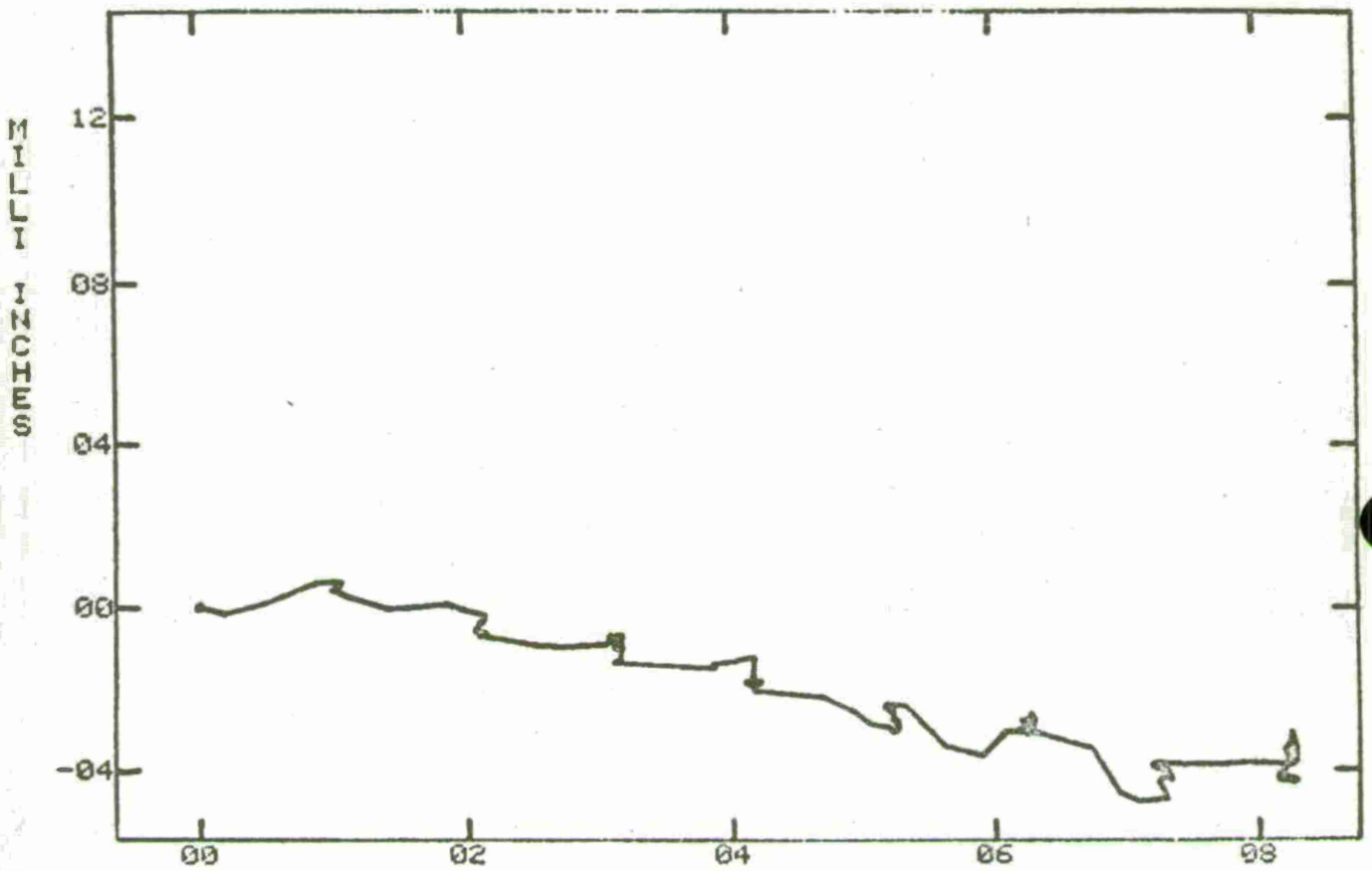


CH 19 VS CH 11 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS

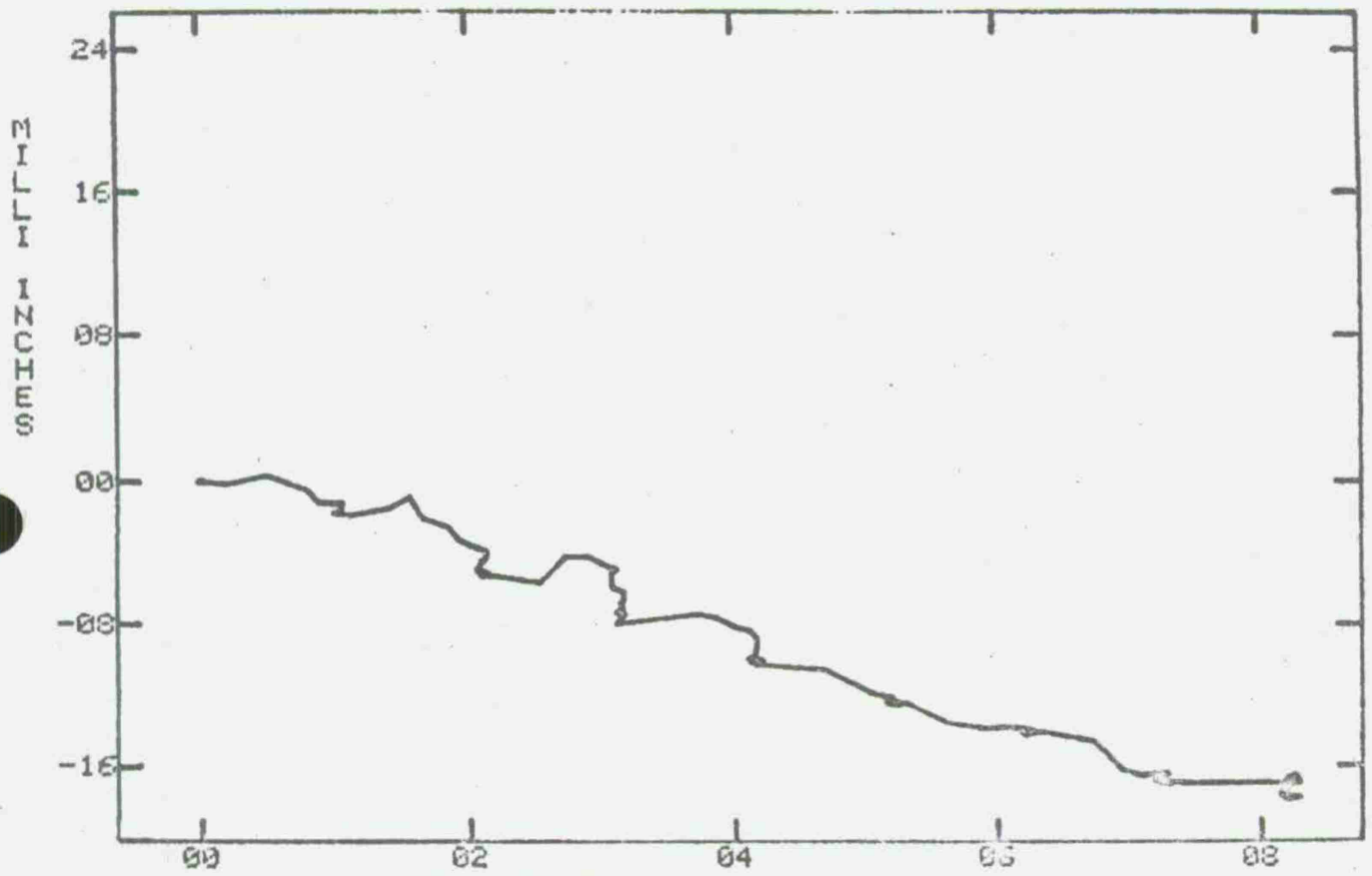


CH 19 VS CH 12 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS

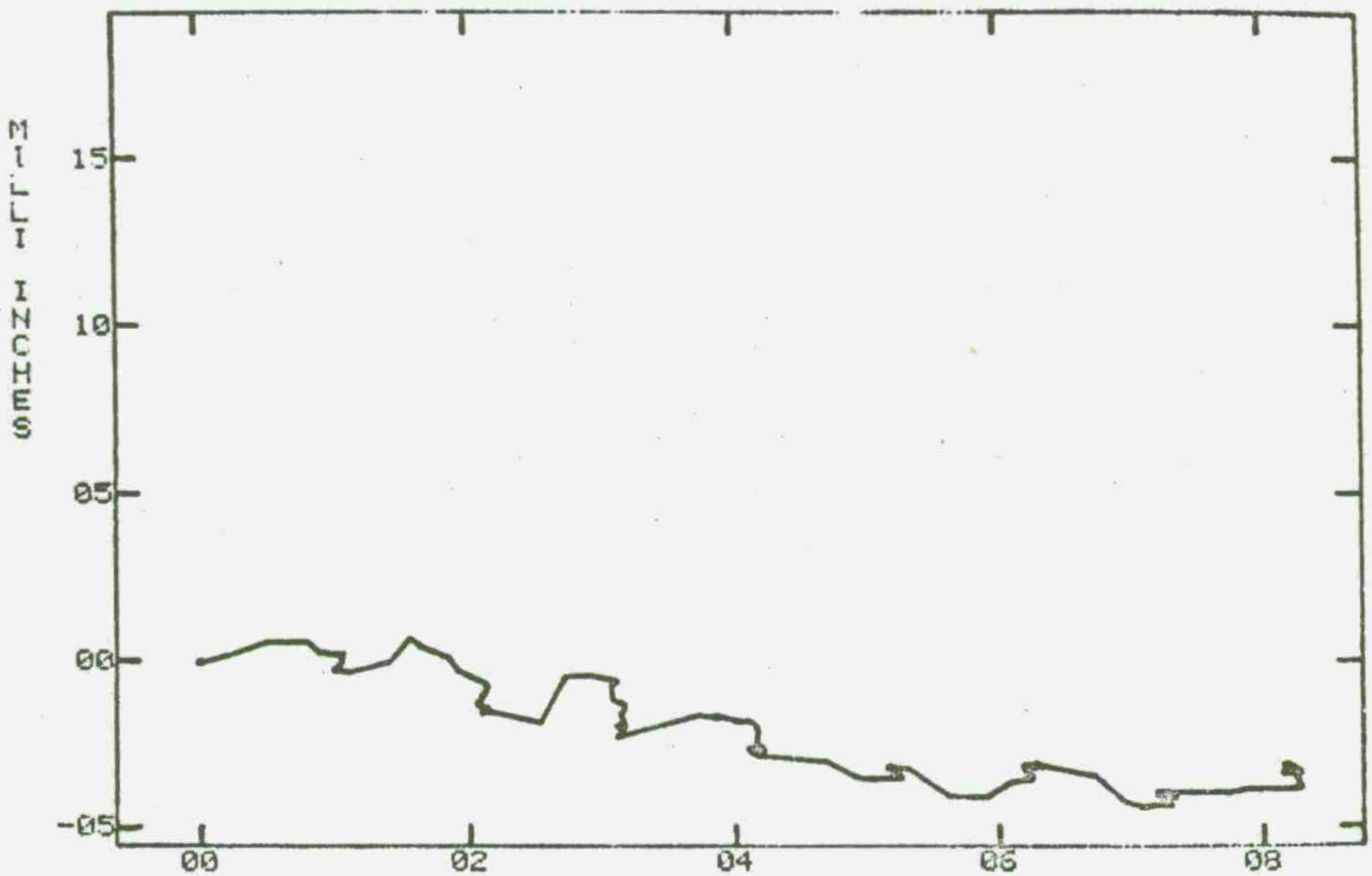

MILLI INCHES
16
12
08
04
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 13 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



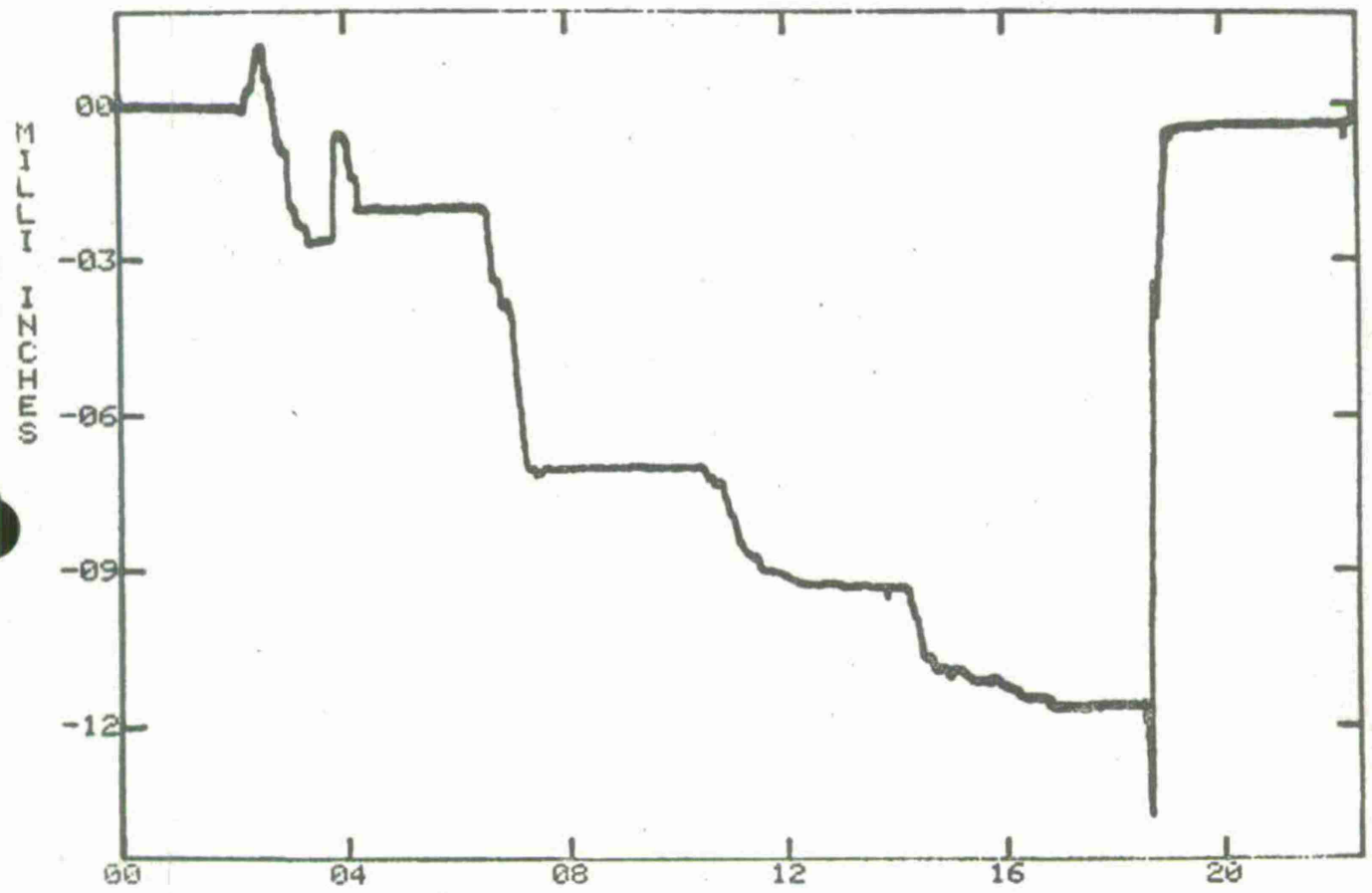
CH 19 VS CH 14 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



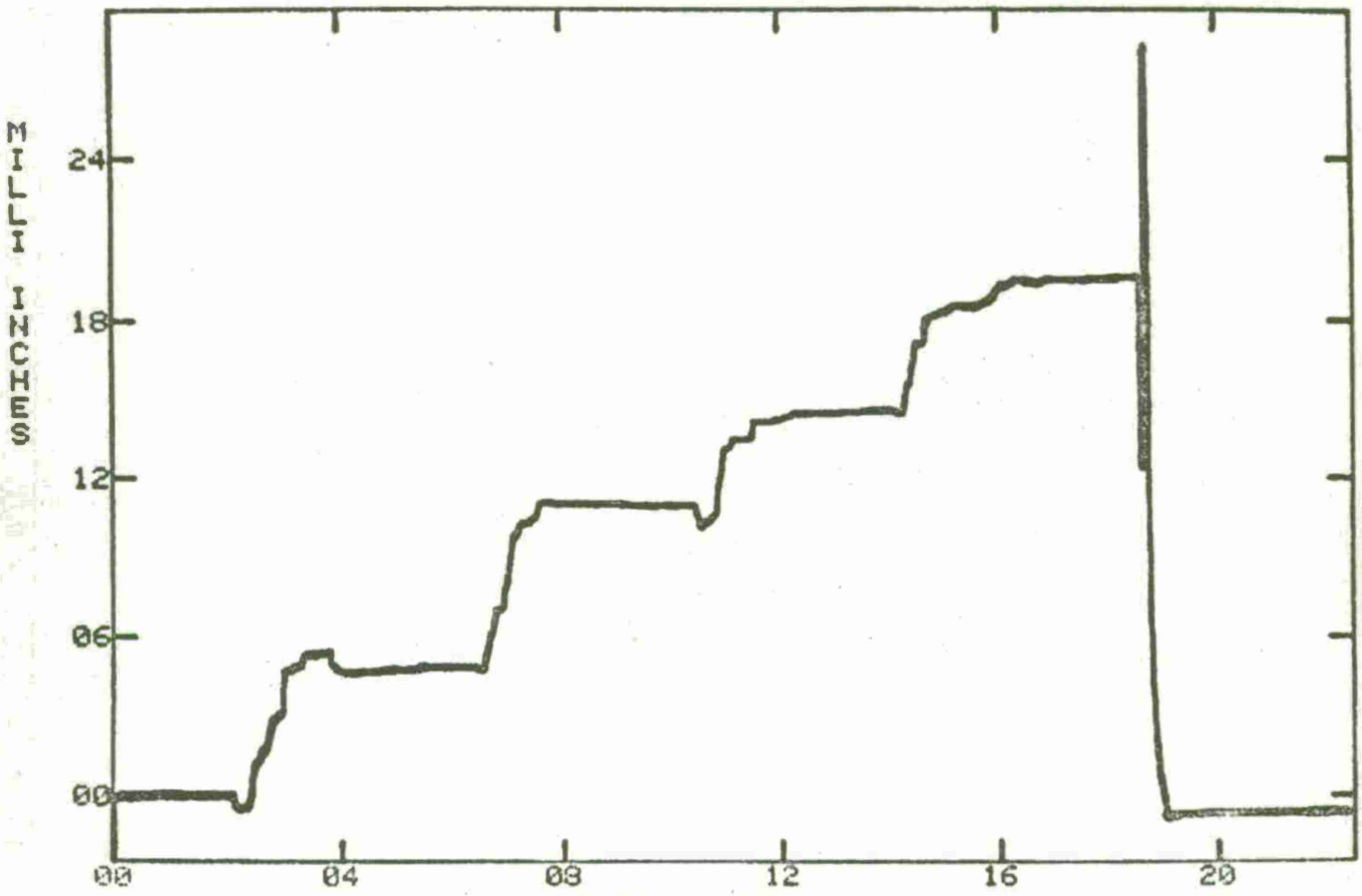
CH 19 VS CH 15 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



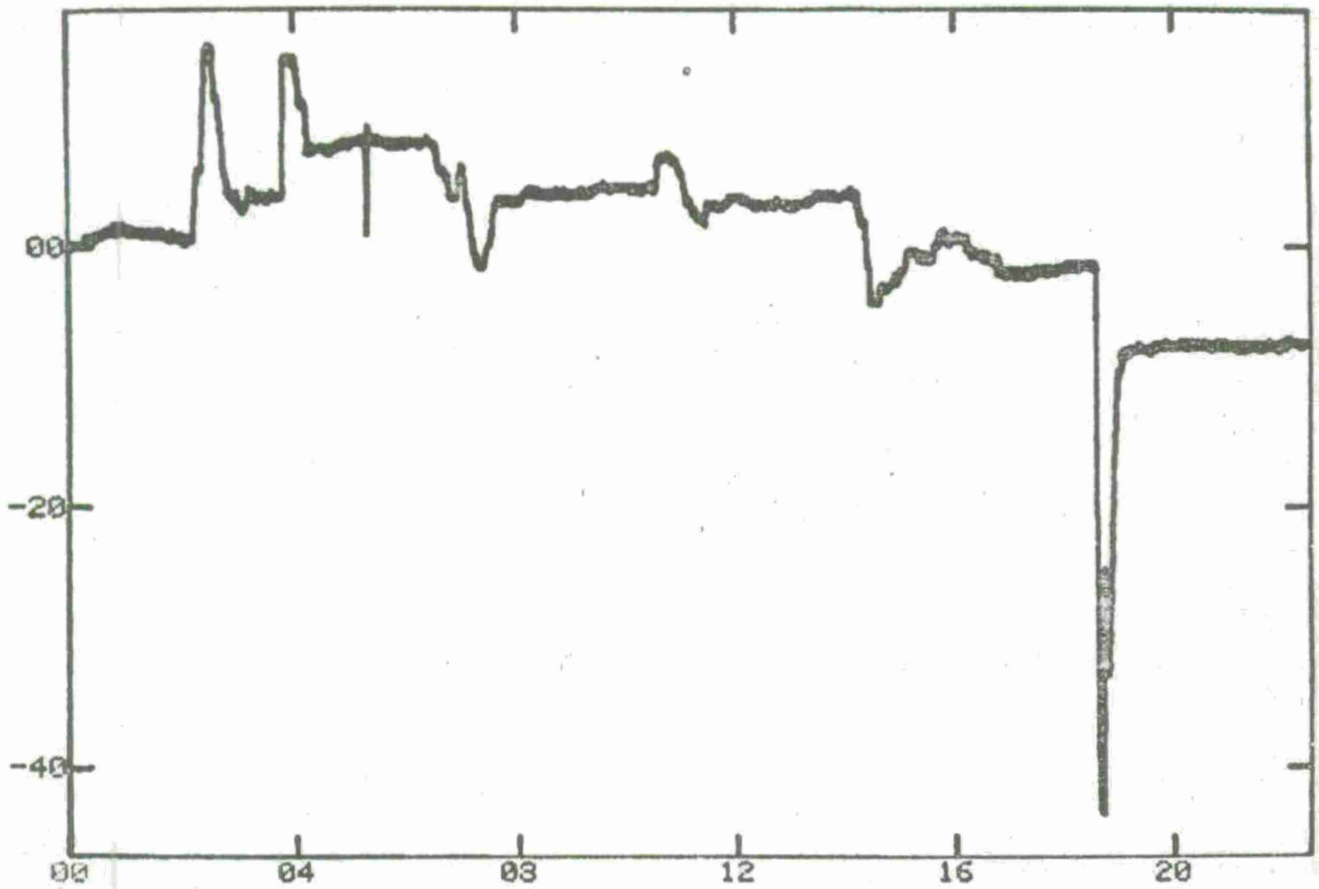
CH 19 VS CH 17 X 10+0
TEST 34 (22AUG75) AH1G BEND TESTS



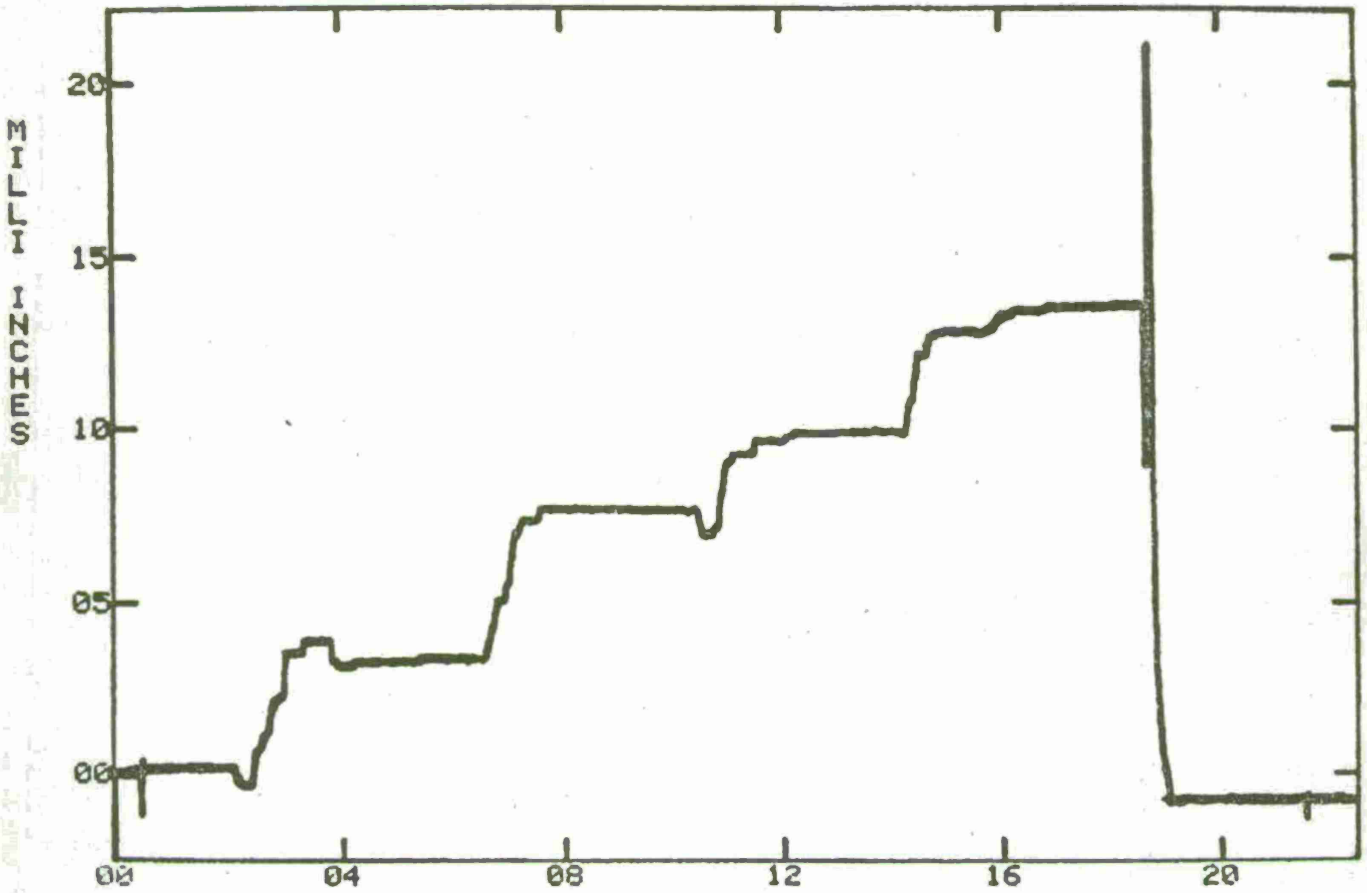
CH 1 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



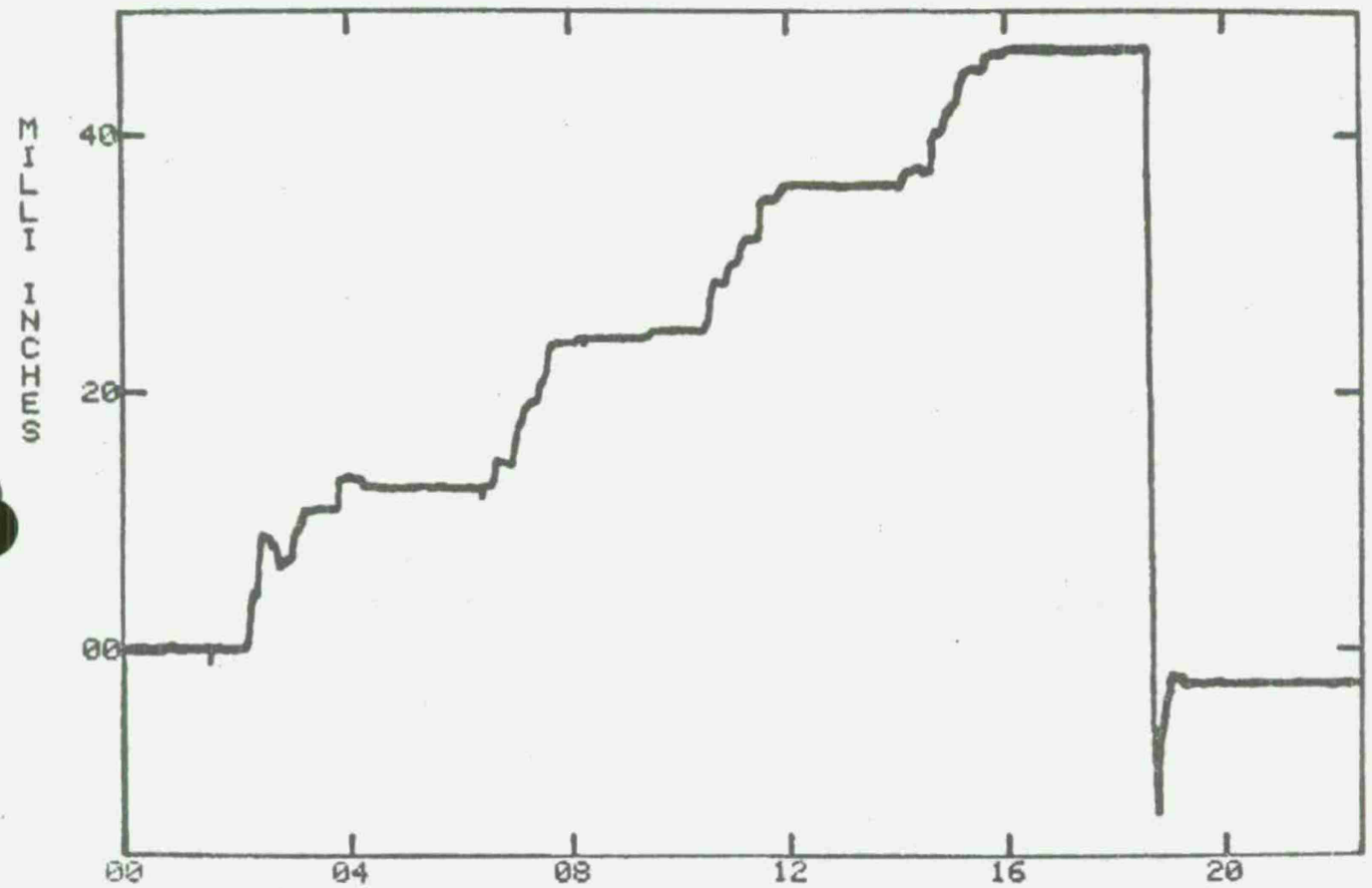
CH 2 WING TRQ DEFLN - ST 212.63 - WS 59 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



CH 3 WING TRQ DEFLN - ST 191.075 - WS 42.5 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

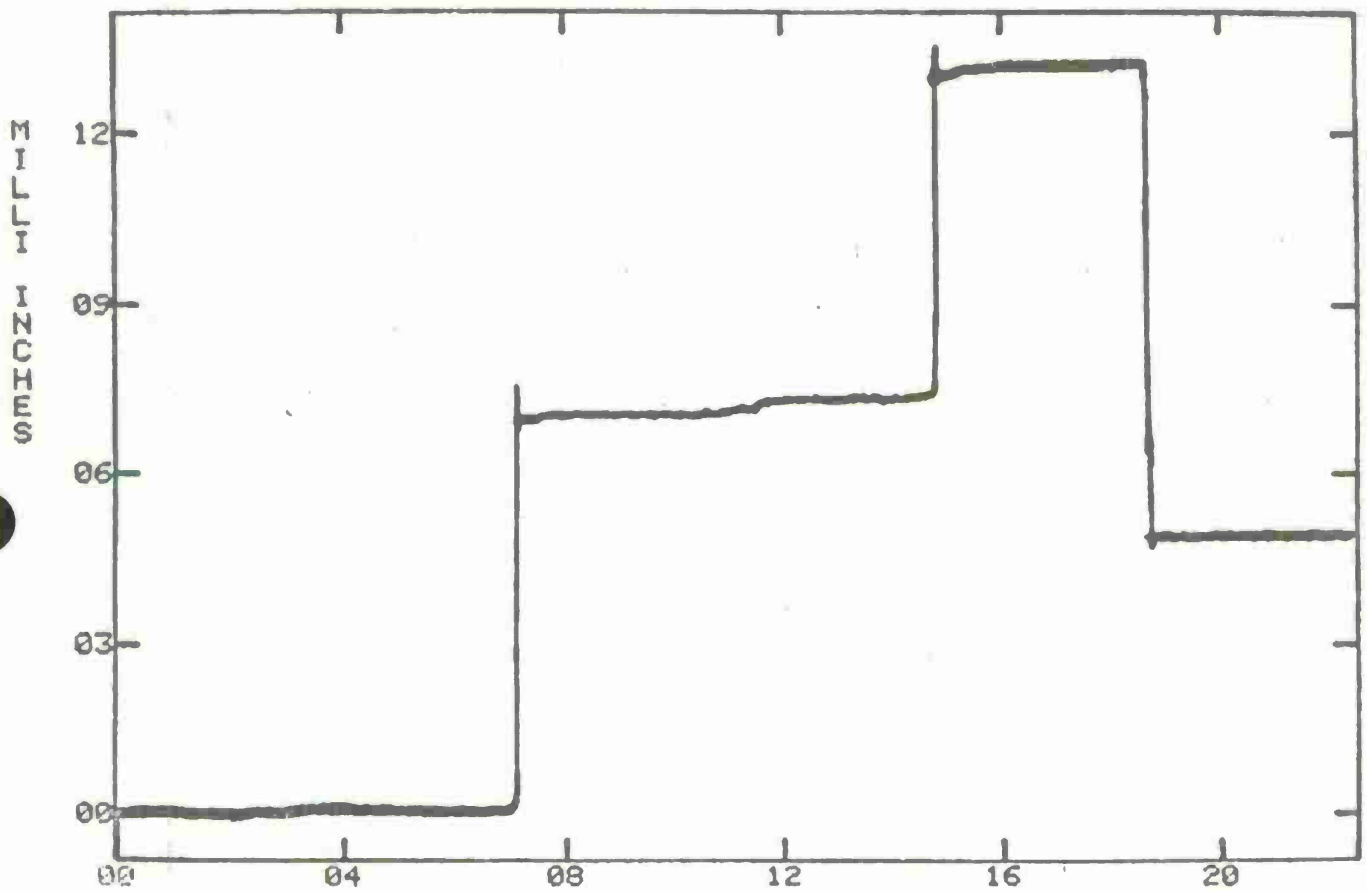


CH 4 WING TRQ DEFLN - ST 212.63 - WS 42.5 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

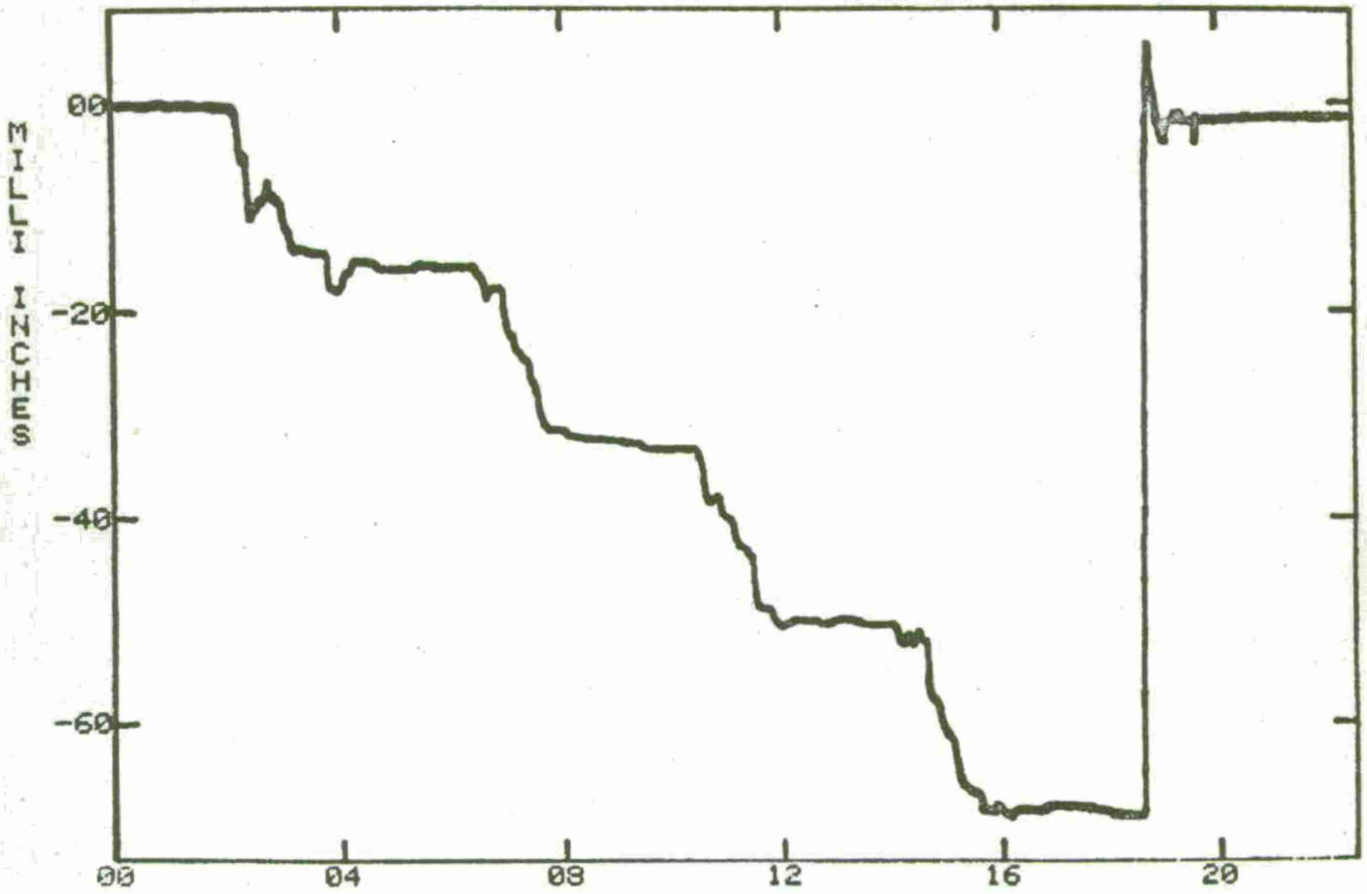


CH 5 WING TRQ DEFLN - ST 187.50 - WS 21.38 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

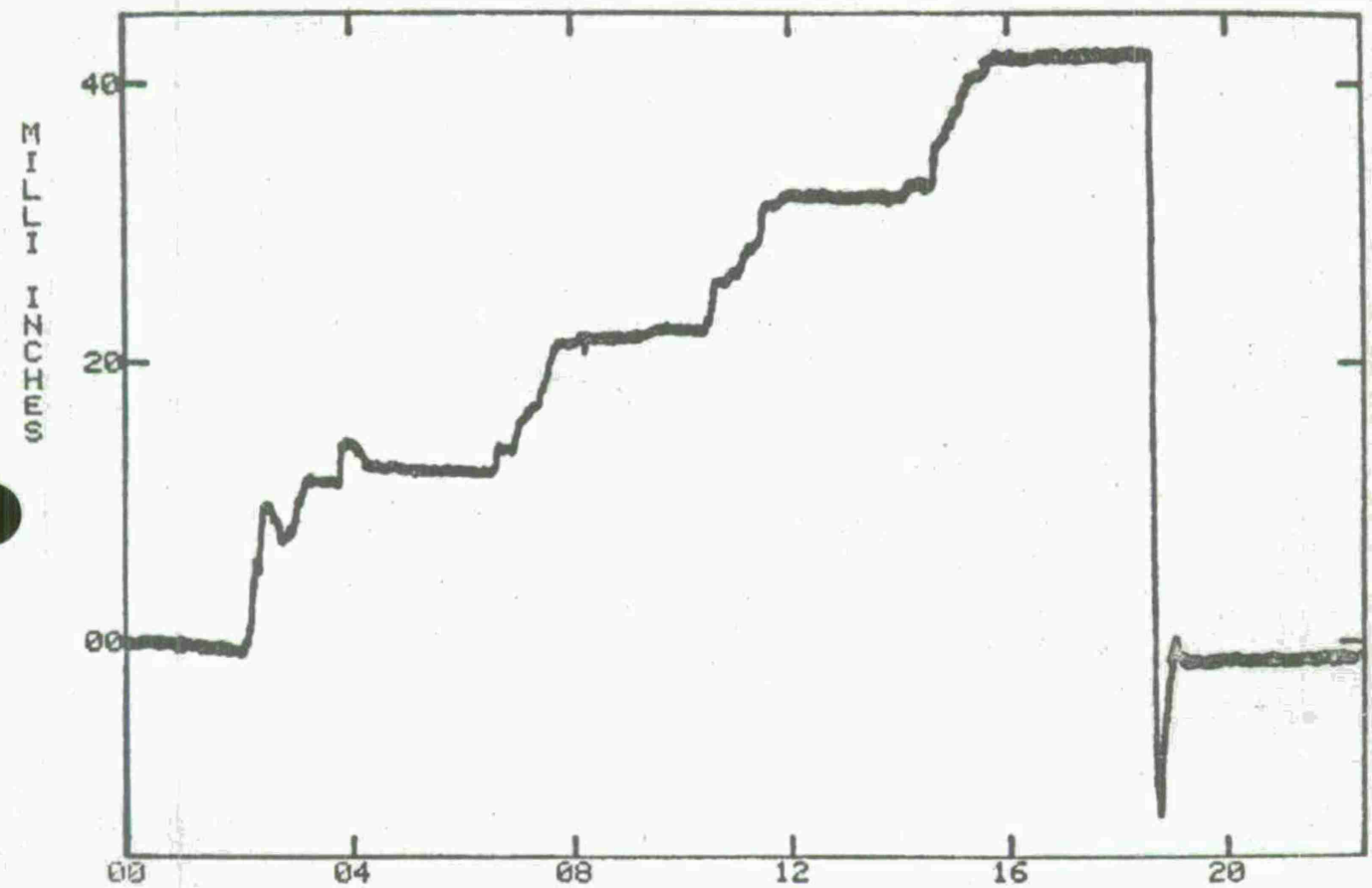
TIME IN SECONDS X 10-1
CH 6 WING TRQ DEFLN - ST 212.63 - WS 21.38 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



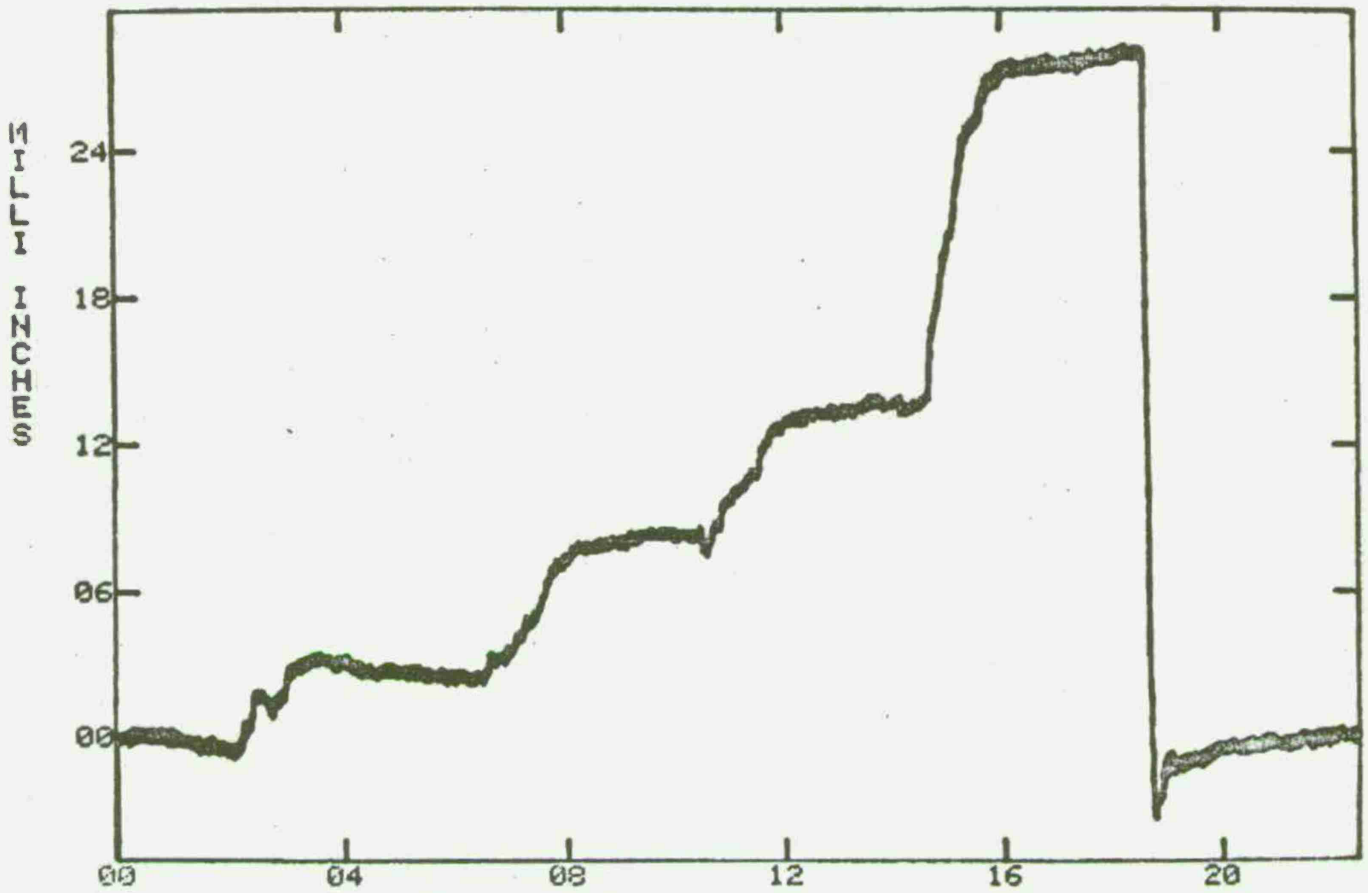
CH 7 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



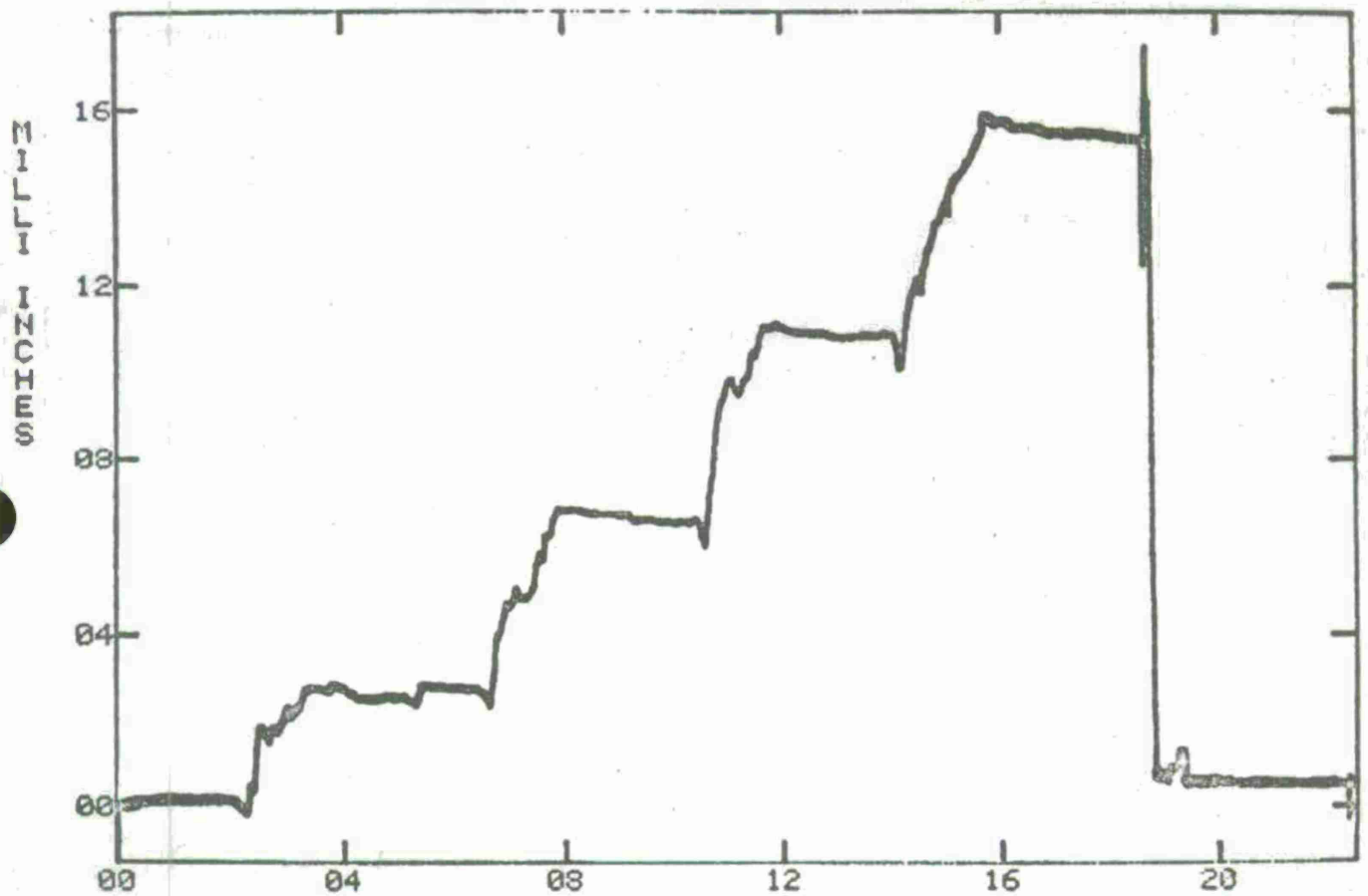
CH 8 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



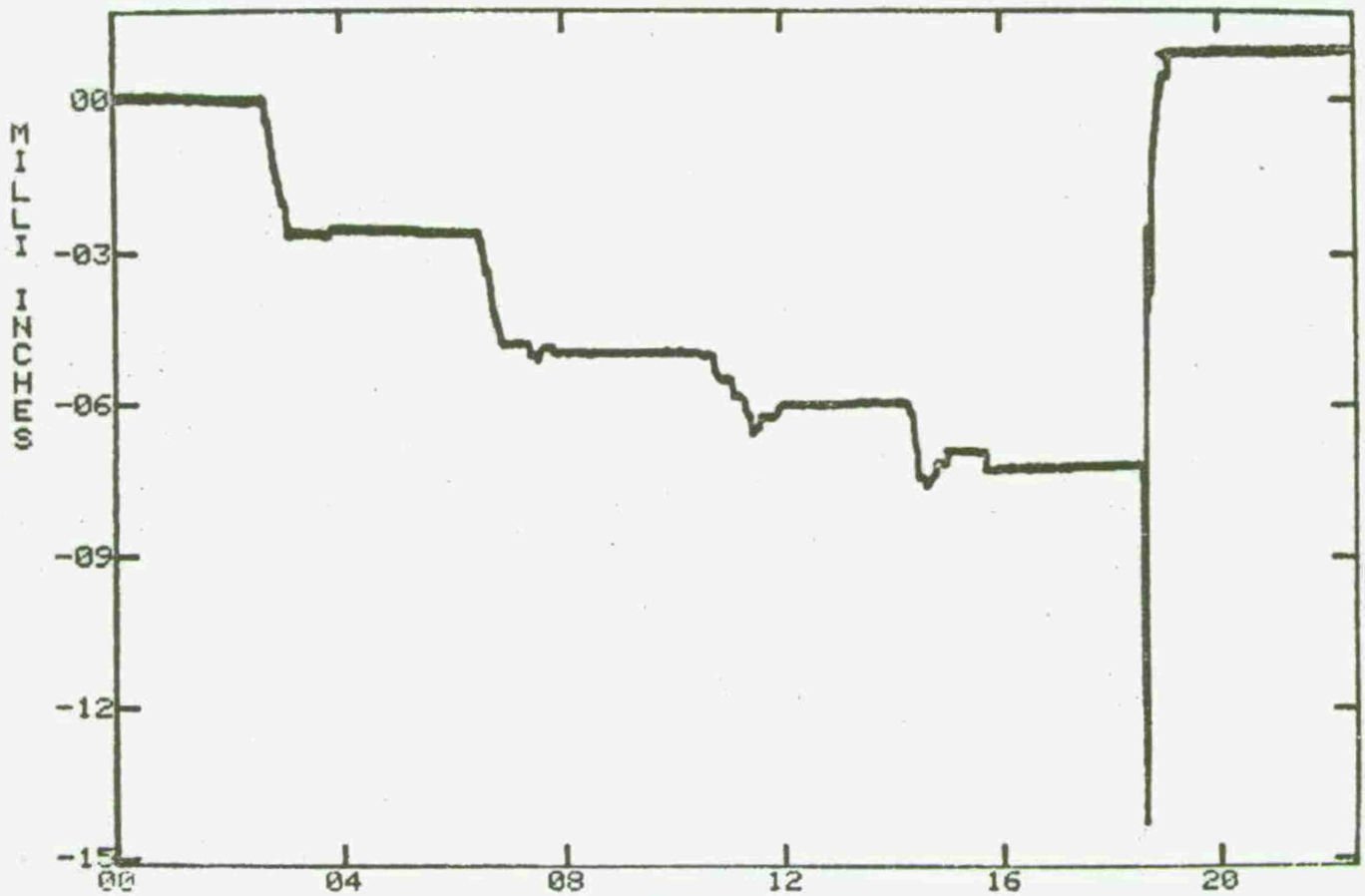
CH 9 WING TRQ DEFLN - ST 186.25 - BL 18 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



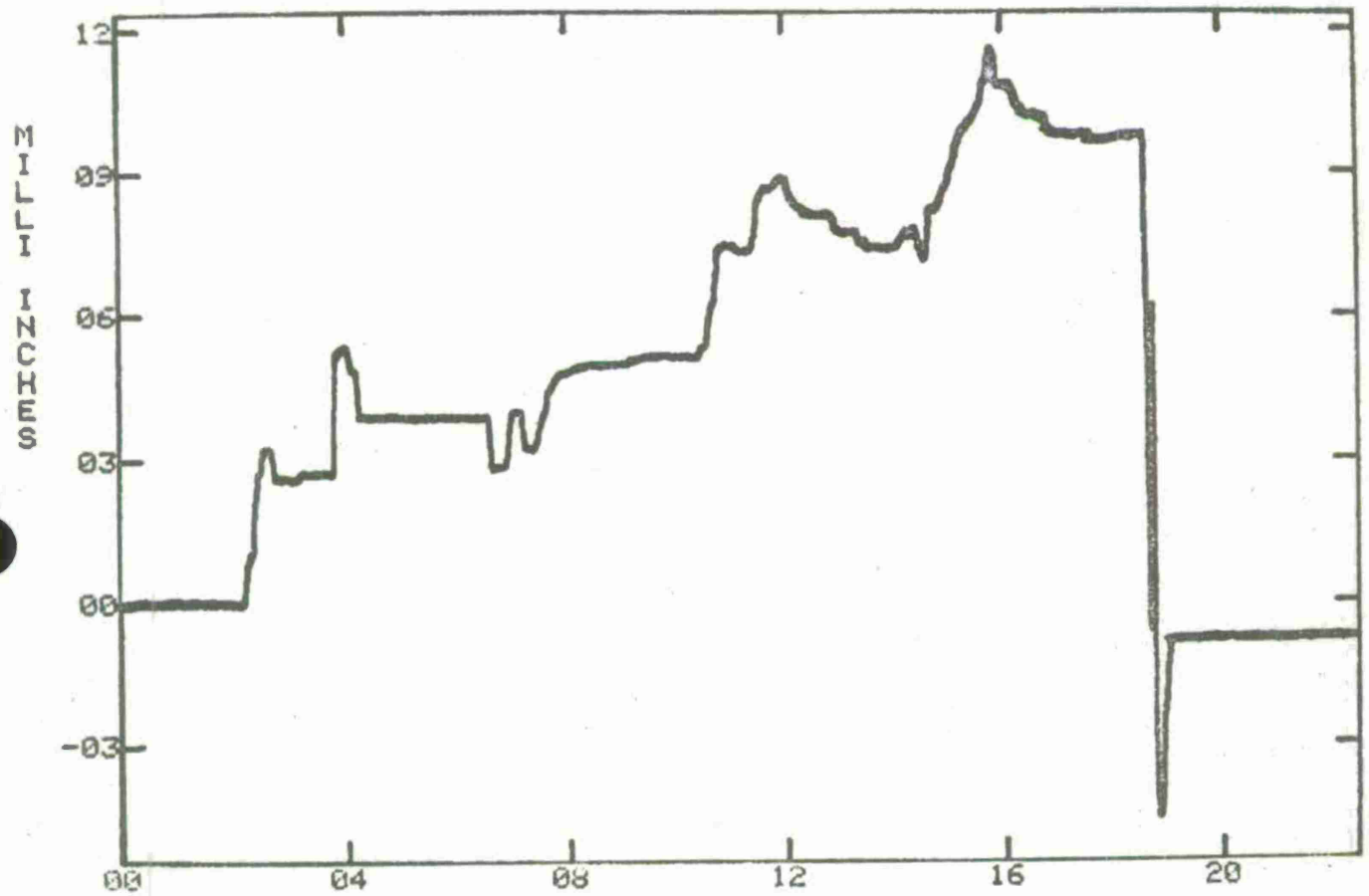
CH 10 WING TRQ DEFLN - ST 212.63 - BL 18 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



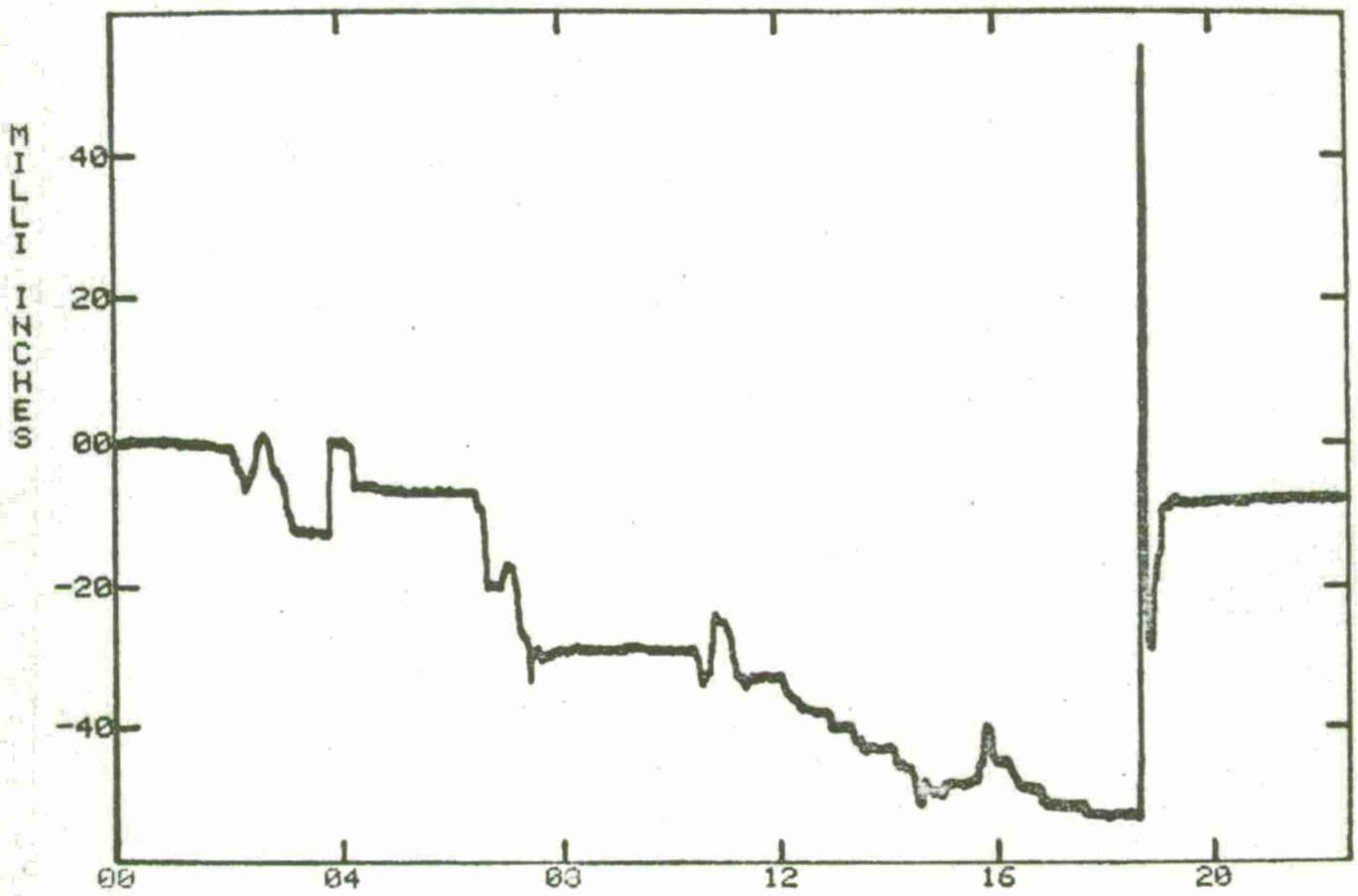
CH 11 WING TRQ DEFLN - ST 195.044 - WS 59 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



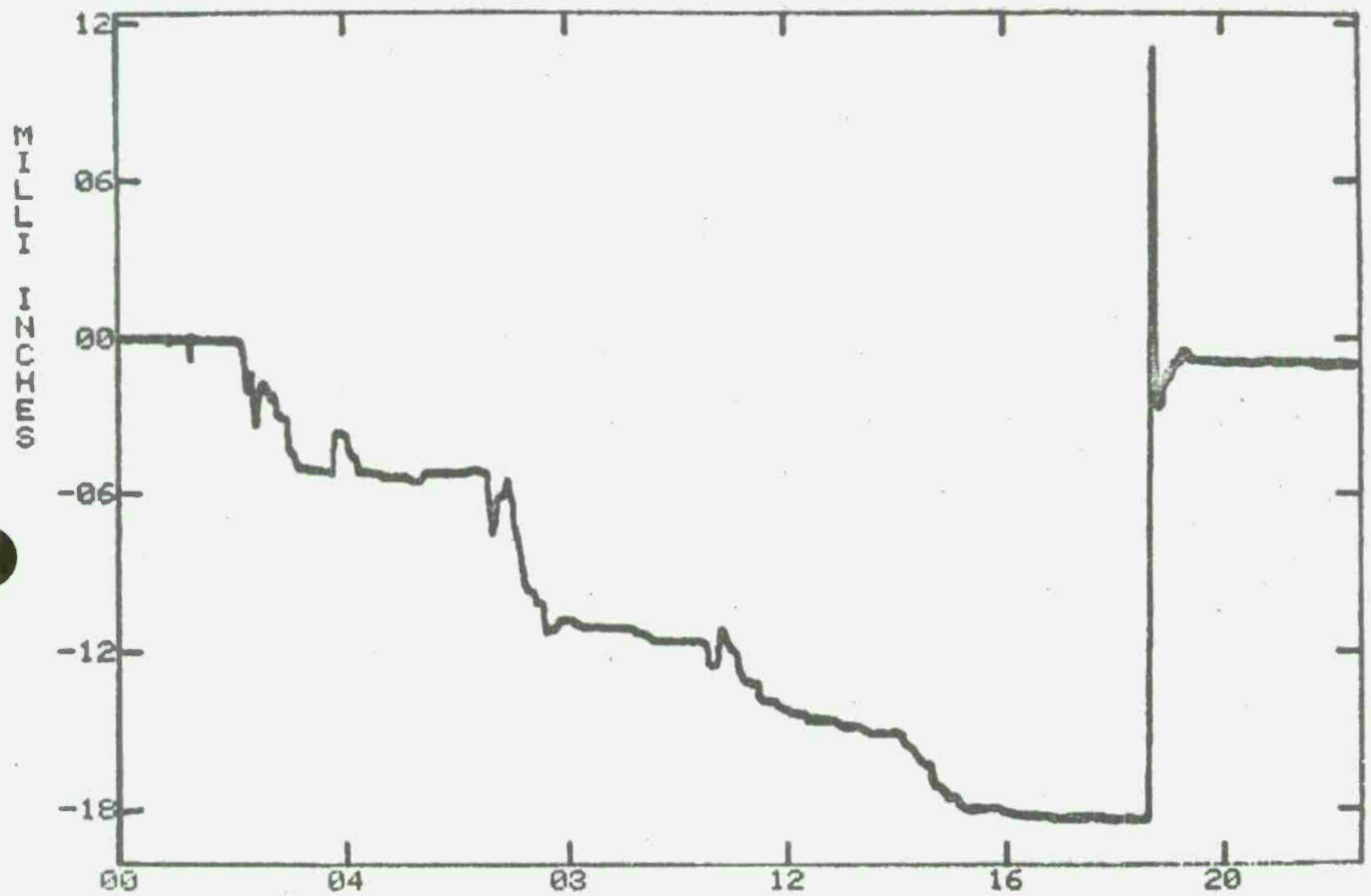
CH 12 WING TRQ DEFLN - ST 212.634 - WS 59 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



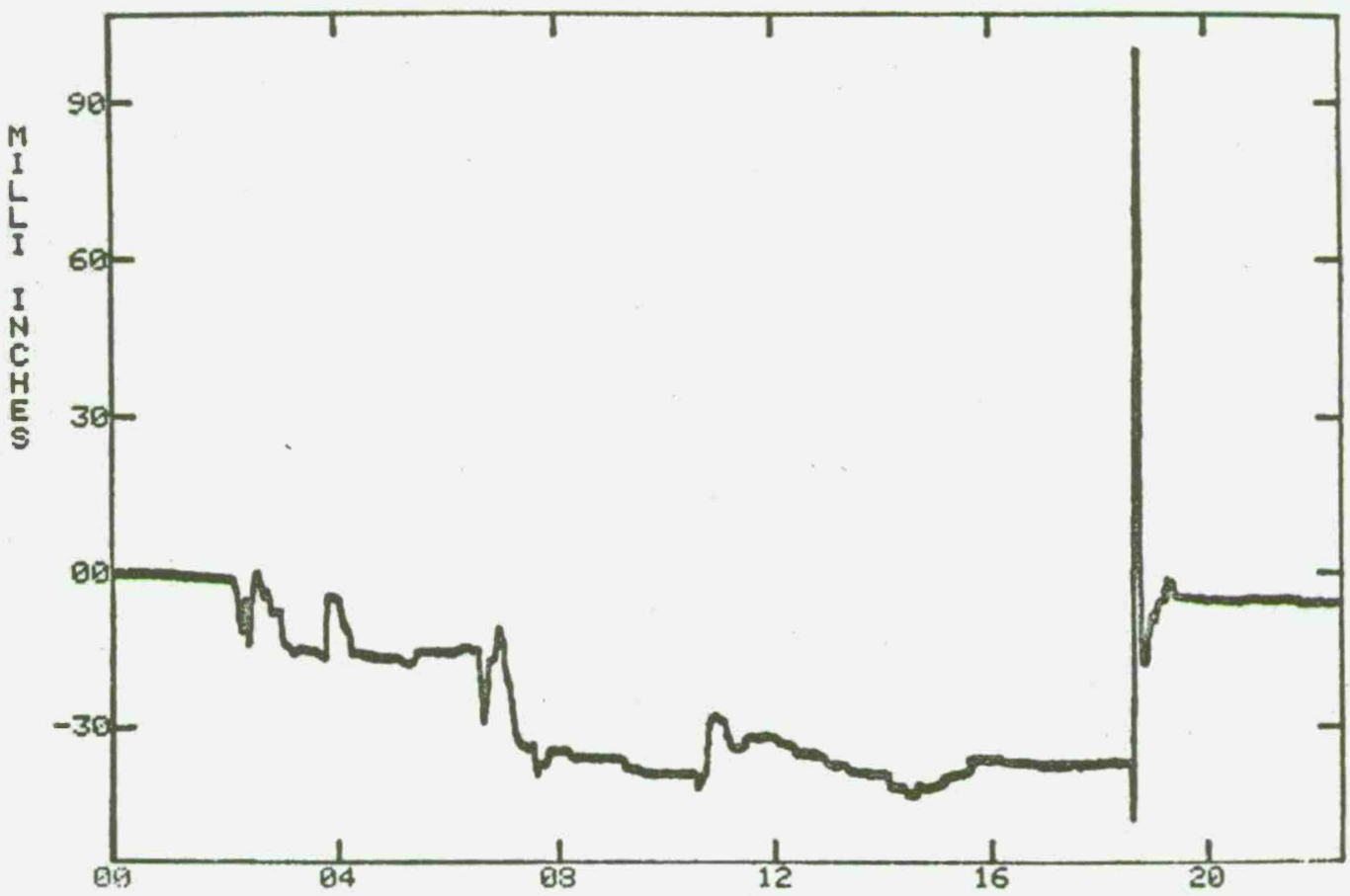
CH 13 GROUND REF - R.H. TOP X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



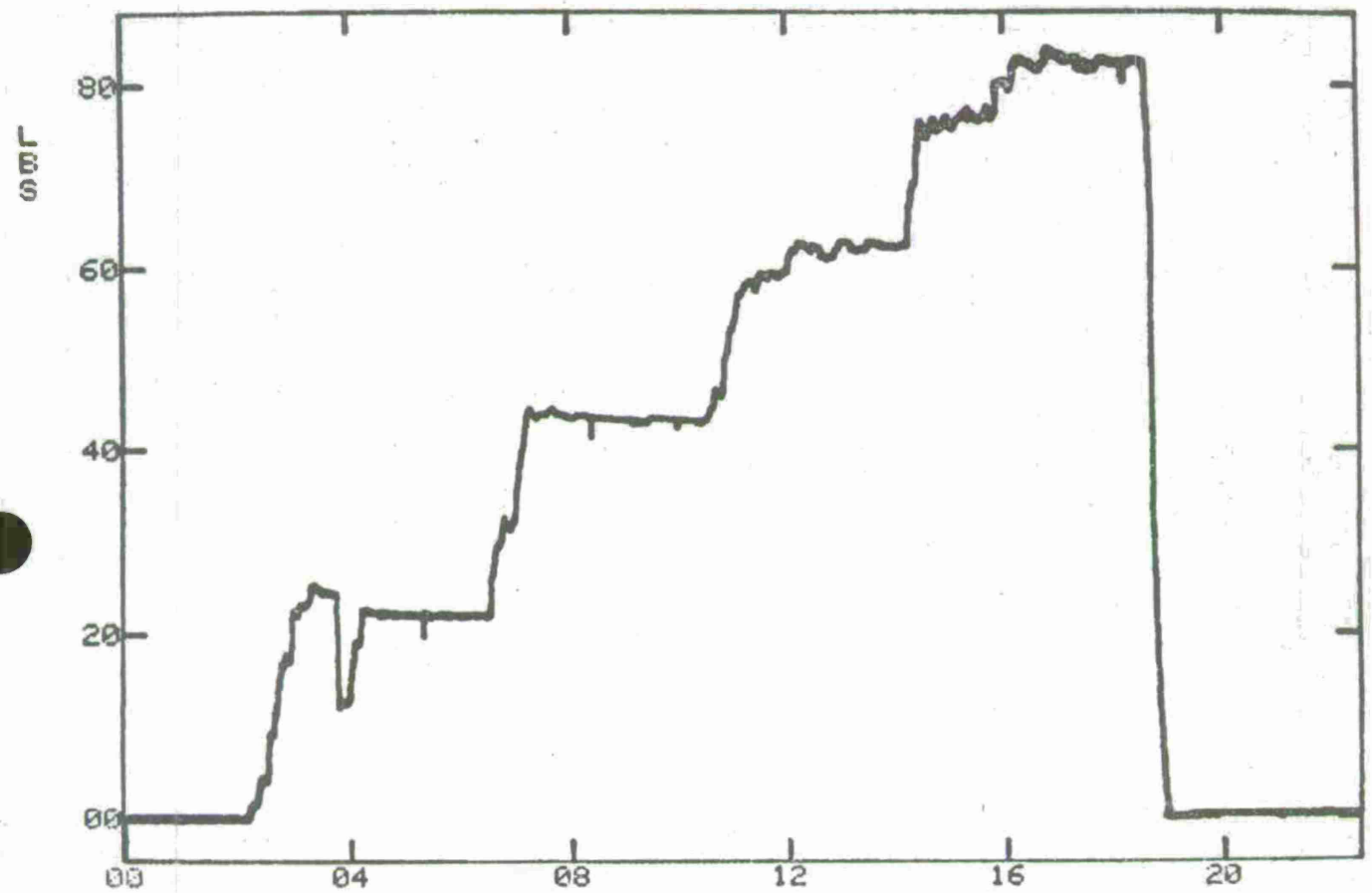
CH 14 GROUND REF - R.H. BOTTOM X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

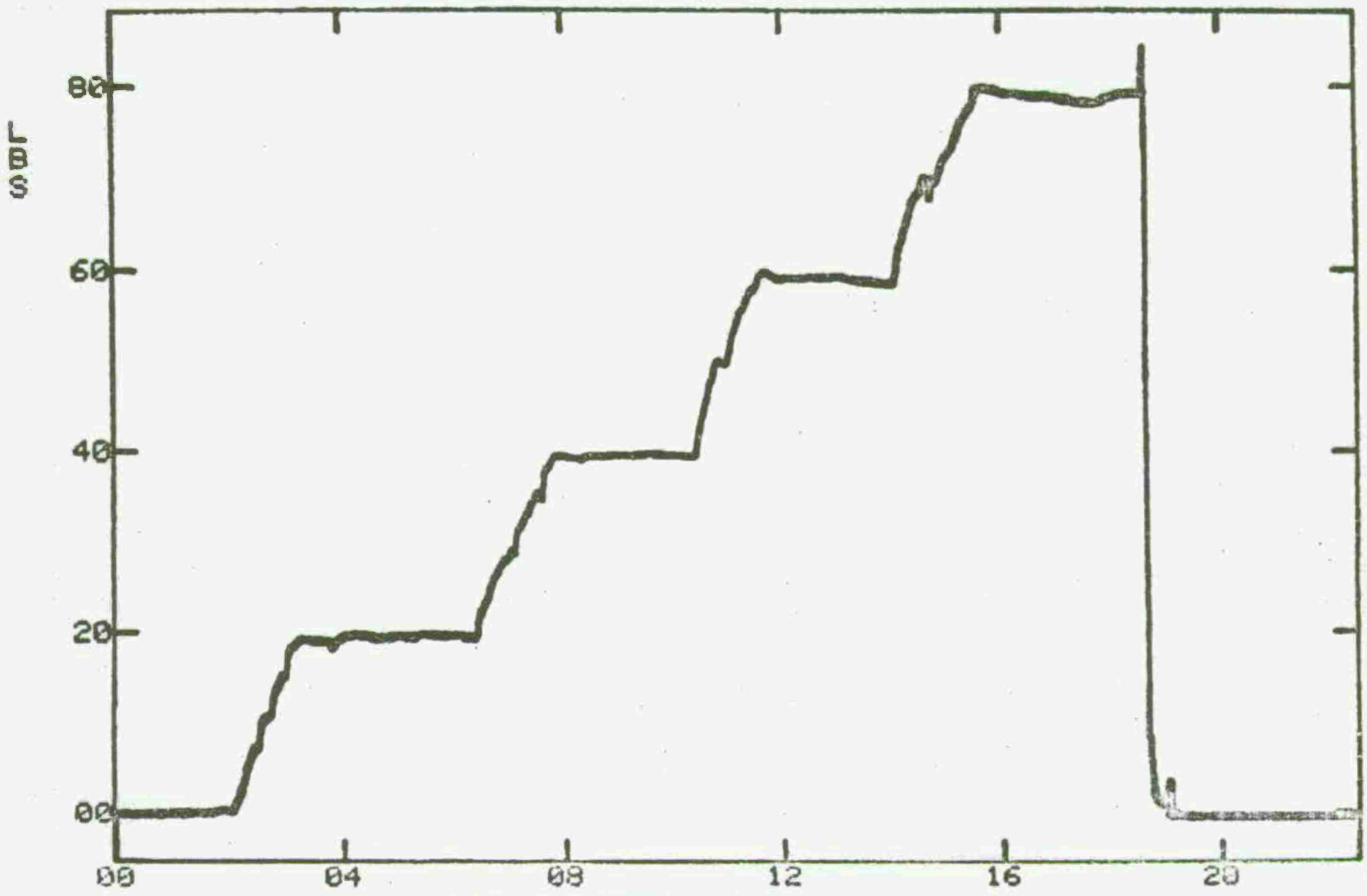


CH 15 GROUND REF - L.H. TOP X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

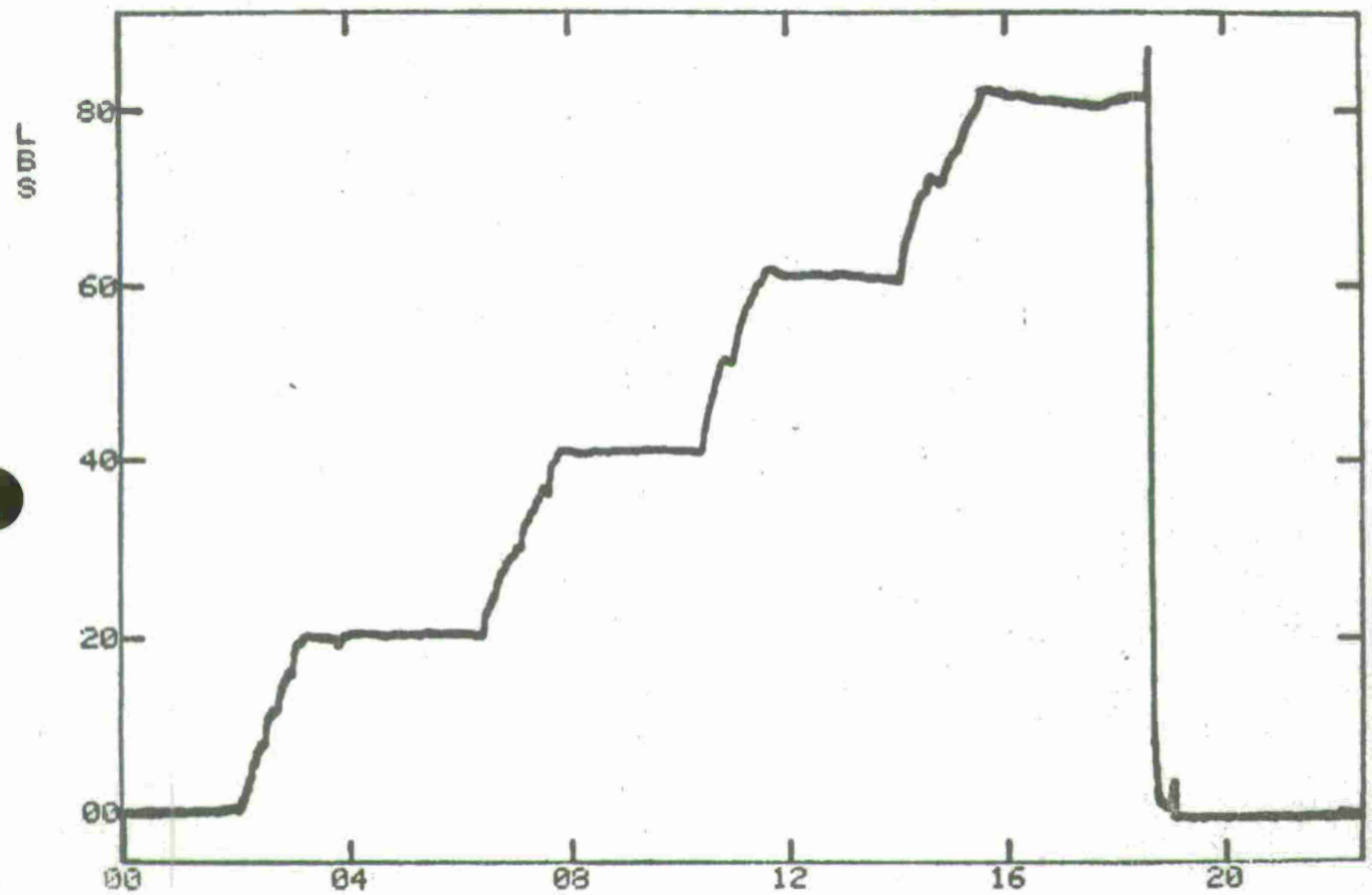


CH 17 GROUND REF - L.H. BOTTOM X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

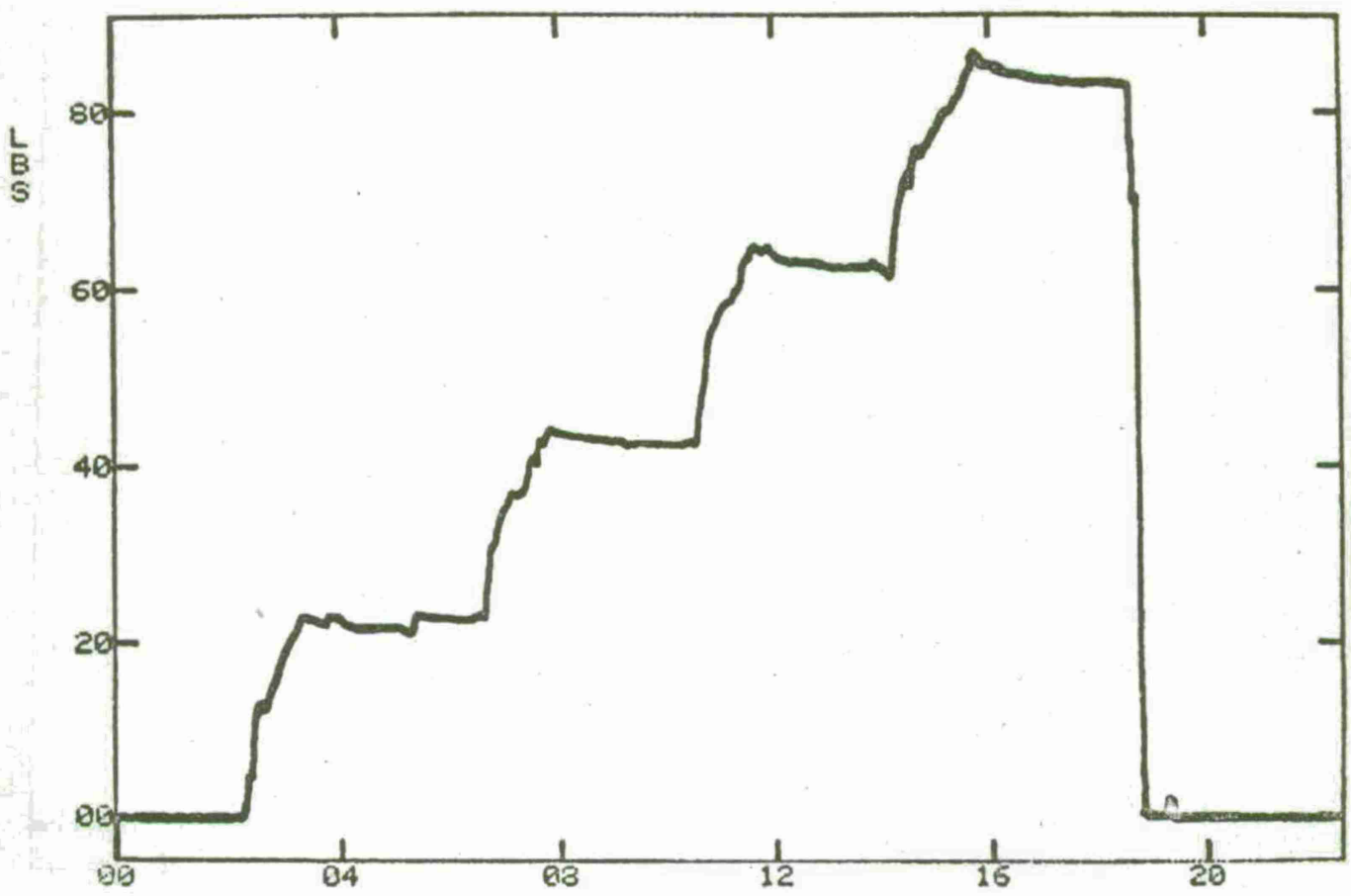

80
60
40
20
00
00
04
08
12
16
20
TIME IN SECONDS X 10-1
CH 18 LOAD APPLIED - L.H. DN X 10-1
TEST 35 (22AUG75) AH1G BEND TESTS



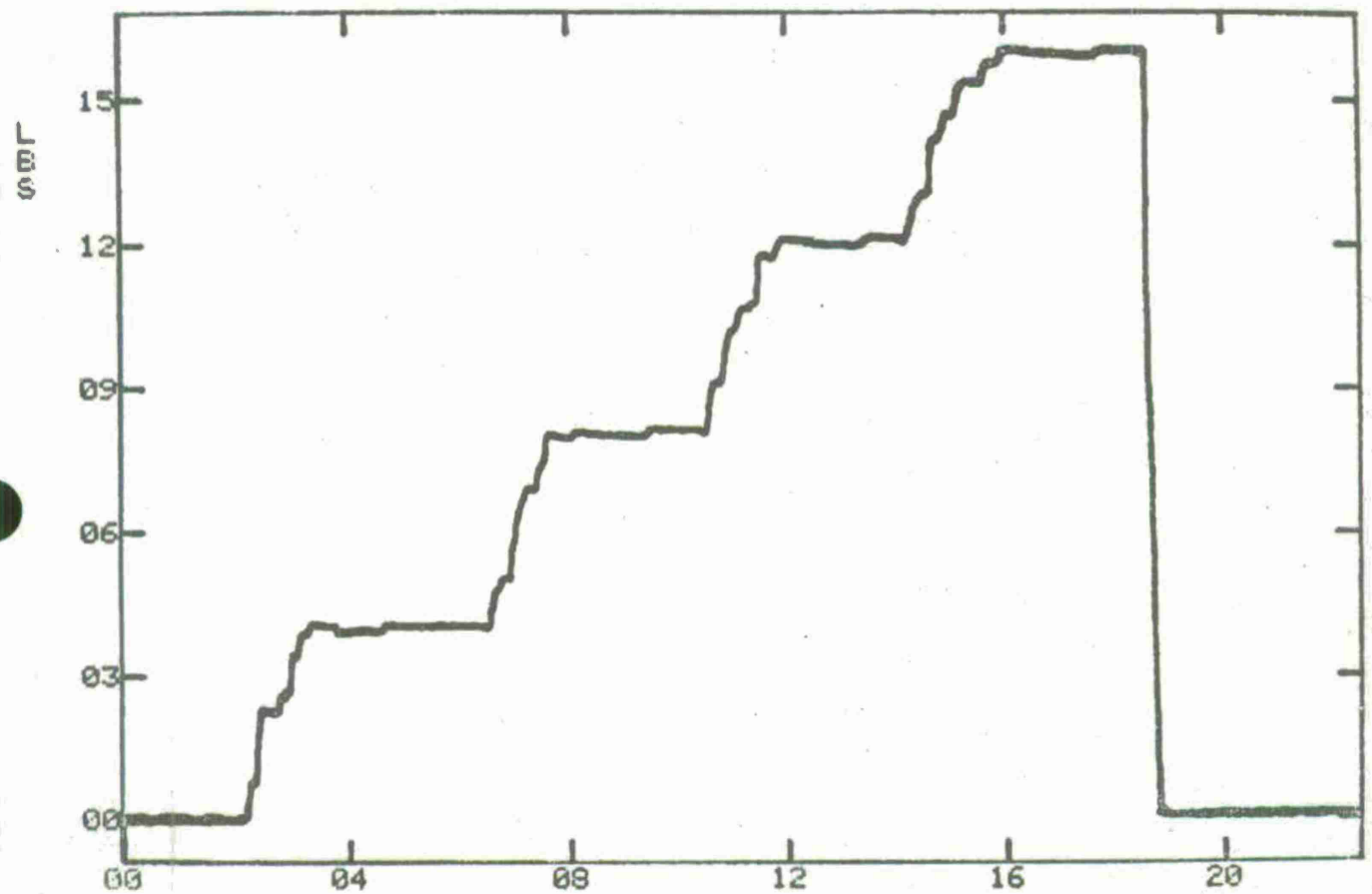
TIME IN SECONDS X 10-1
CH 19 LOAD APPLIED - R.H. DN (CHS 1/10) X 10-1
TEST 35 (22AUG75) AH1G BEND TESTS



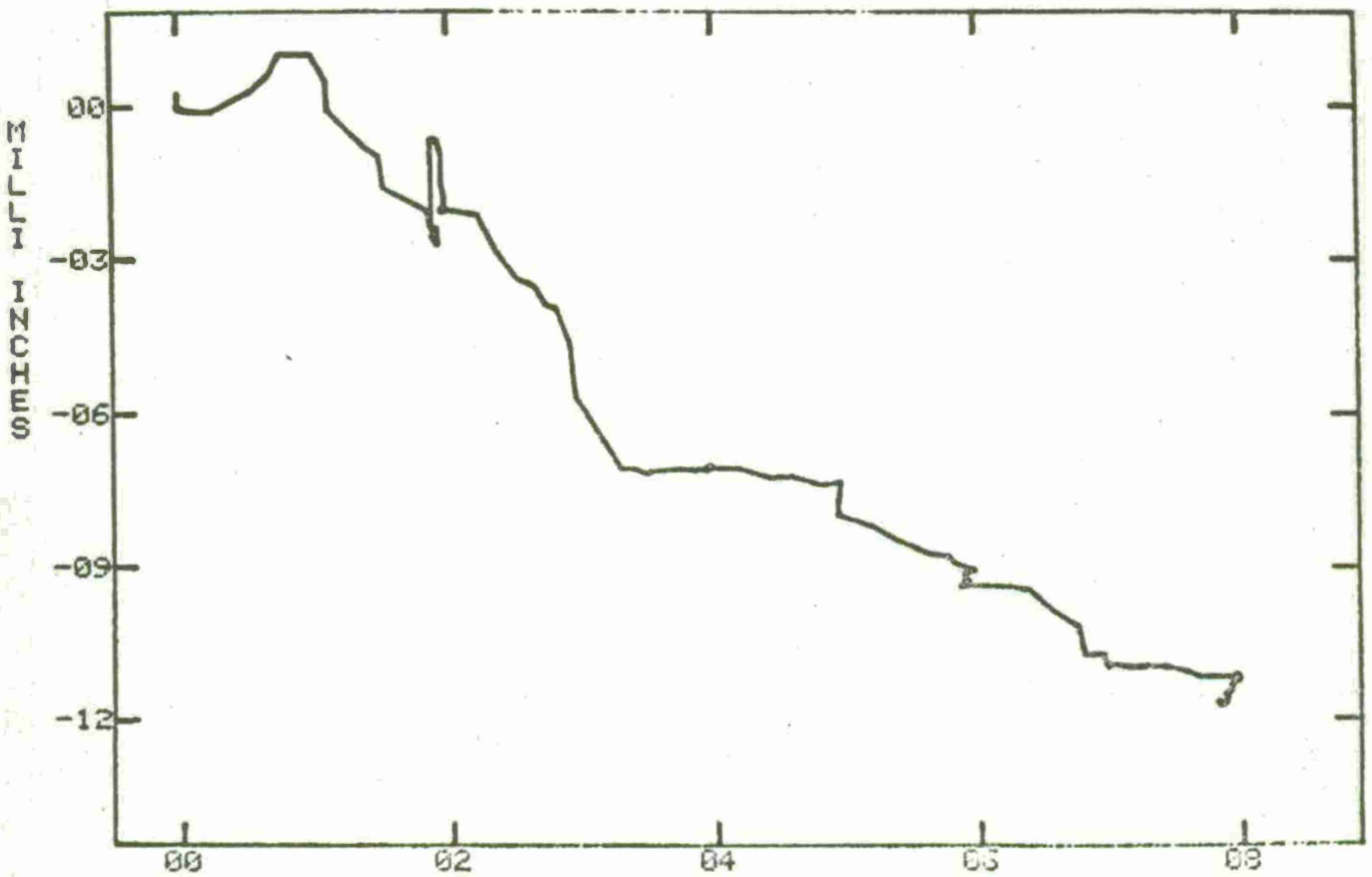
CH 19 LOAD APPLIED - R.H. DN (CHS 11/21) X 10-1
TEST 35 (22AUG75) AH1G BEND TESTS



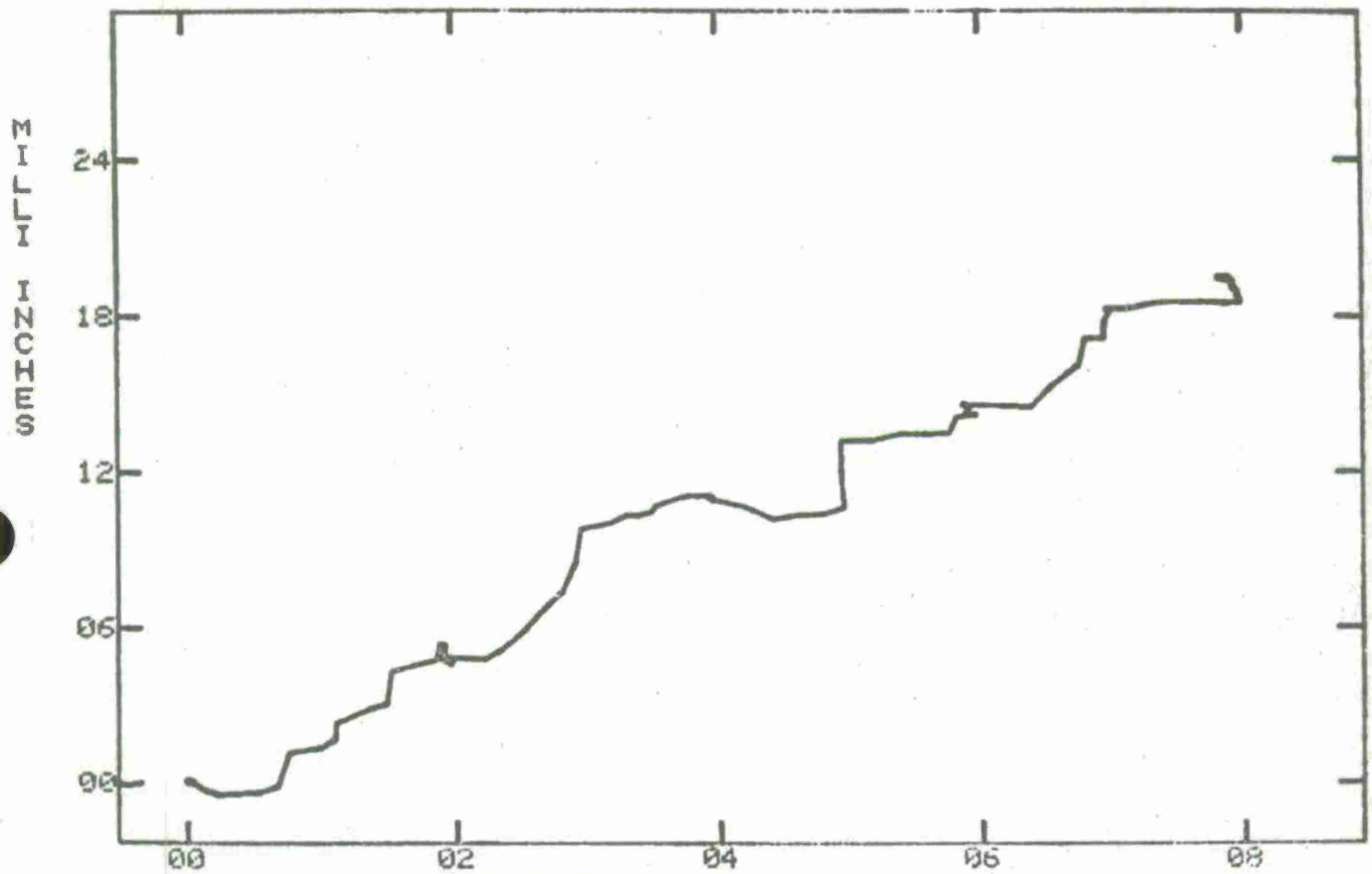
CH 20 LOAD APPLIED - R.H. UP X 10-1
TEST 35 (22AUG75) AH1G BEND TESTS



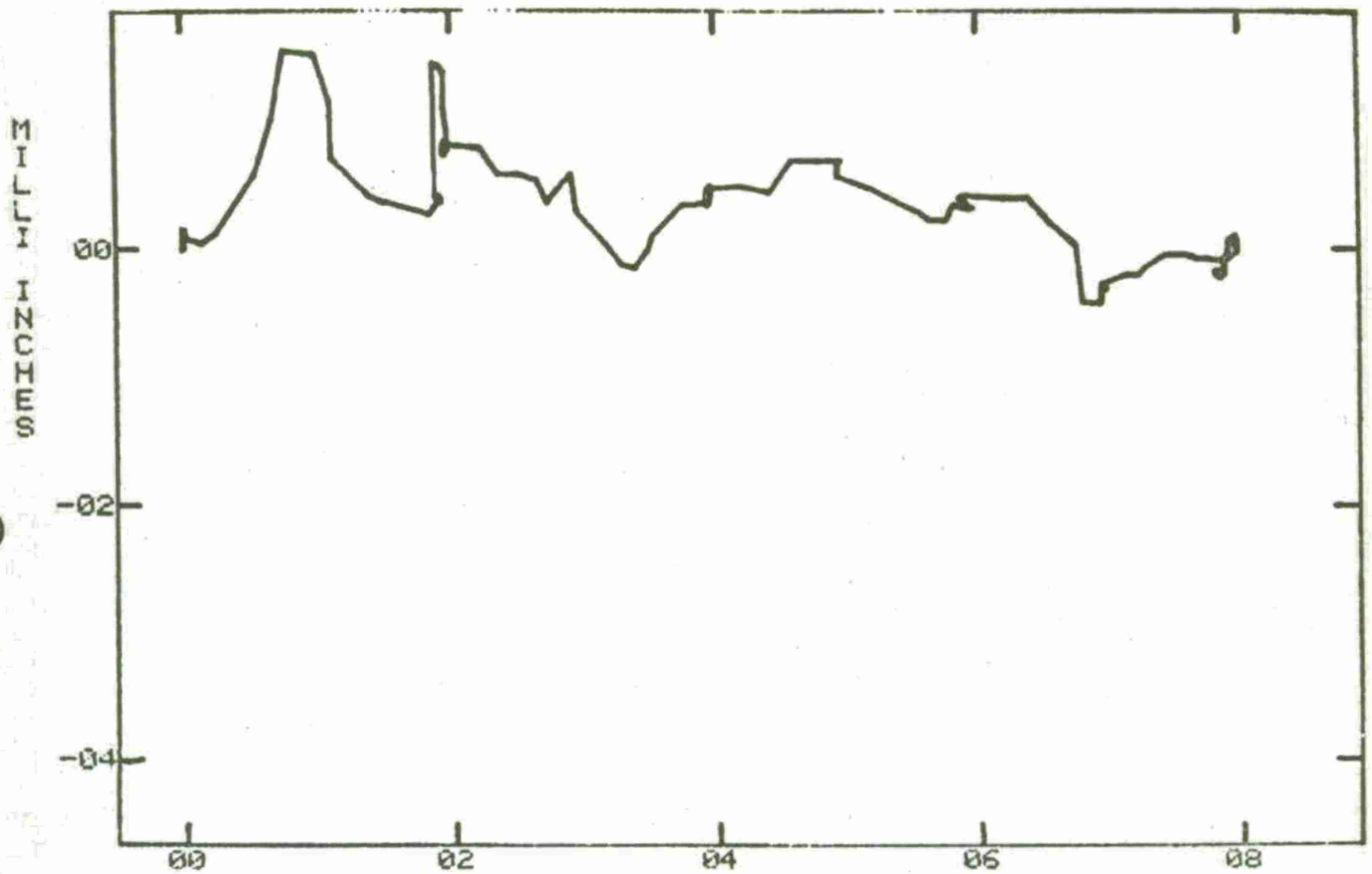
CH 21 LOAD APPLIED - L.H. UP X 10-2
TEST 35 (22AUG75) AH1G BEND TESTS



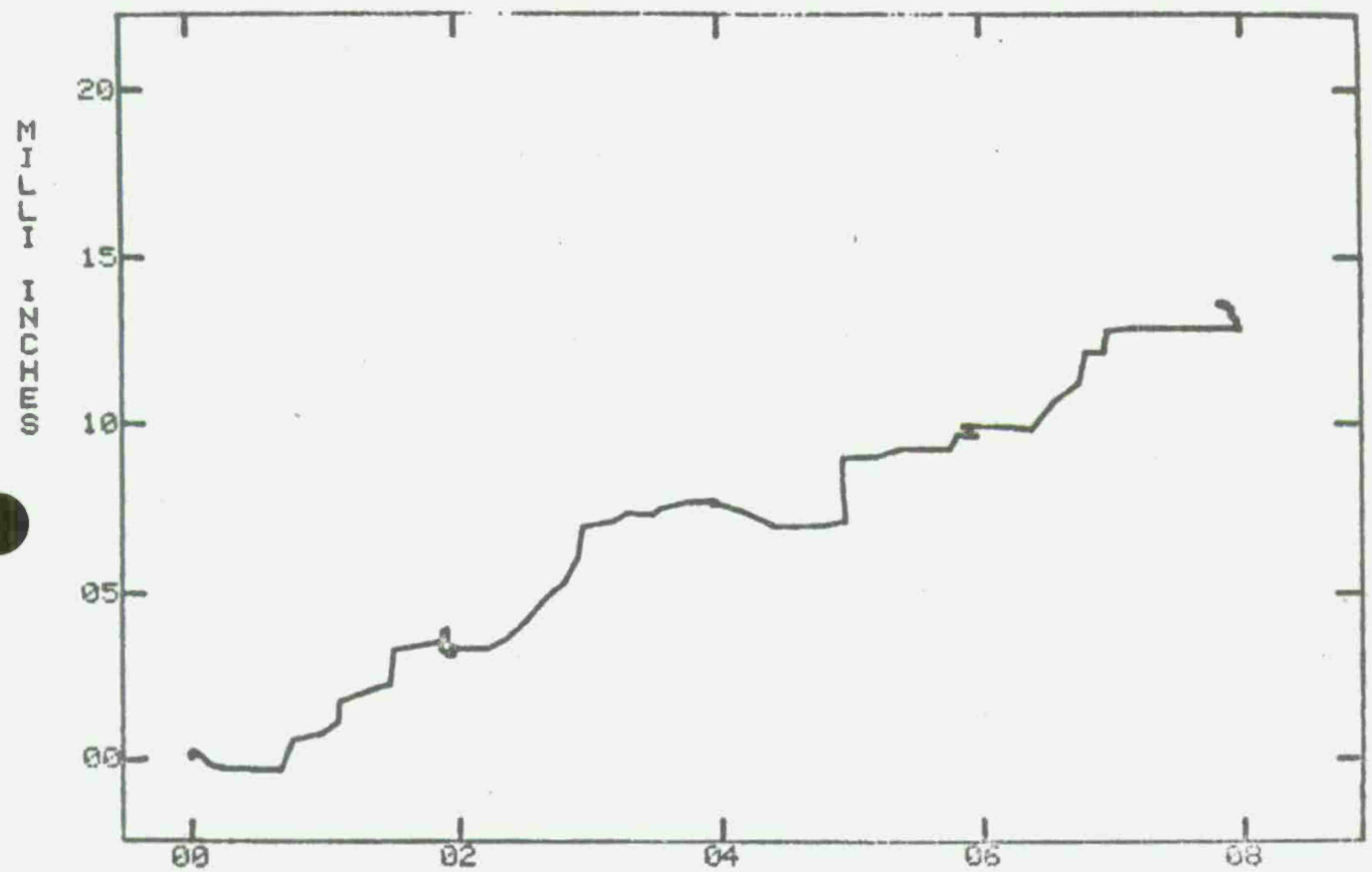
CH 19 VS CH 1 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

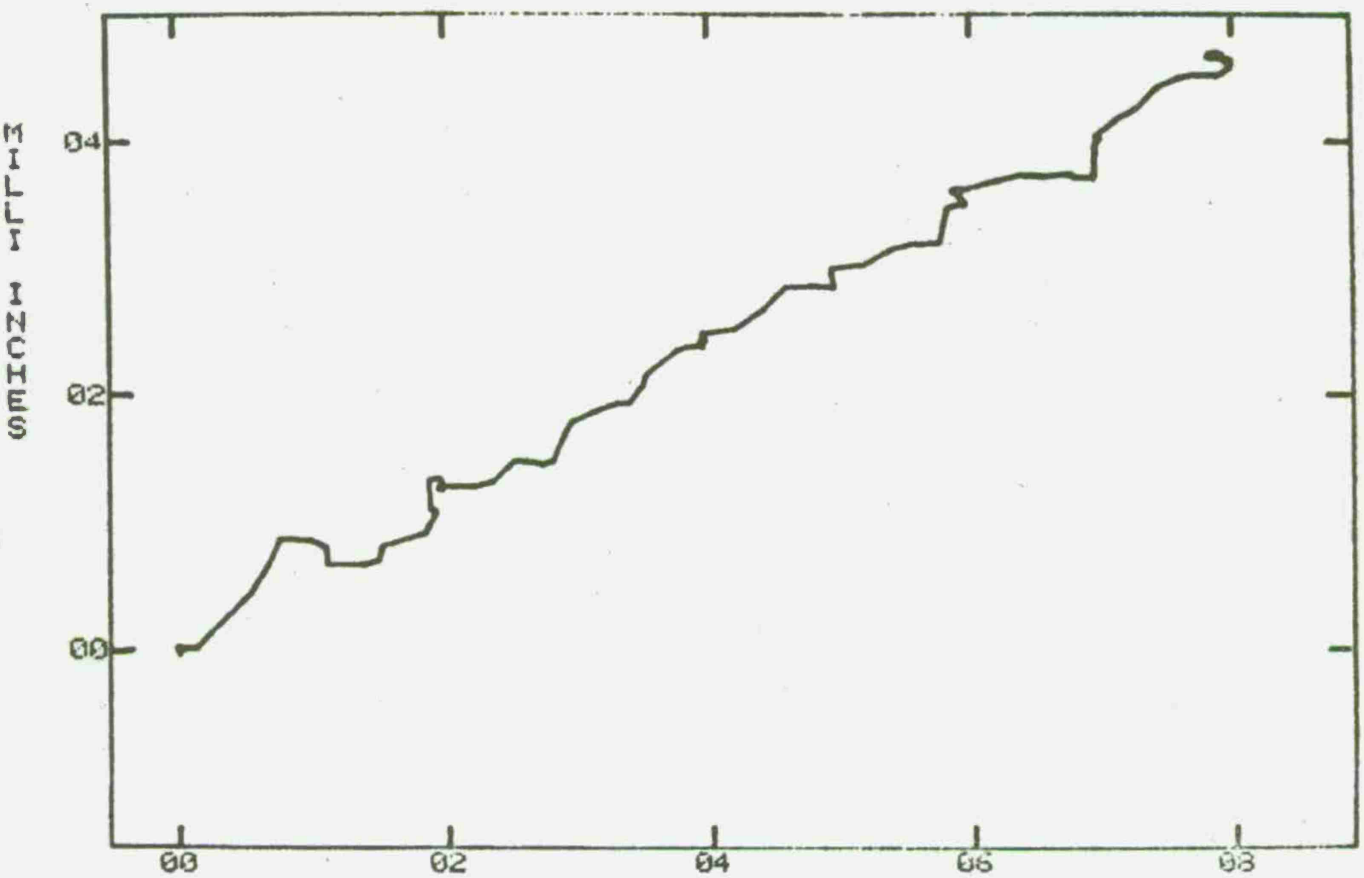


CH 19 VS CH 2 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

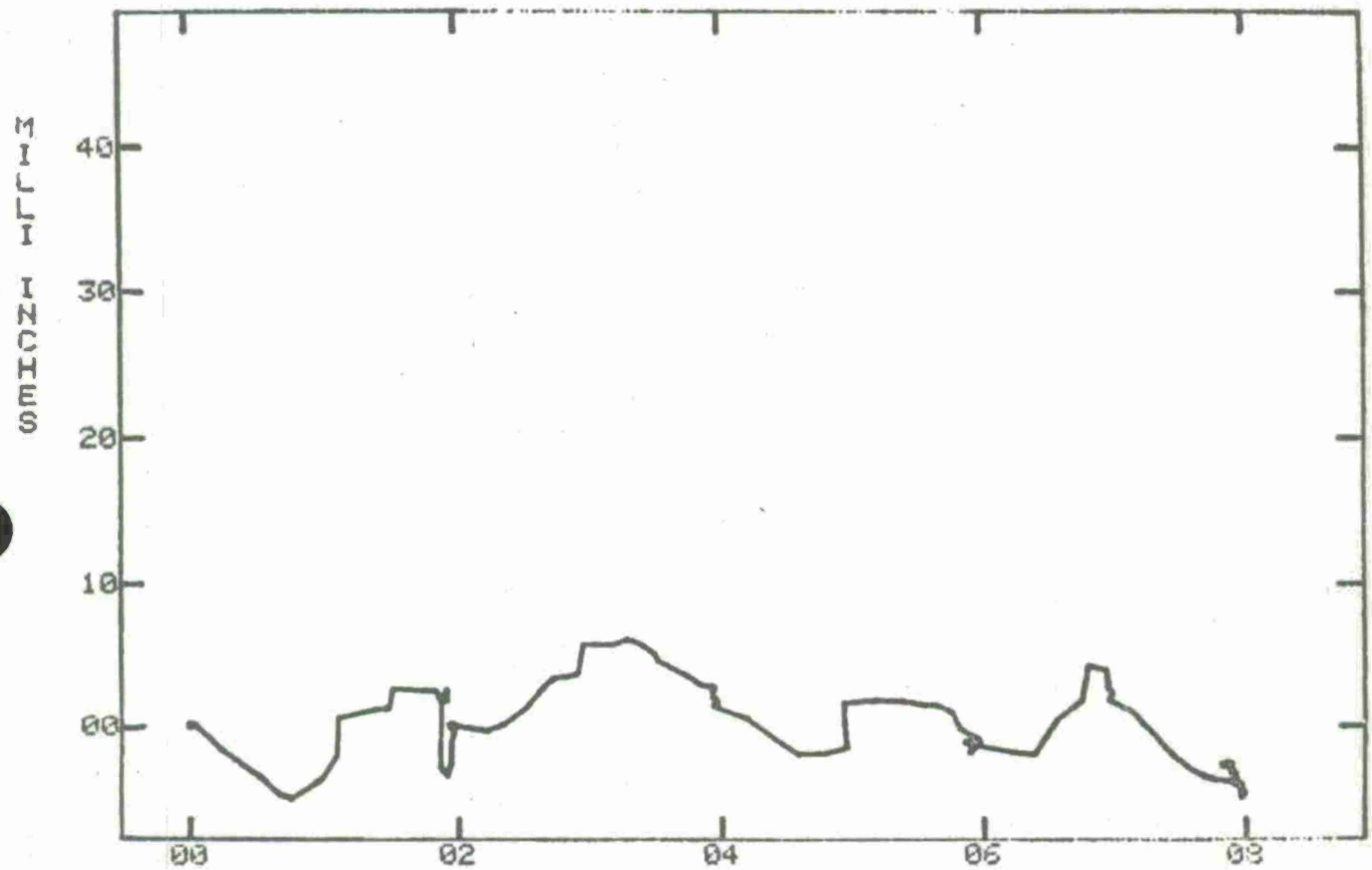


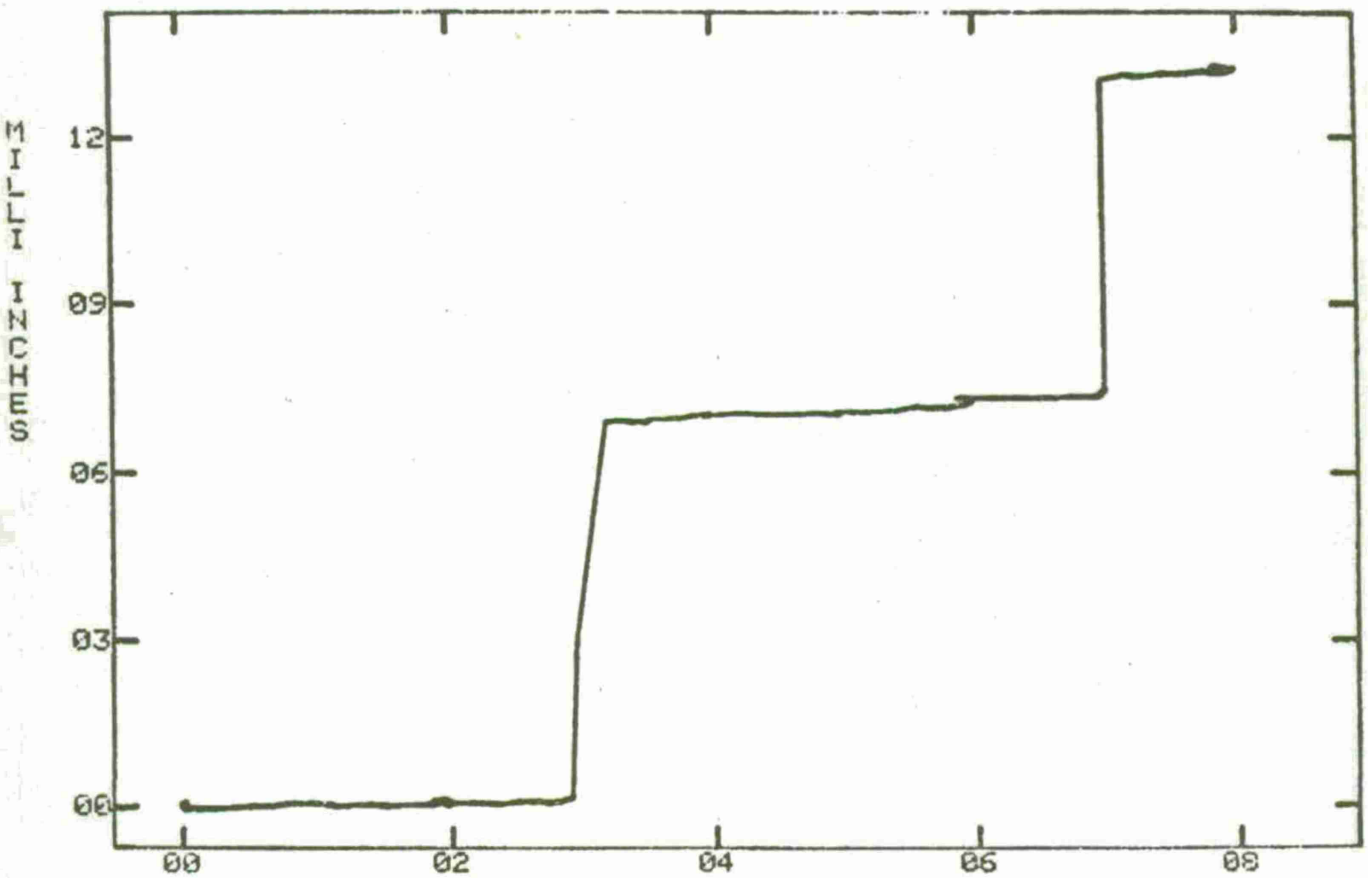
CH 19 VS CH 3 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS


MILLI INCHES
20
15
10
05
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 4 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

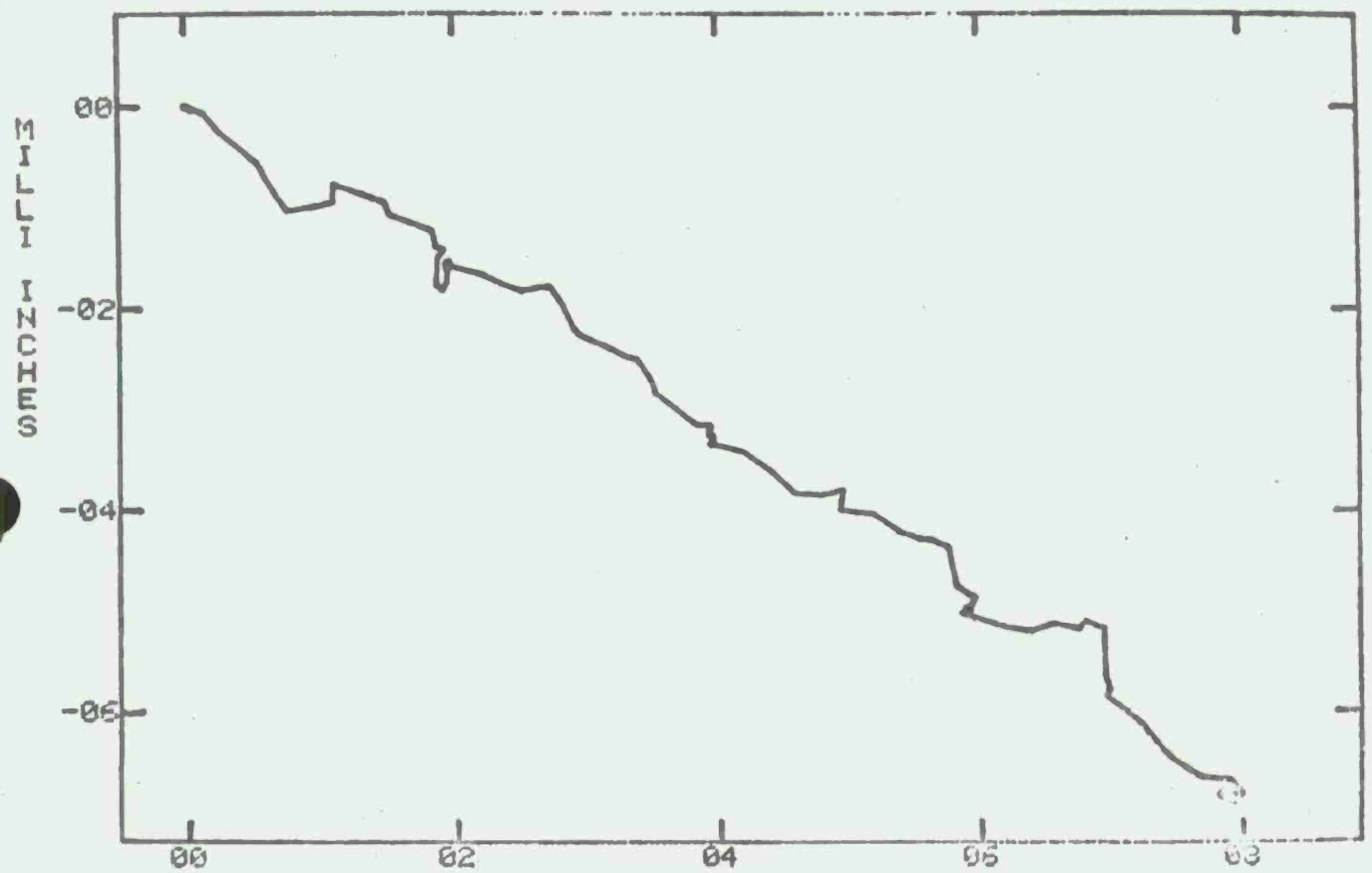


CH 19 VS CH 5 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

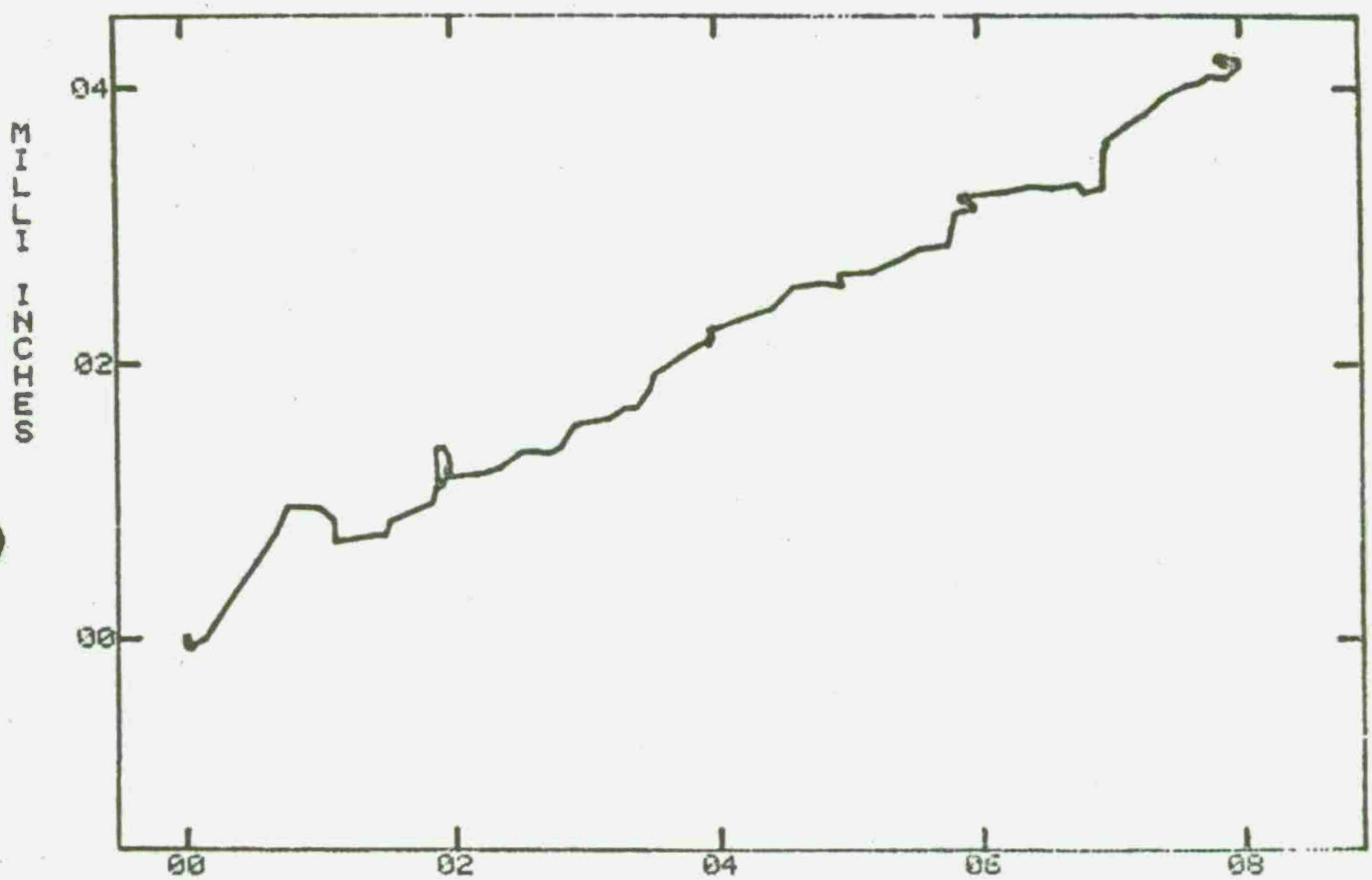

MILLI INCHES
40
30
20
10
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 6 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS



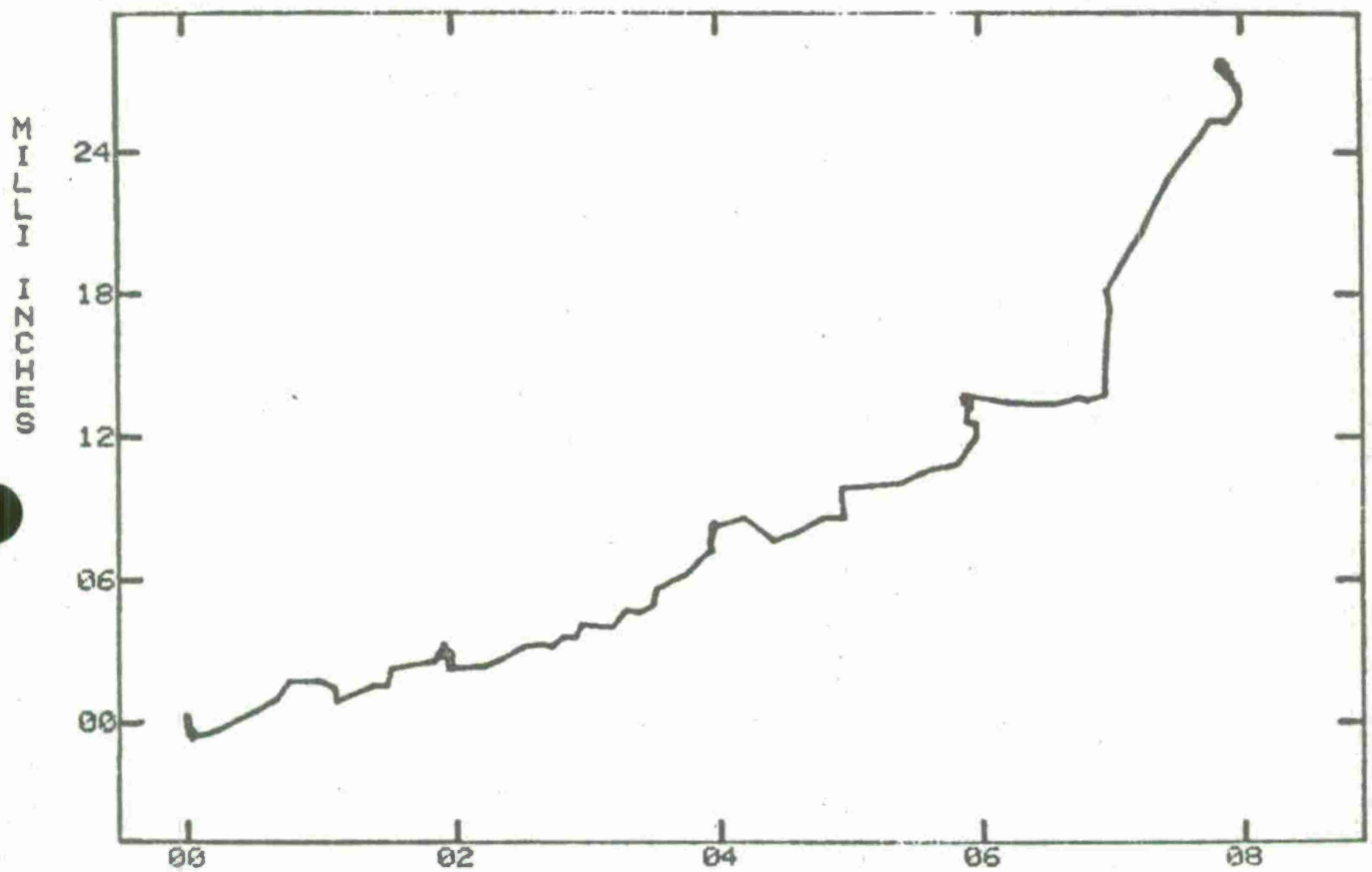
CH 19 VS CH 7 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

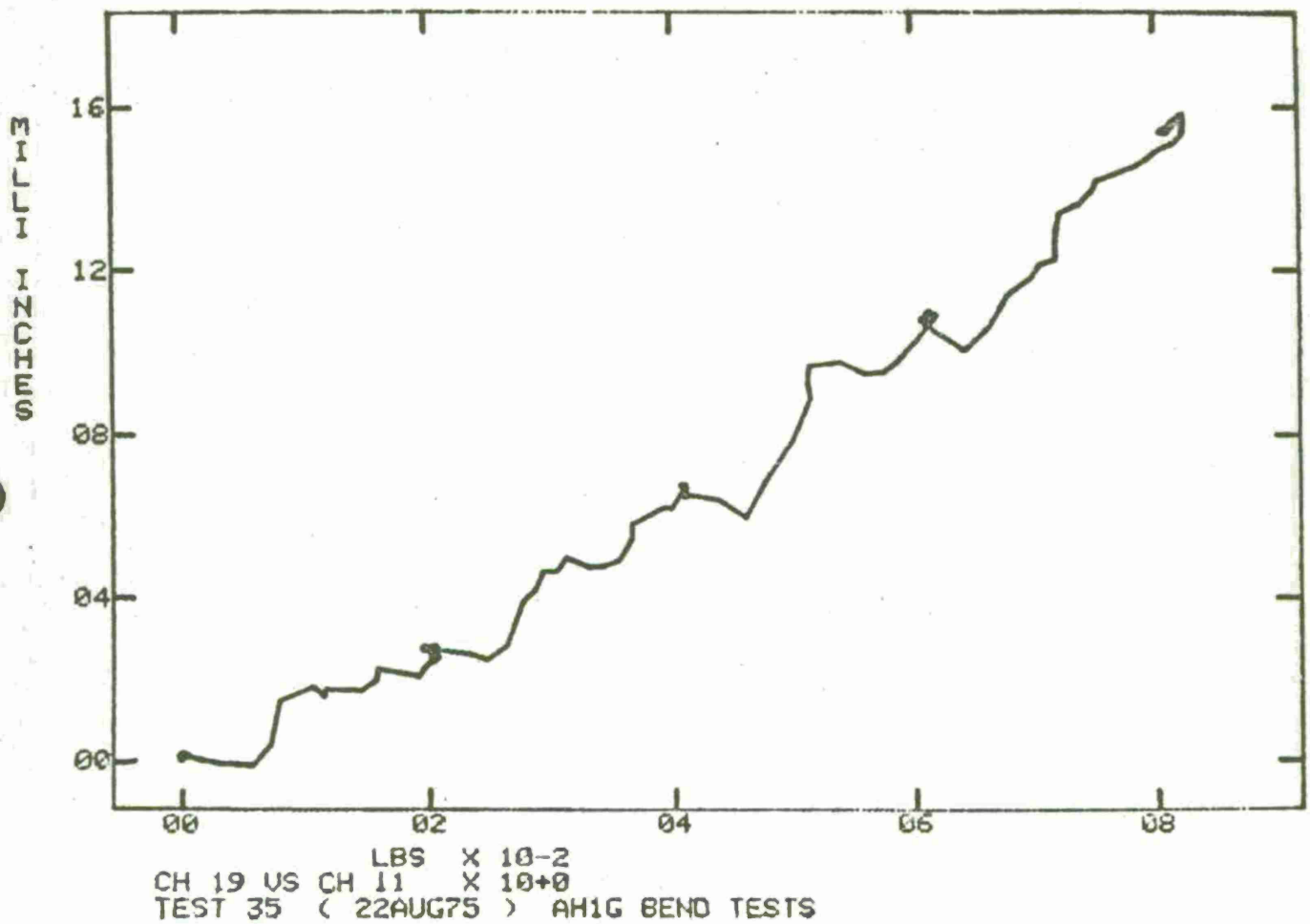


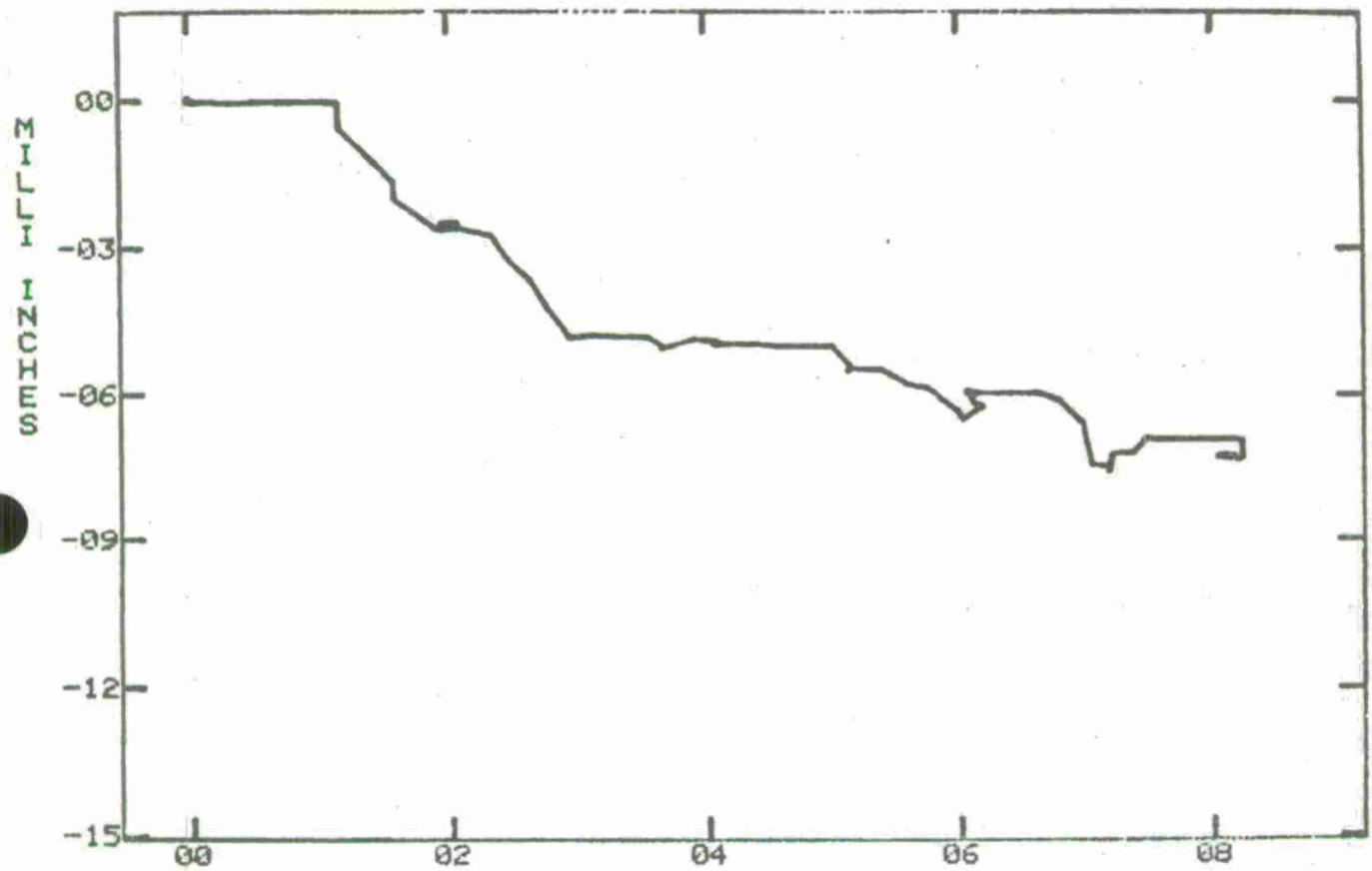
CH 19 VS CH 8 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



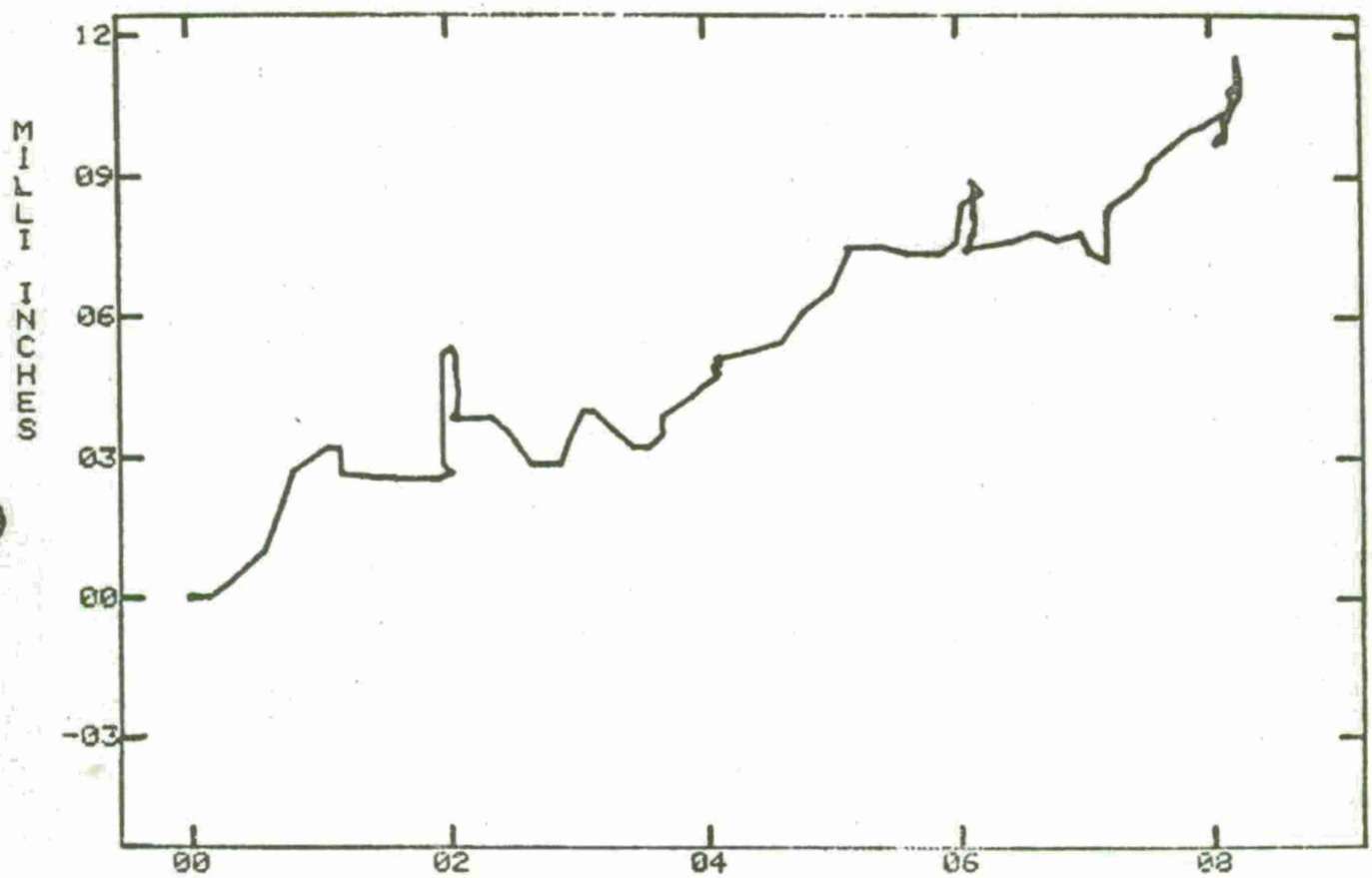
CH 19 VS CH 9 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS


MILLI INCHES
24
18
12
06
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 10 X 10+1
TEST 35 (22AUG75) AH1G BEND TESTS

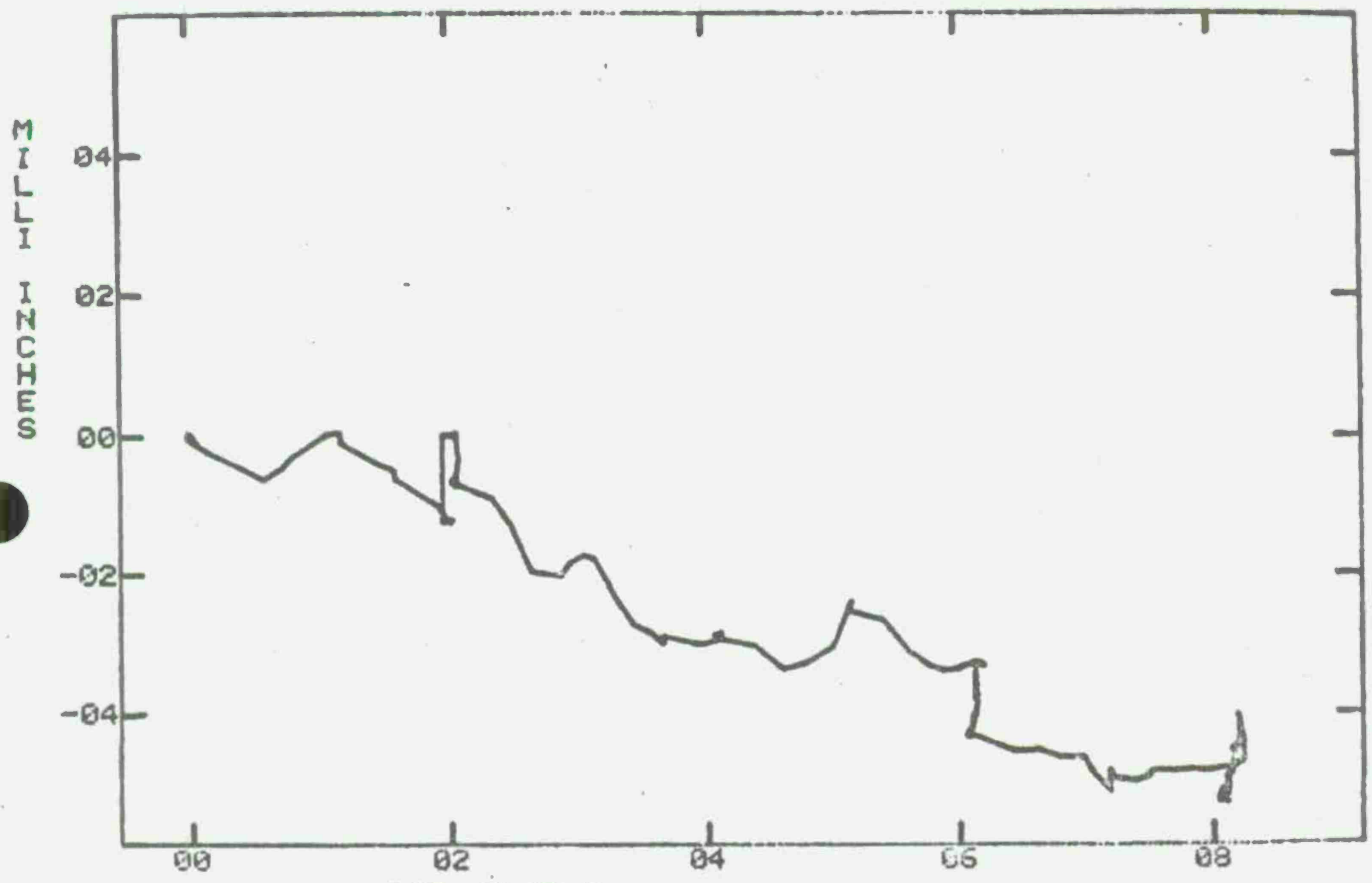

MILLI INCHES
16
12
08
04
00
00
02
04
06
08
LBS X 10-2
CH 19 VS CH 11 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 12 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

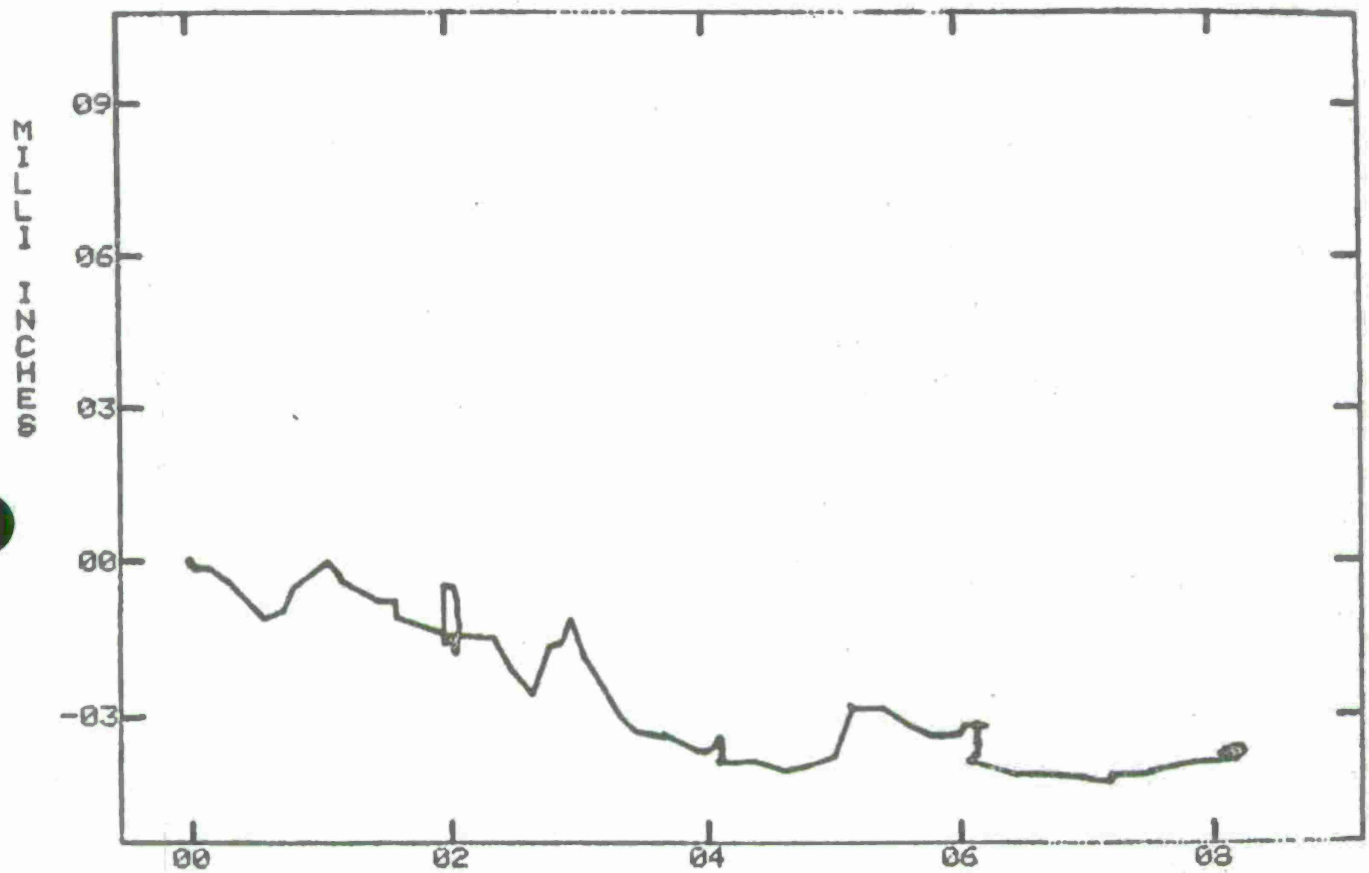


CH 19 VS CH13 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



CH 19 VS CH 14 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

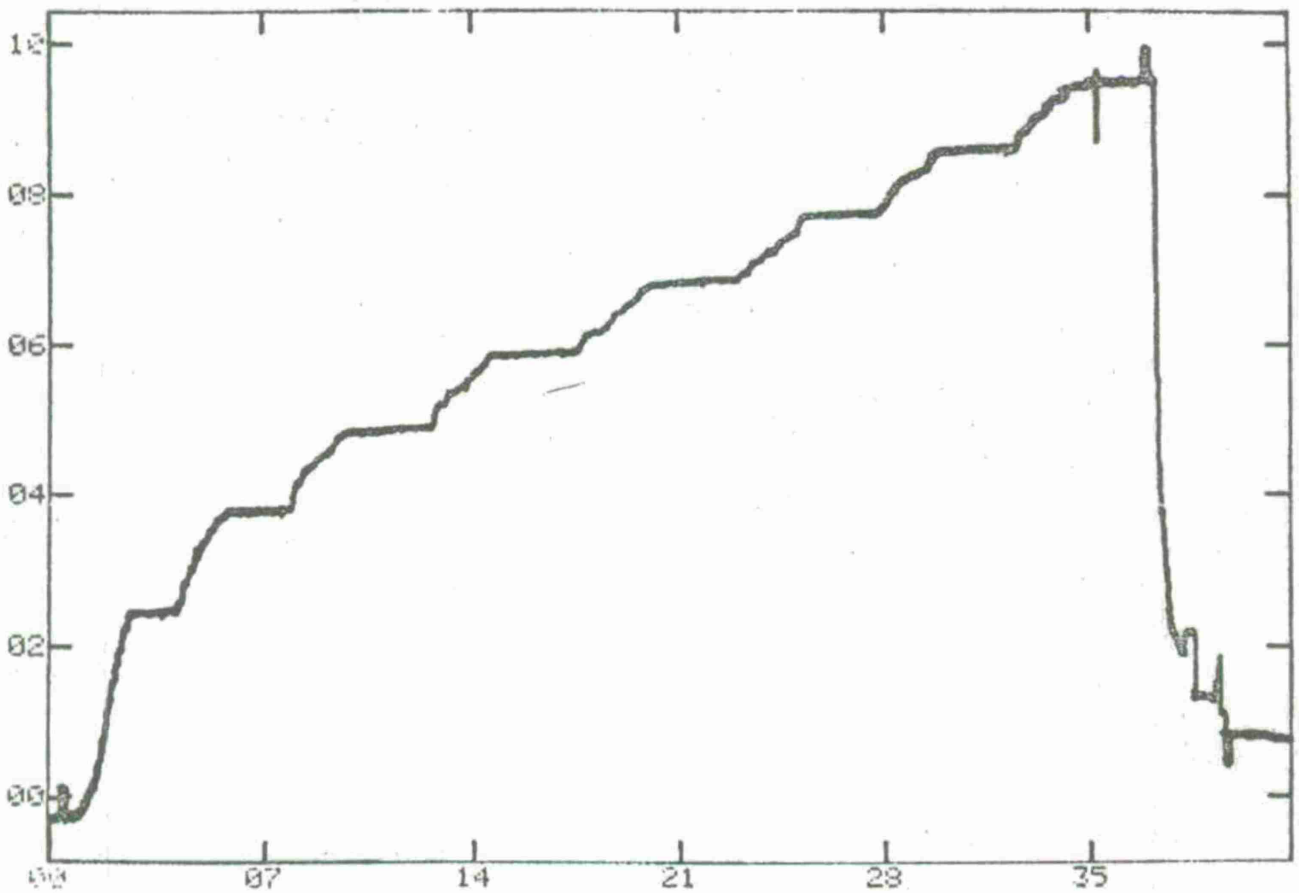
CH 19 VS CH 15 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS



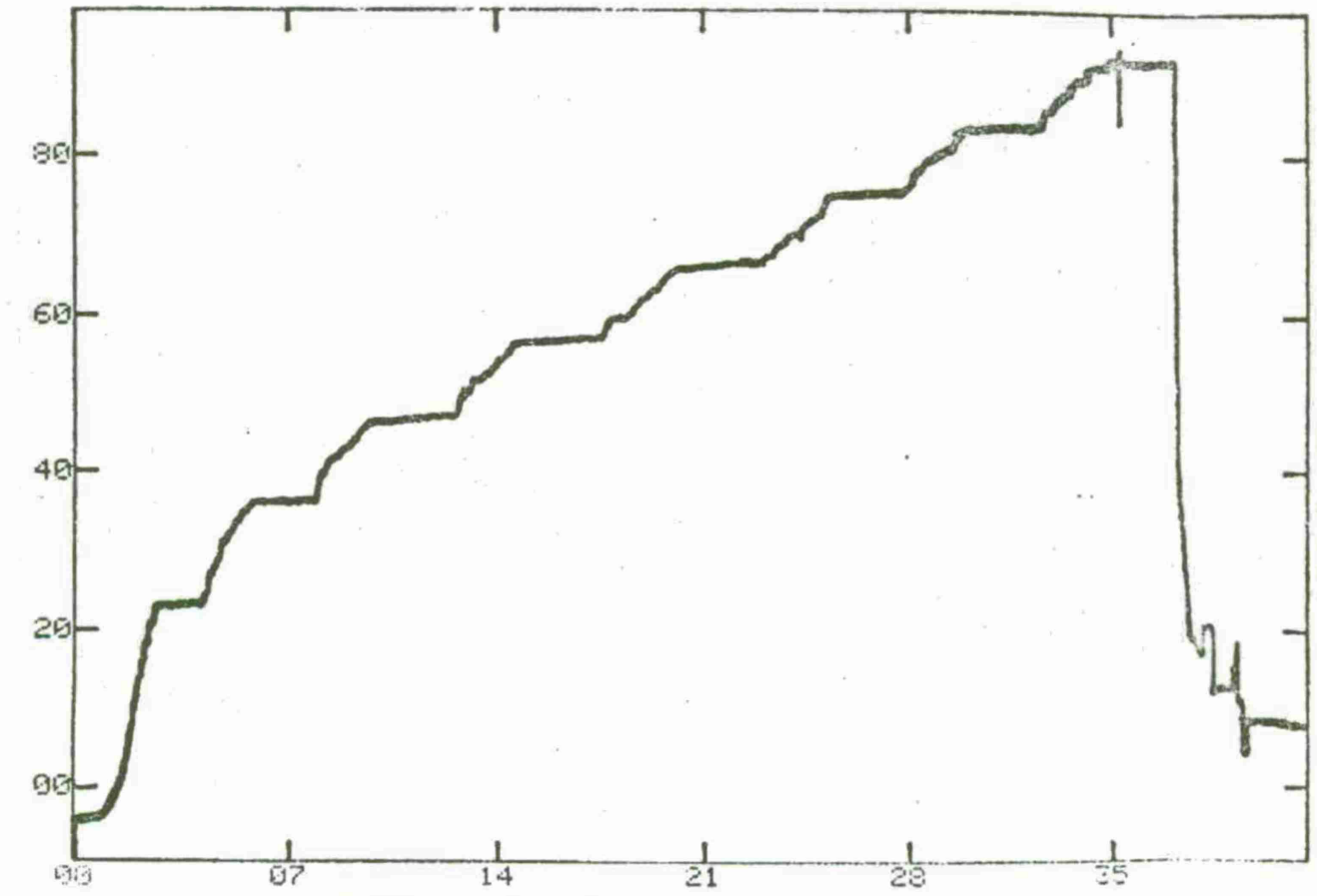
CH 19 VS CH 17 X 10+0
TEST 35 (22AUG75) AH1G BEND TESTS

APPENDIX D

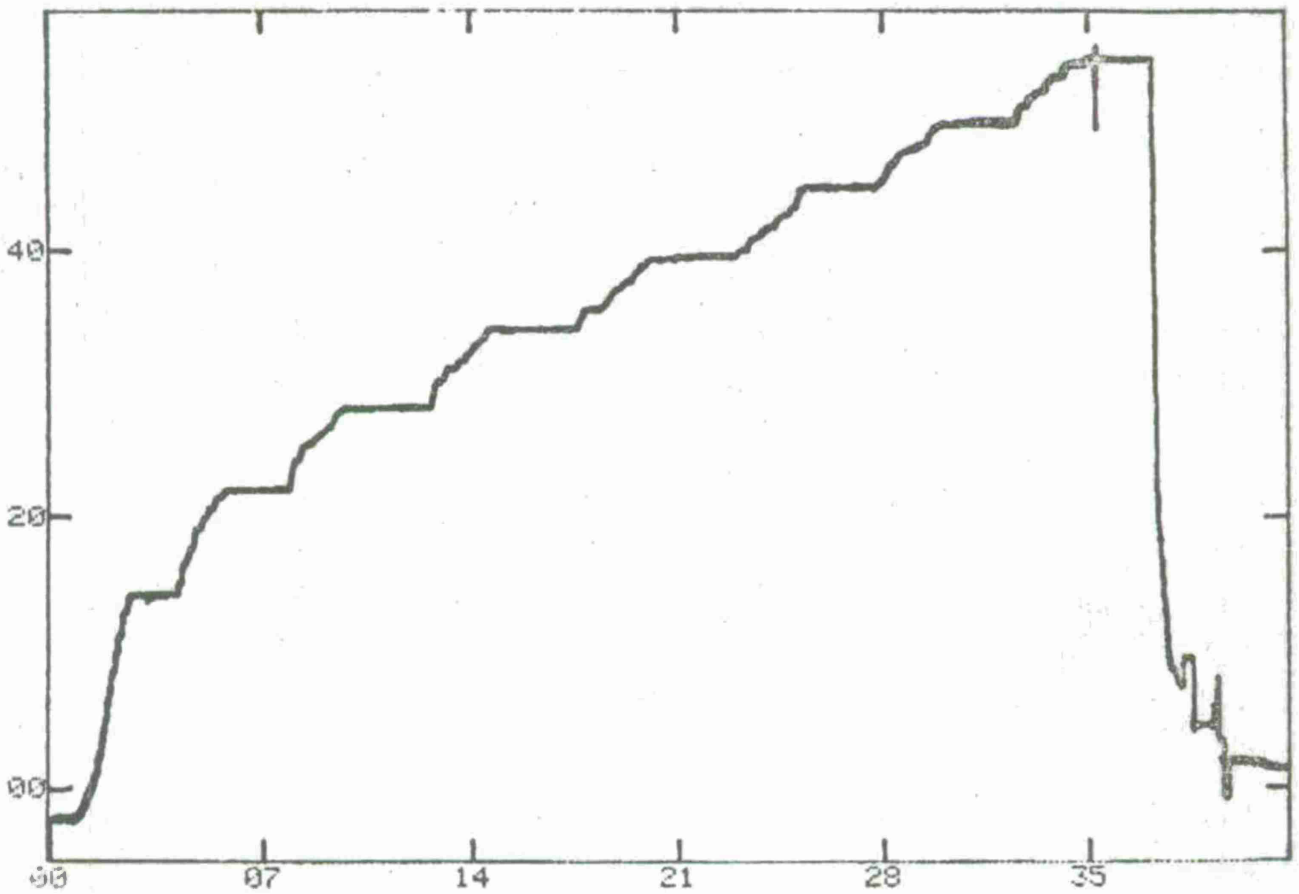
Data Sheets for Wing Beamwise Loading



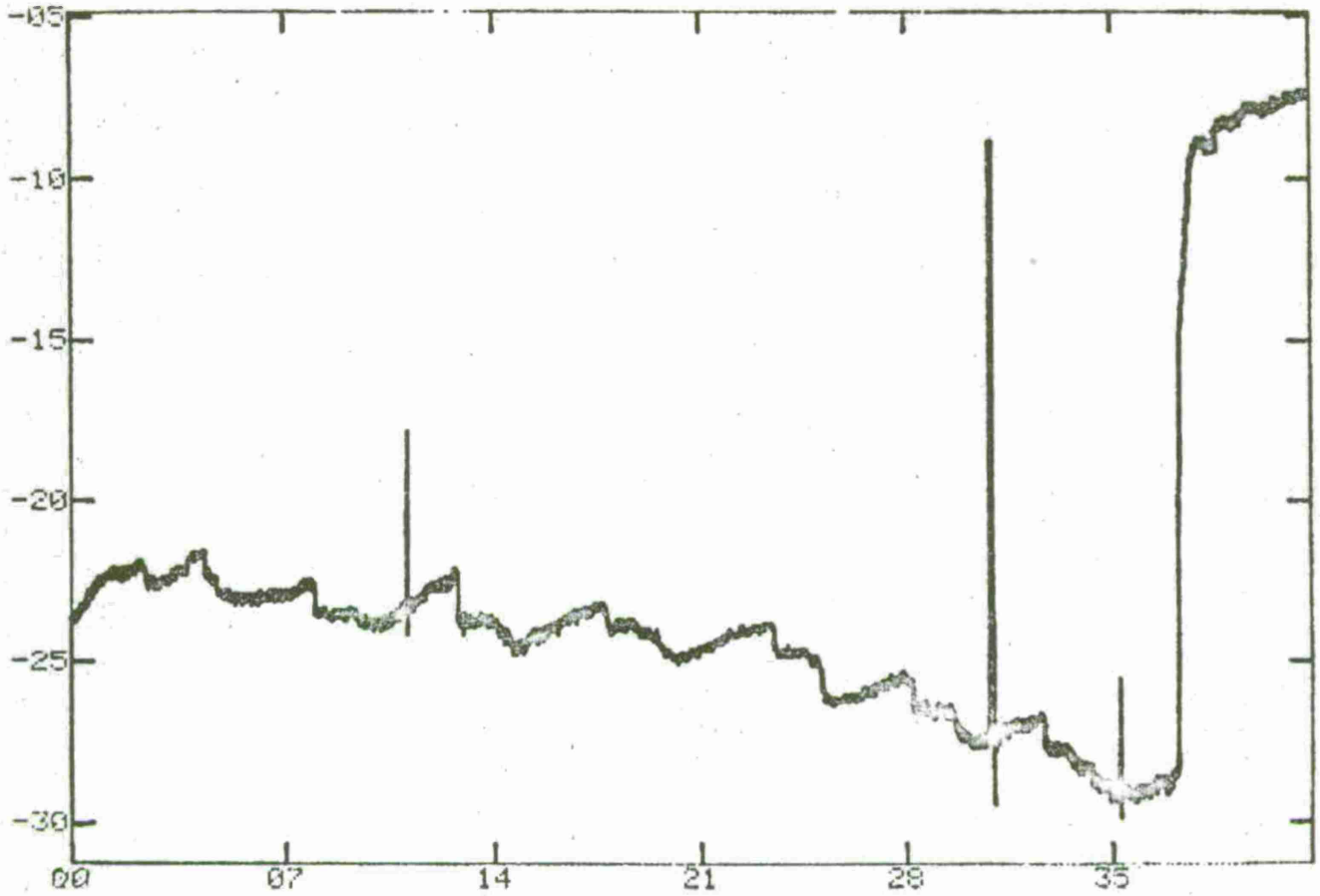
CH 1 WING VERT DISPLACEMENT - WS 57.74 X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



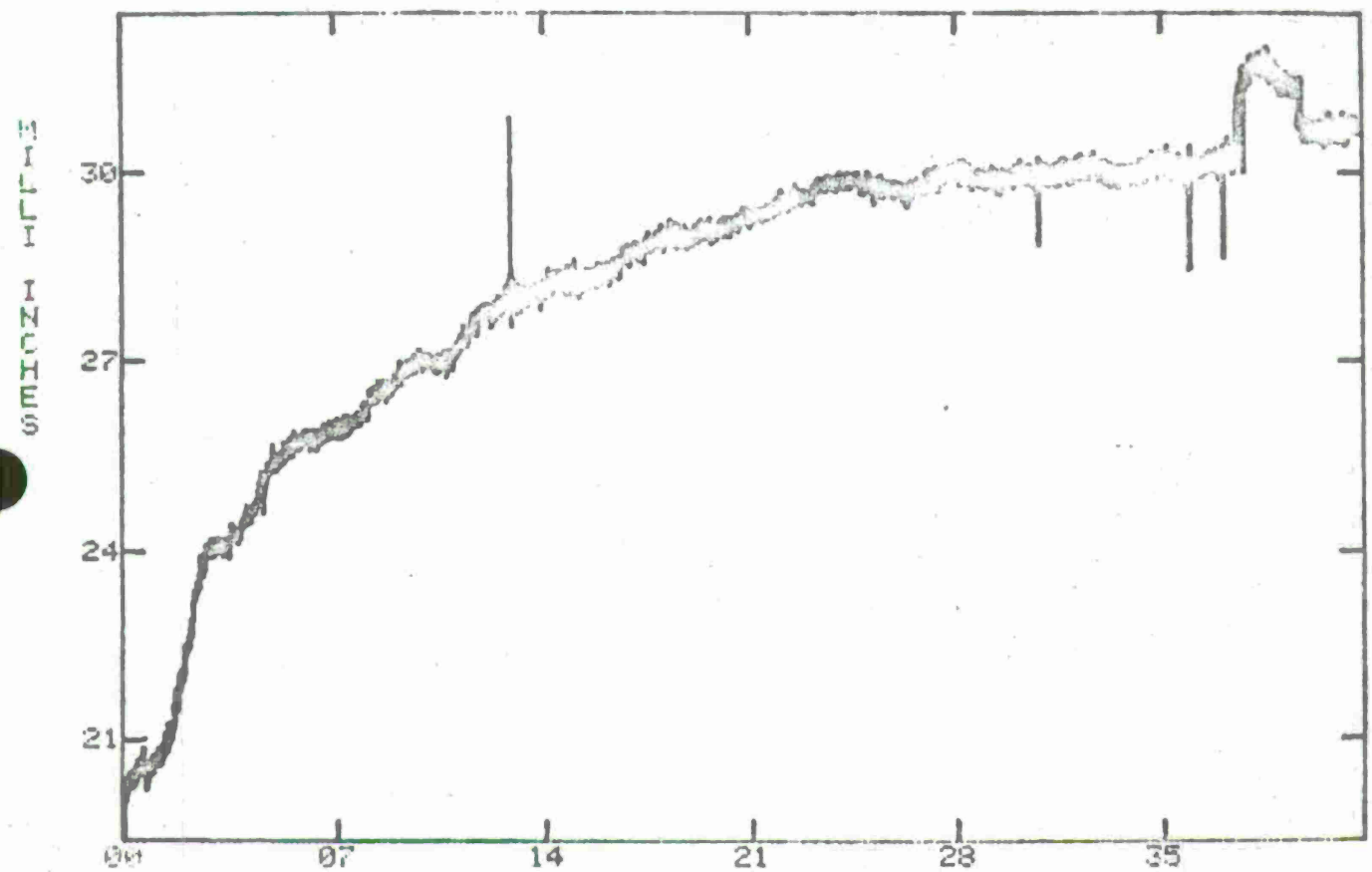
CH 2 WING VERT DISPLACEMENT - WS 59.00 X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



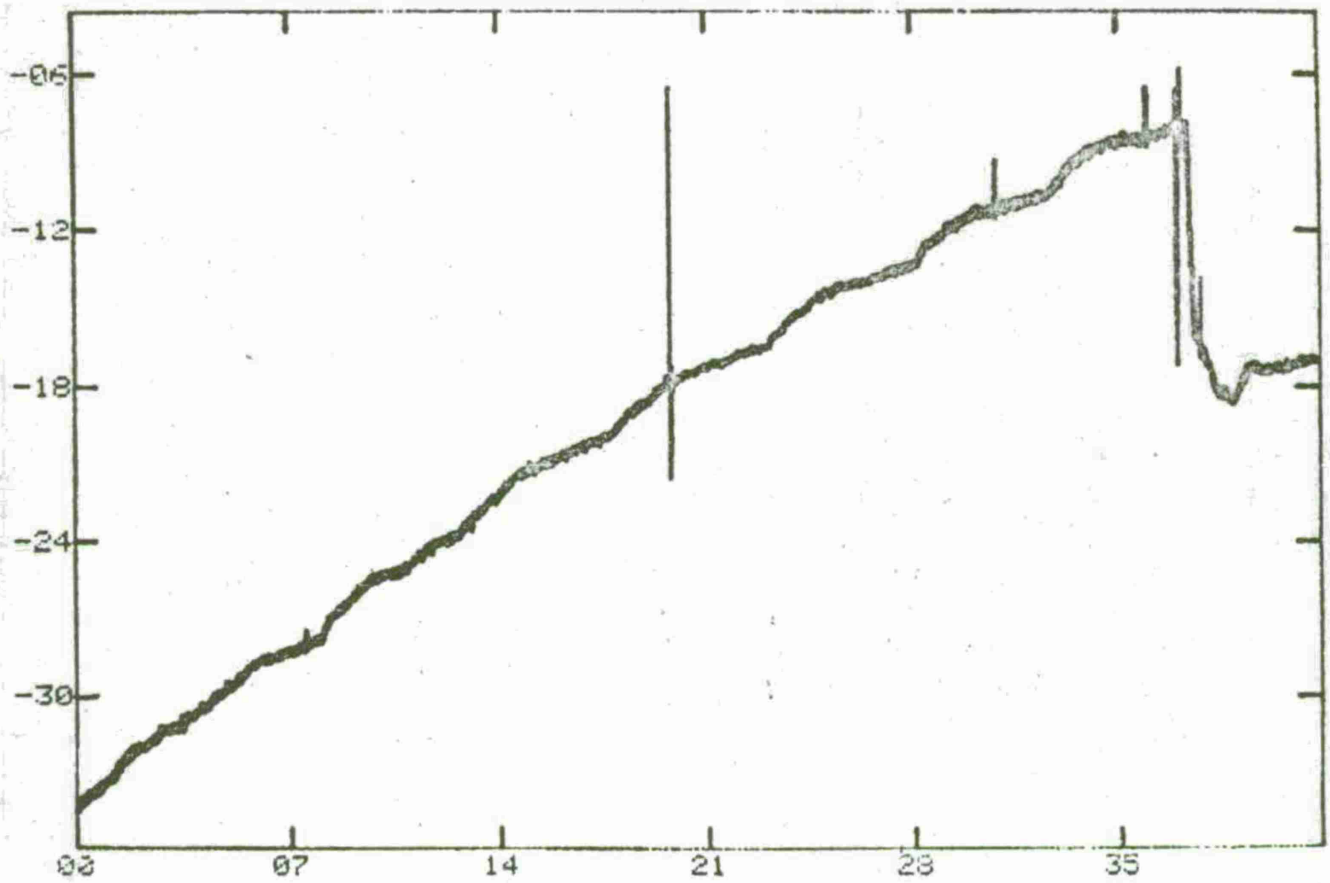
CH 3 WING VERT DISPLACEMENT - WS 42.50 X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



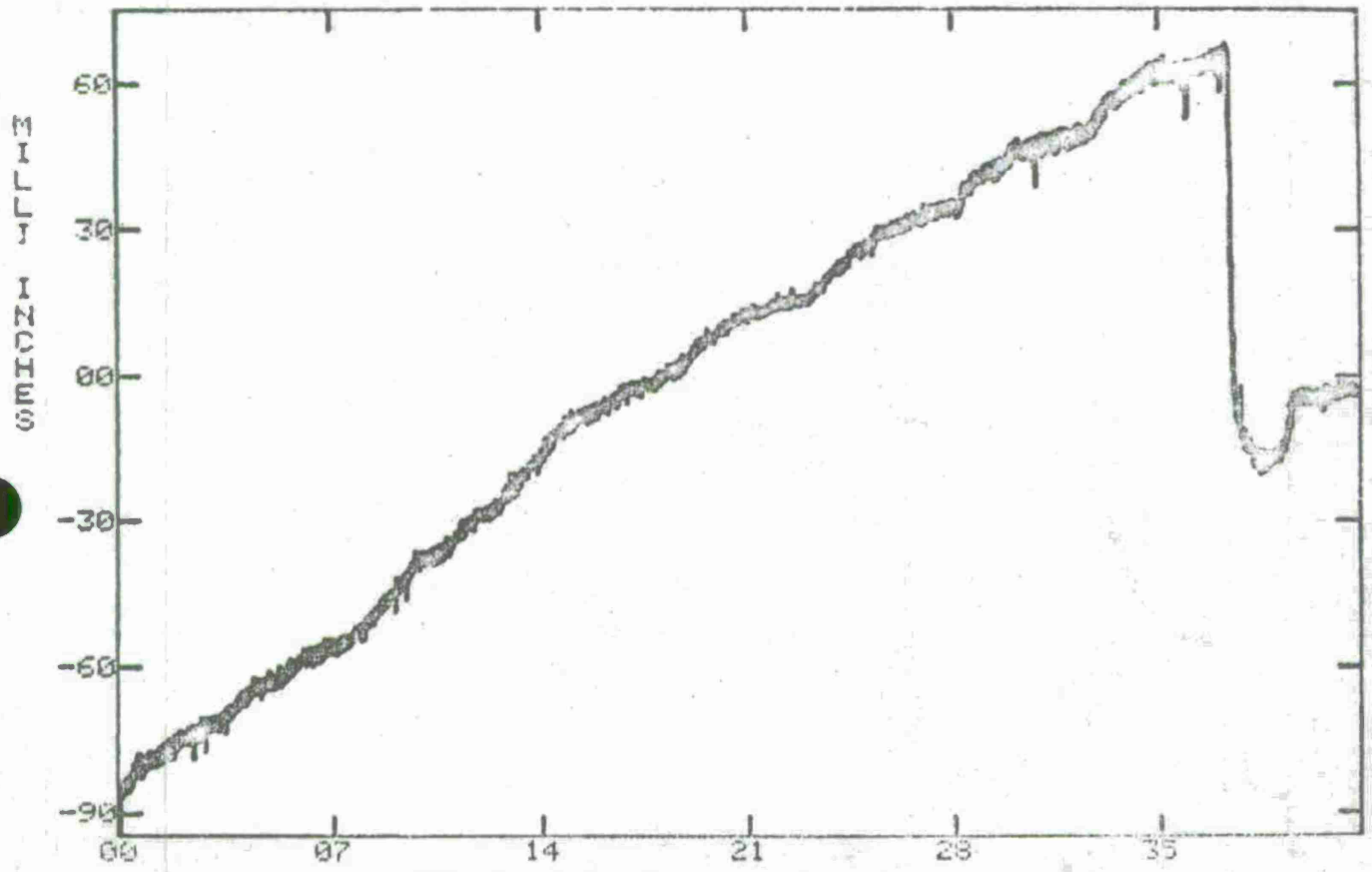
CH 4 WING VERT DISPLACEMENT - WS 21.38 X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



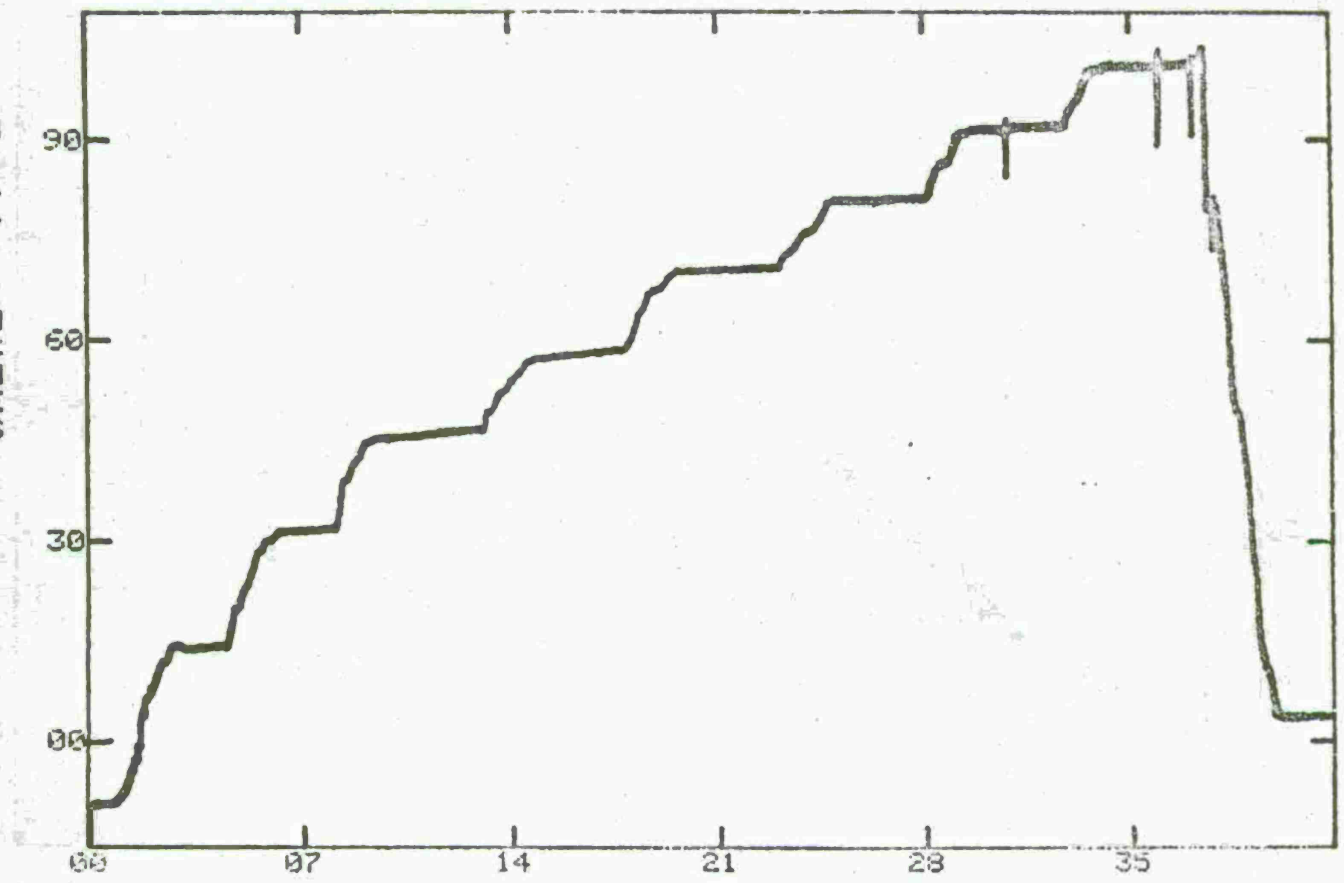
CH 5 WING VERT DISPLACEMENT - WS 21.38 X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



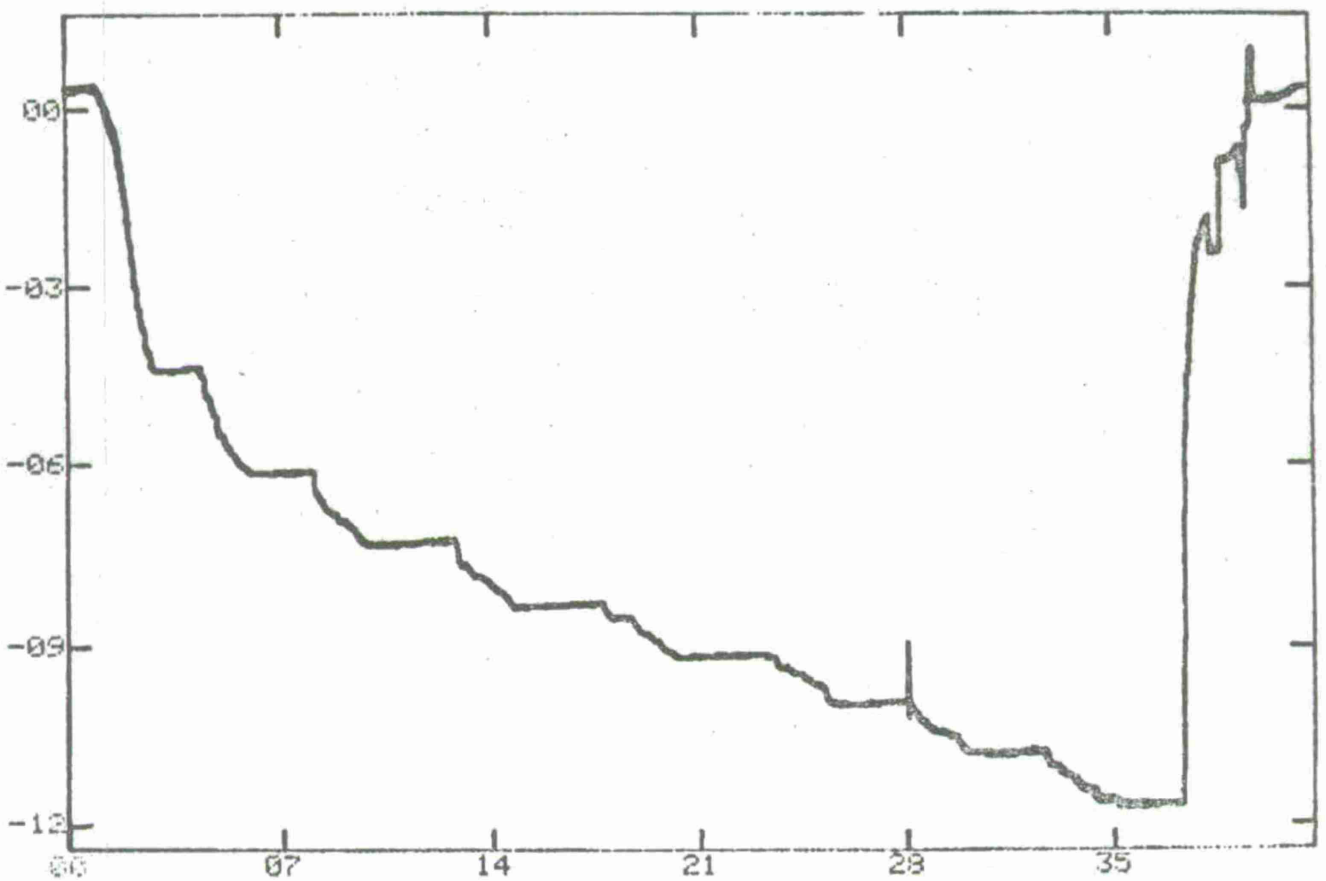
CH 6 CENTER SPAR DISPLACEMENT - L.H. X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



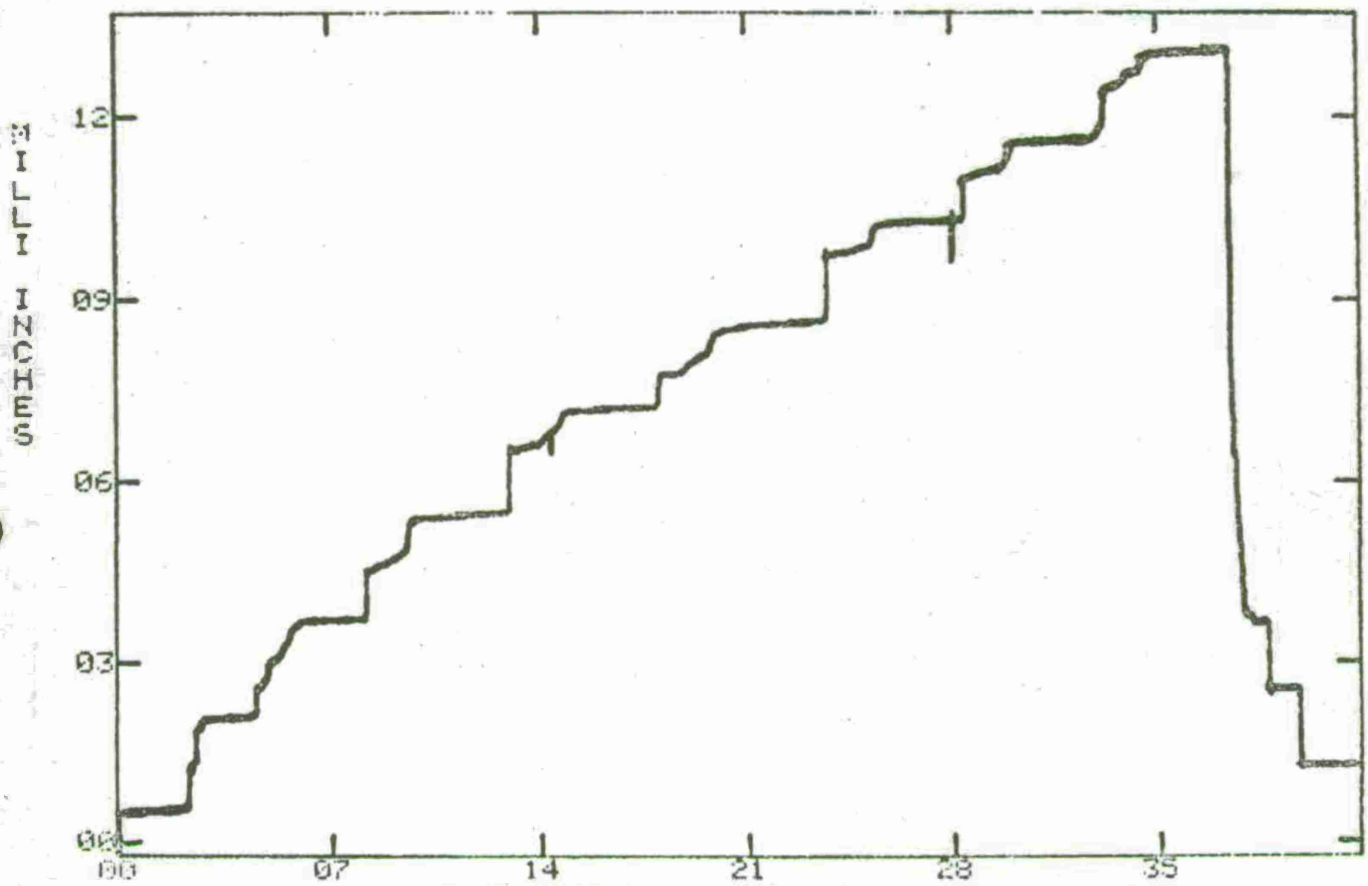
CH 7 CENTER SPAR DISPLACEMENT - R.H X 10+2
TEST 26 (23JUL75) AH1G BEND TESTS



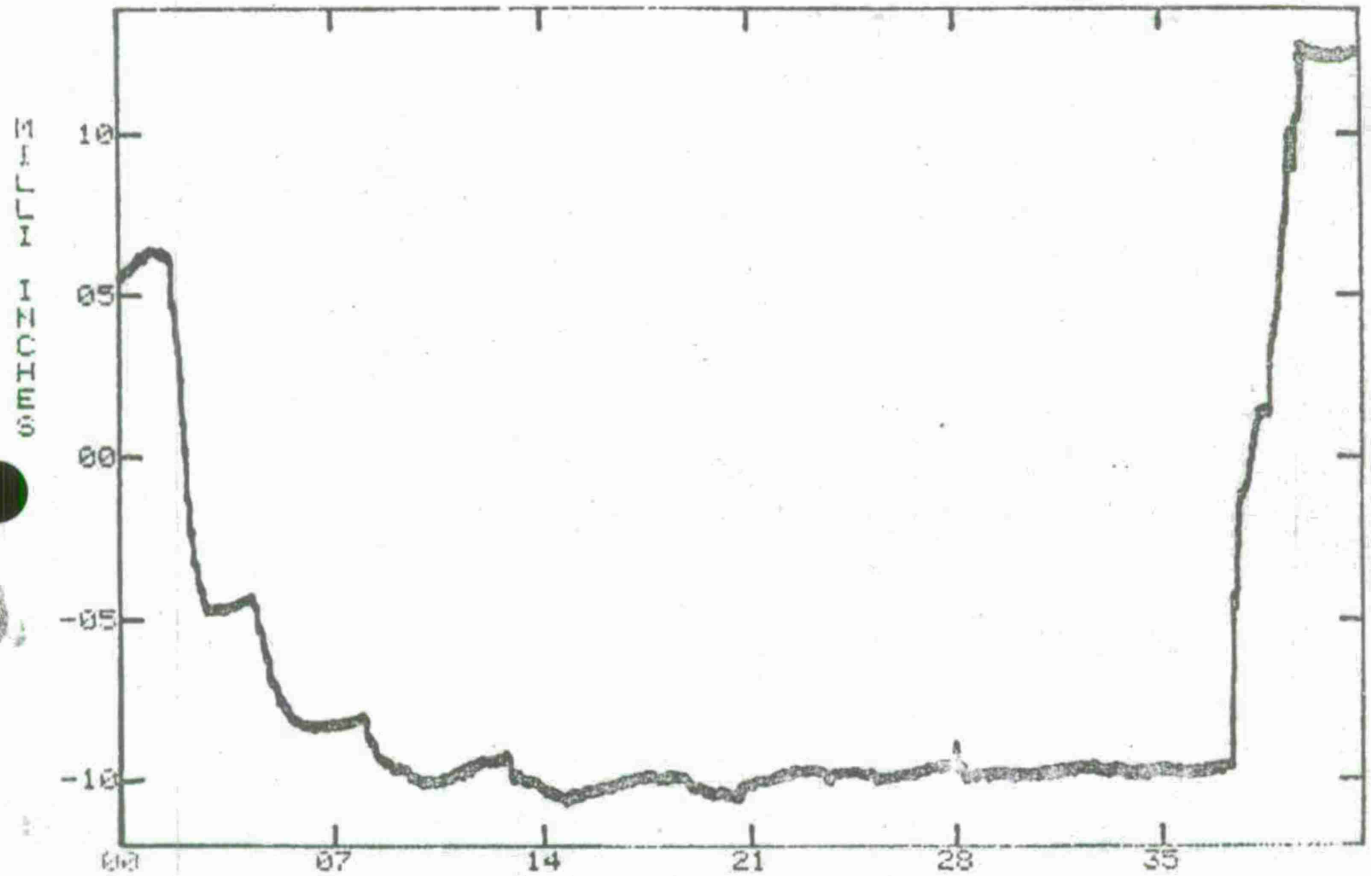
CH 8 WING VERT DISPLACEMENT - WS 60.00 X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



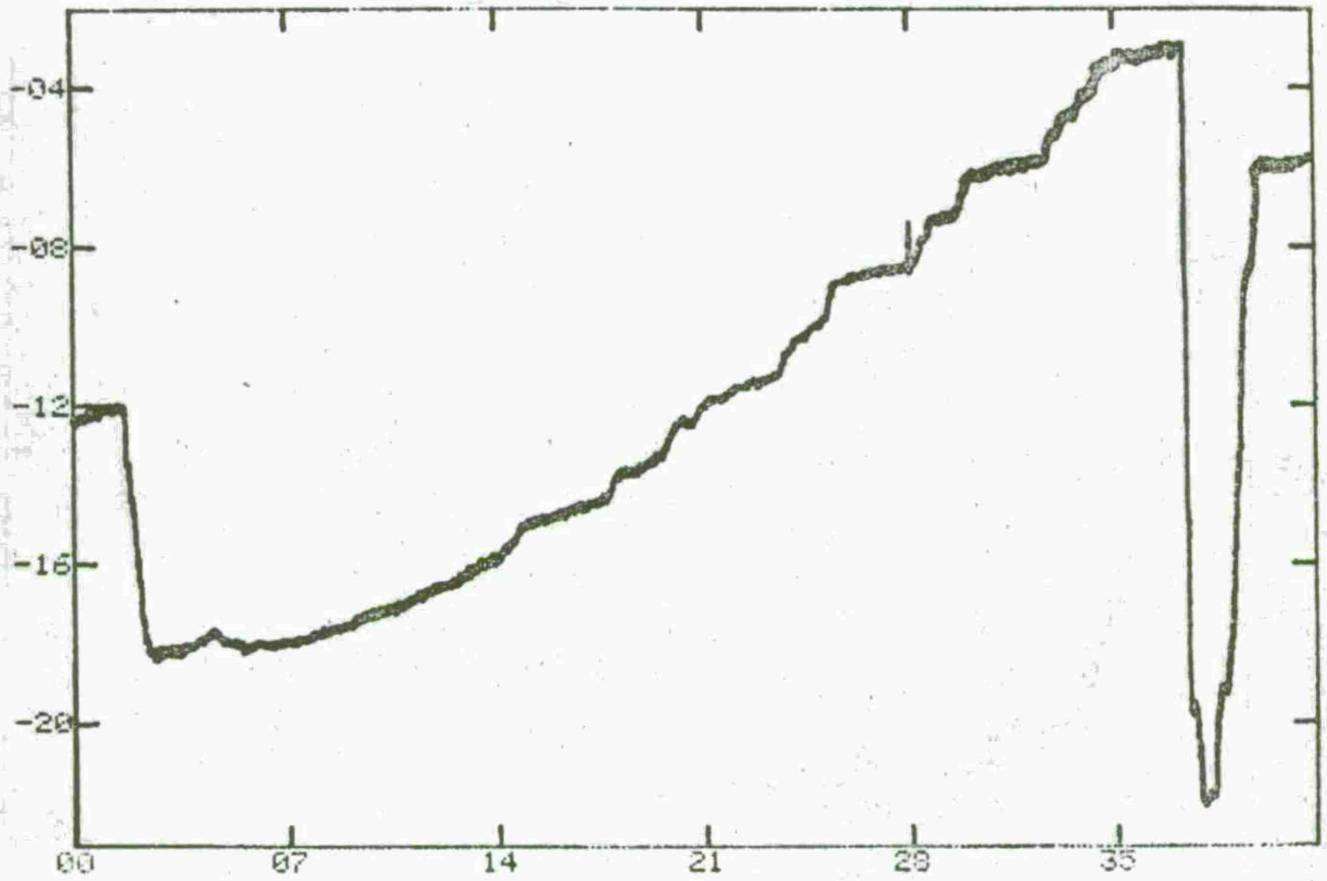
CH 9 WING SLOPE DISPLACEMENT - BOTTOM X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



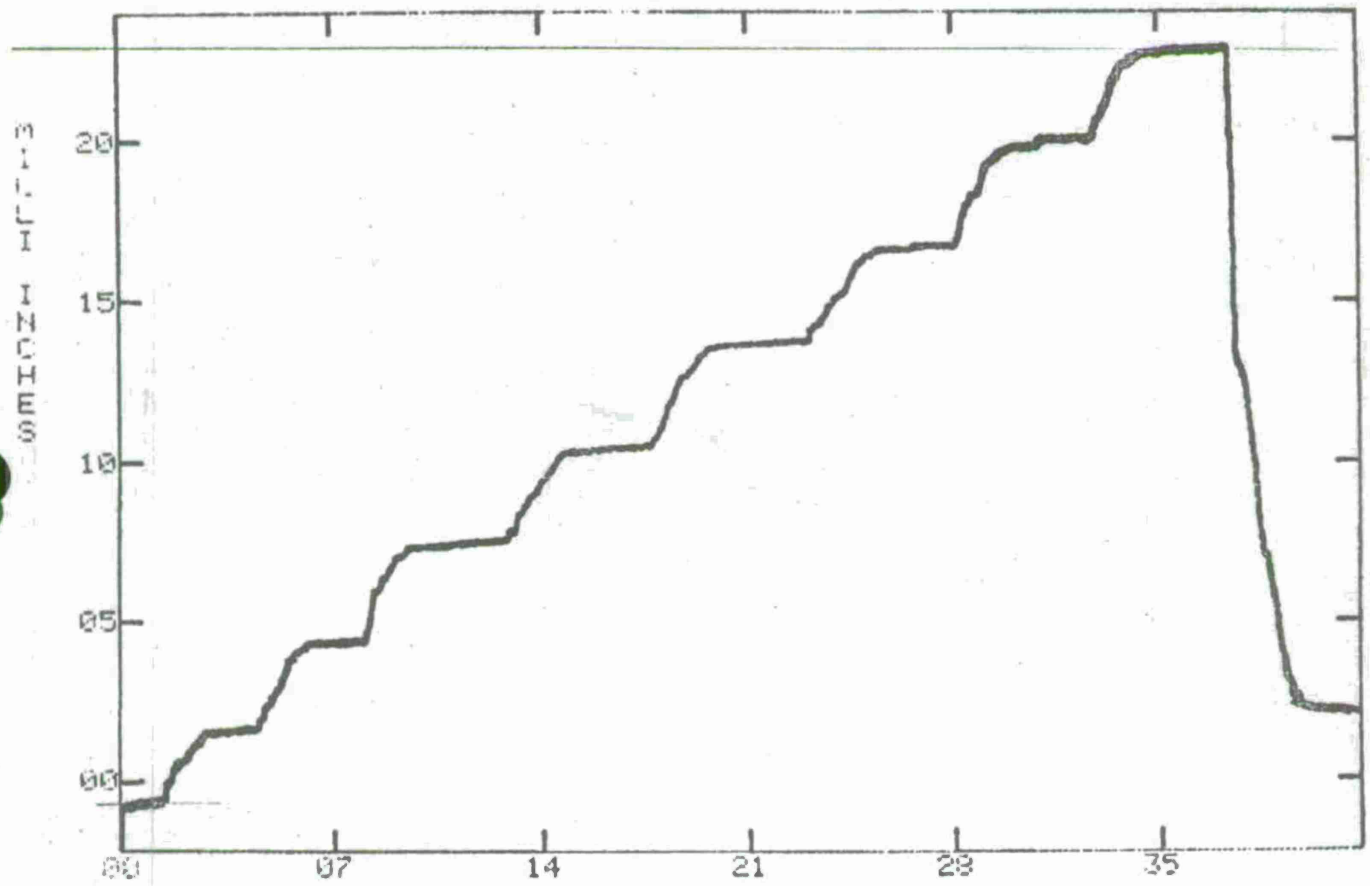
TIME IN SECONDS X 10-1
CH 10 WING SLOPE DISPLACEMENT - TOP X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



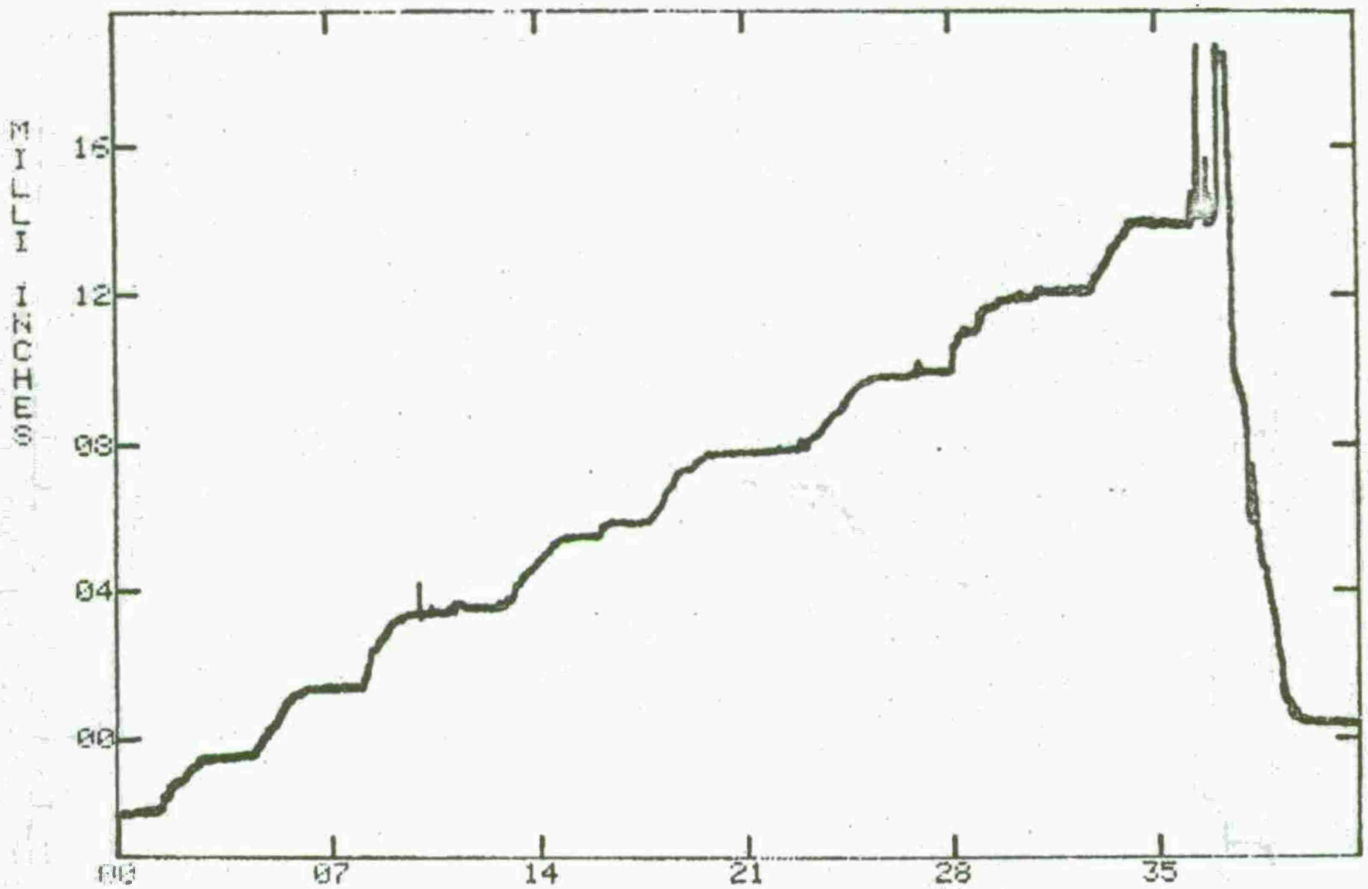
CH 11 FUSELAGE SLOPE DISPLACEMENT - BOTTOM X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



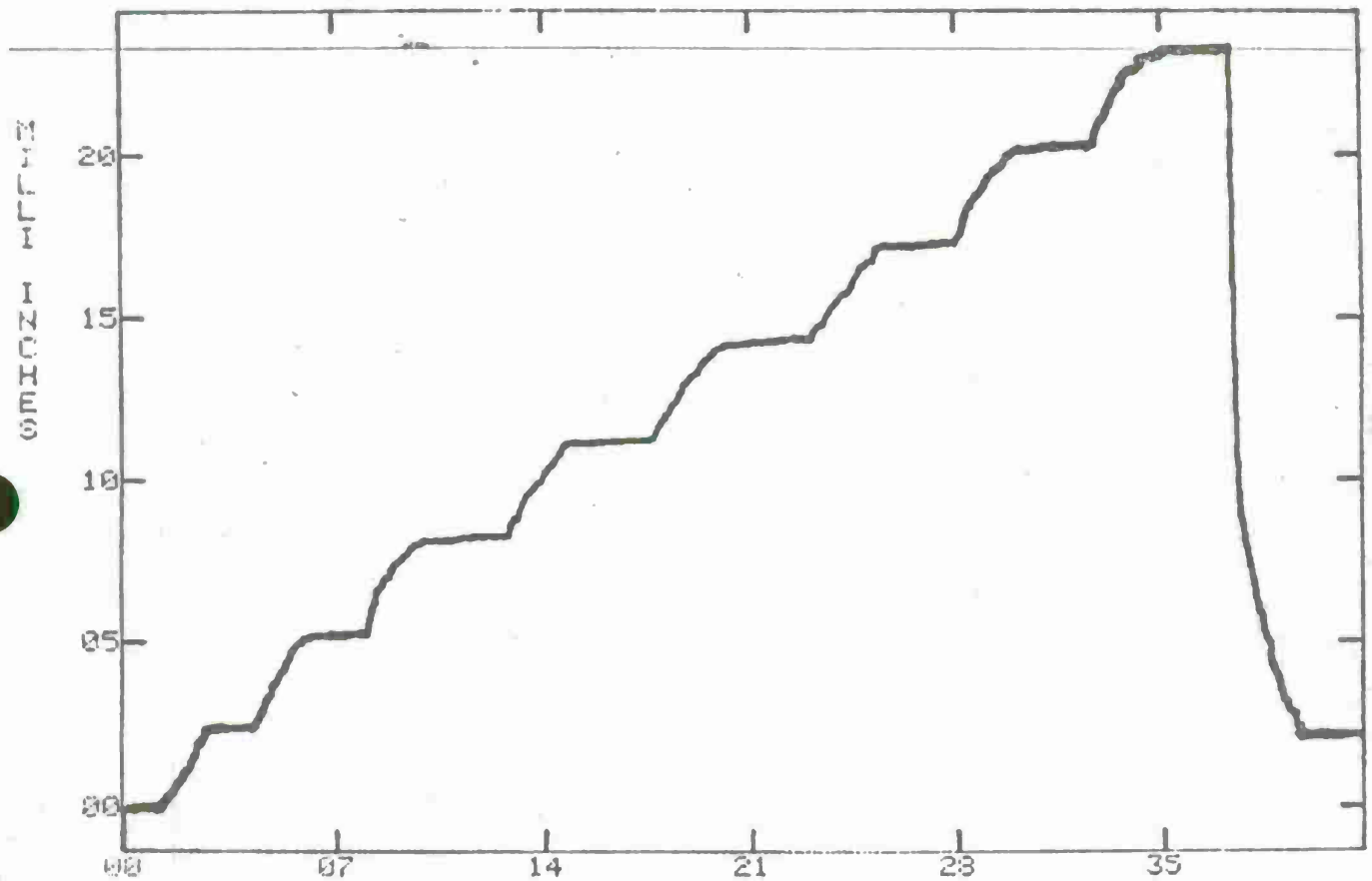
CH 12 FUSELAGE SLOPE DISPLACEMENT - TOP X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



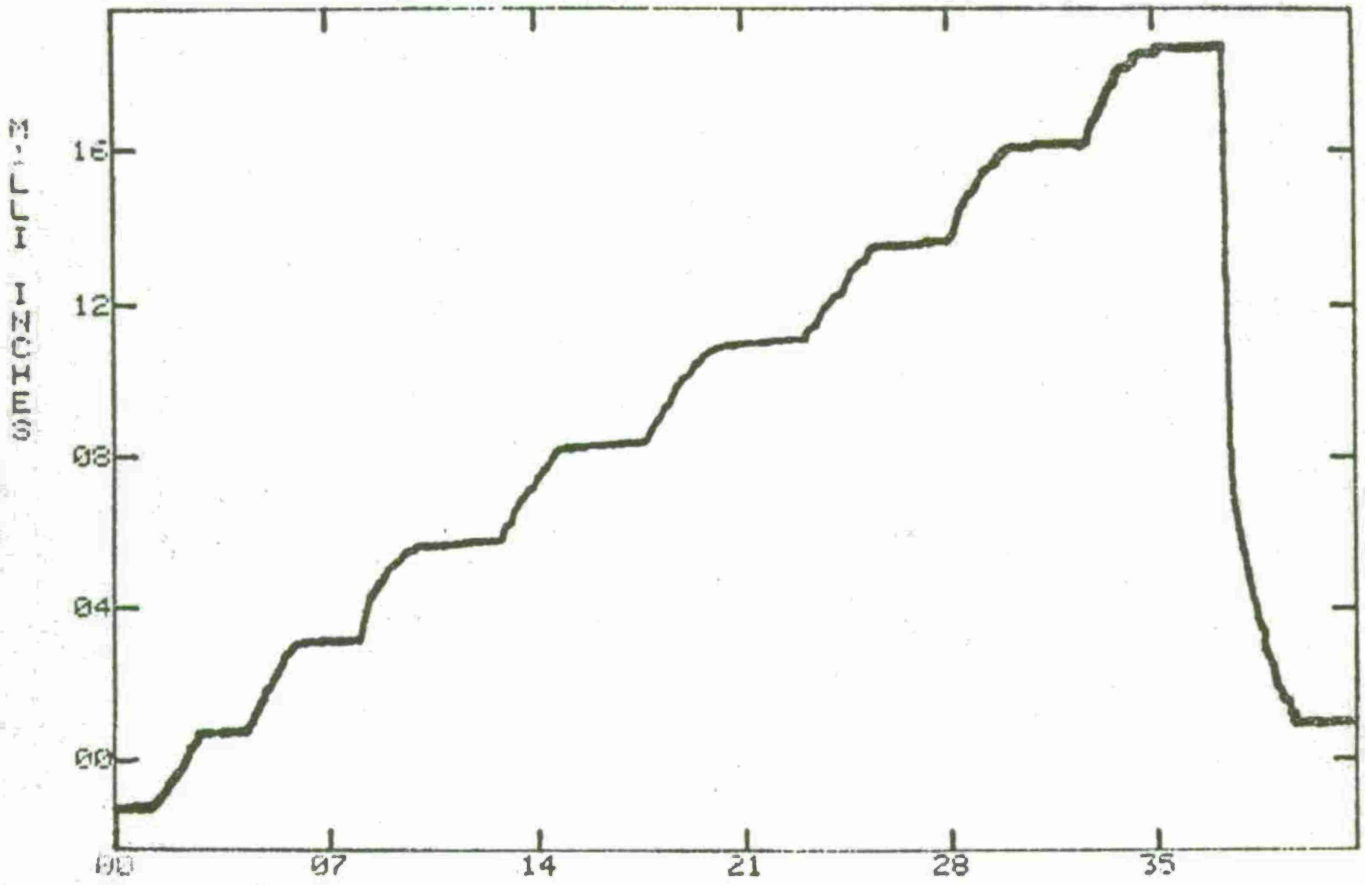
CH 13 FIXTURE / GROUND DISPLACEMENT - R.H. TOP X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



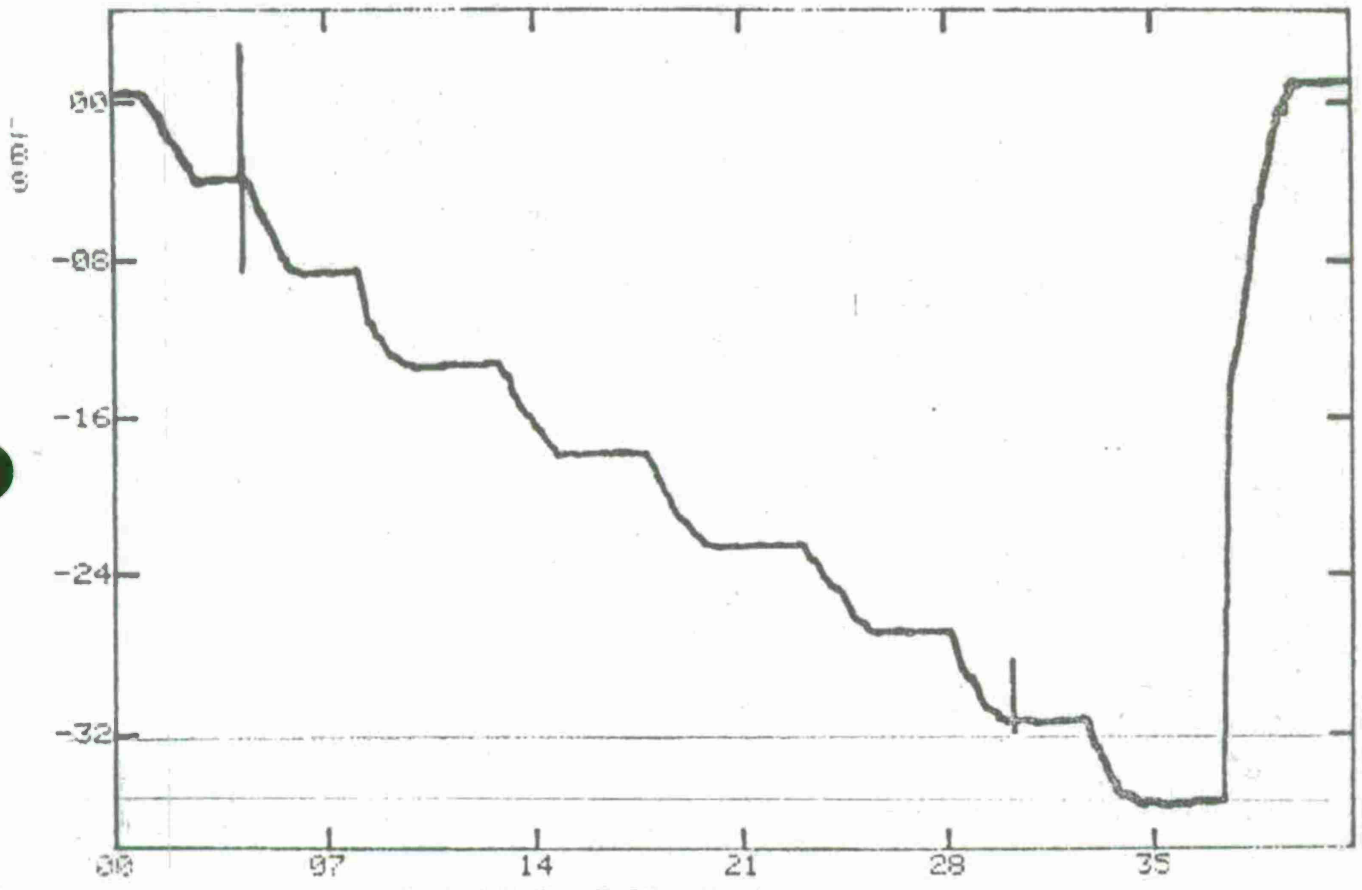
CH 14 FIXTURE / GROUND DISPLACEMENT - R.H. BOTTOM X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



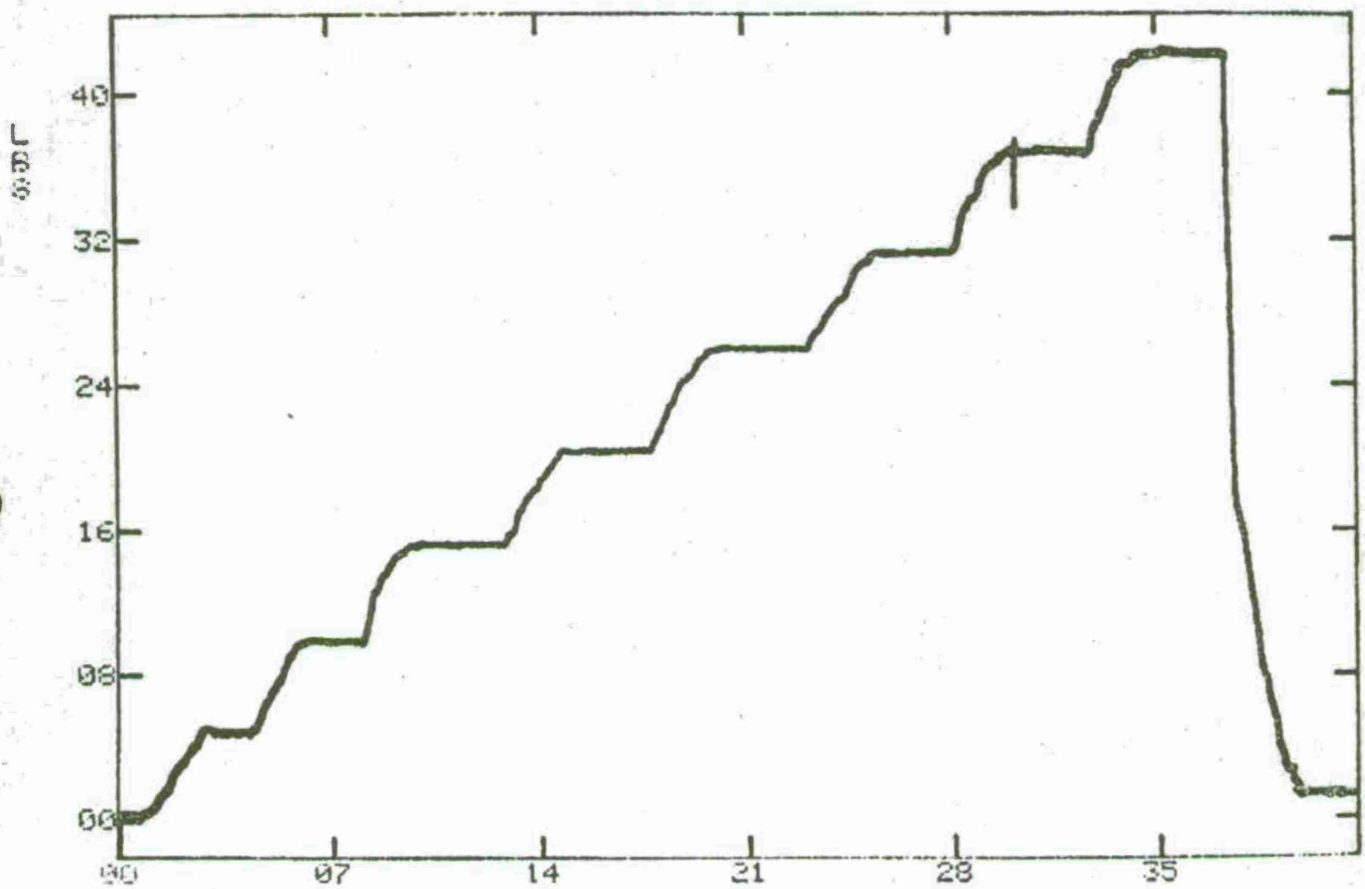
CH 15 FIXTURE / GROUND DISPLACEMENT - L.H. TOP X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS

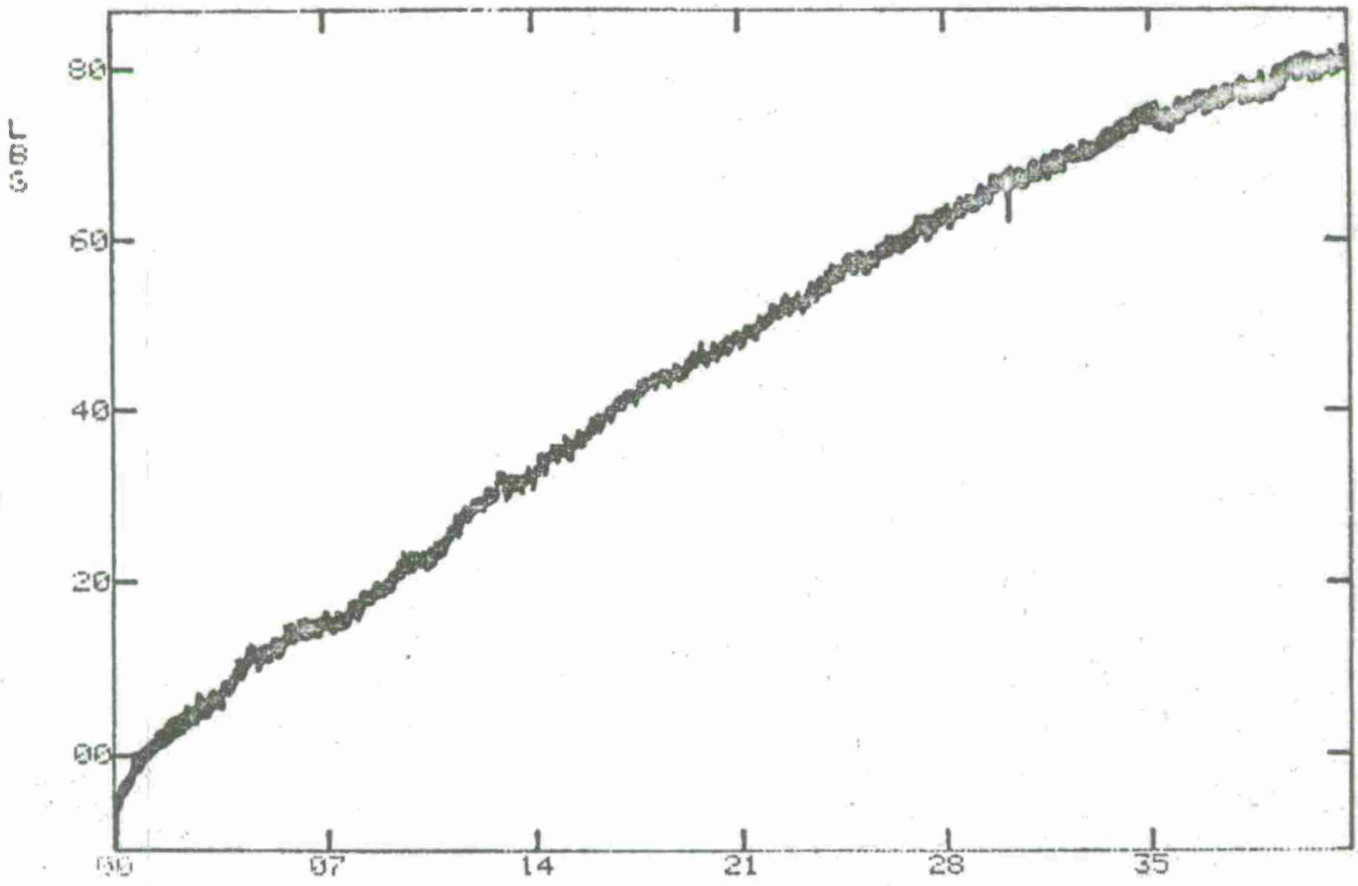


CH 17 FIXTURE / GROUND DISPLACEMENT - L.H. BOTTOM X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS

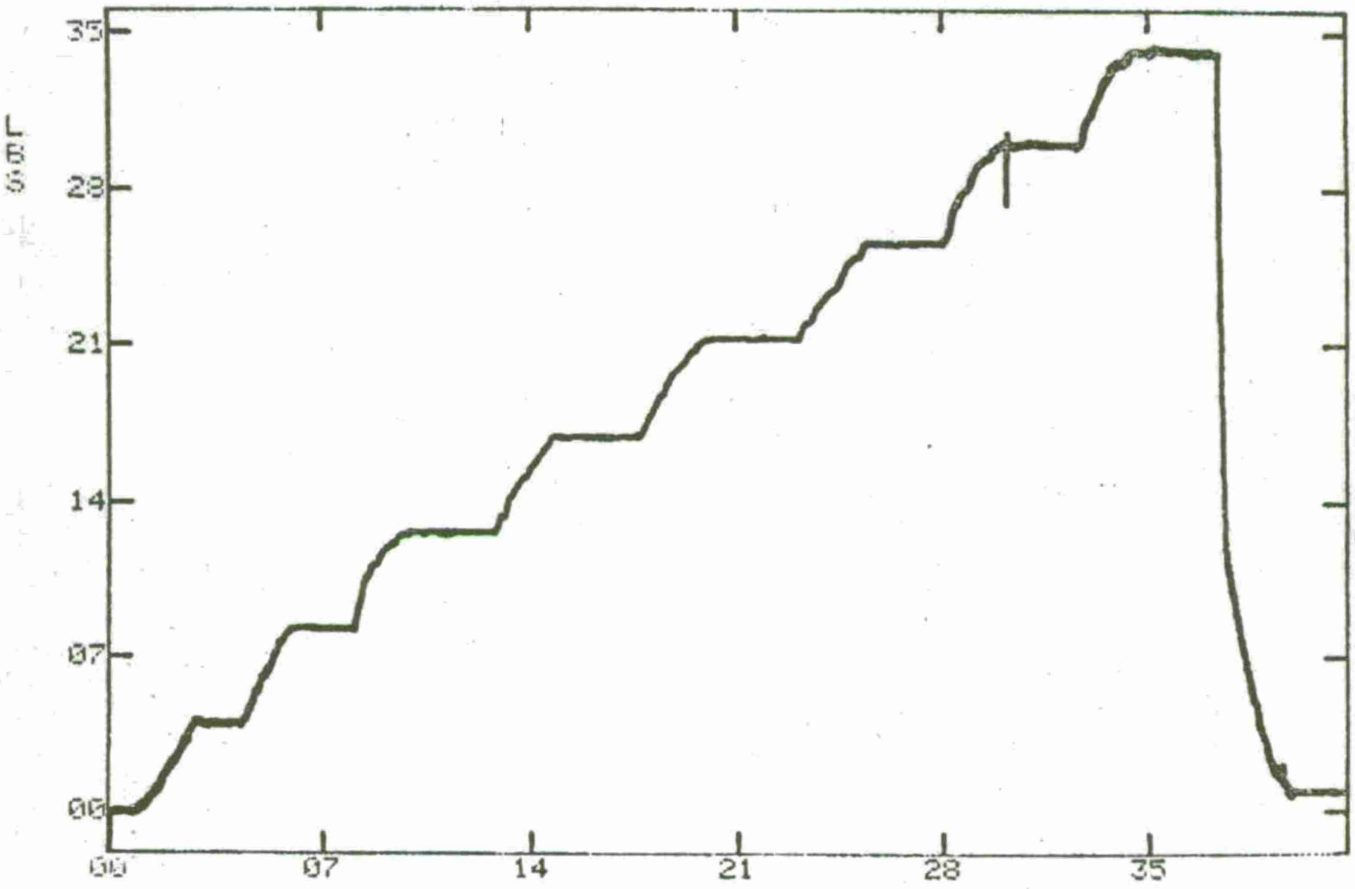


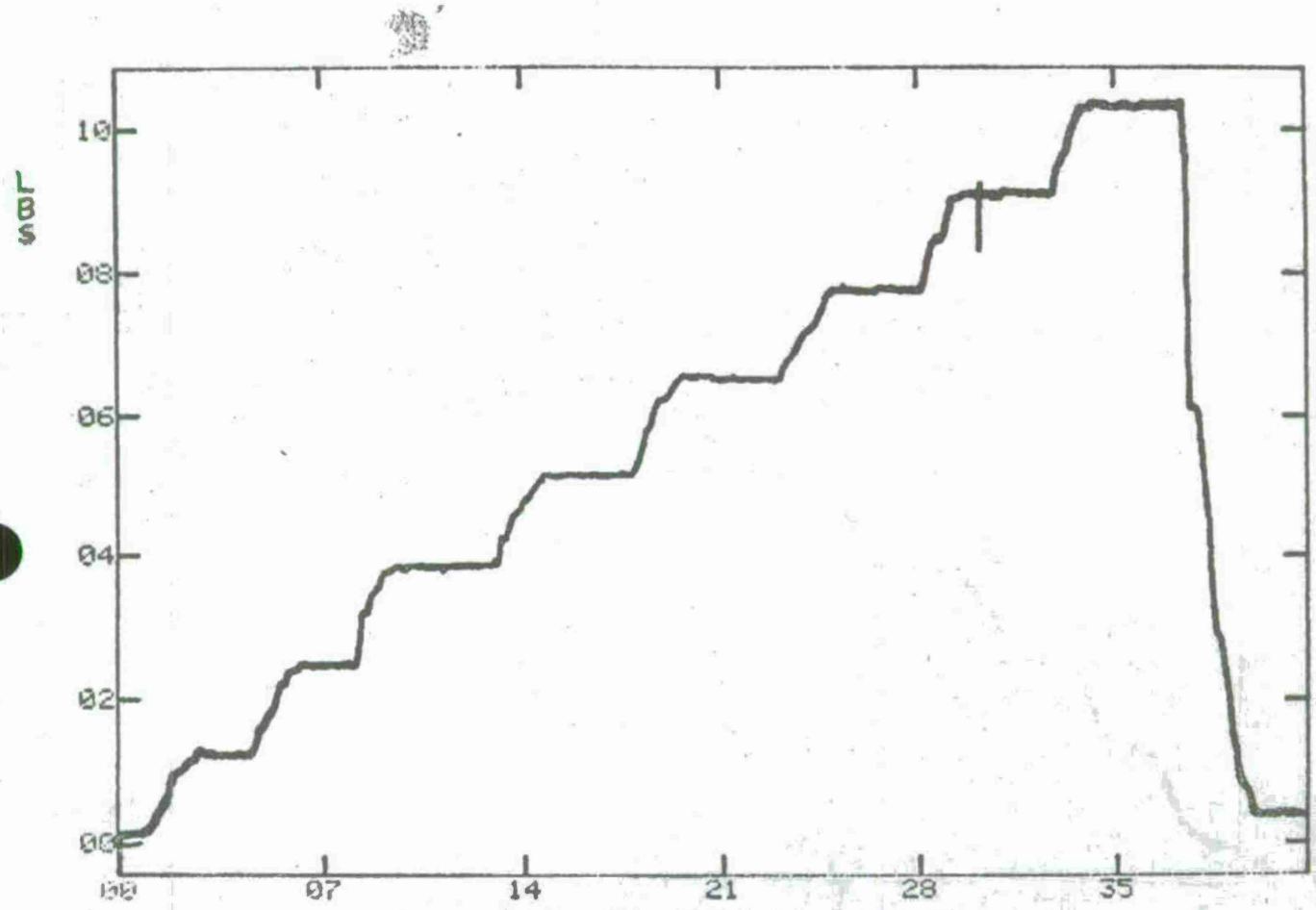
CH 18 BASE LOAD - L.H. TOP X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS

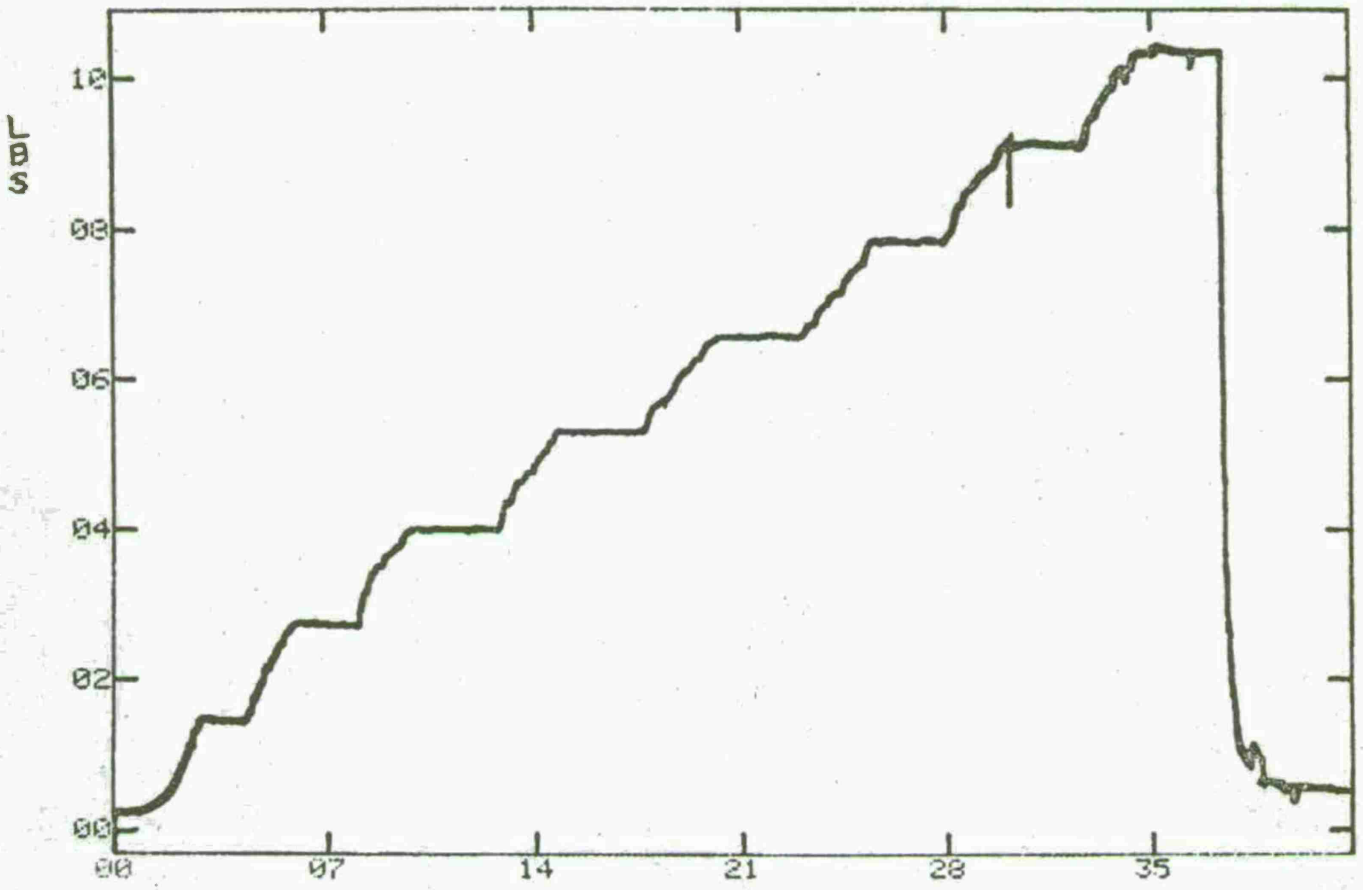

40
32
24
16
08
00
00
07
14
21
28
35
TIME IN SECONDS X 10-1
CH 19 BASE LOAD - L.H. BOTTOM X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 20 : BASE LOAD - R.H. TOP X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS


35
28
21
14
07
00
00
07
14
21
28
35
TIME IN SECONDS X 10-1
CH 21 BASE LOAD - R.H BOTTOM X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS


LBS
10
08
06
04
02
00
00
07
14
21
28
35
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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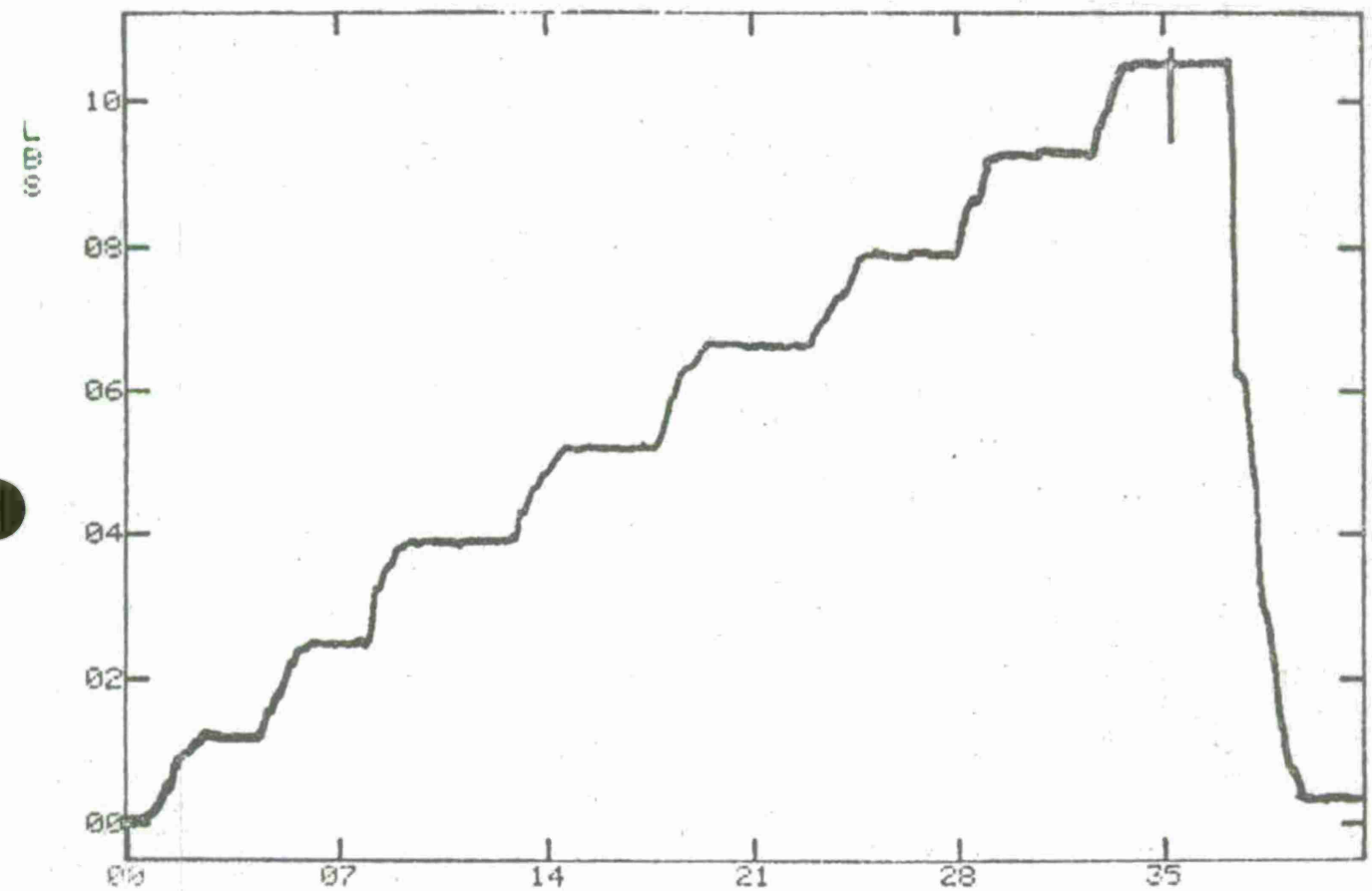
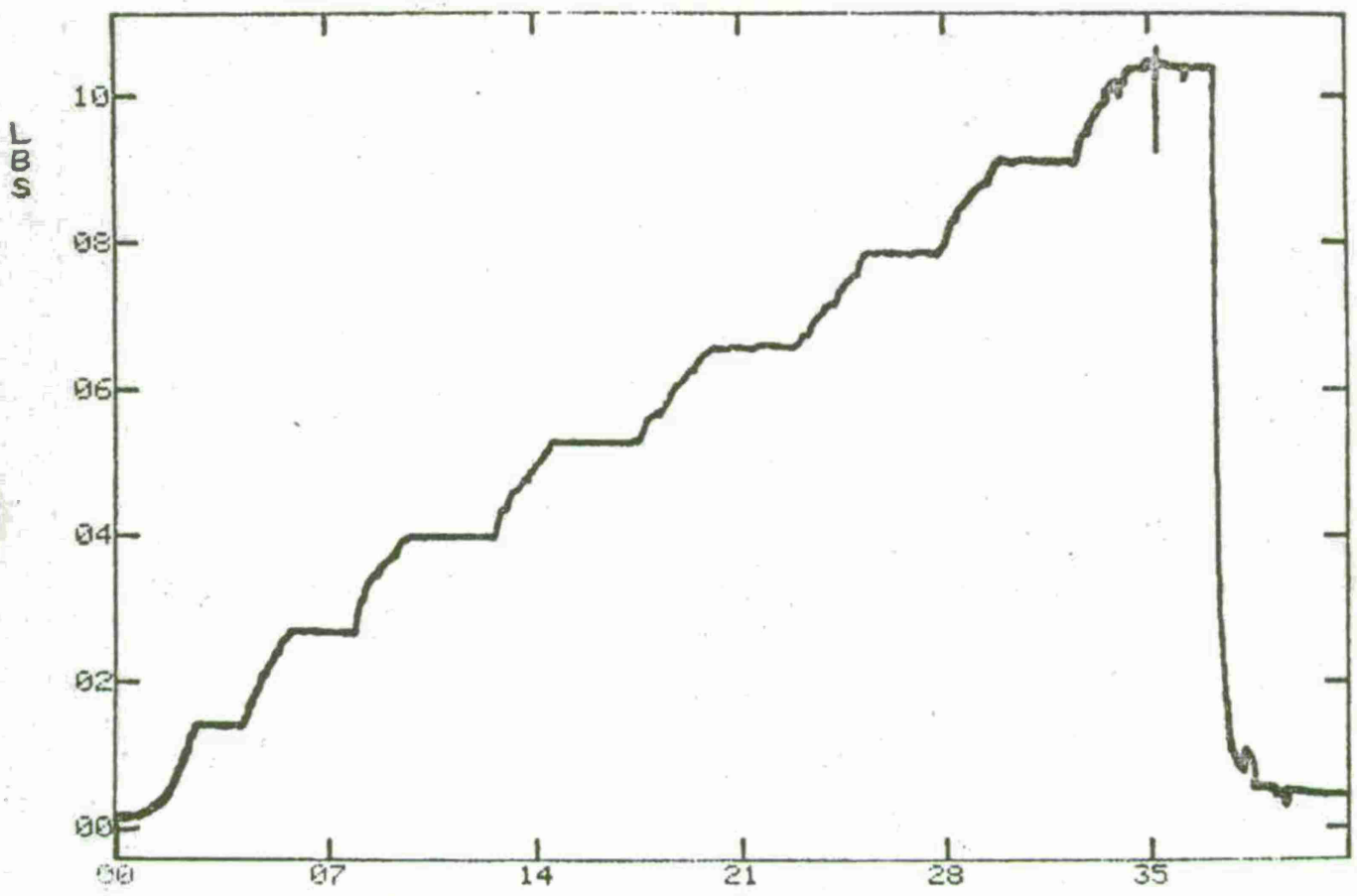
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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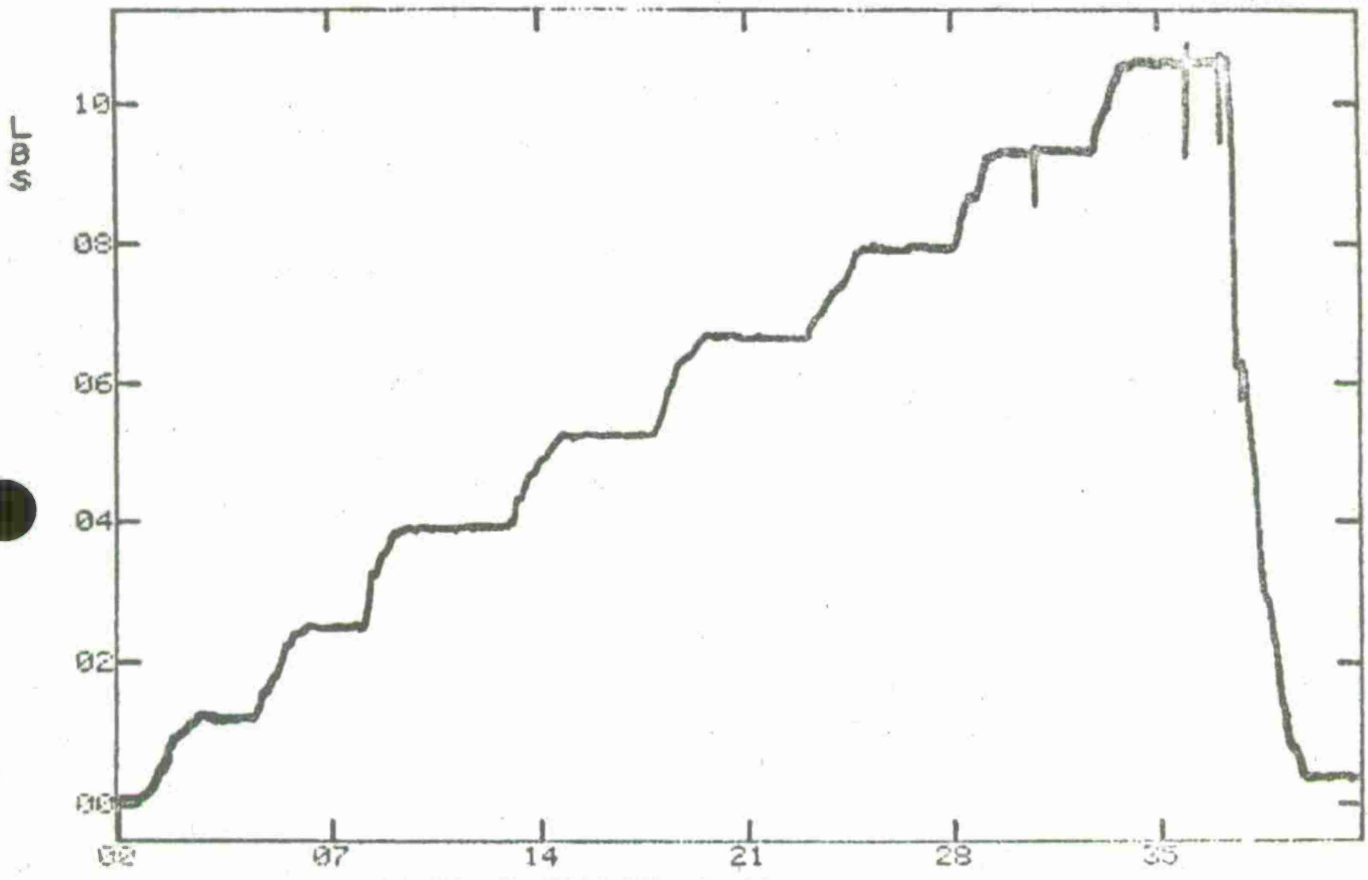
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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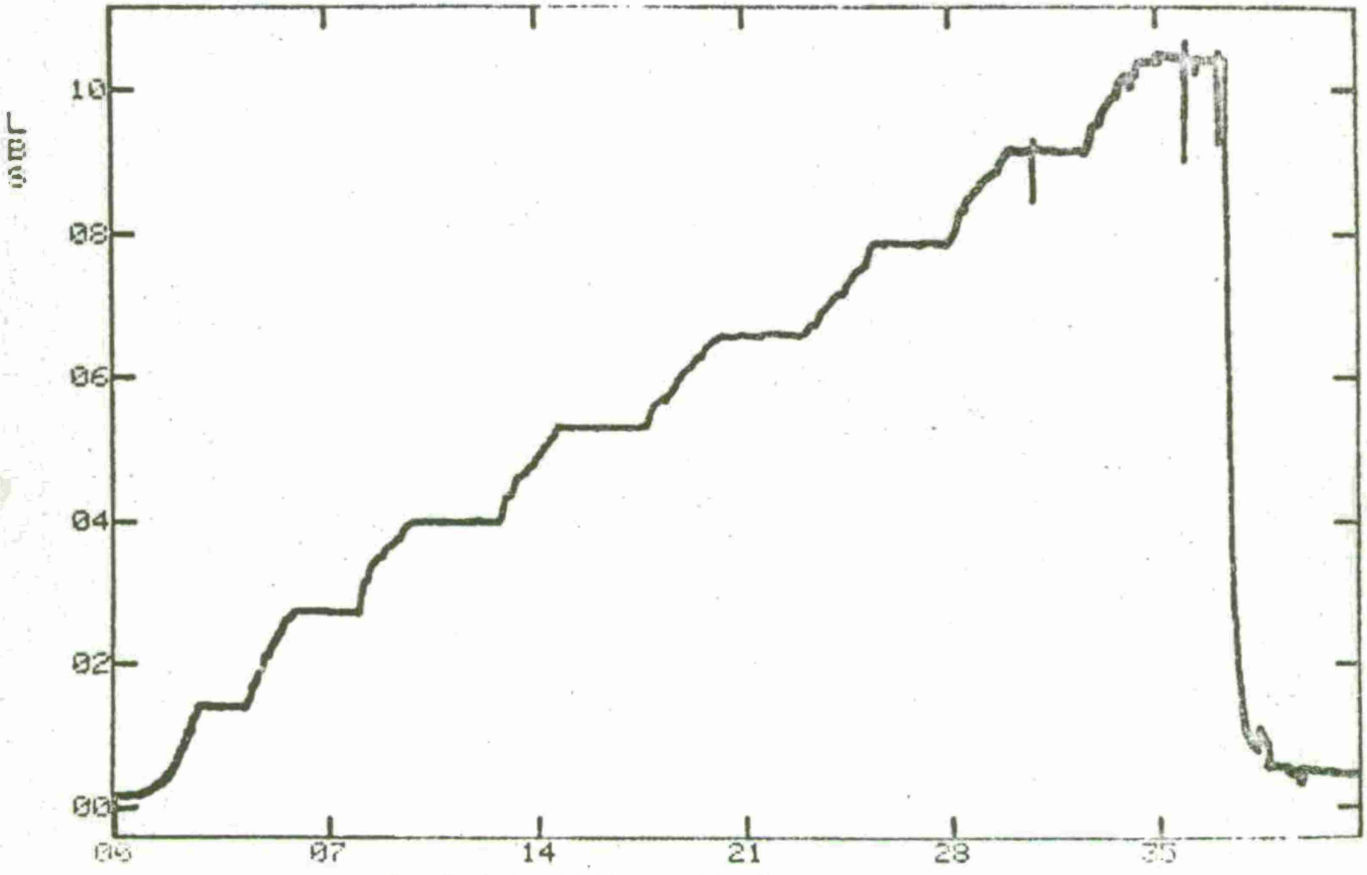
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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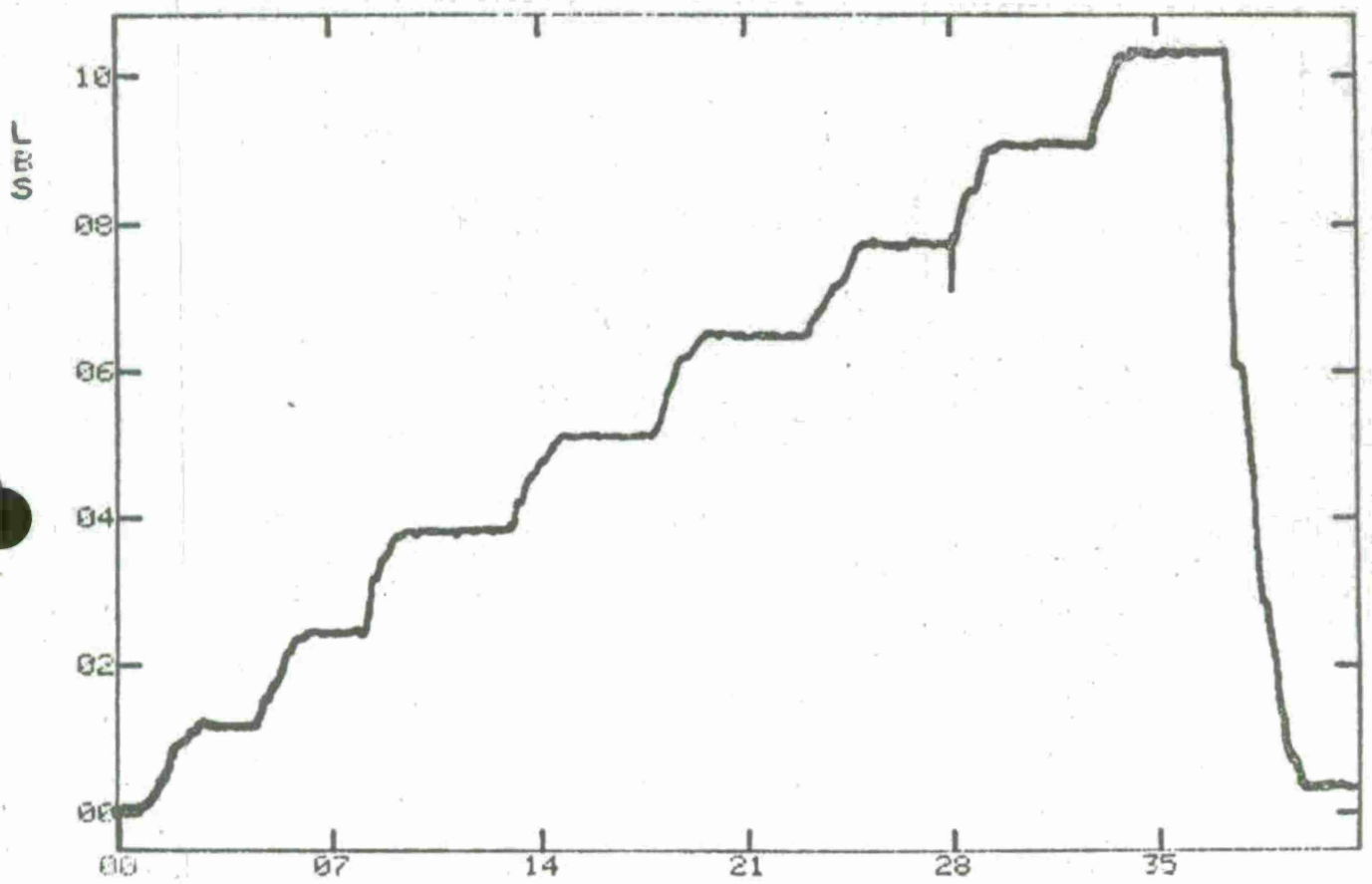
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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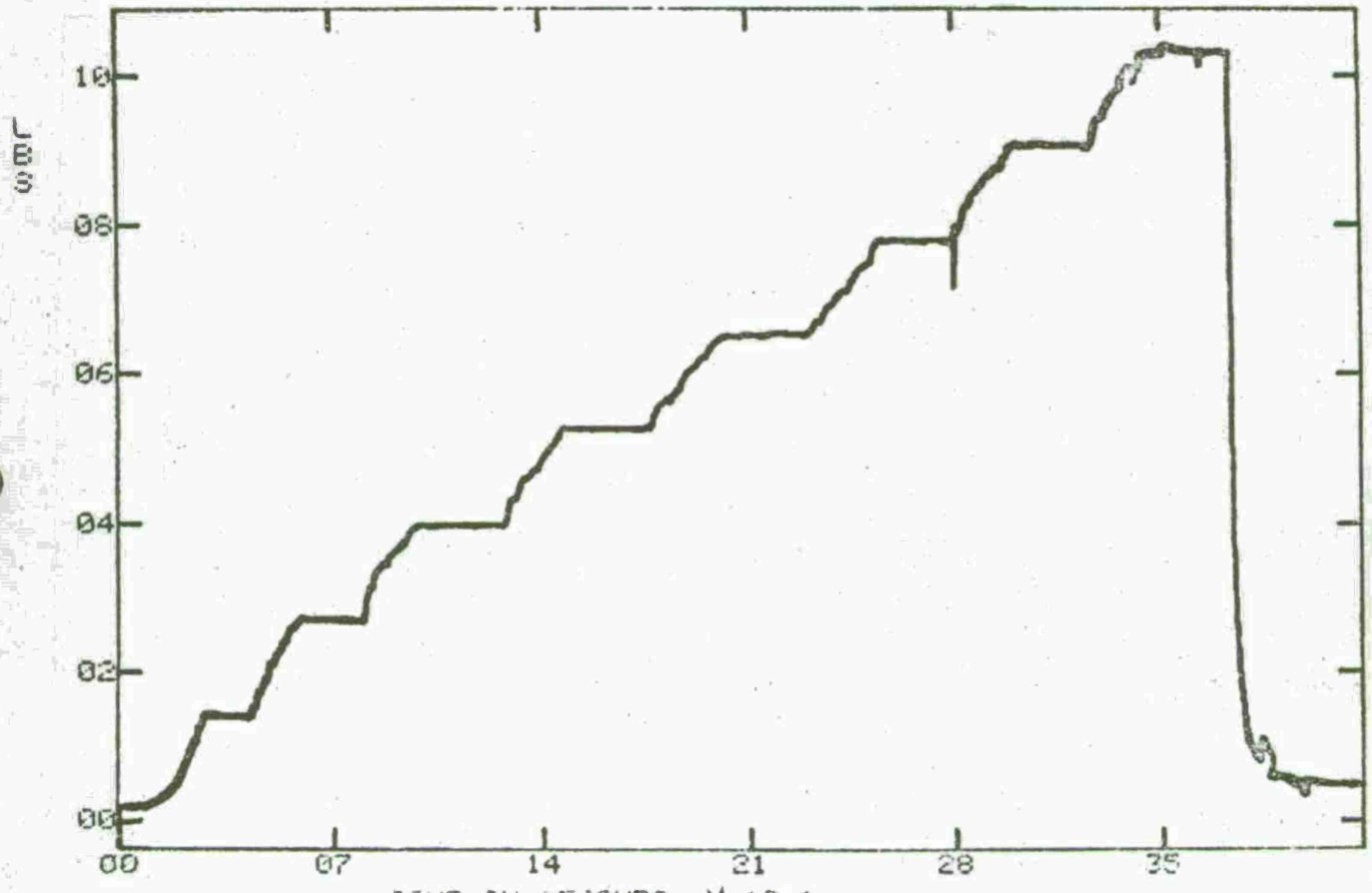
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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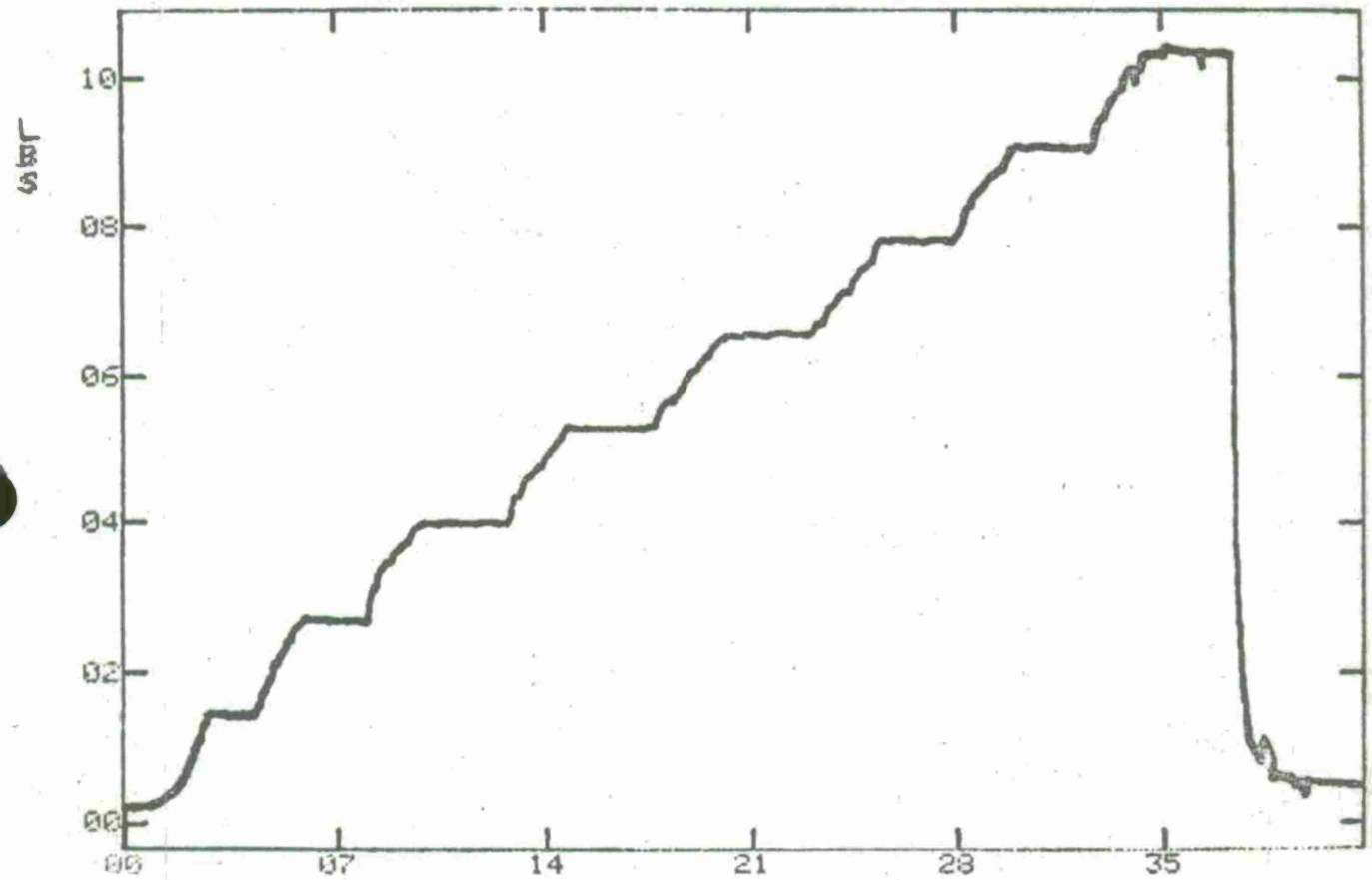
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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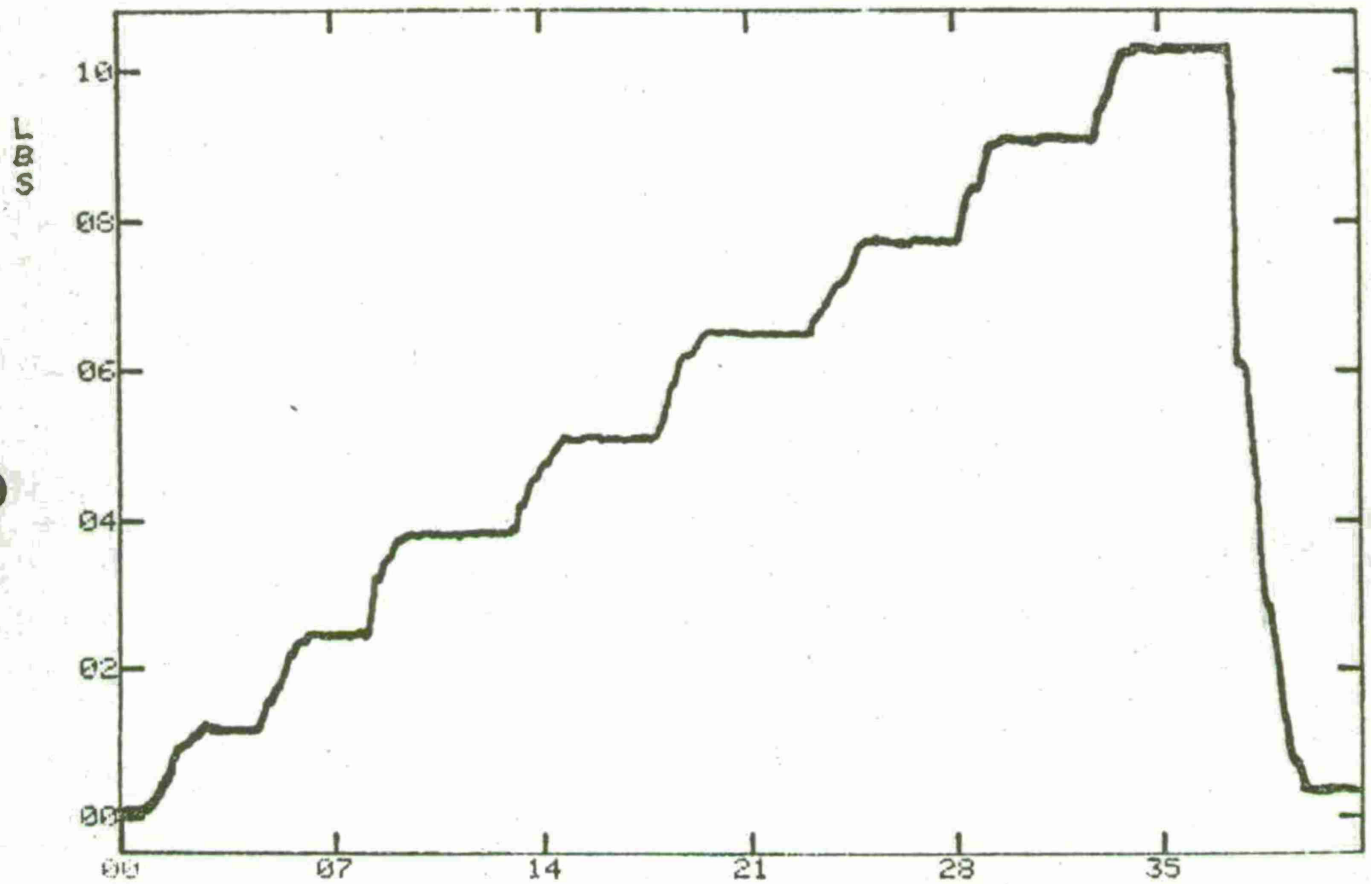
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS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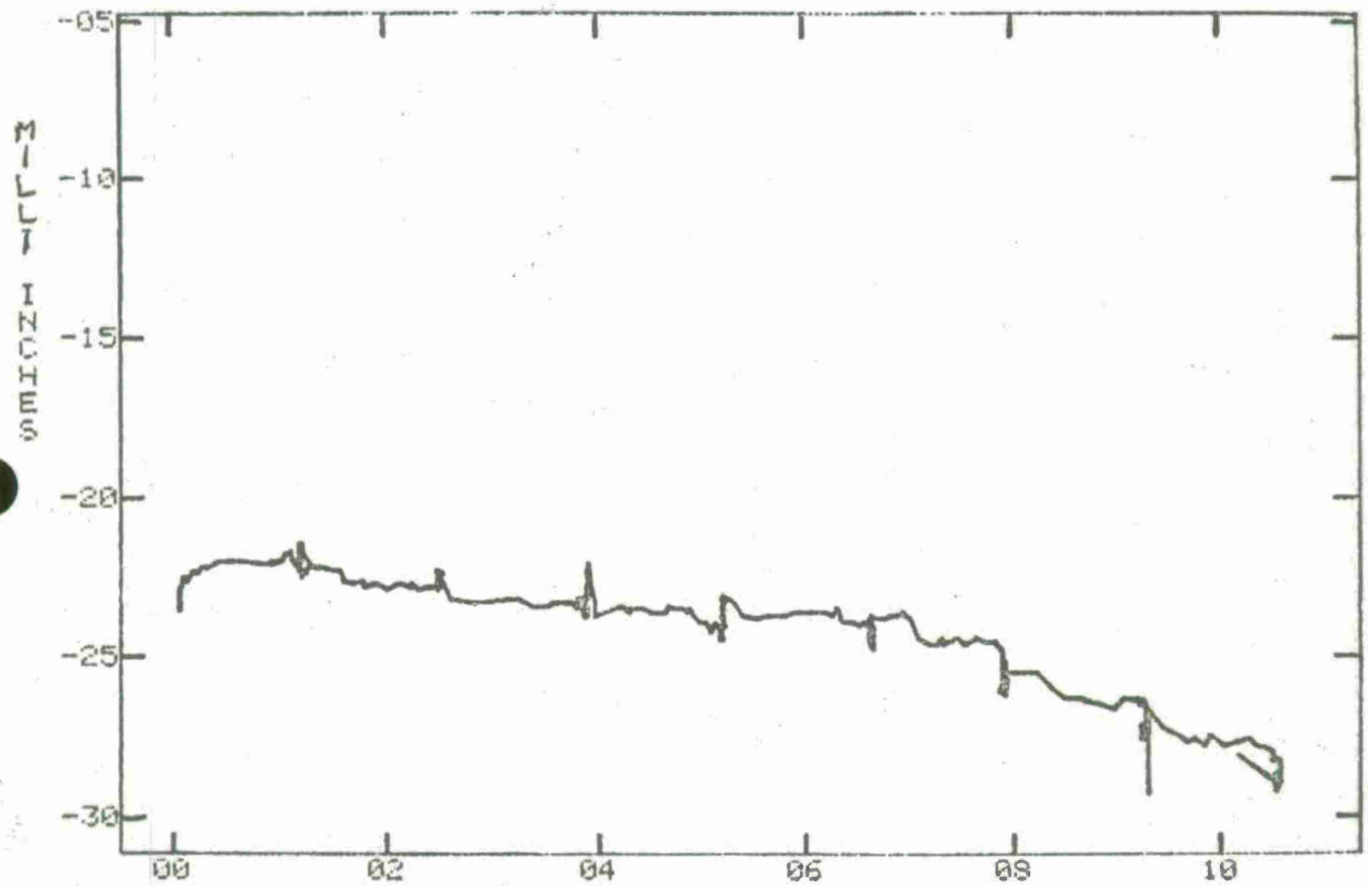
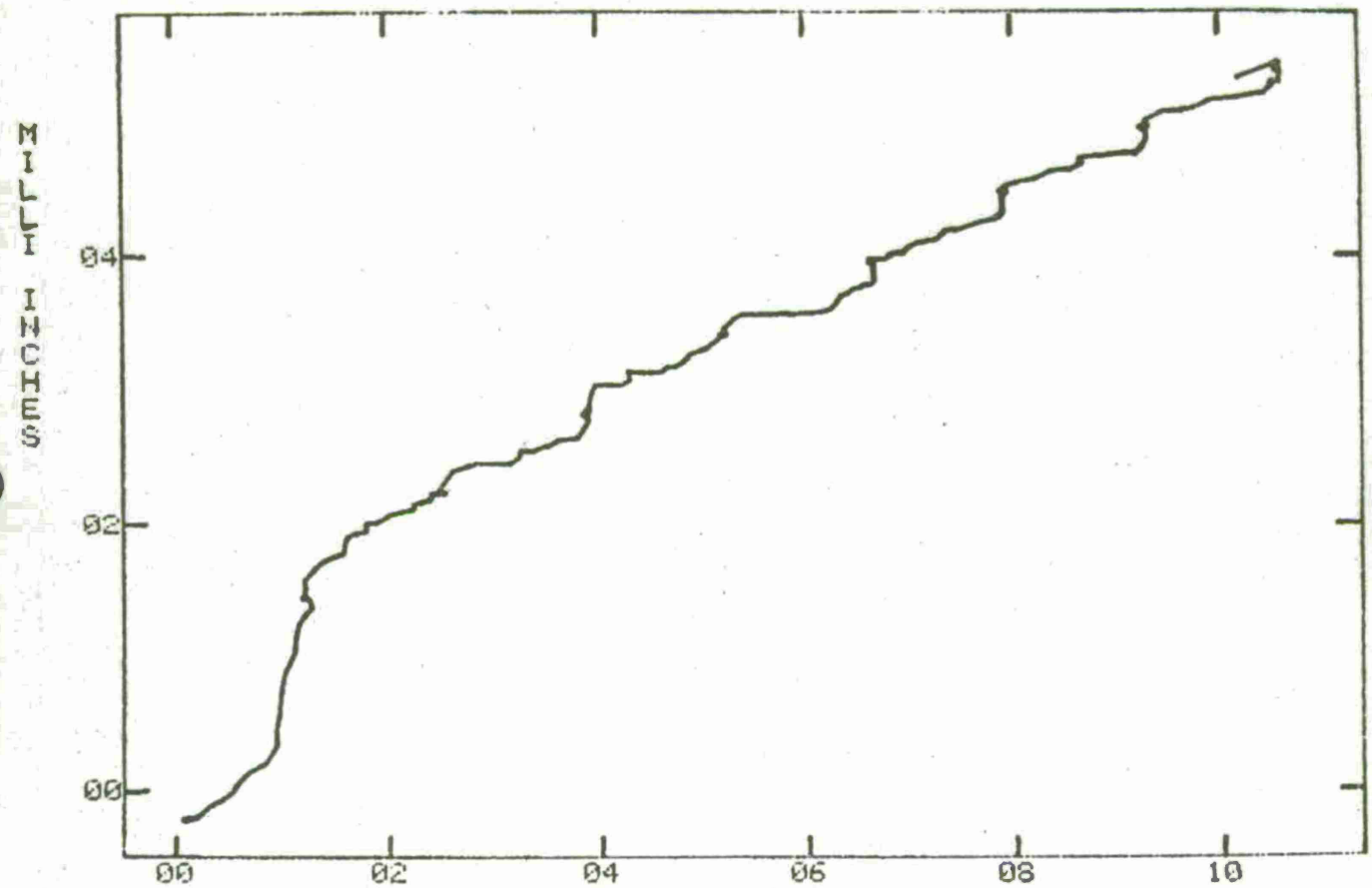
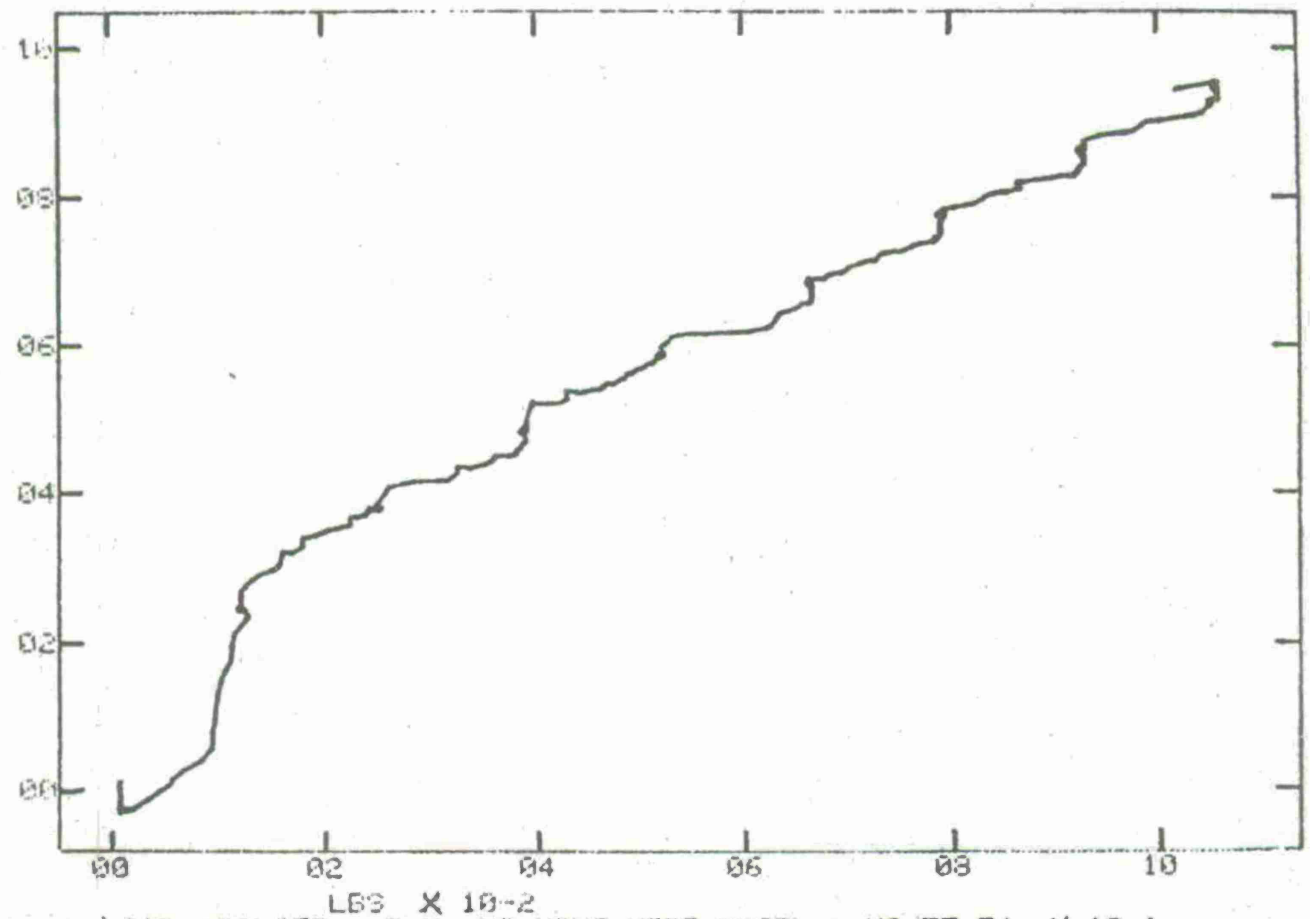
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 26 (23JUL75) AH1G BEND TESTS



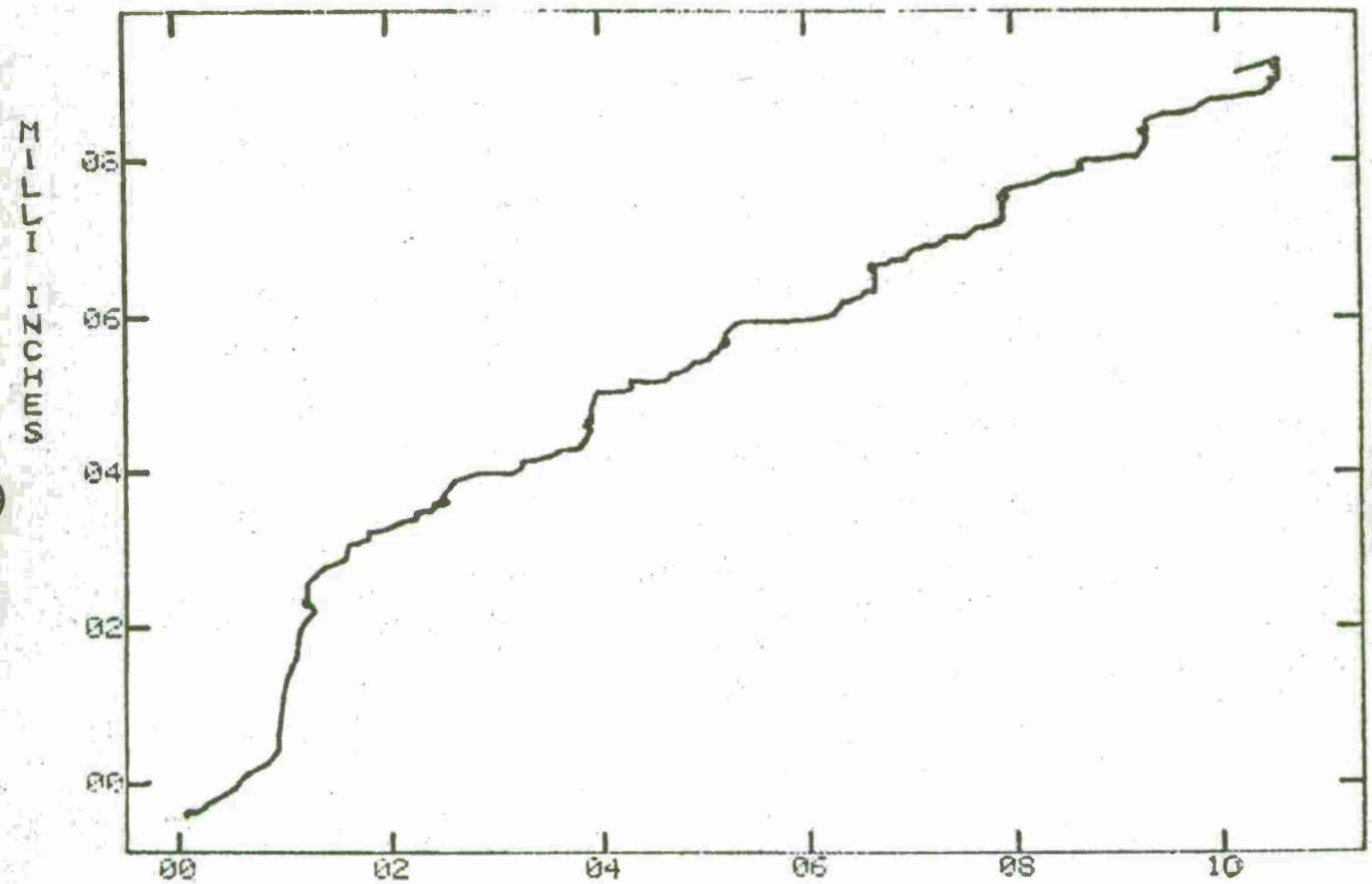
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 21.38 X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



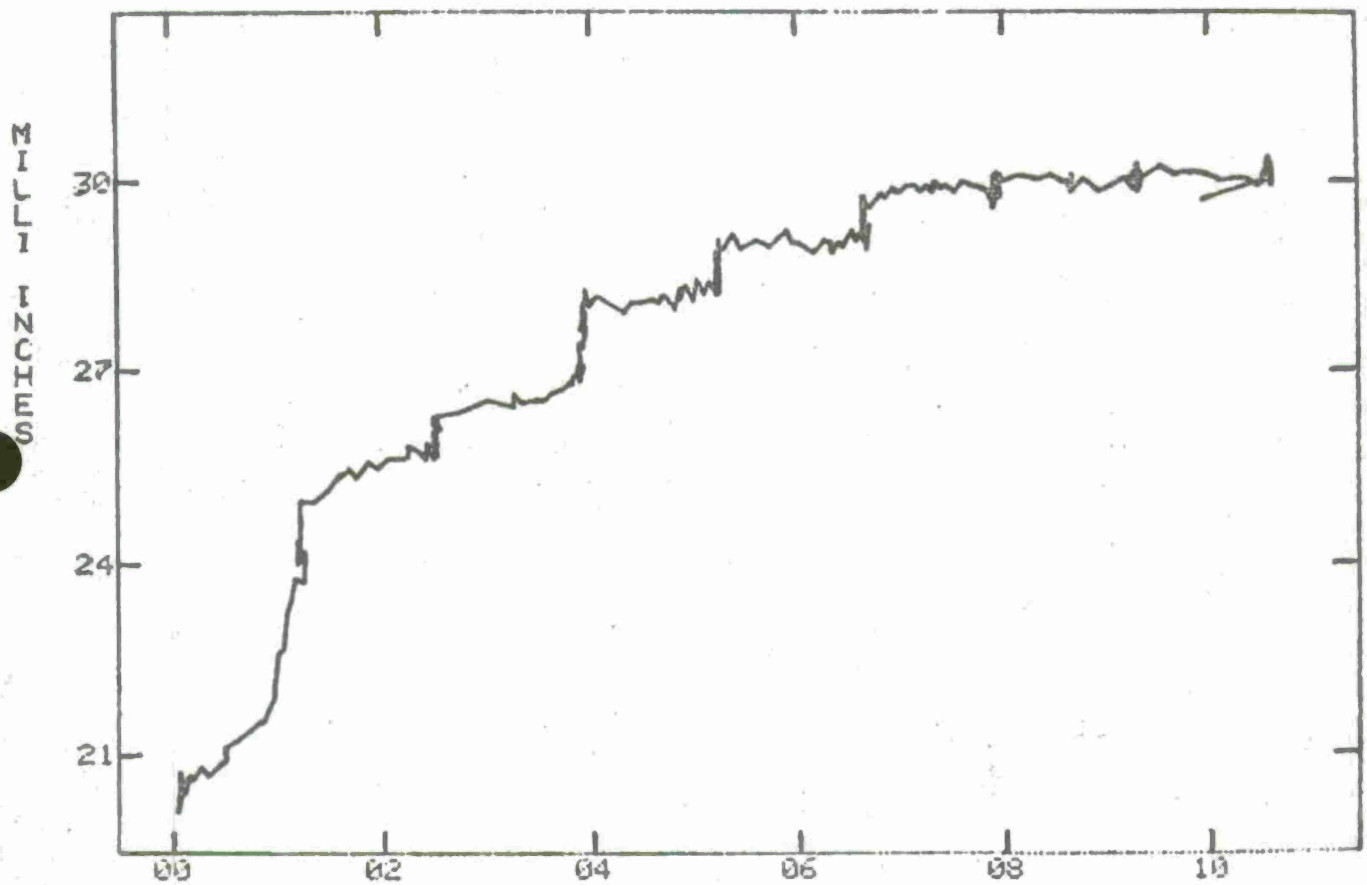
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 42.50 X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



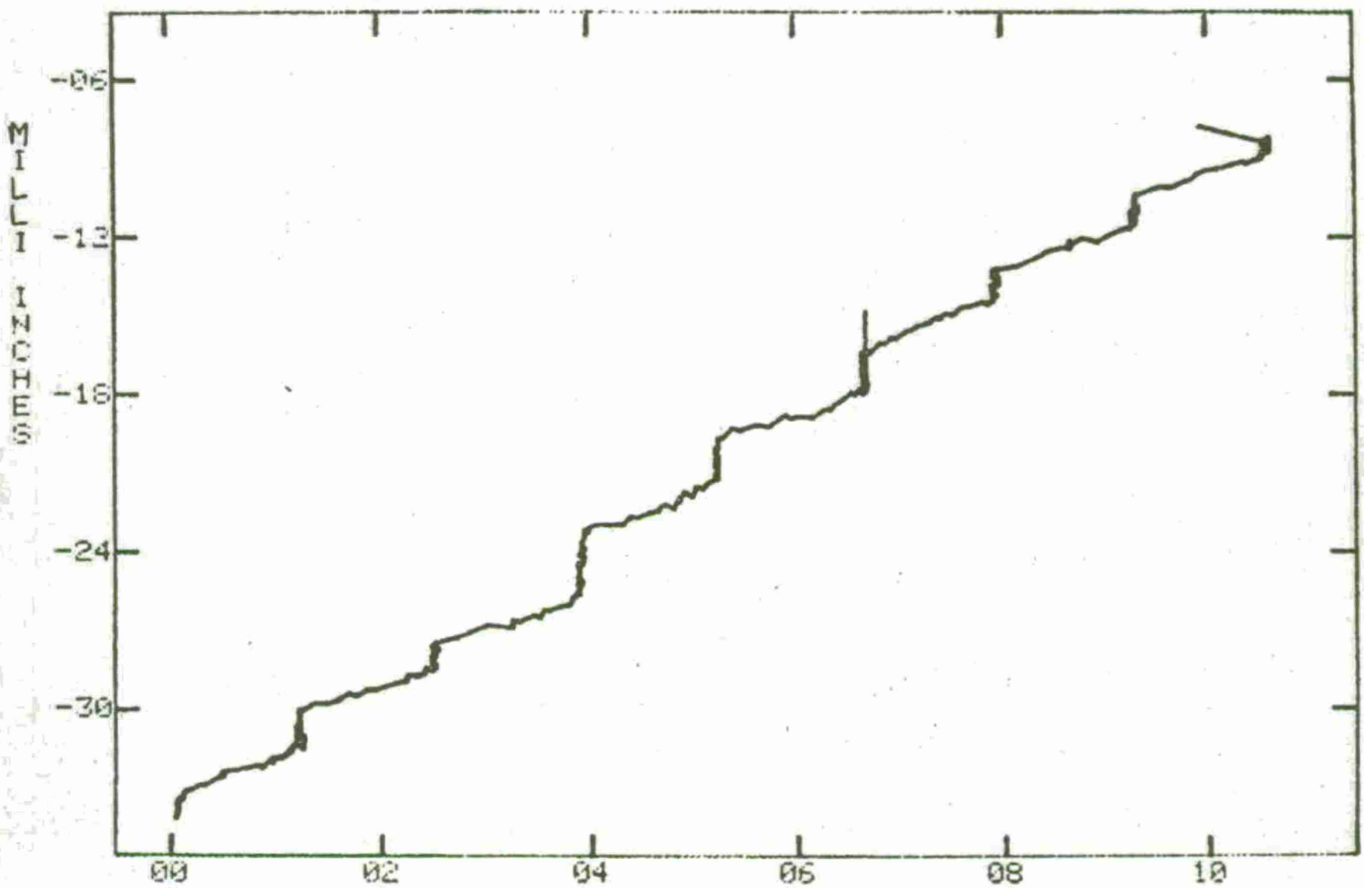
LOAD APPLIED - R.H. WS WING VERT DISPL - WS 57.74 X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



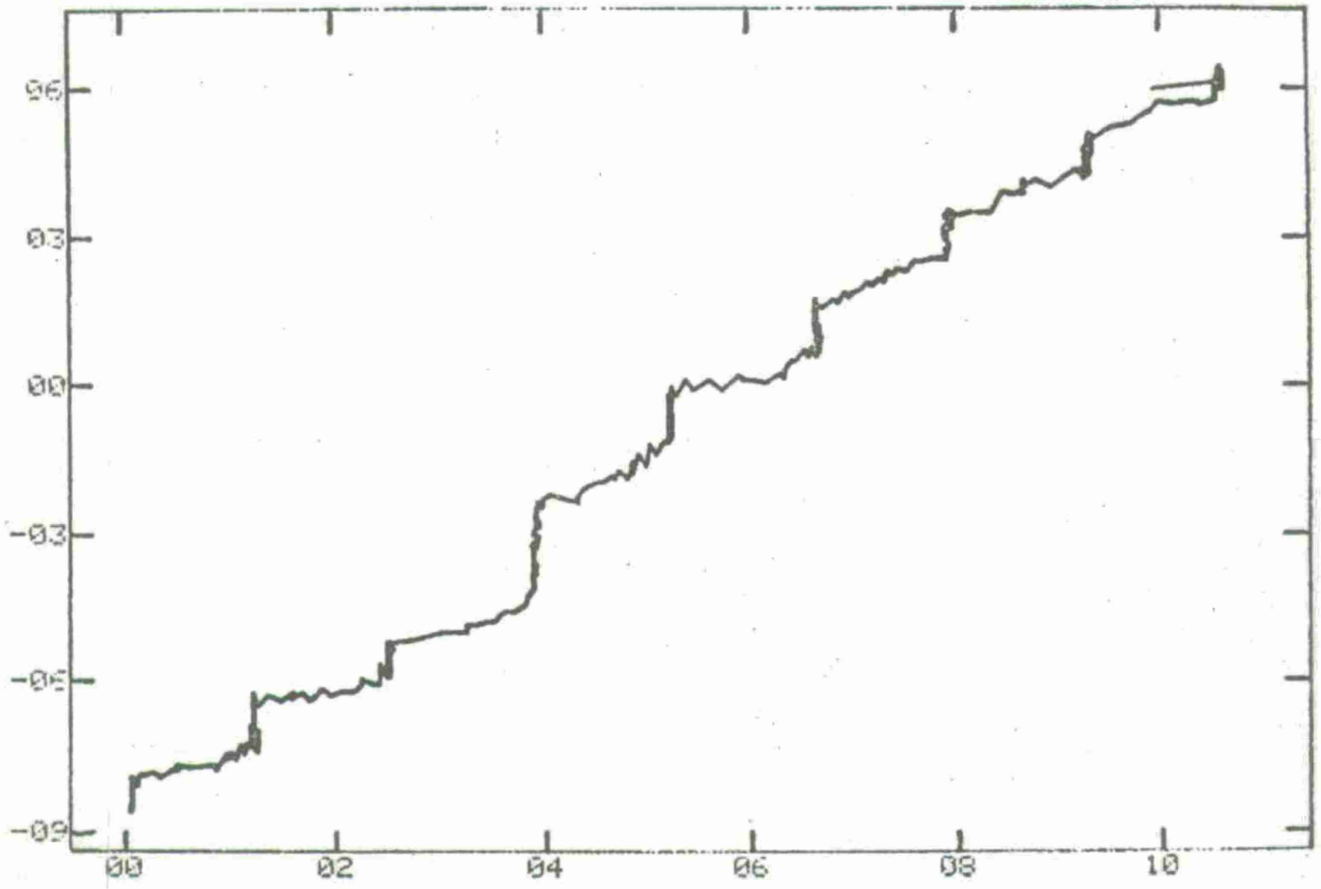
LOAD APPLIED - R.H. US WING VERT DISPL - WS 59.00 X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



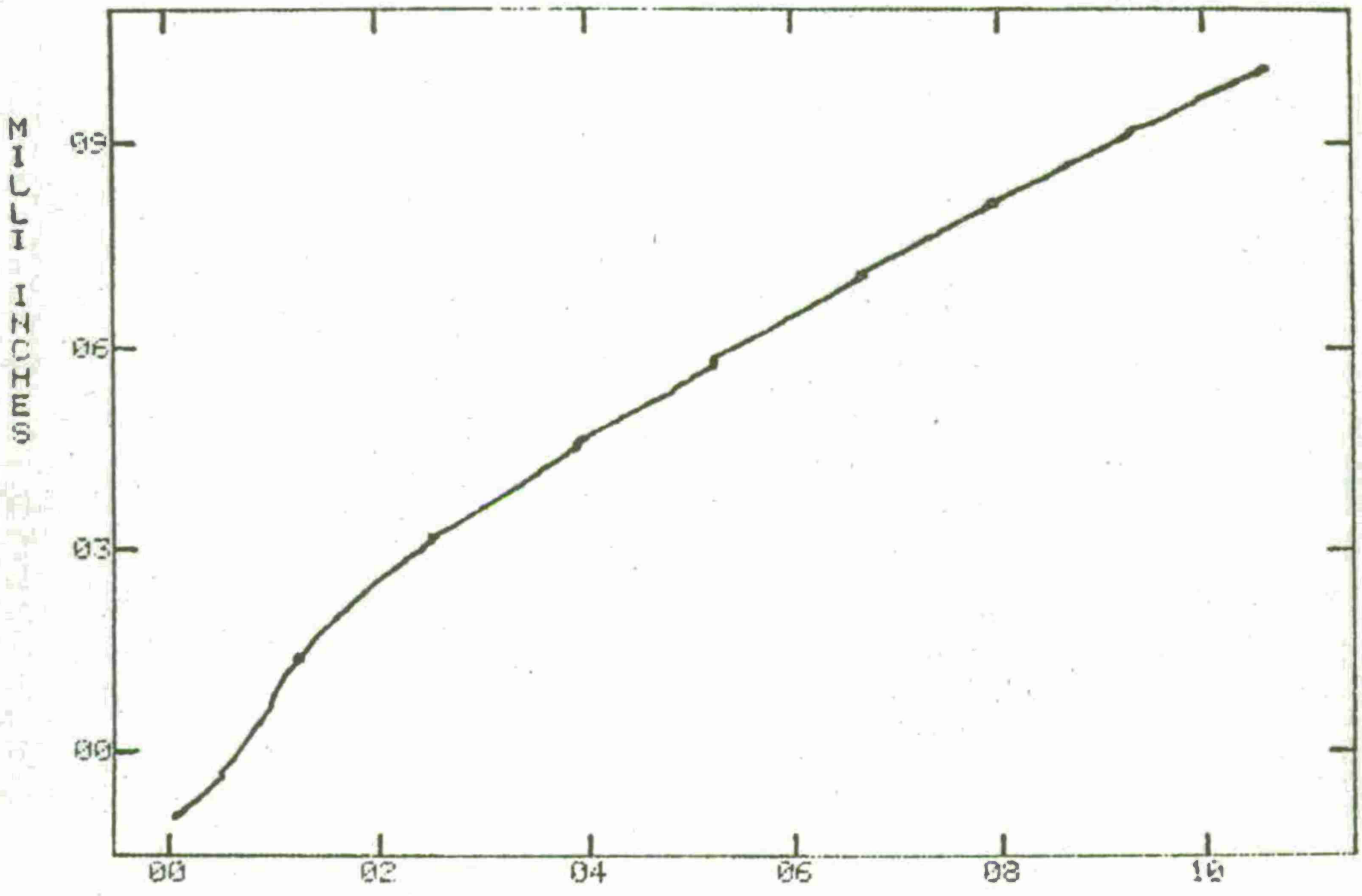
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 21.38 (CH5) X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



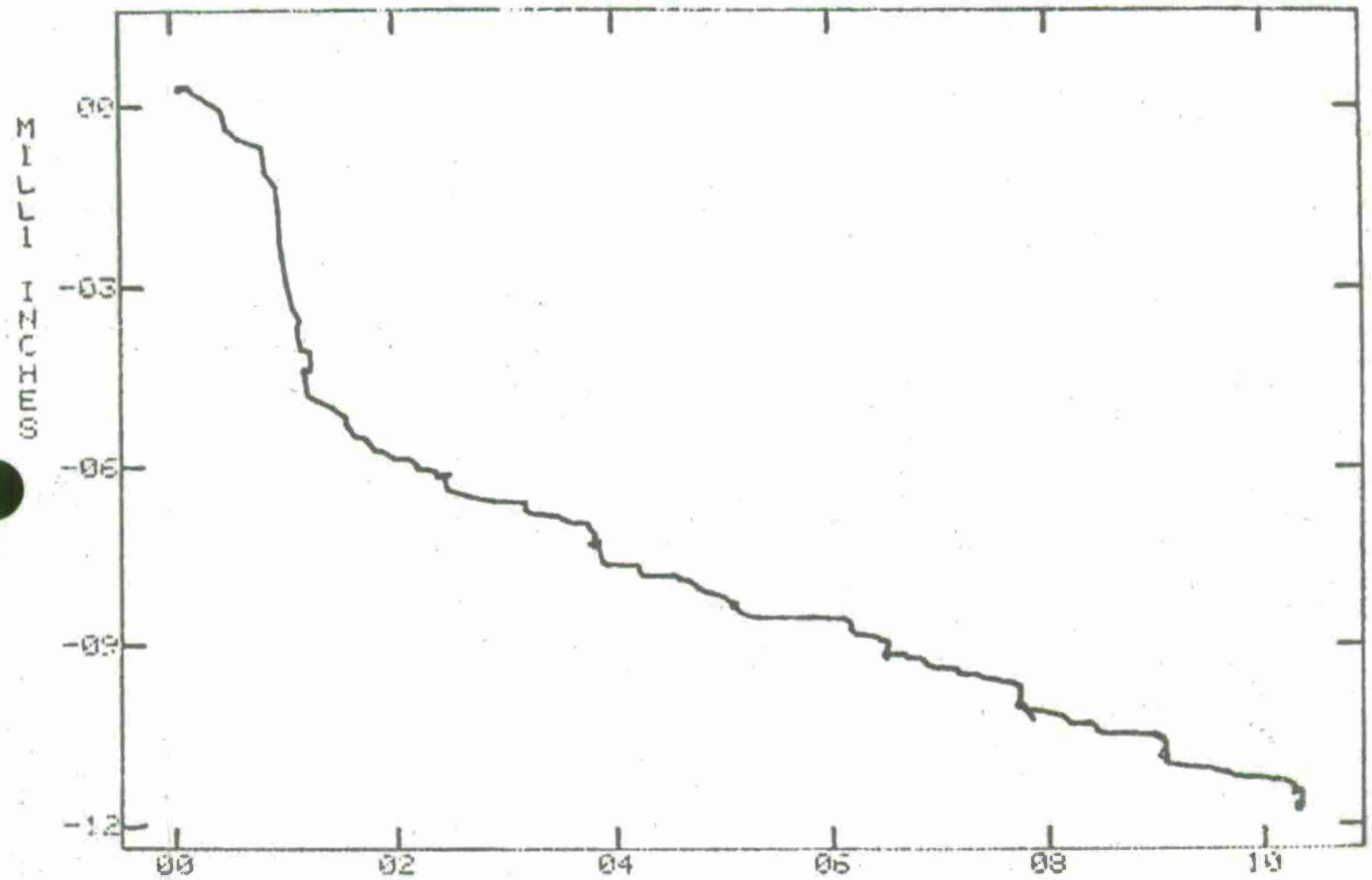
LOAD APPLIED - R.H. VS CENTER SPAR DISPL - L.H. X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



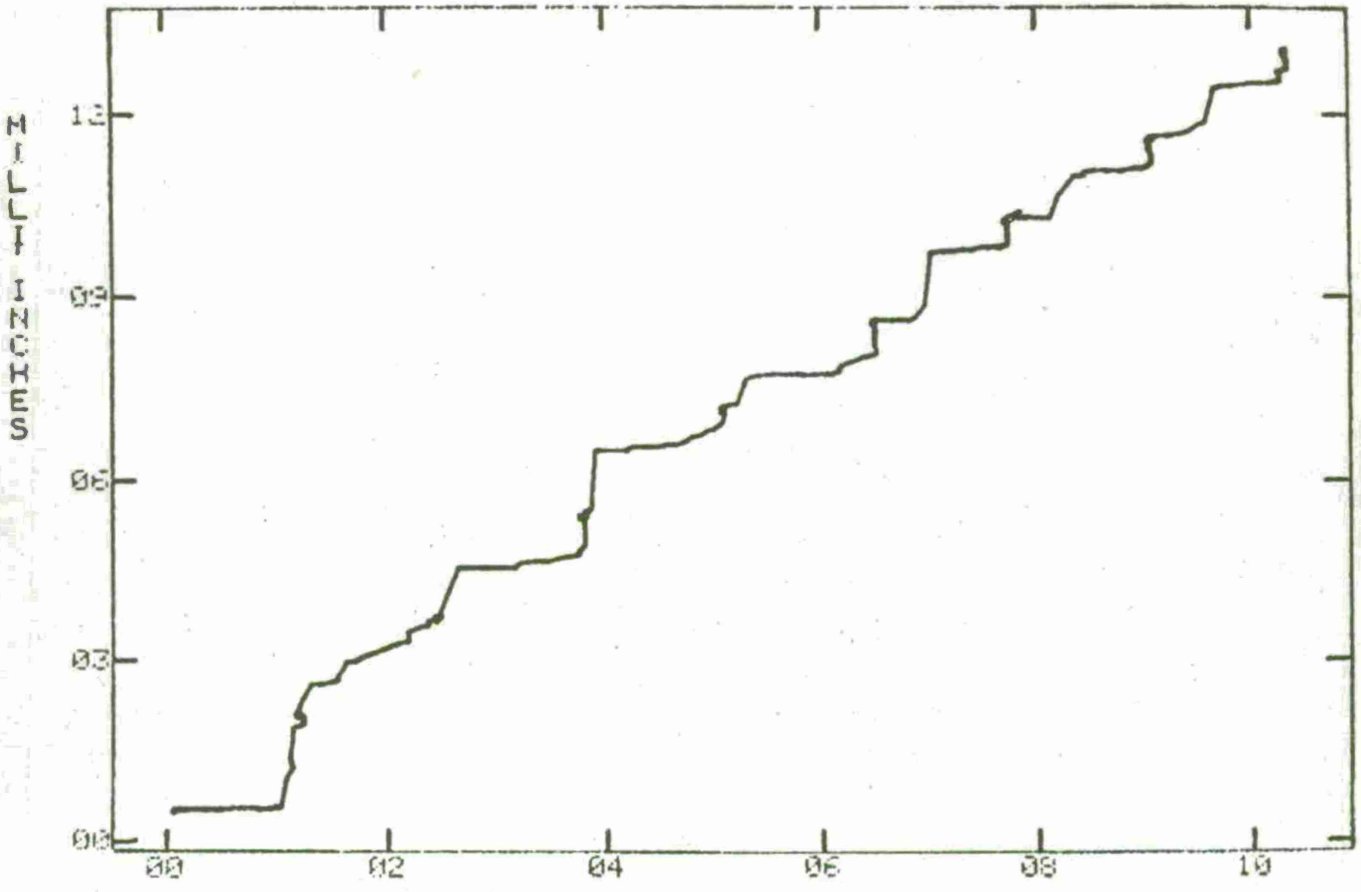
LOAD APPLIED - R.H. VS CENTER SPAR DISPL - R.H. X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



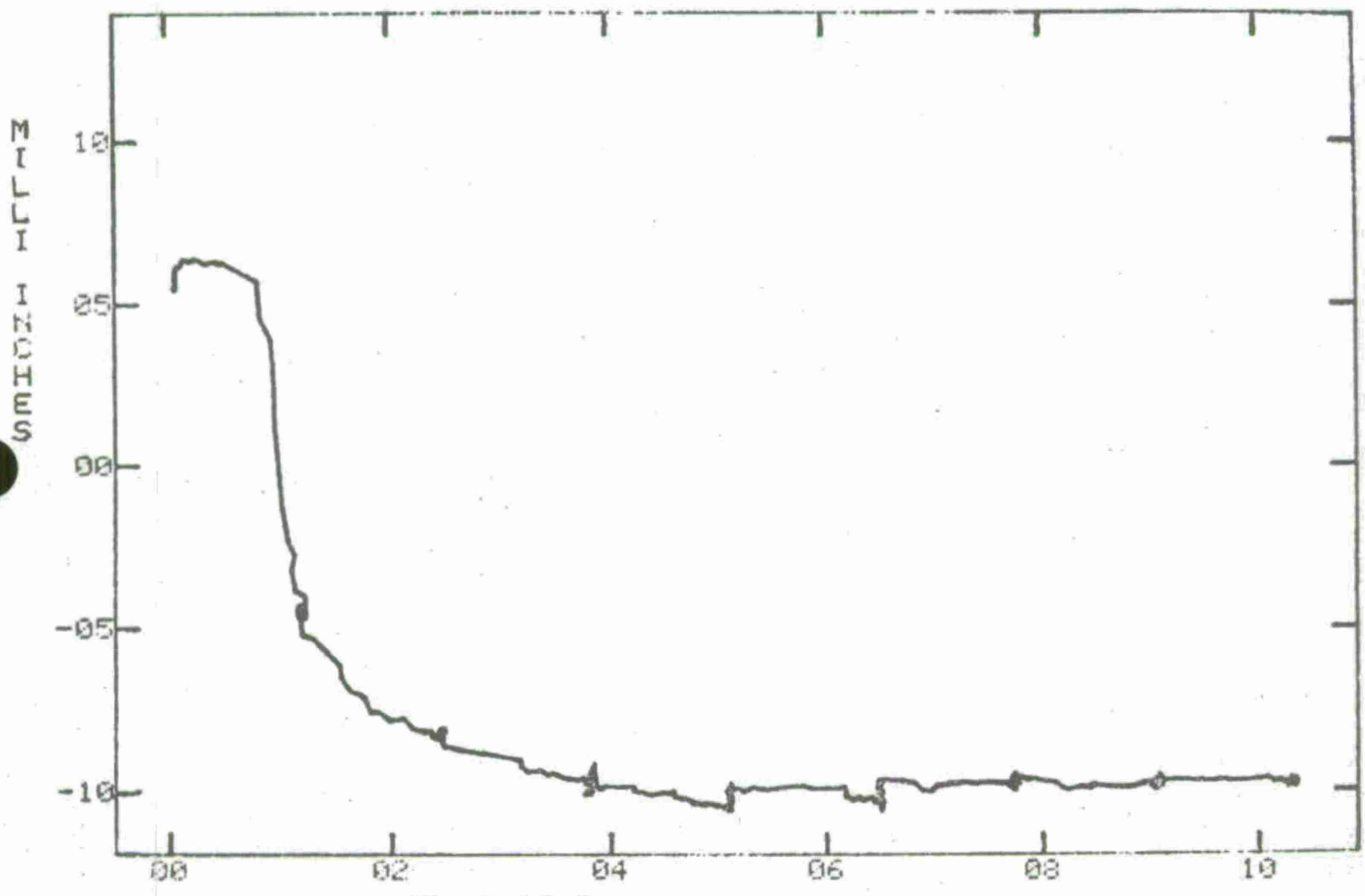
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 60.00 X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



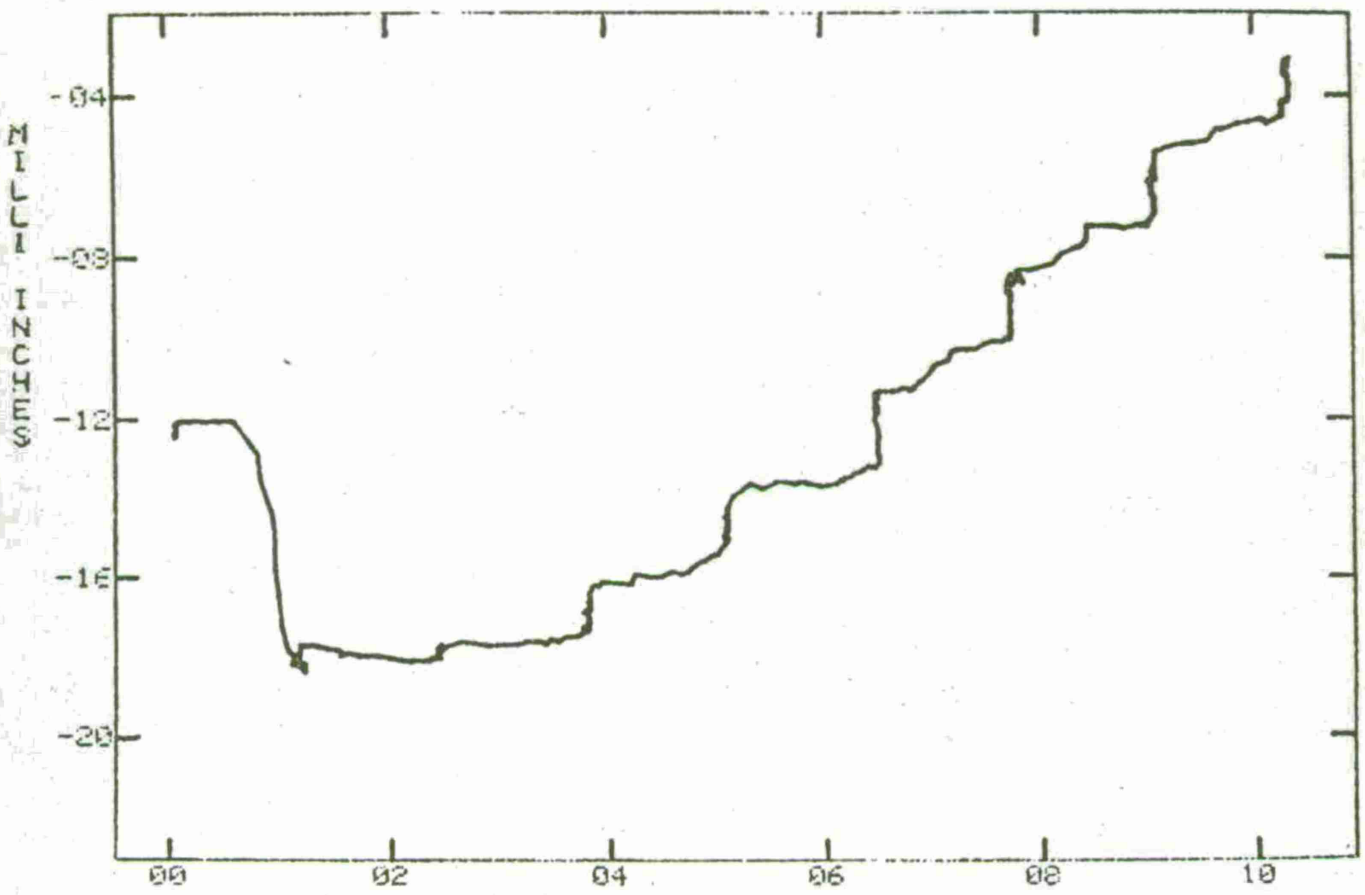
LOAD APPLIED - R H. VS WING SLOPE DISPL - BOTTOM X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



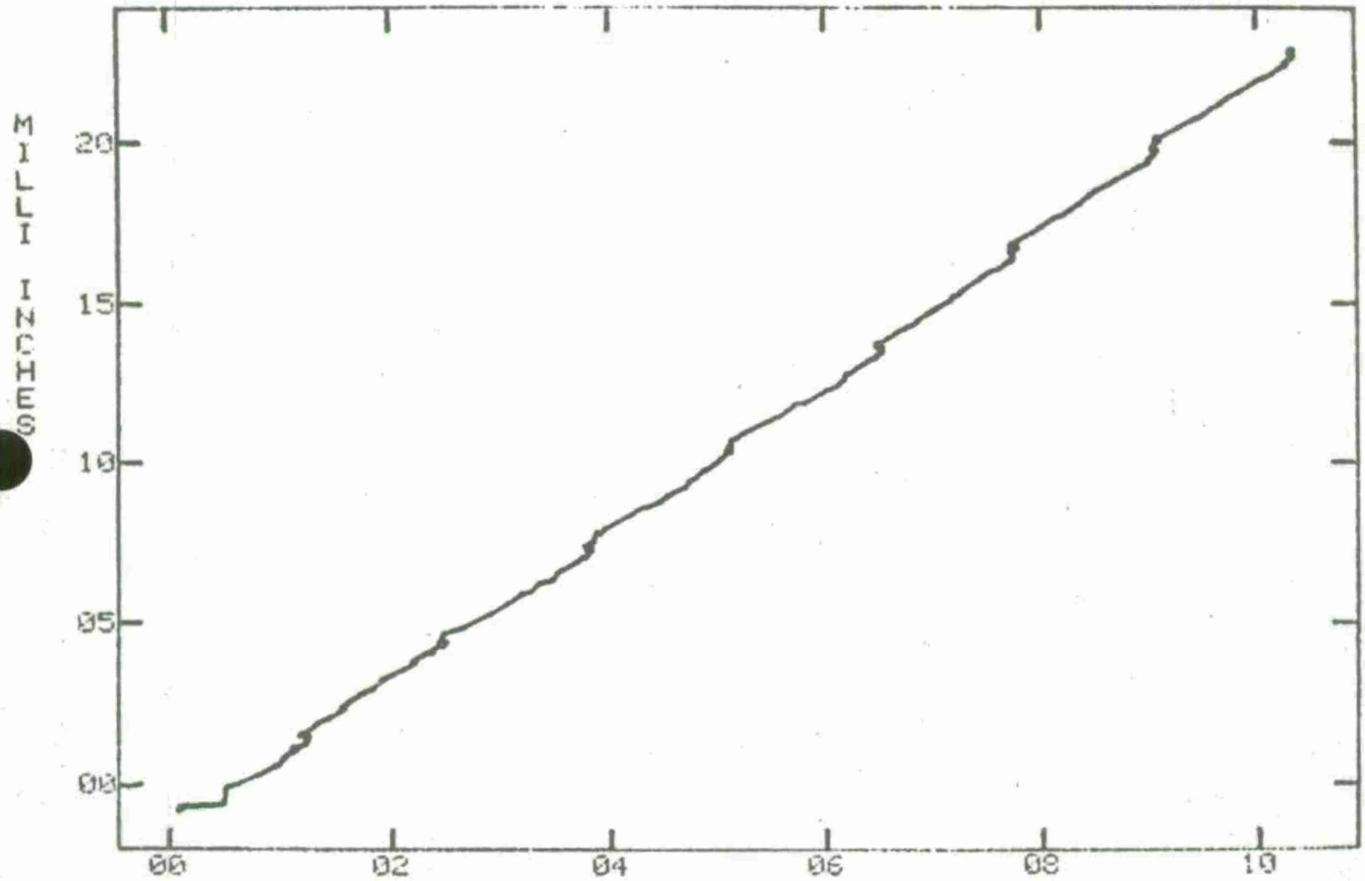
LOAD APPLIED - R.H VS WING SLOPE DISPL - TOP X 10+0
TEST 26 (23JUL75) AH1G BEND TESTS



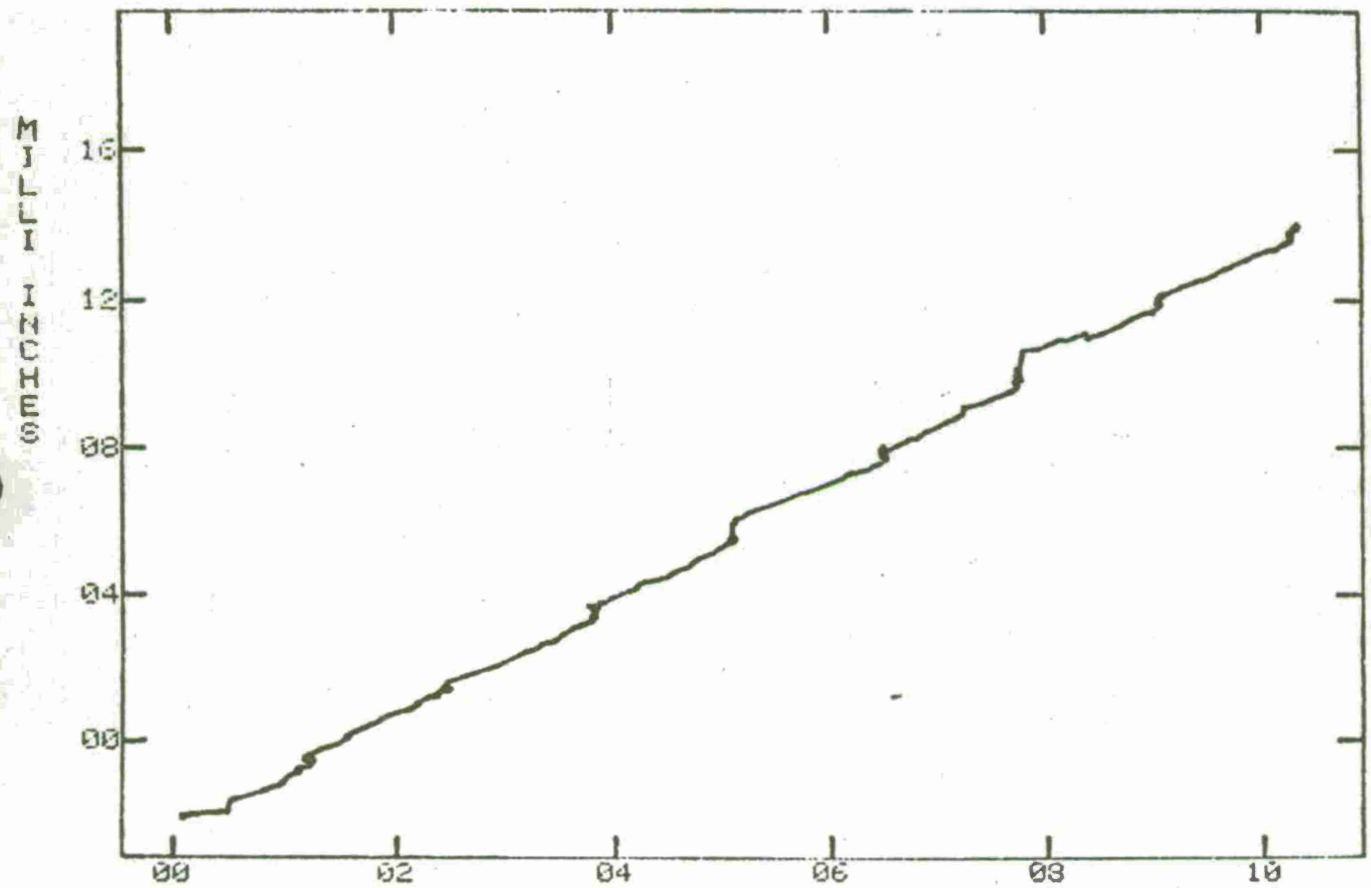
LOAD APPLIED - R.H. VS FUSLG SLOPE DISPL - BOTTOM X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



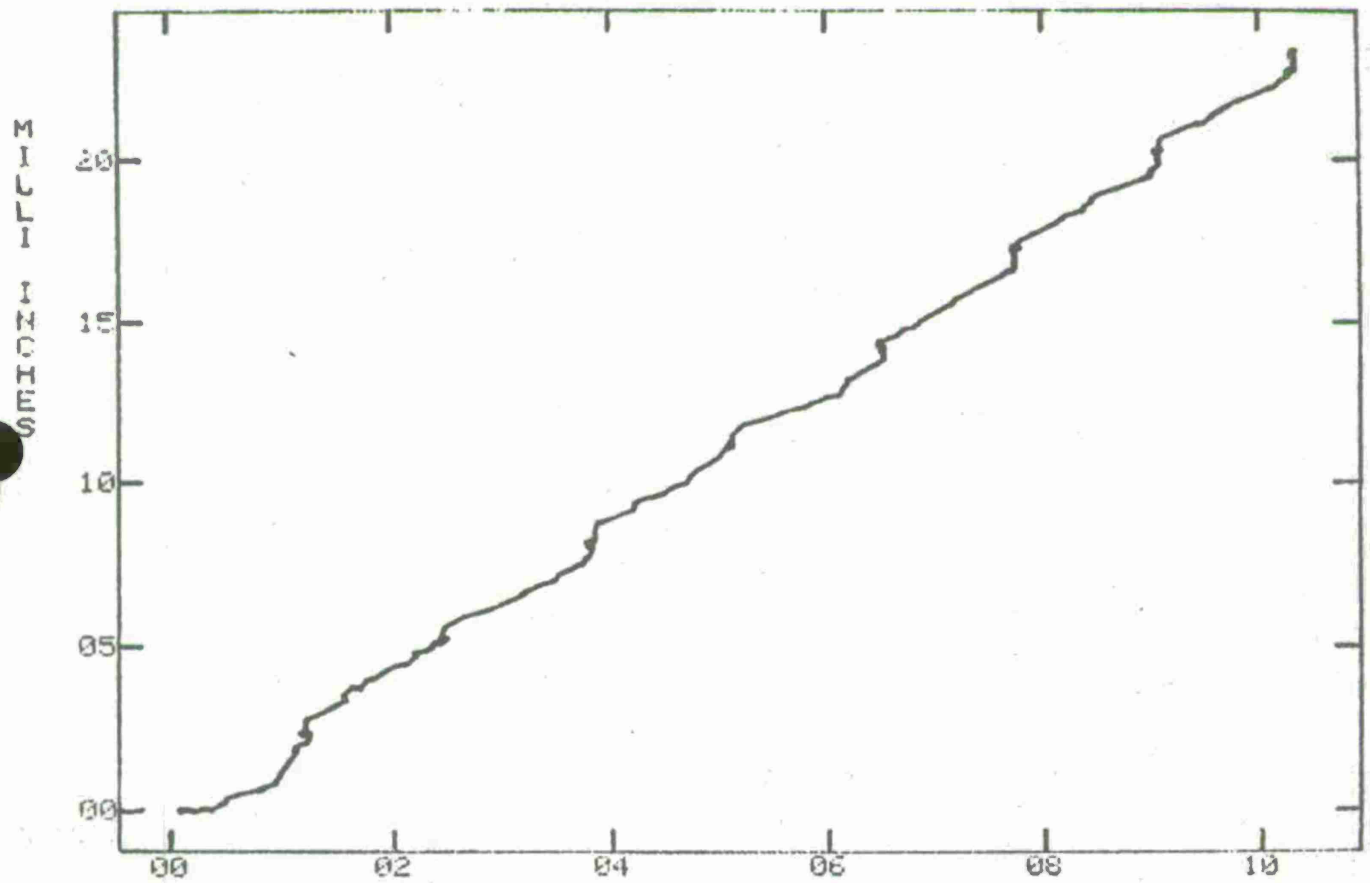
LOAD APPLIED - R.H. VS FUSLG SLOPE DISPL - TOP X 10+1
TEST 26 (23JUL75) AH1G BEND TESTS



LOAD APPLIED - R.H. VS FXTR / GROUND DISPL - R.H. TOP X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



LOAD APPLIED - R.H. VS EXTR / GROUND DISPL - R.H. BOTTOM X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS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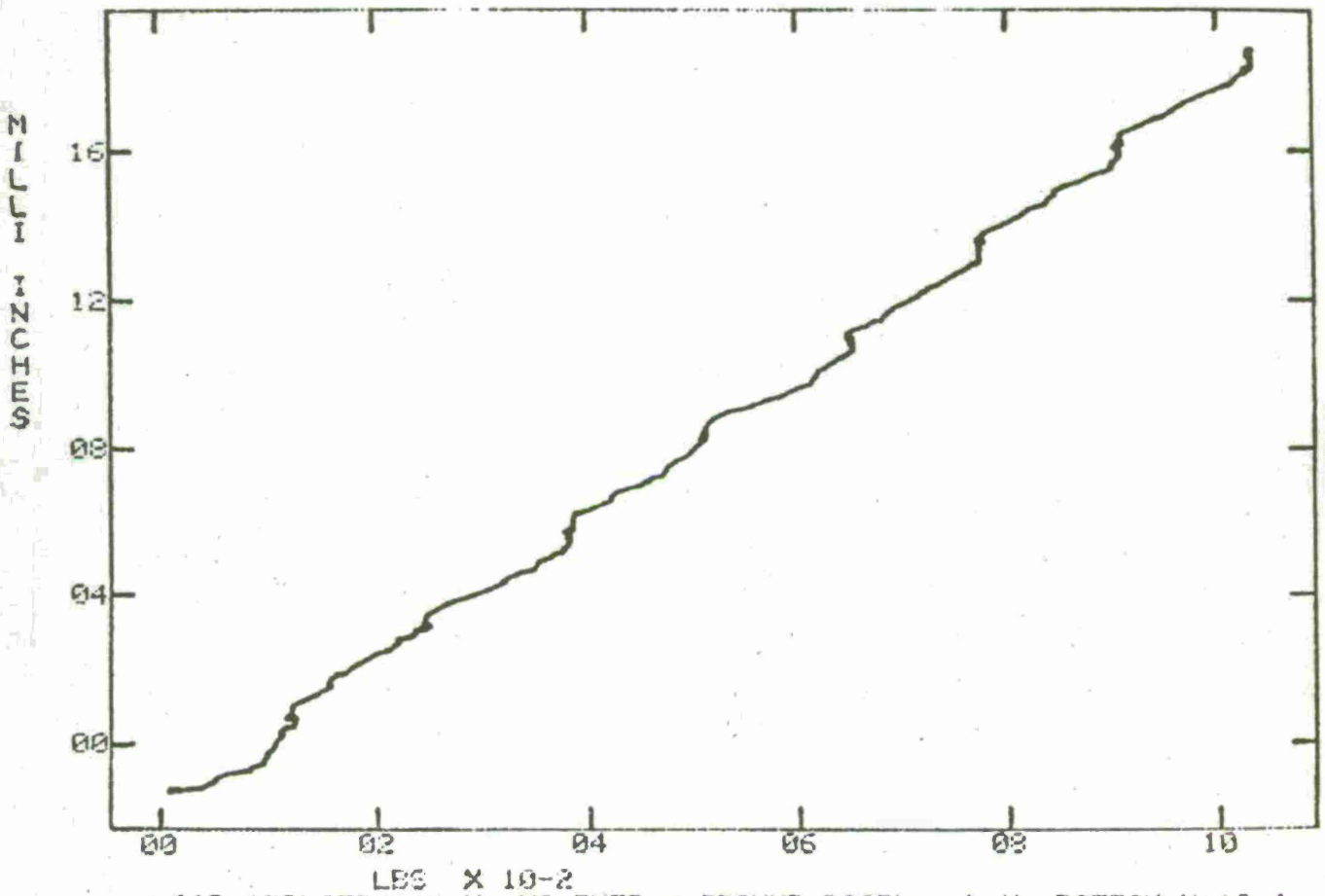
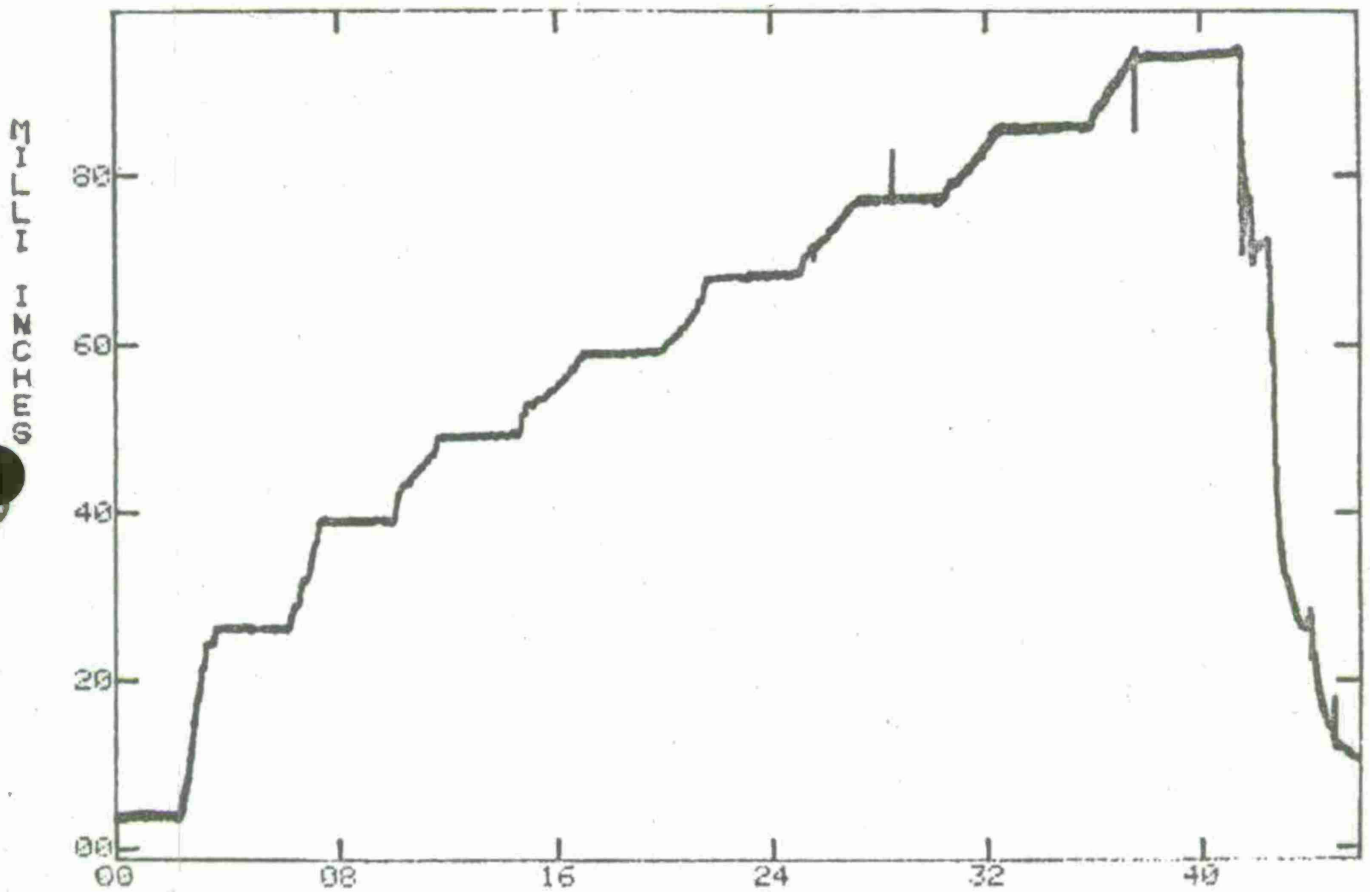
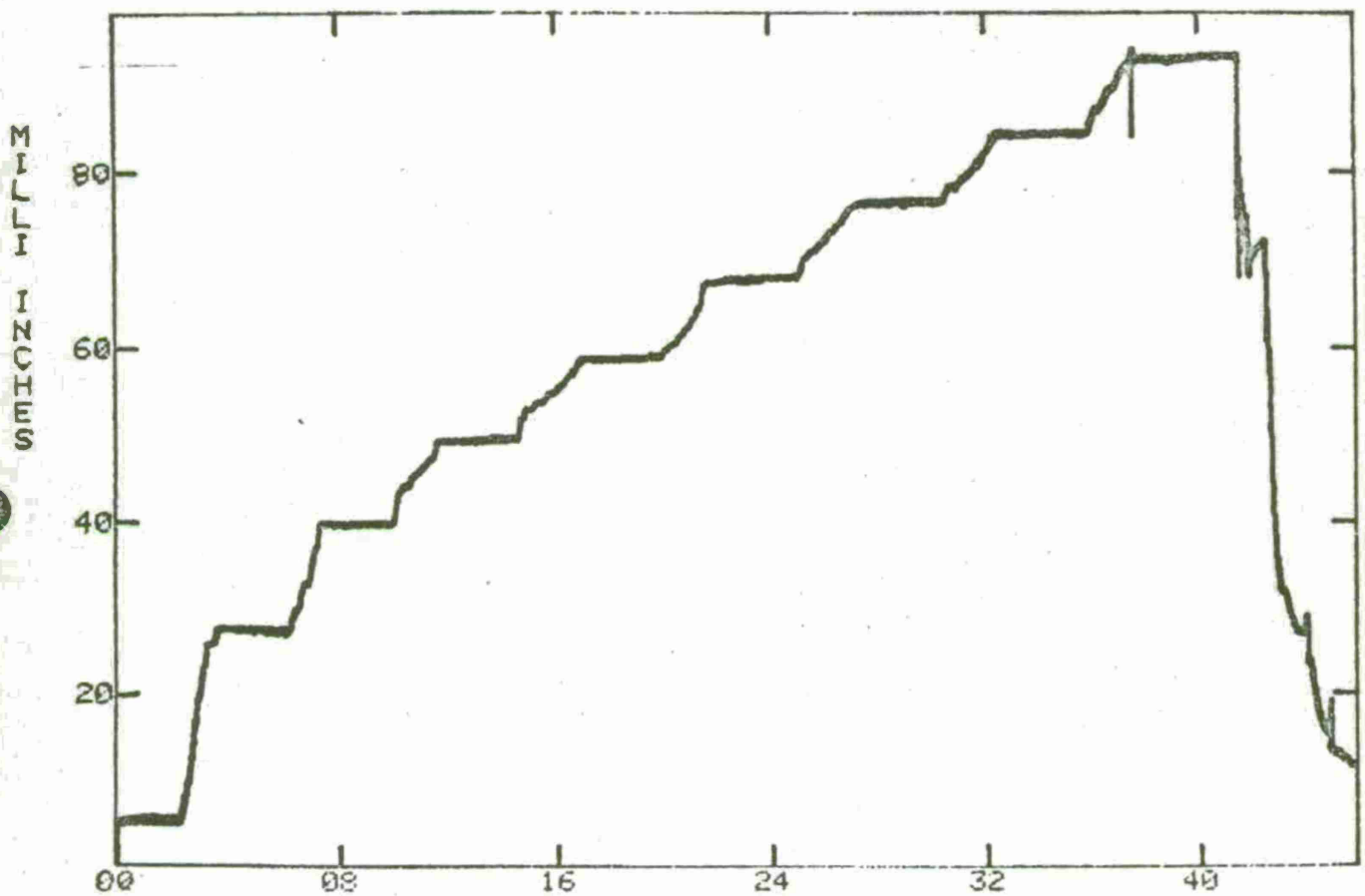
LOAD APPLIED - R.H. VS EXTR / GROUND DISPL - L.H TOP X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



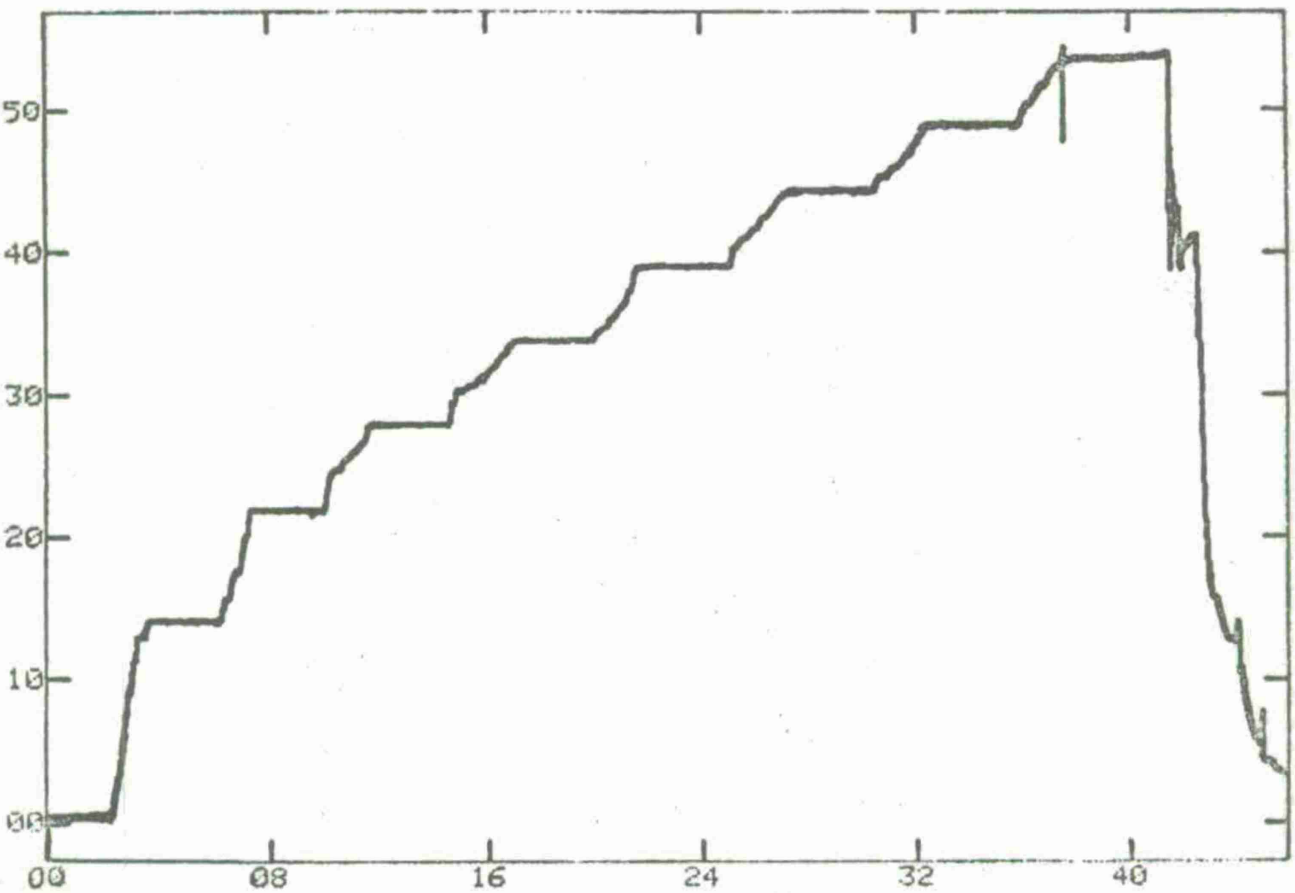
LOAD APPLIED - R.H. US FXTR / GROUND DISPL - L.H. BOTTOM X 10-1
TEST 26 (23JUL75) AH1G BEND TESTS



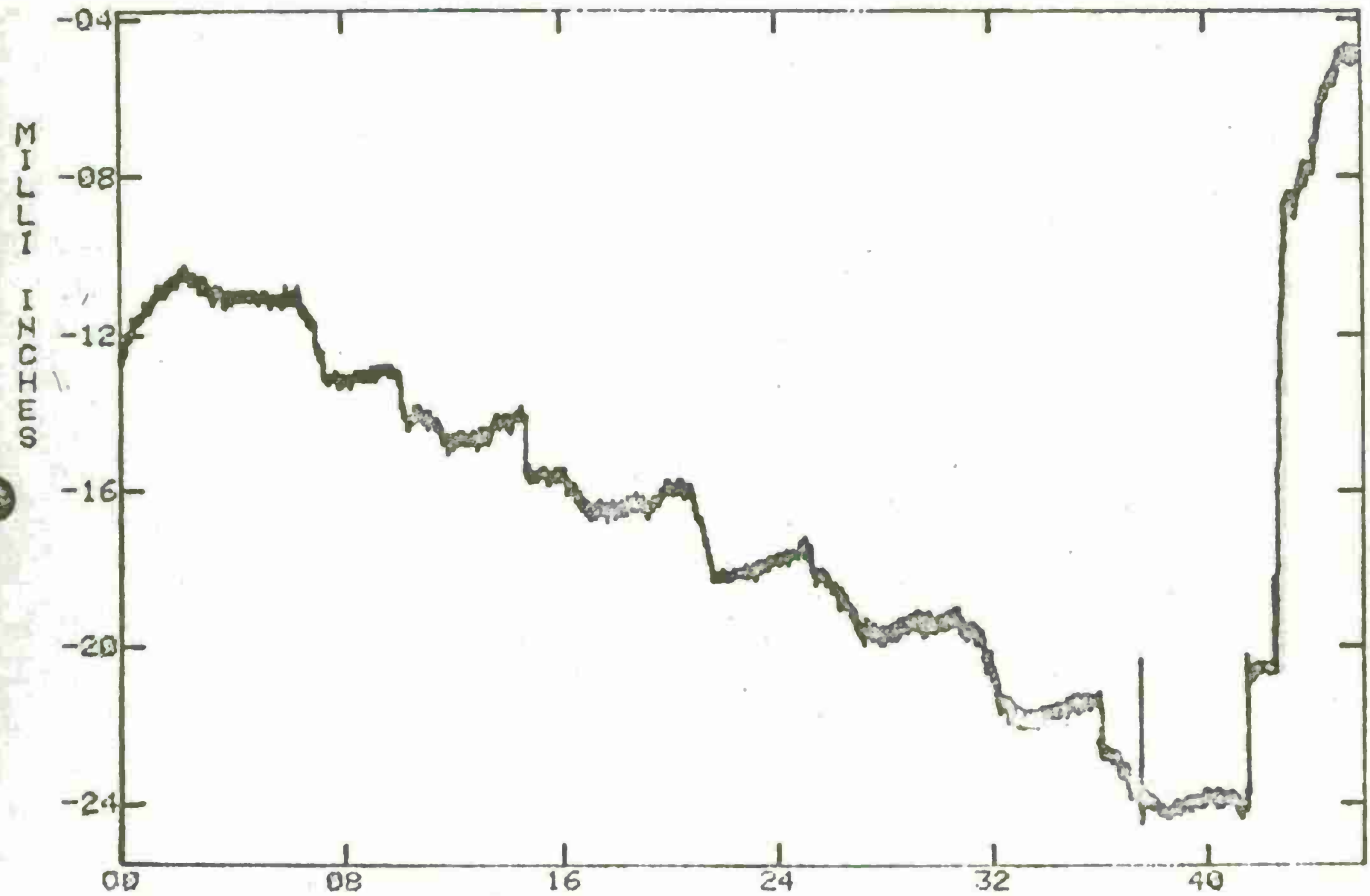
CH 1 WING VERT DISPLACEMENT - WS 57.74 X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



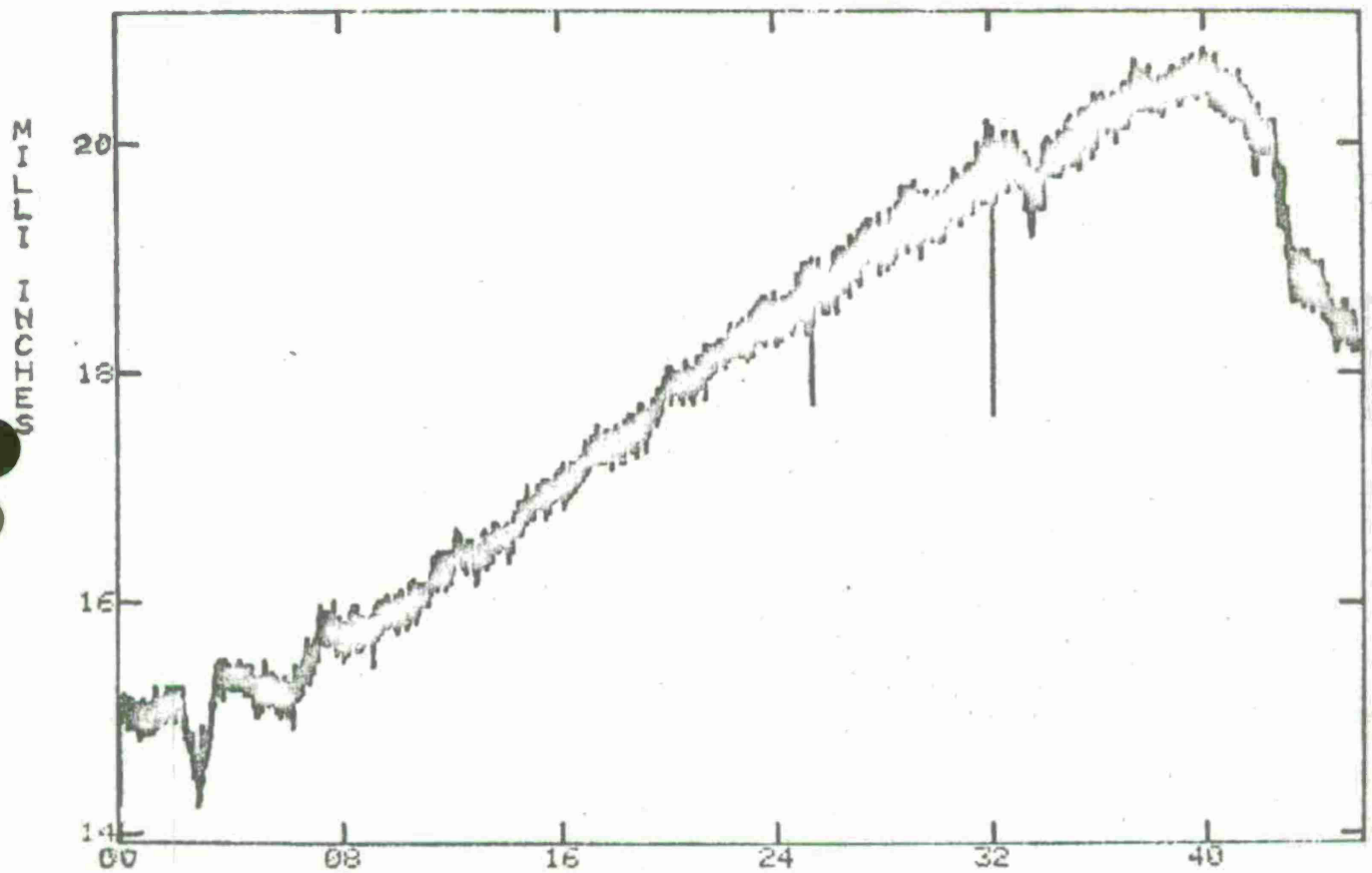
CH 2 WING VERT DISPLACEMENT - WS 59.00 X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



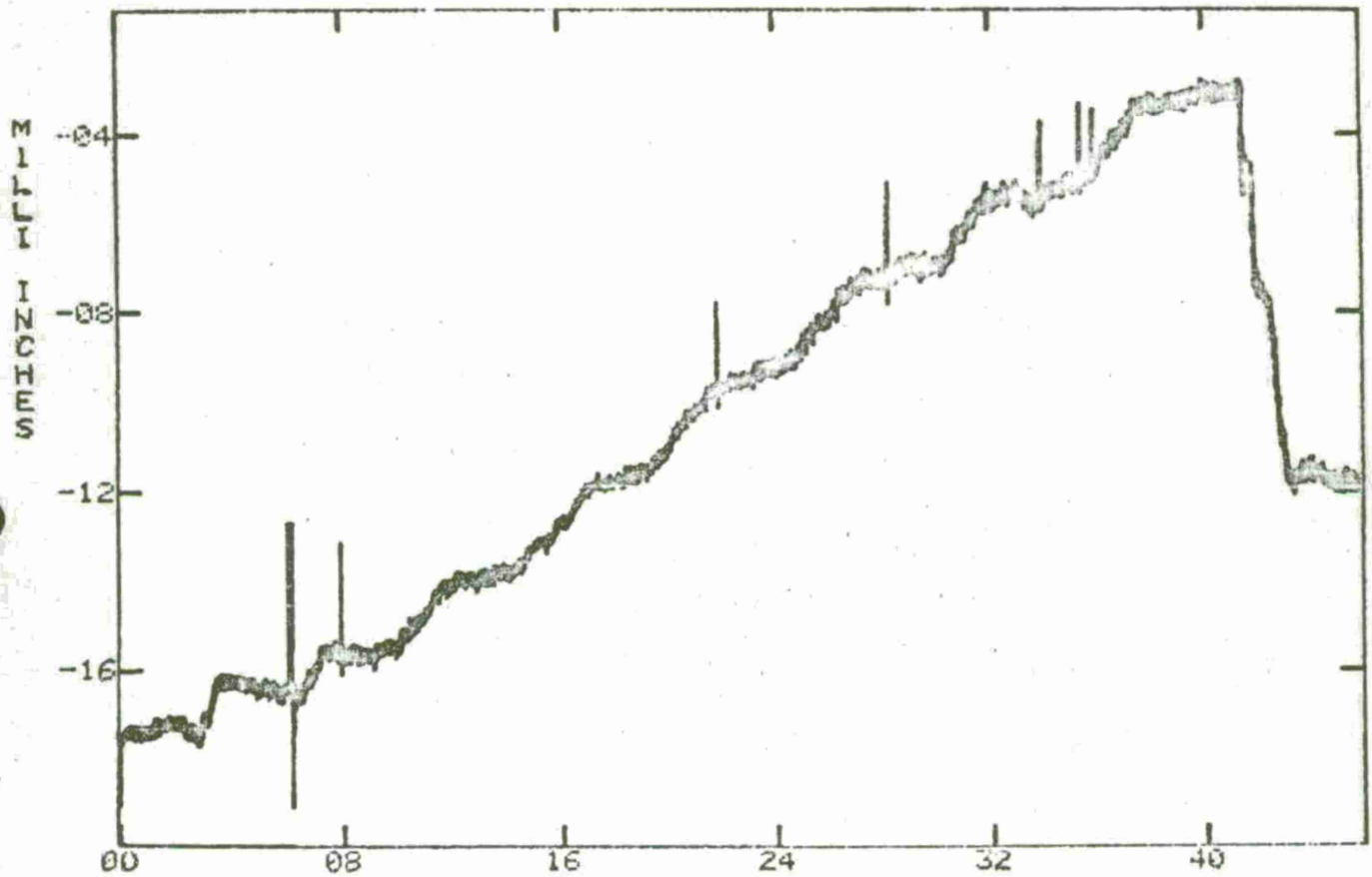
CH 3 WING VERT DISPLACEMENT - WS 42.50 X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



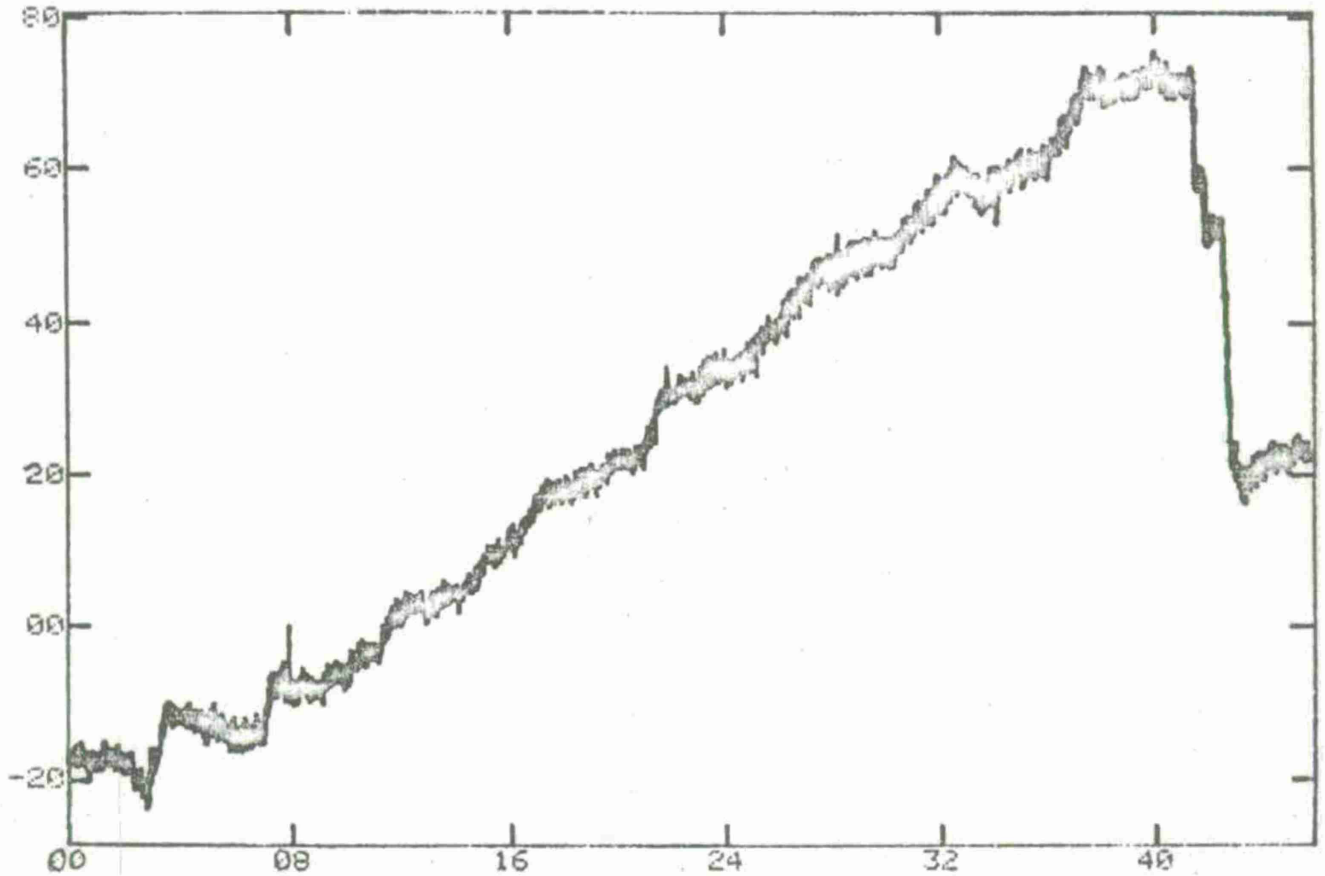
CH 4 WING VERT DISPLACEMENT - WS 21,38 X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



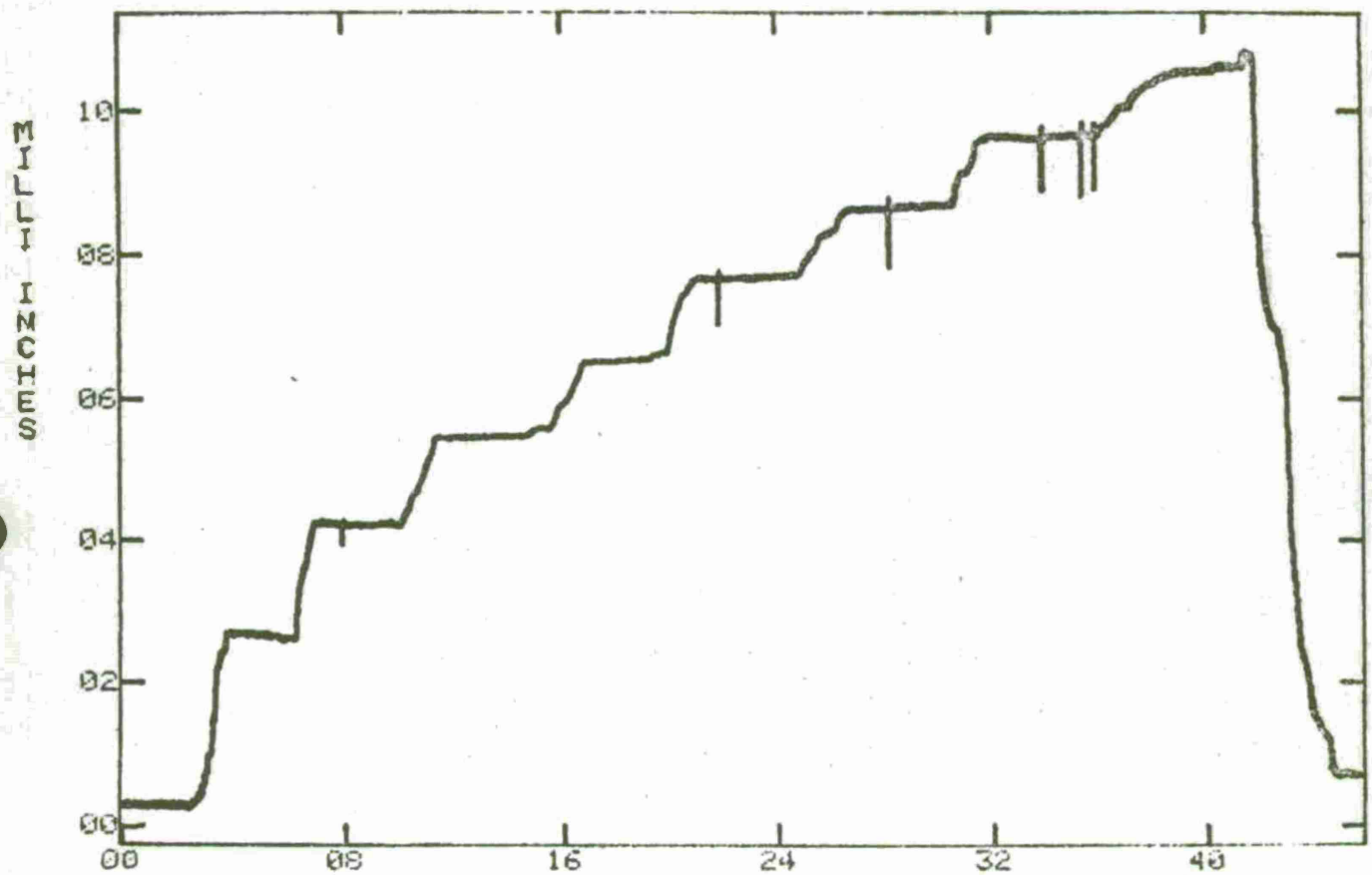
CH 5 WING VERT DISPLACEMENT - WS 21.38 X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



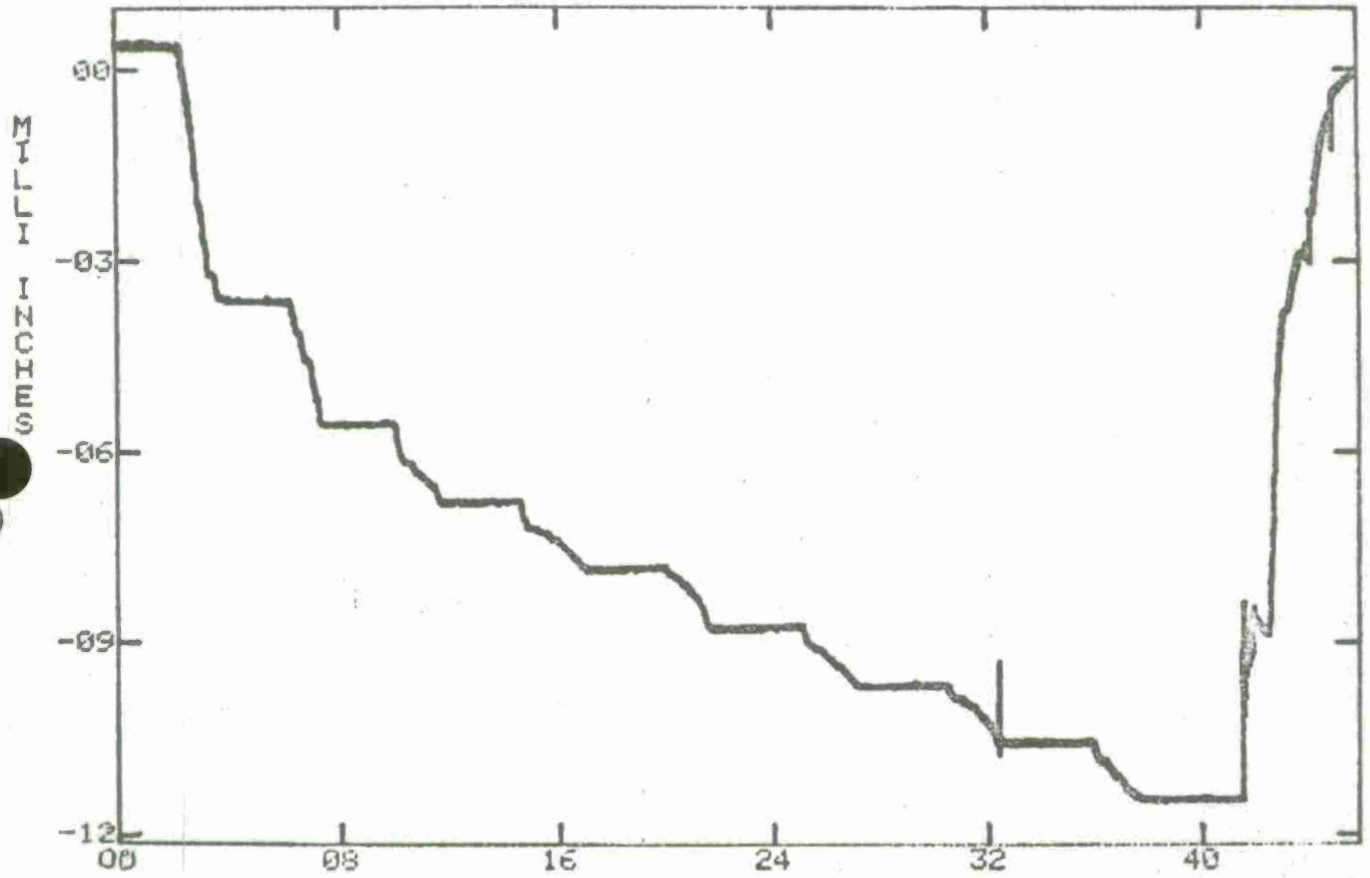
CH 6 CENTER SPAR DISPLACEMENT - L.H. X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



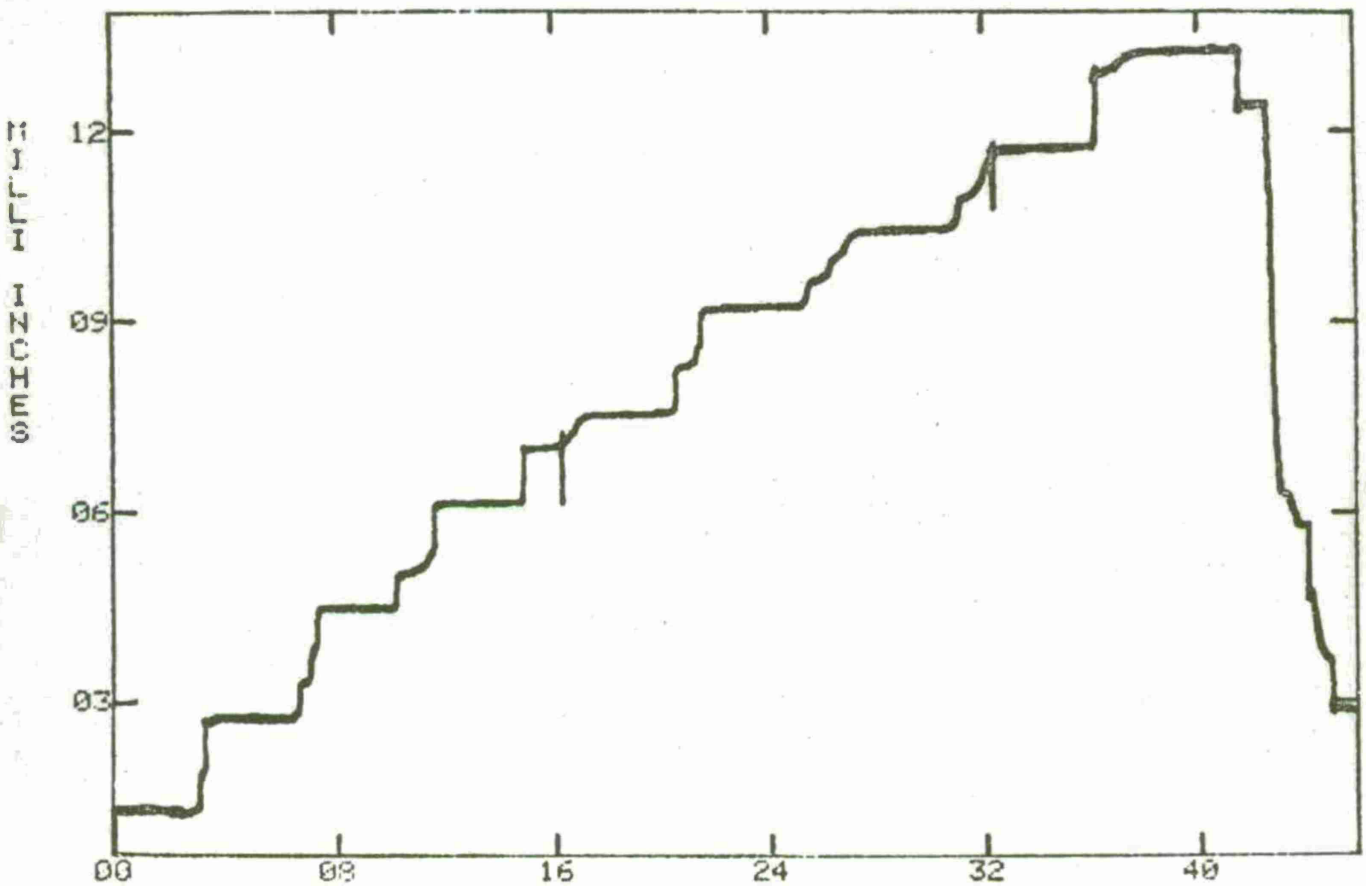
CH 7 CENTER SPAR DISPLACEMENT - R.H. X 10+2
TEST 27 (23JUL75) AH1G BEND TESTS



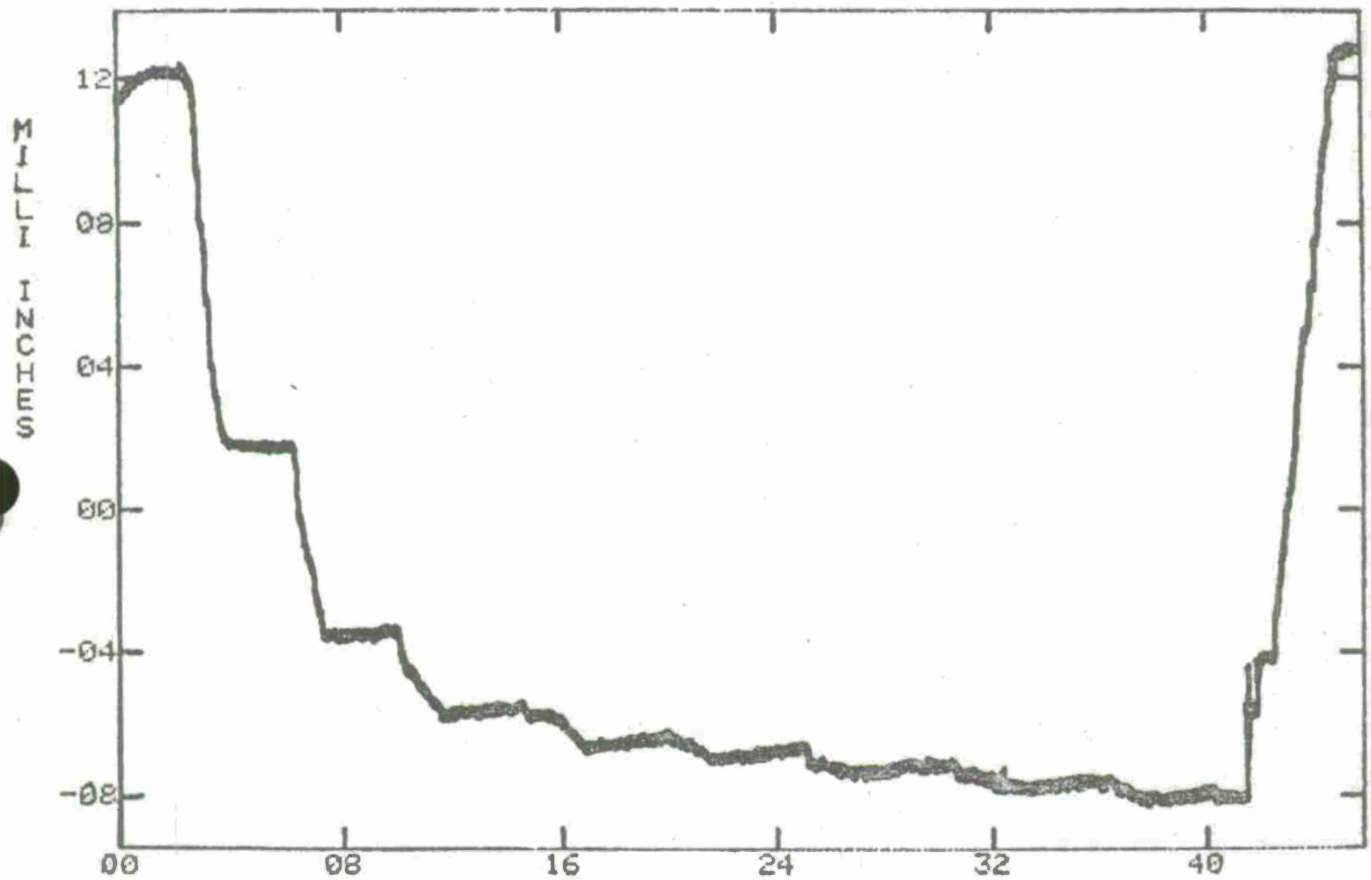
CH 8 WING VERT DISPLACEMENT - WS 60.00 X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



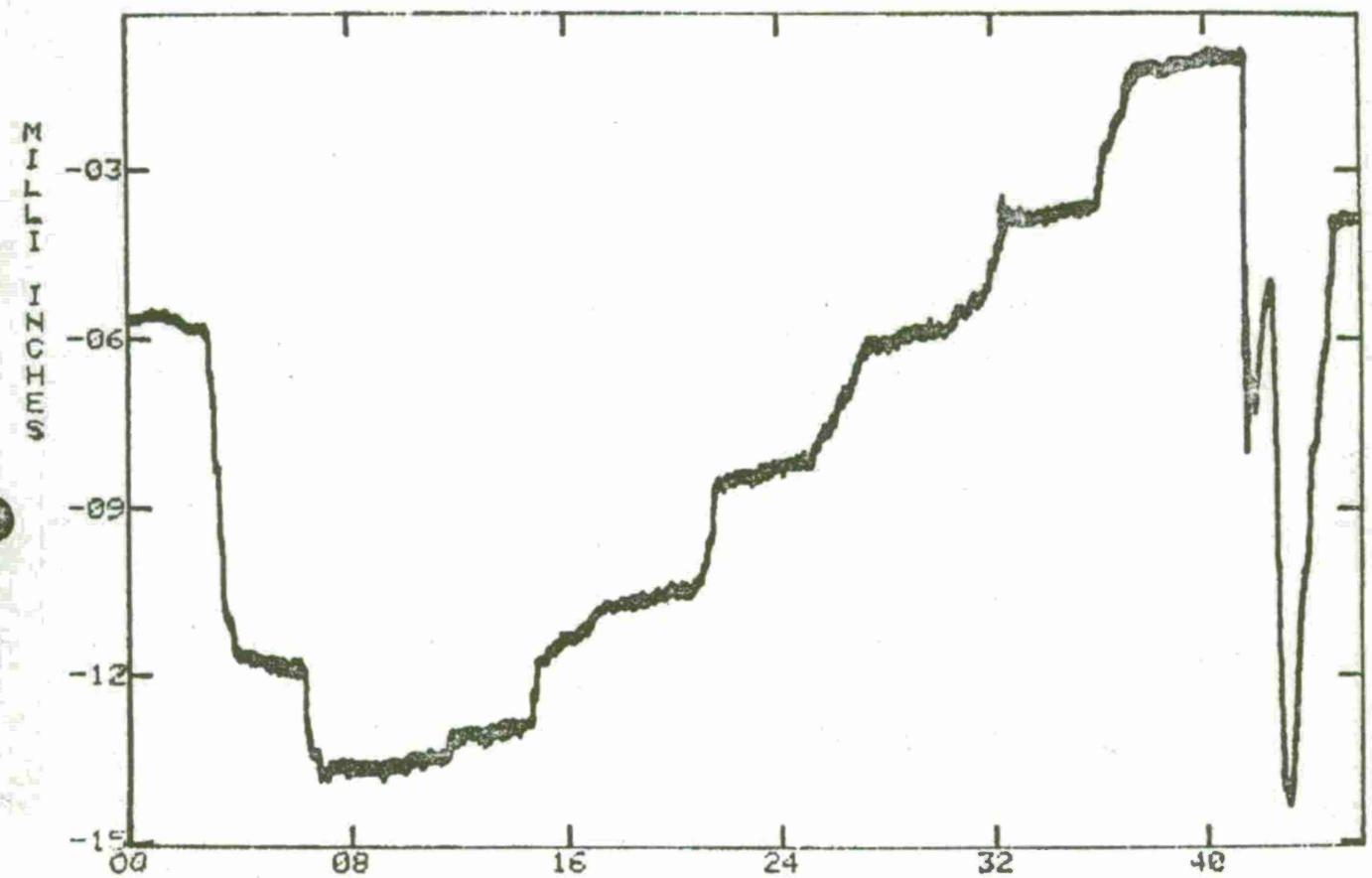
CH 9 WING SLOPE DISPLACEMENT - BOTTOM X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



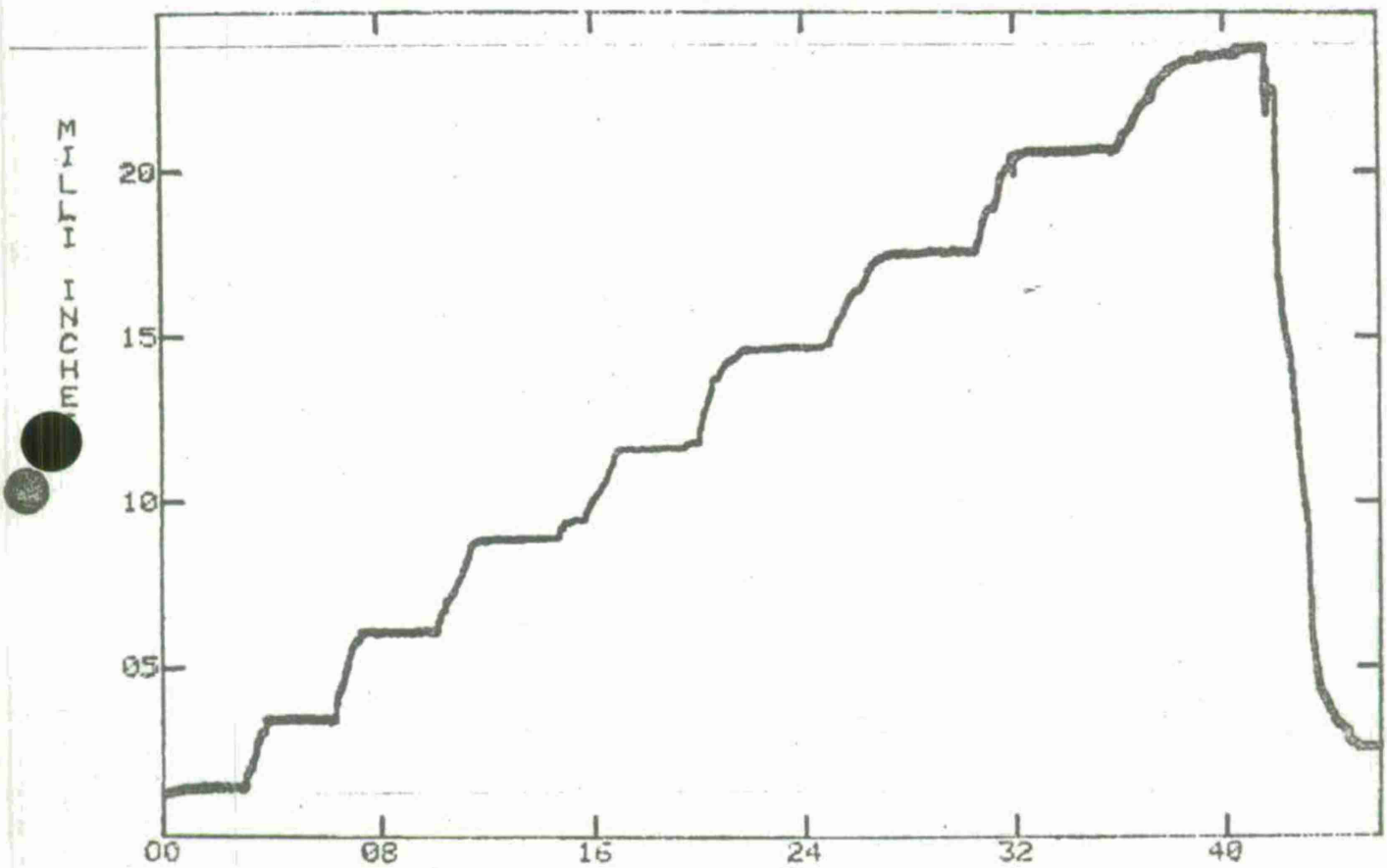
CH 10 WING SLOPE DISPLACEMENT - TOP X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



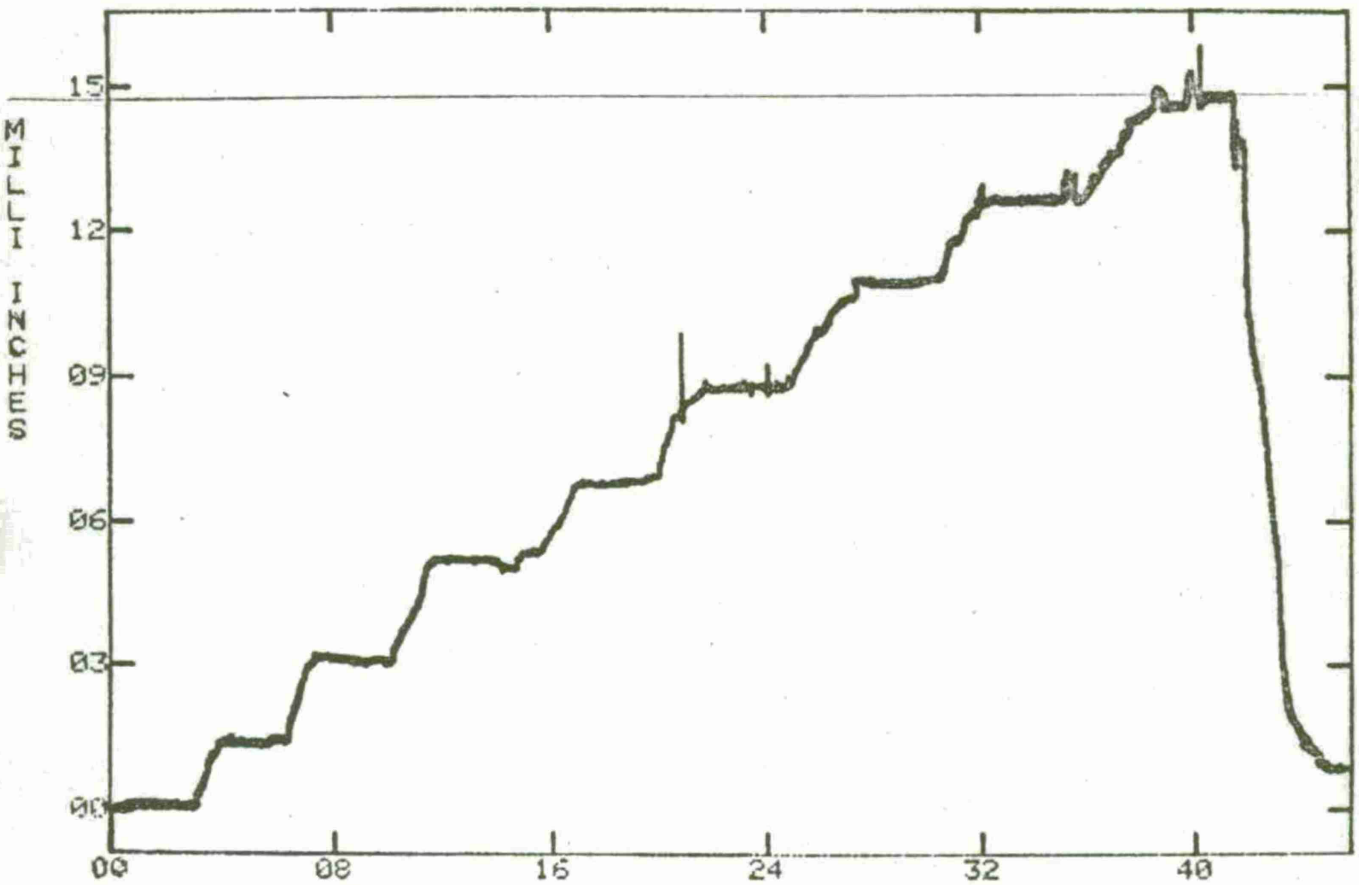
CH 11 FUSELAGE SLOPE DISPLACEMENT - BOTTOM X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



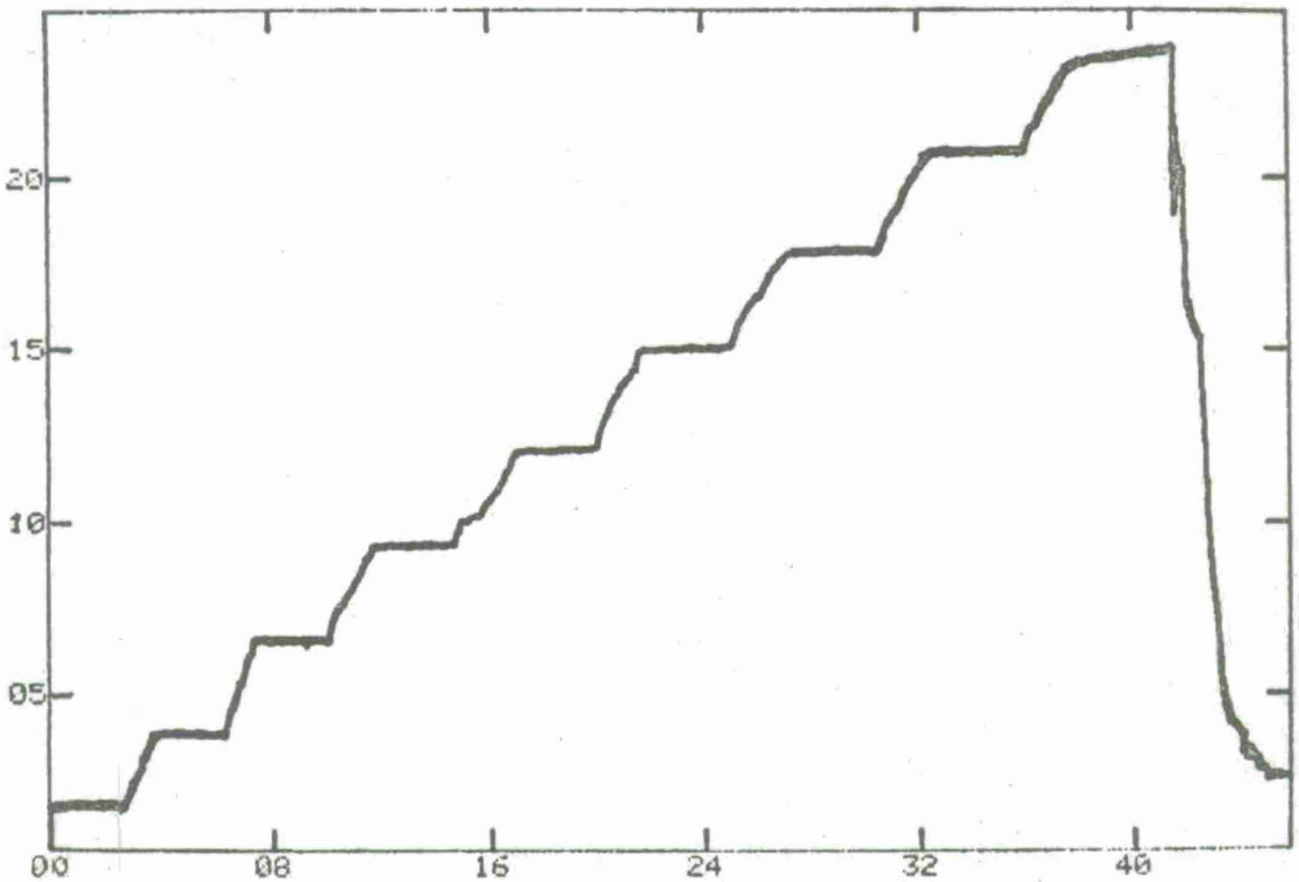
CH 12 FUSELAGE SLOPE DISPLACEMENT - TOP X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



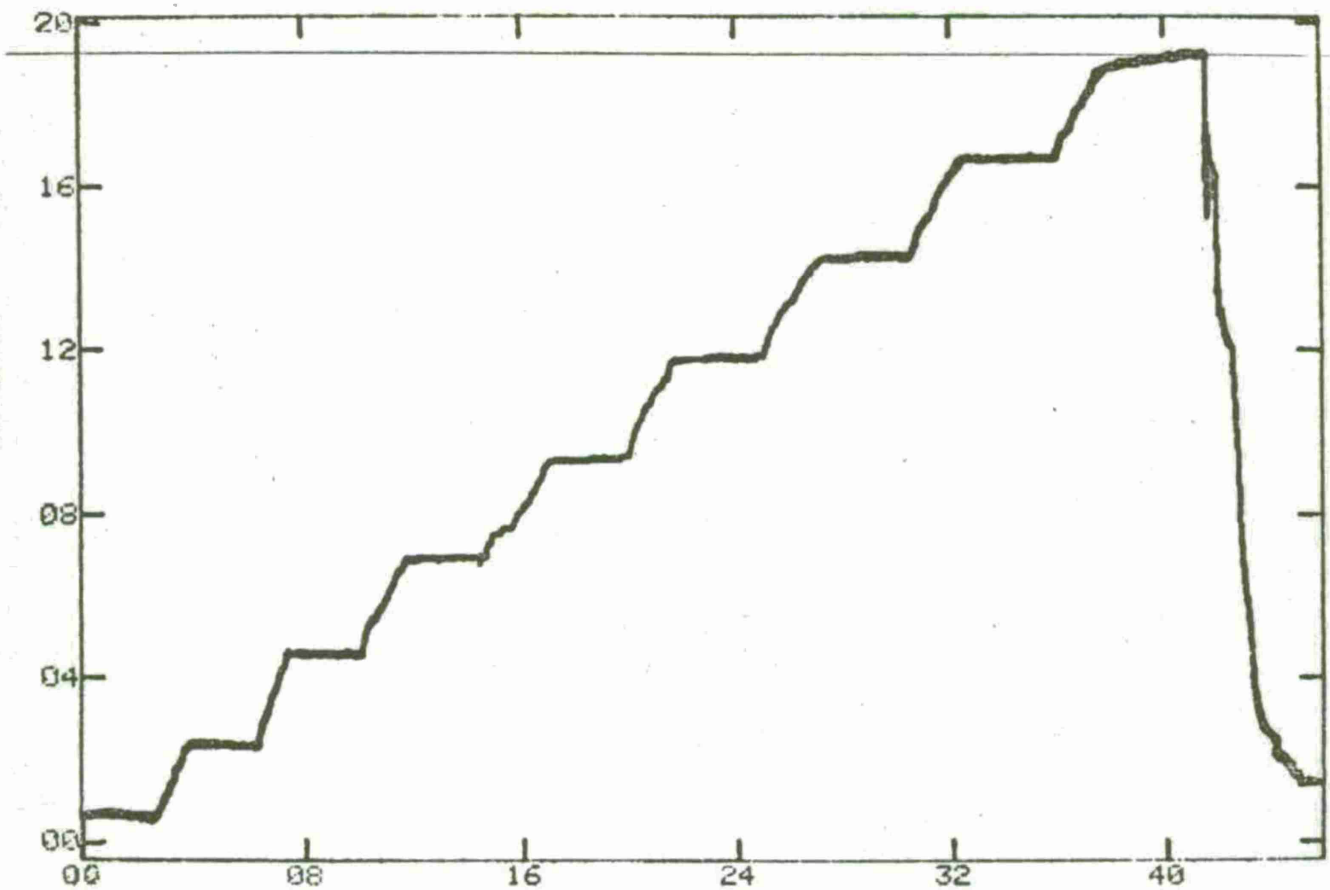
CH 13 FIXTURE / GROUND DISPLACEMENT - R.H. TOP X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



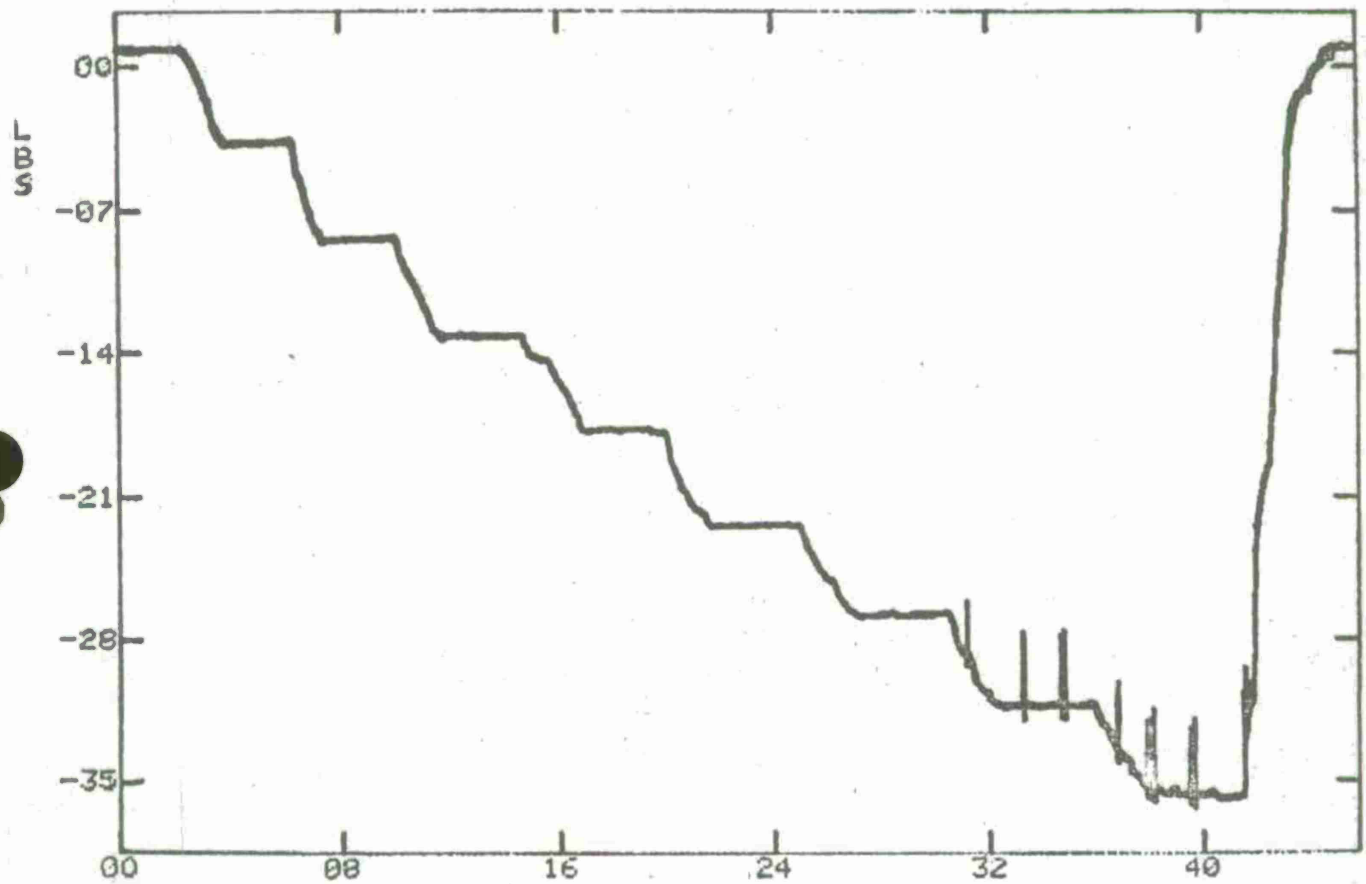
CH 14 FIXTURE / GROUND DISPLACEMENT - R.H. BOTTOM X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



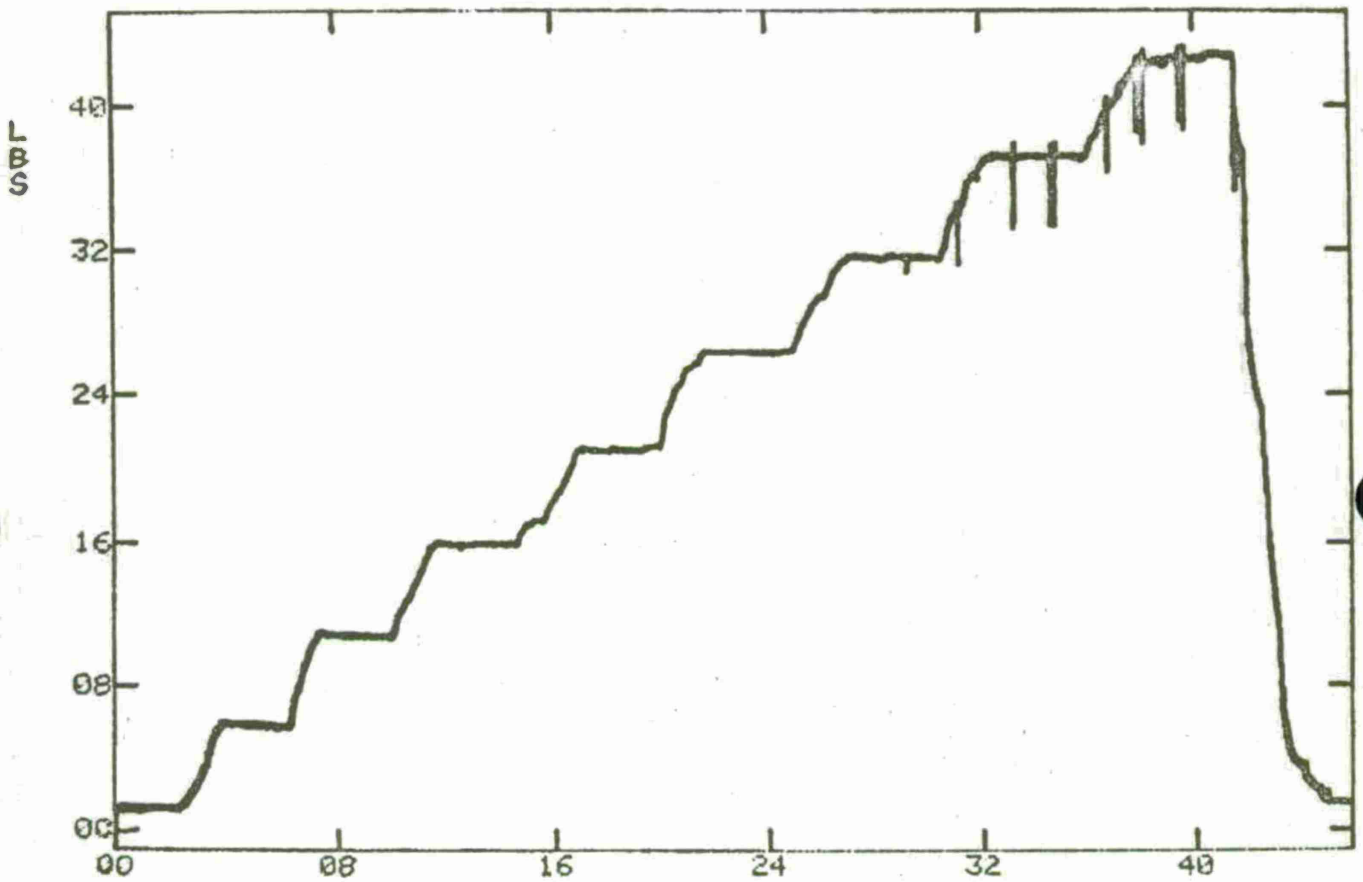
CH 15 FIXTURE / GROUND DISPLACEMENT - L.H. TOP X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



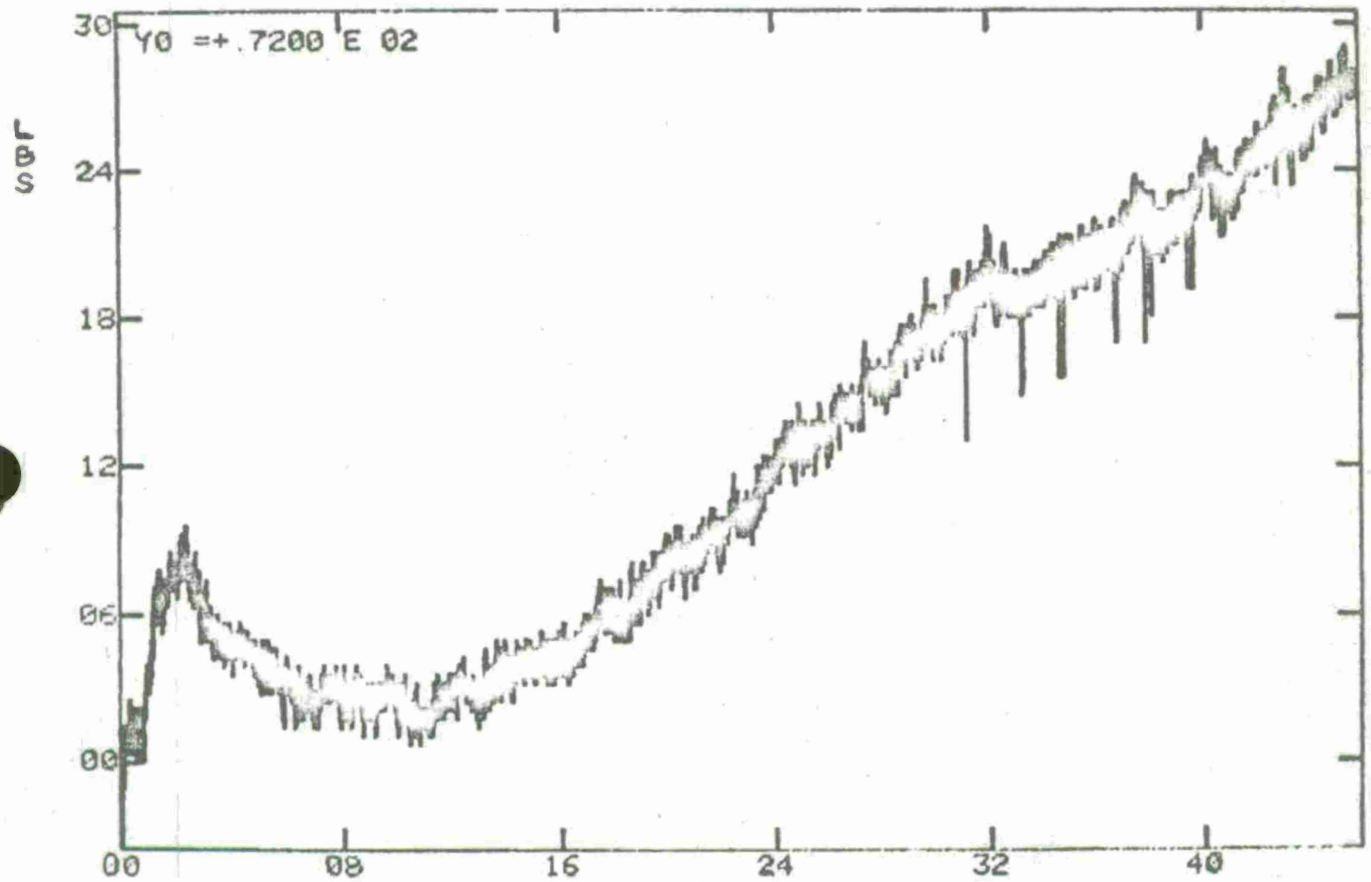
CH 17 FIXTURE / GROUND DISPLACEMENT - L.H. BOTTOM X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



CH 18 BASE LOAD - L.H. TOP X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS



CH 19 BASE LOAD - L.H. BOTTOM X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS


YO =+.7200 E 02
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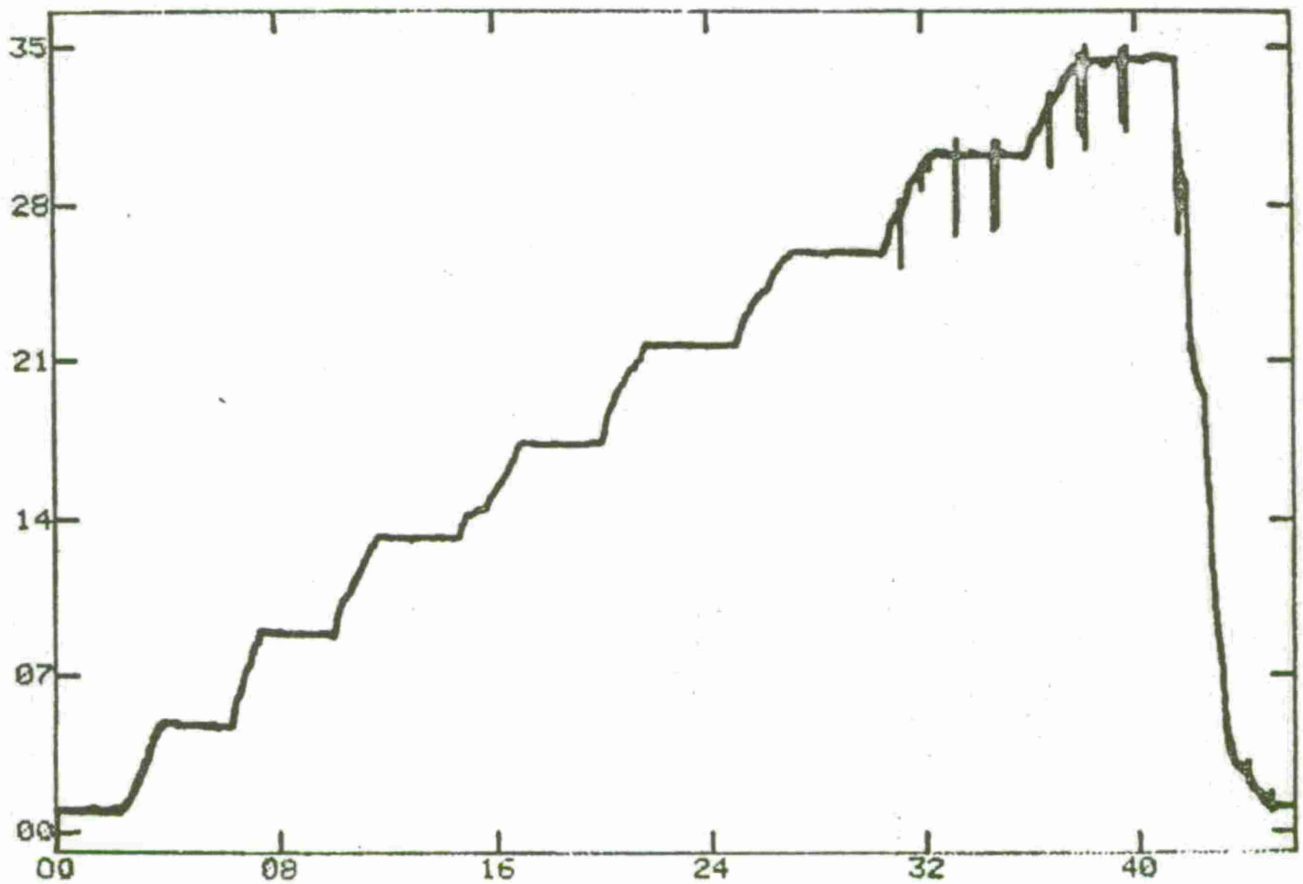
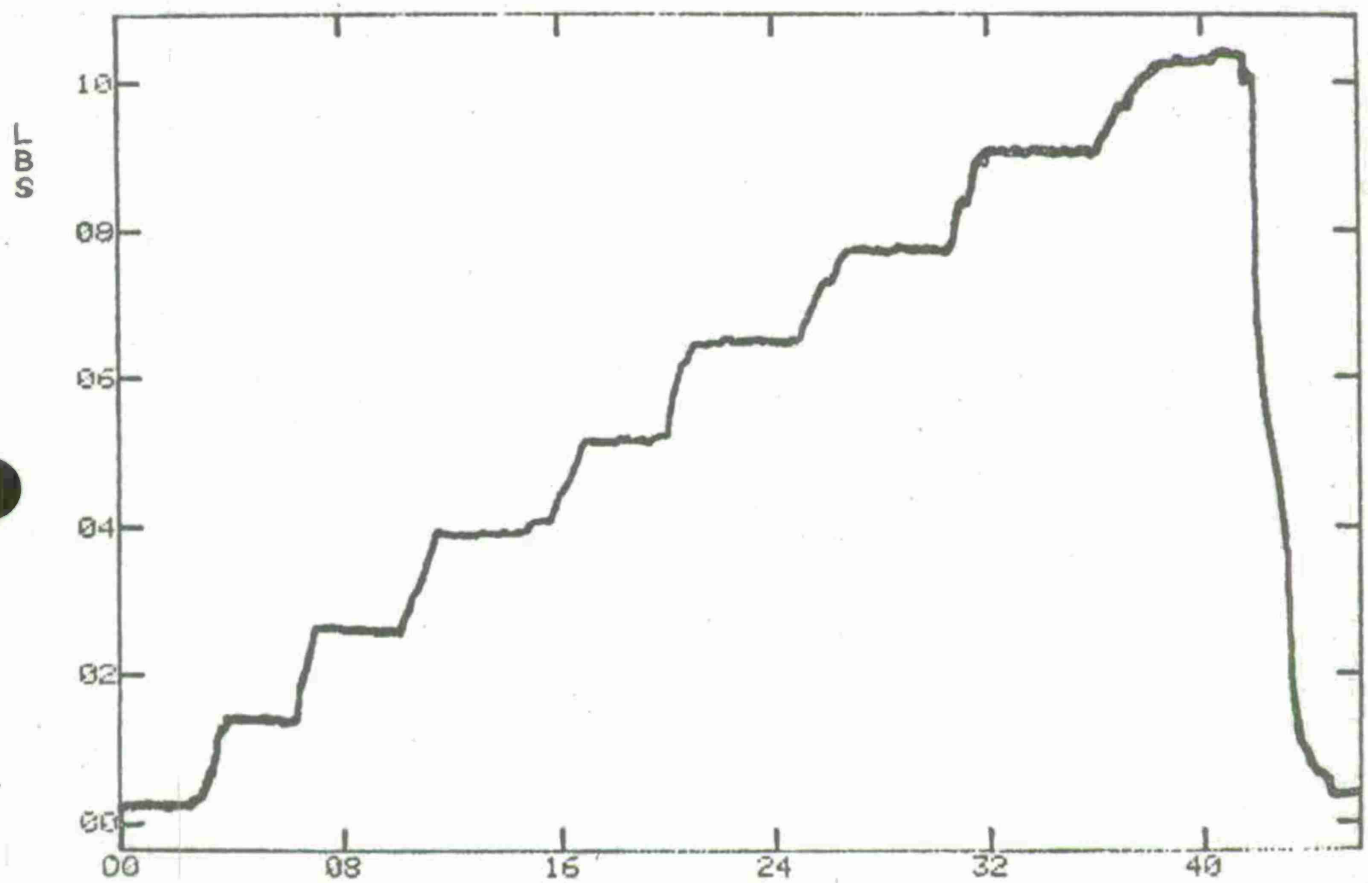
TIME IN SECONDS X 10-1
CH 20 BASE LOAD - R.H. TOP X 10+0
TEST 27 (23JUL75) AH1C BEND TESTS



CH 21 BASE LOAD - R.H. BOTTOM X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS


LBS
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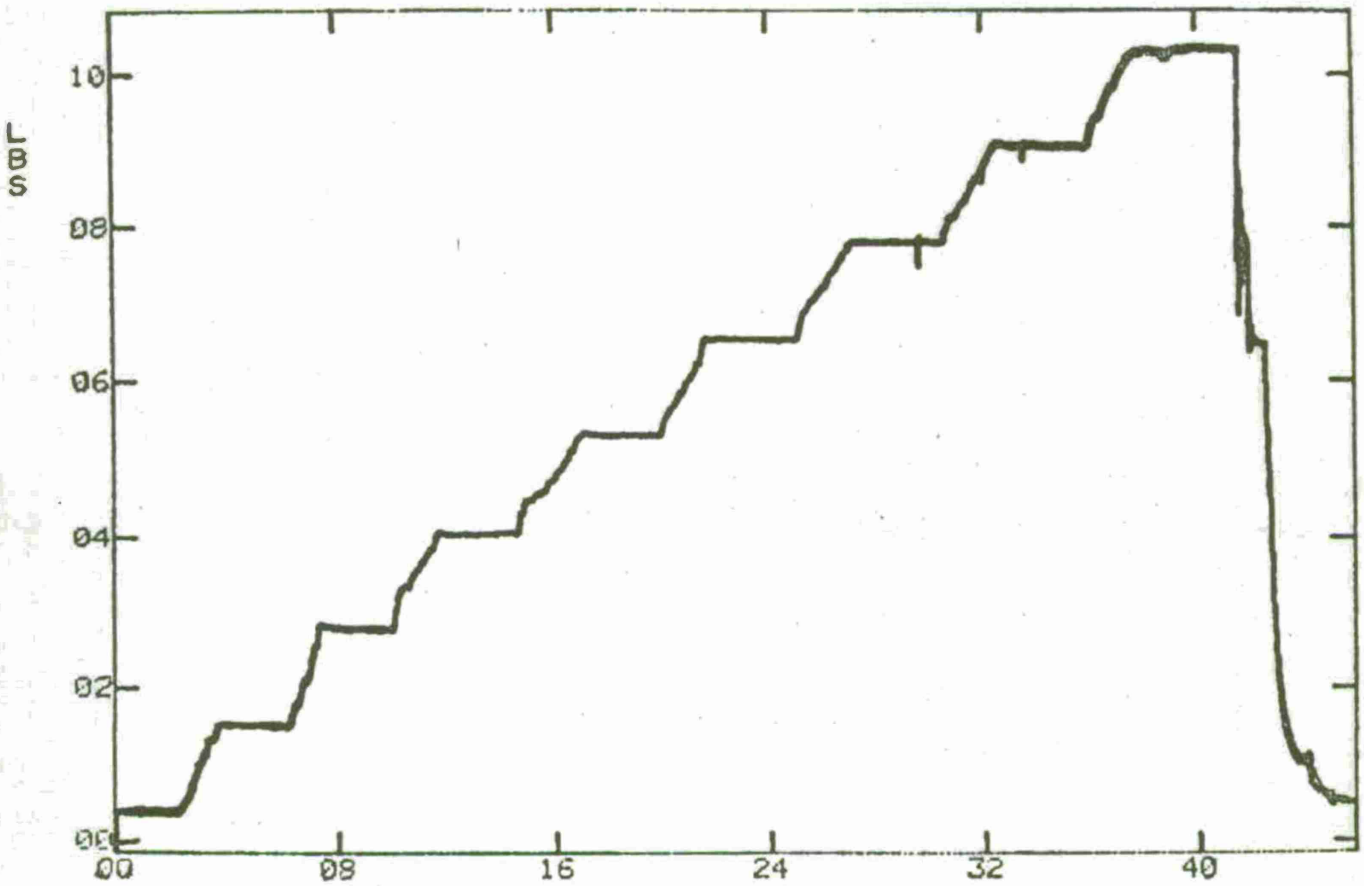
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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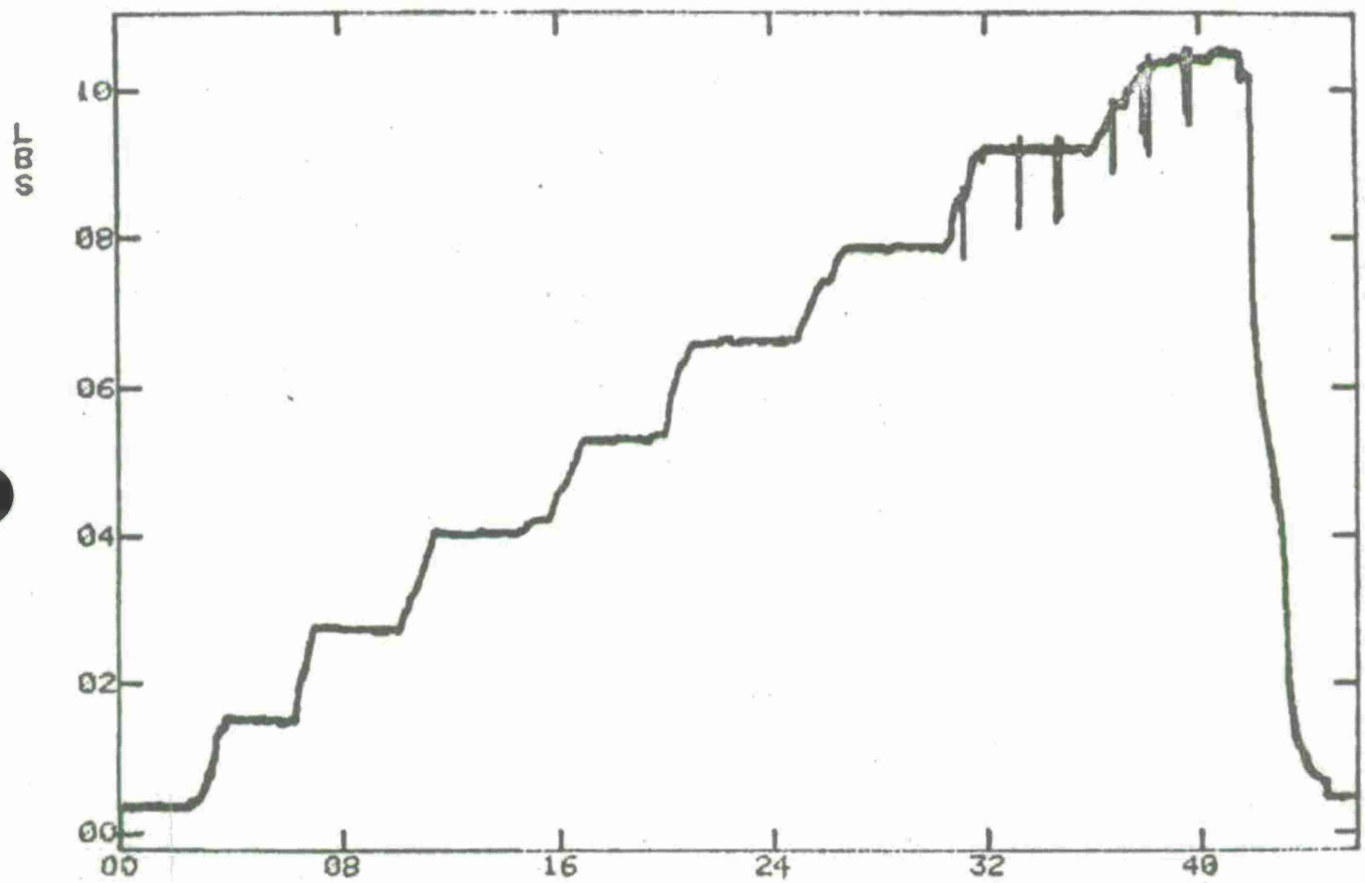
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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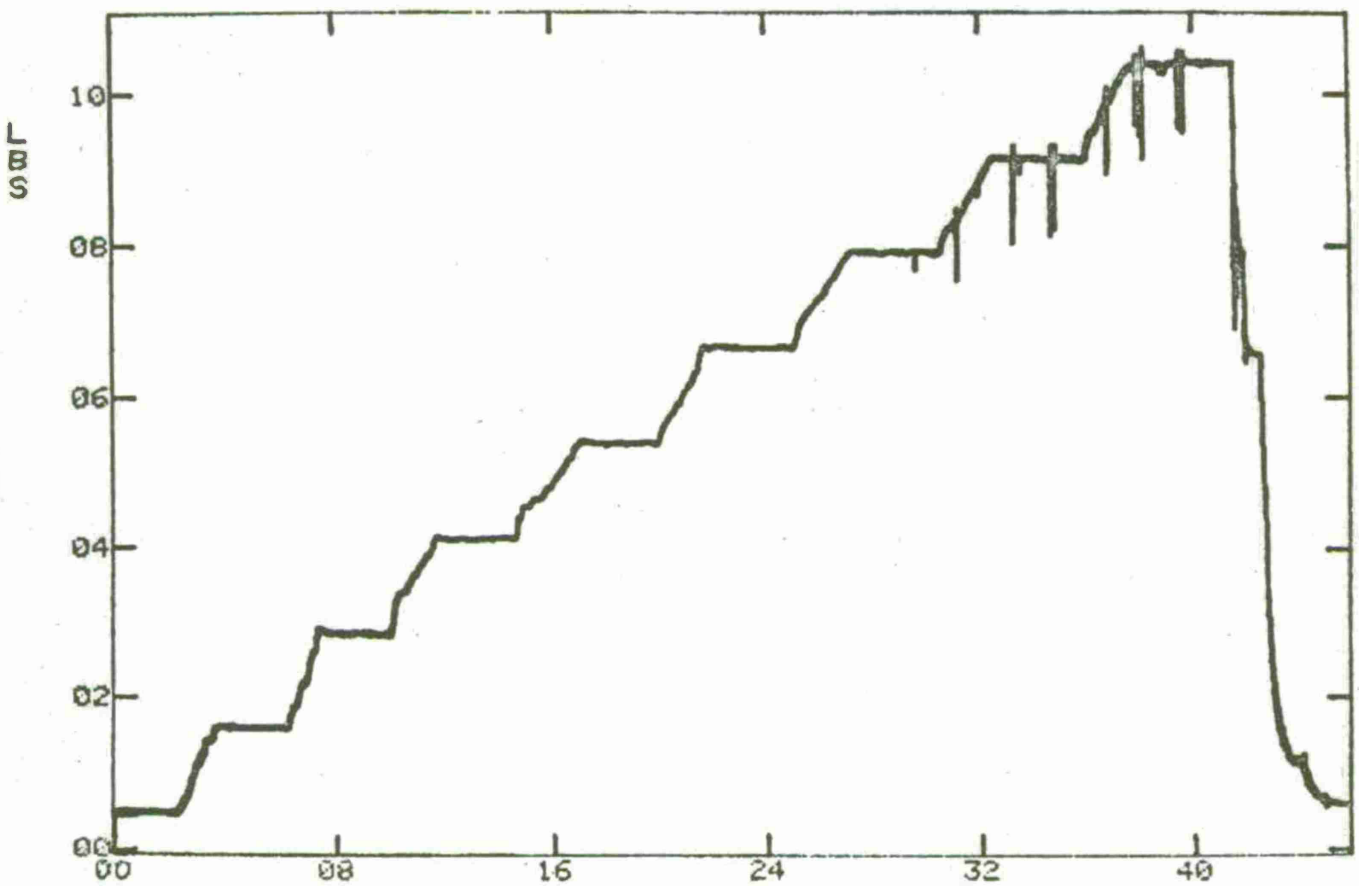
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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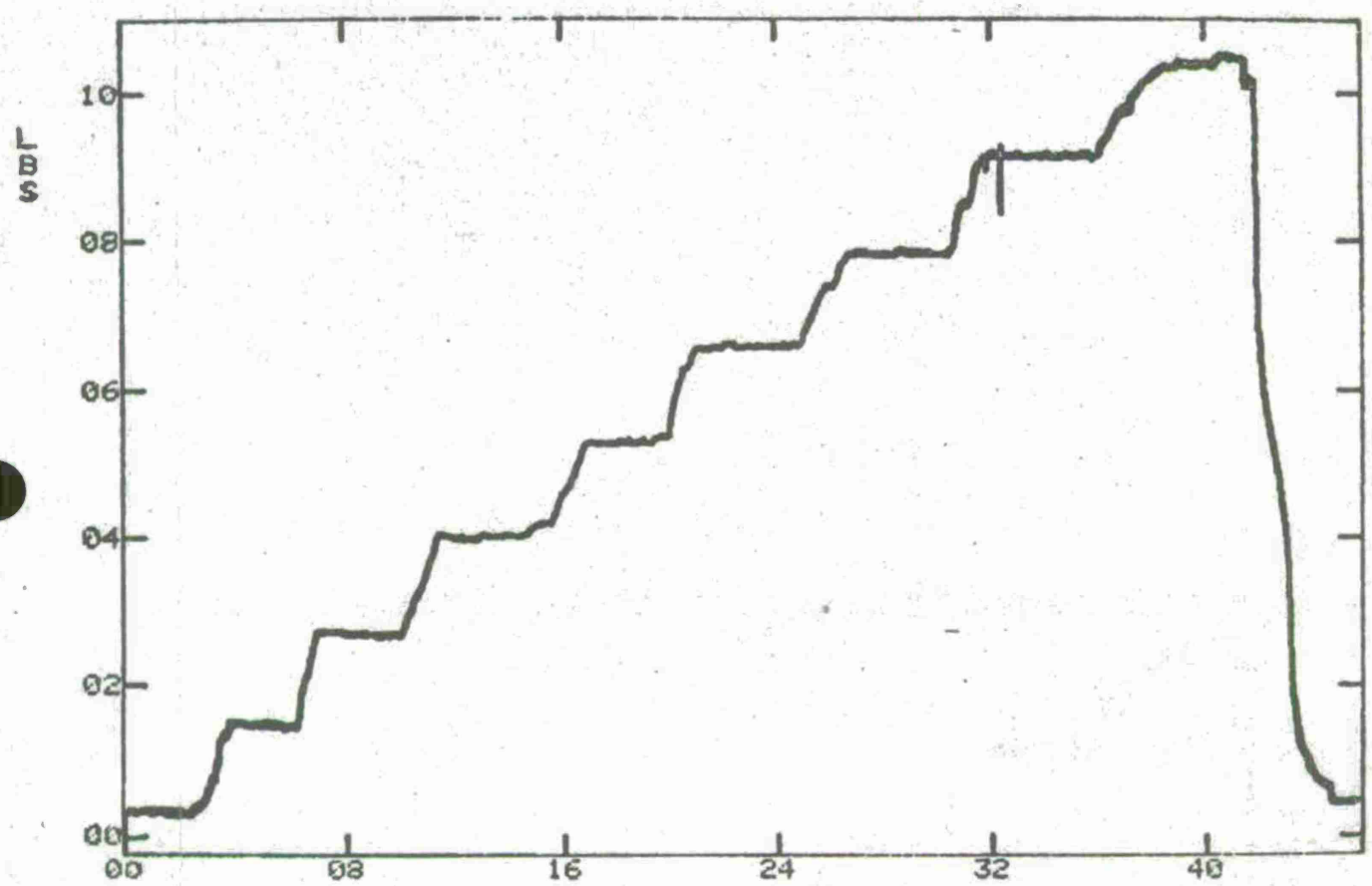
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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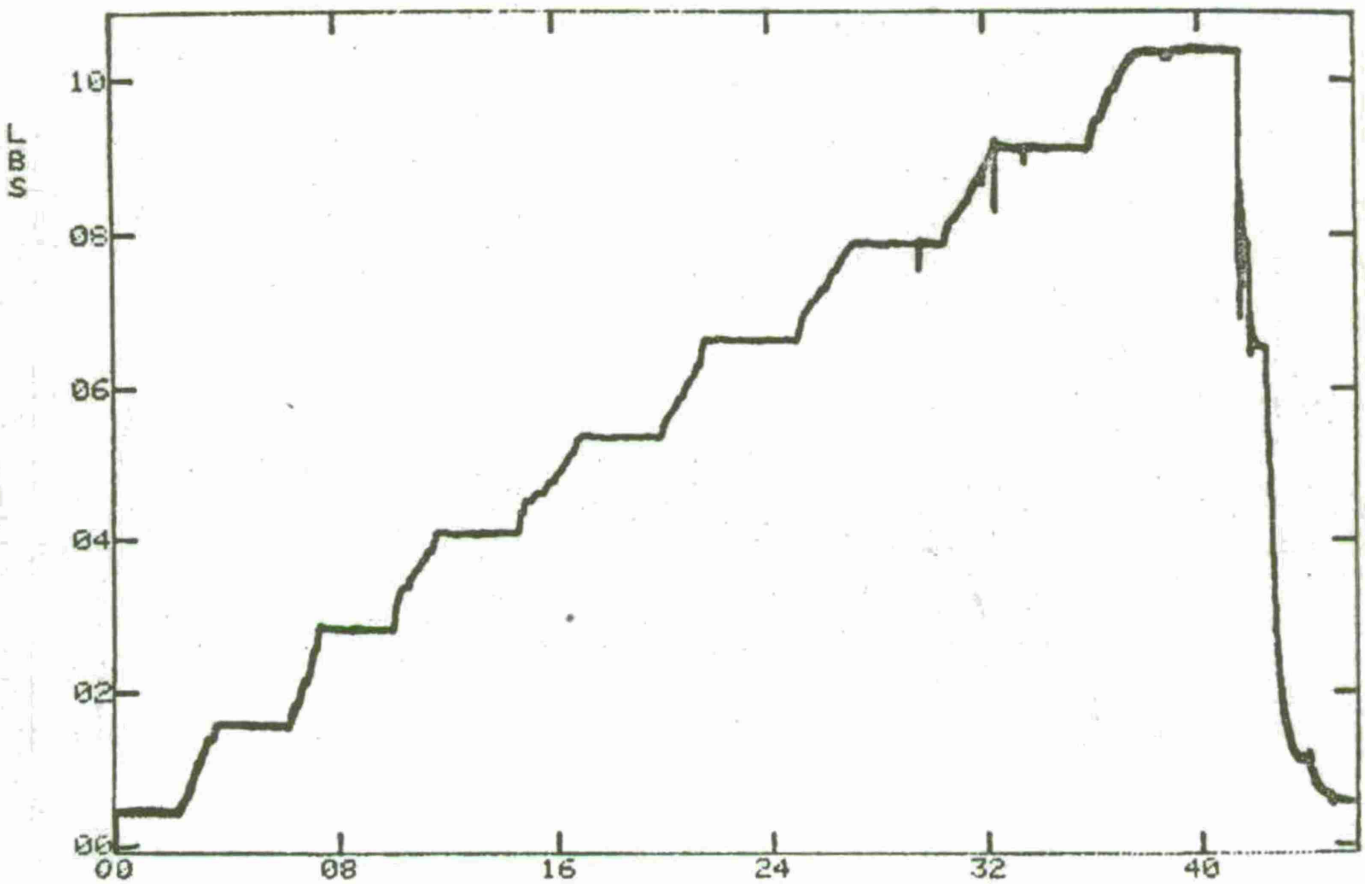
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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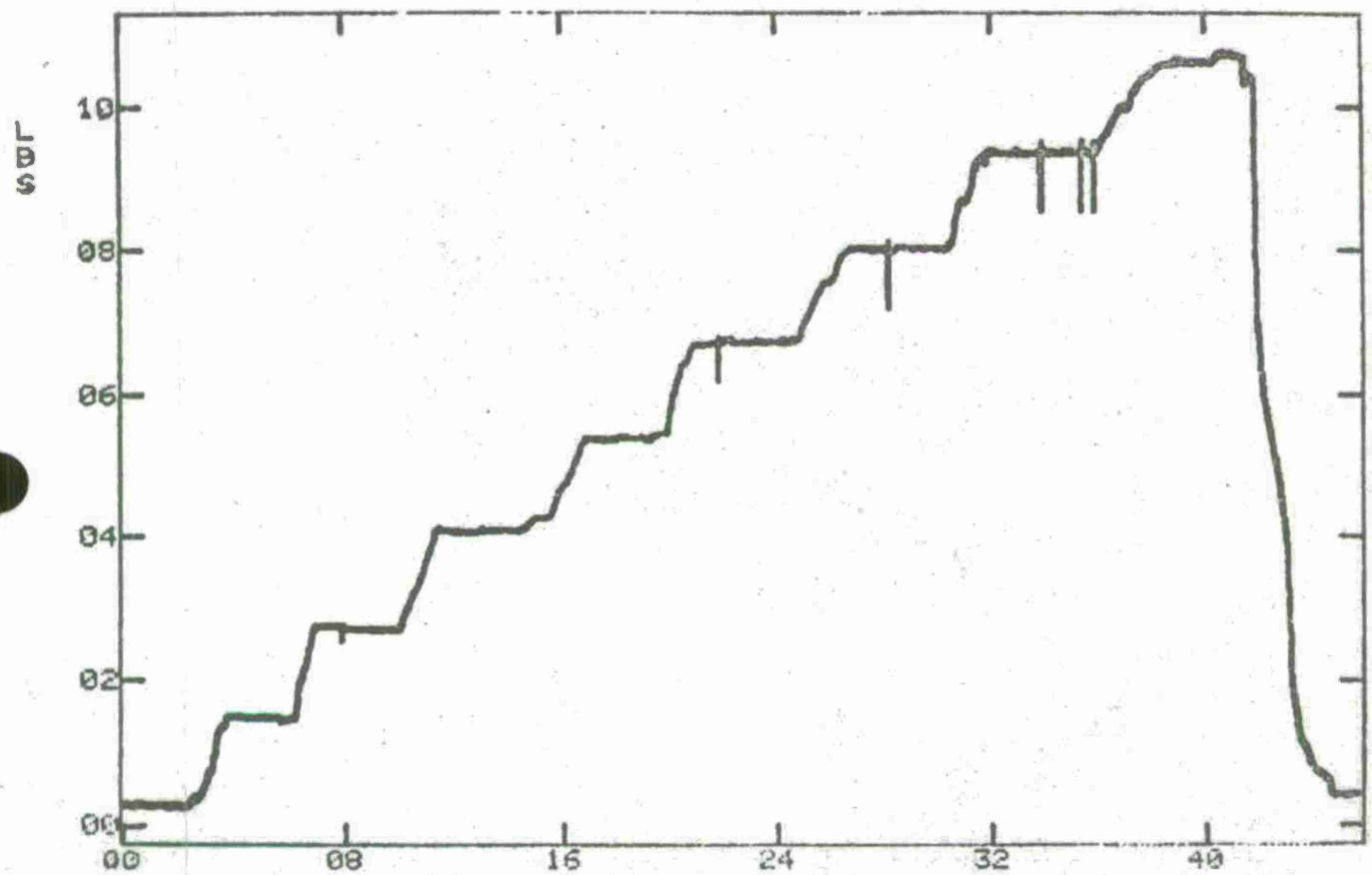
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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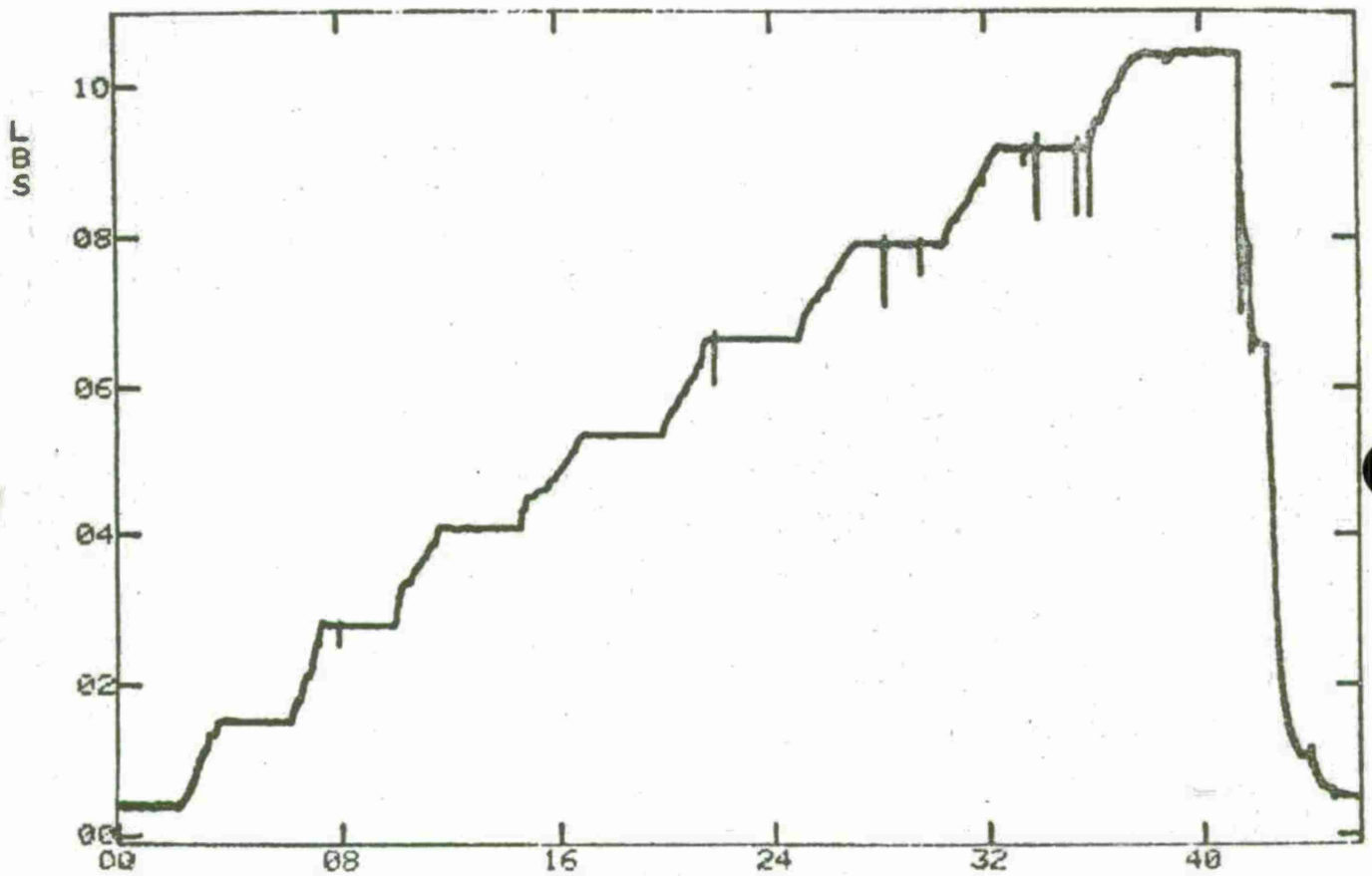
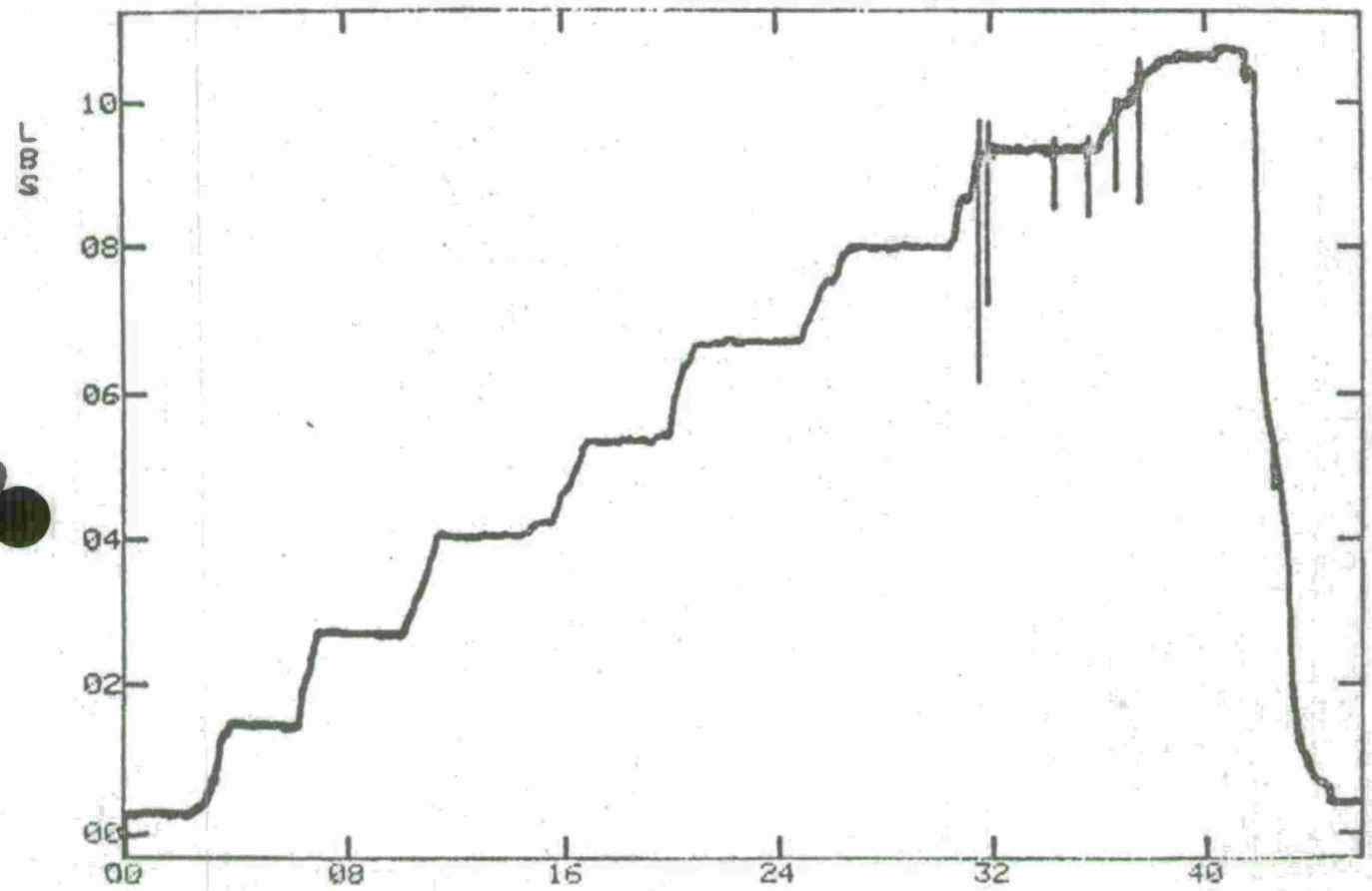
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS


LBS
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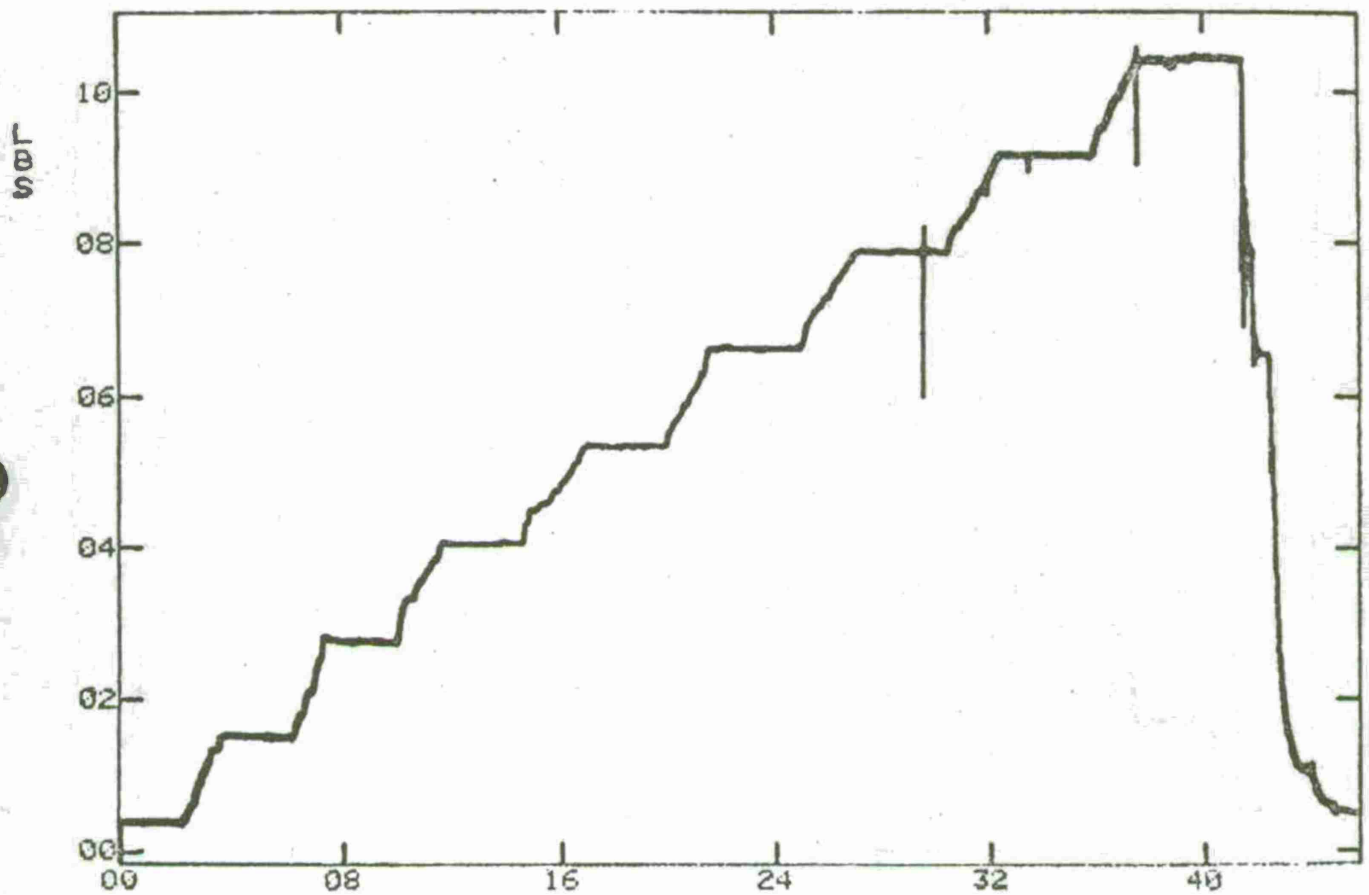
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS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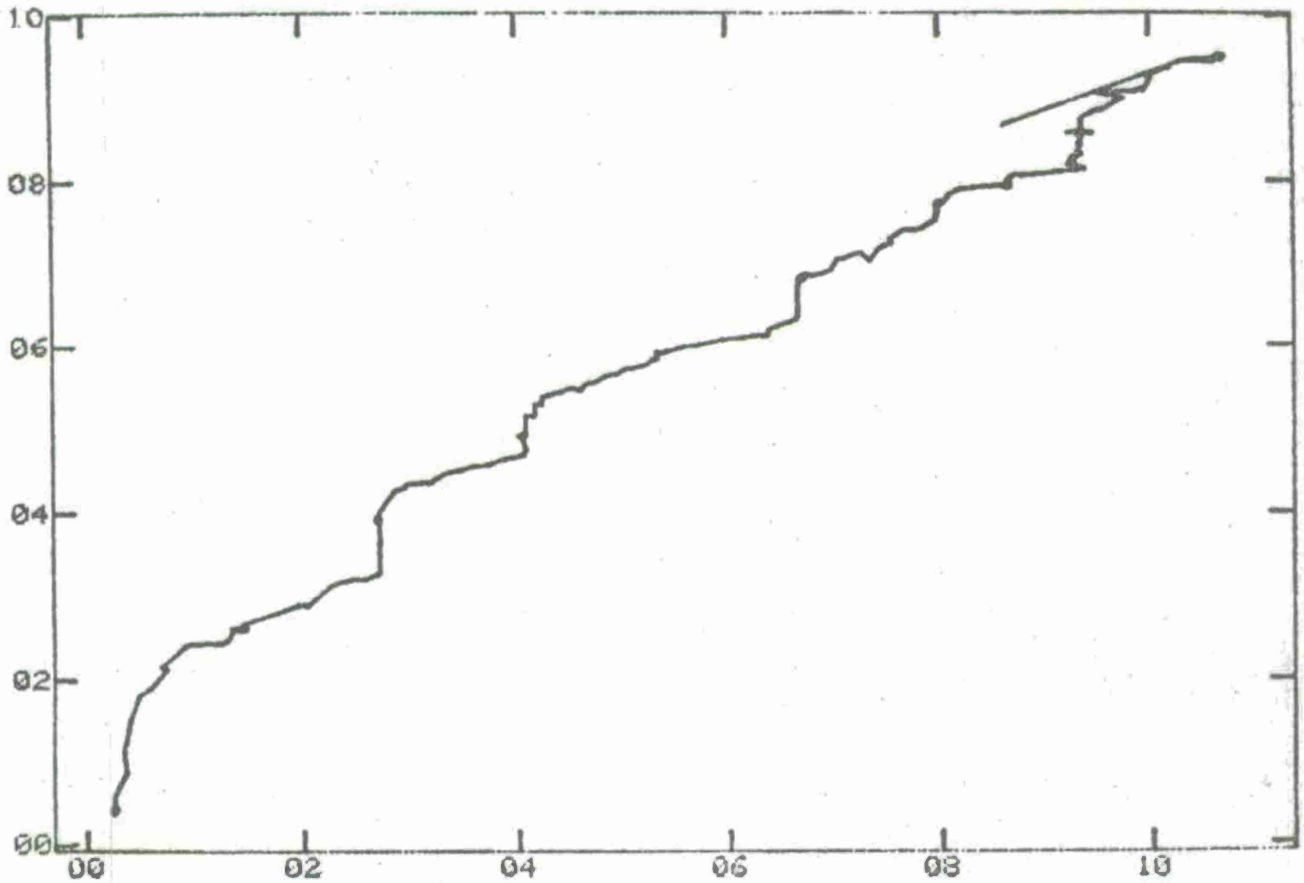
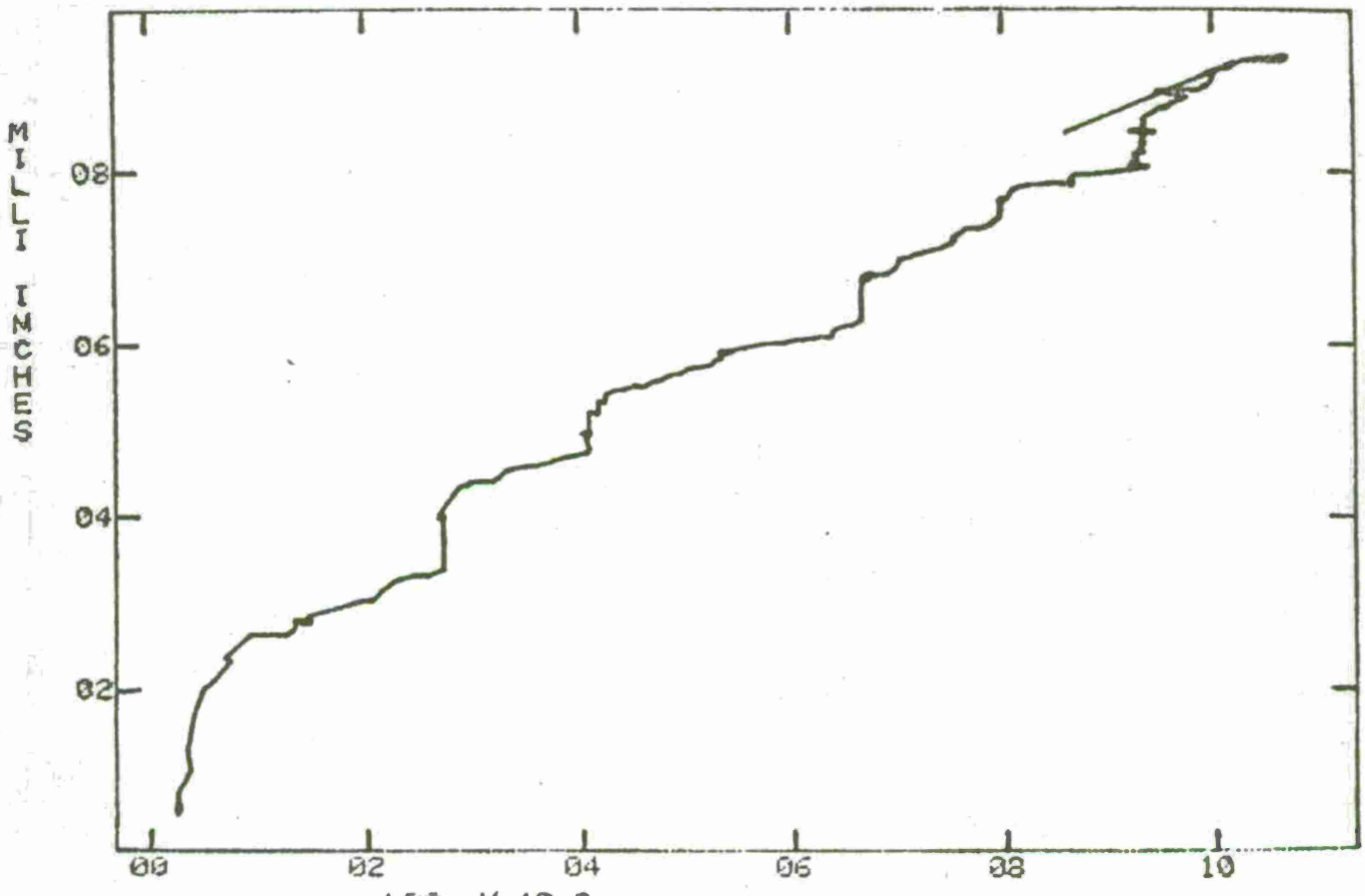
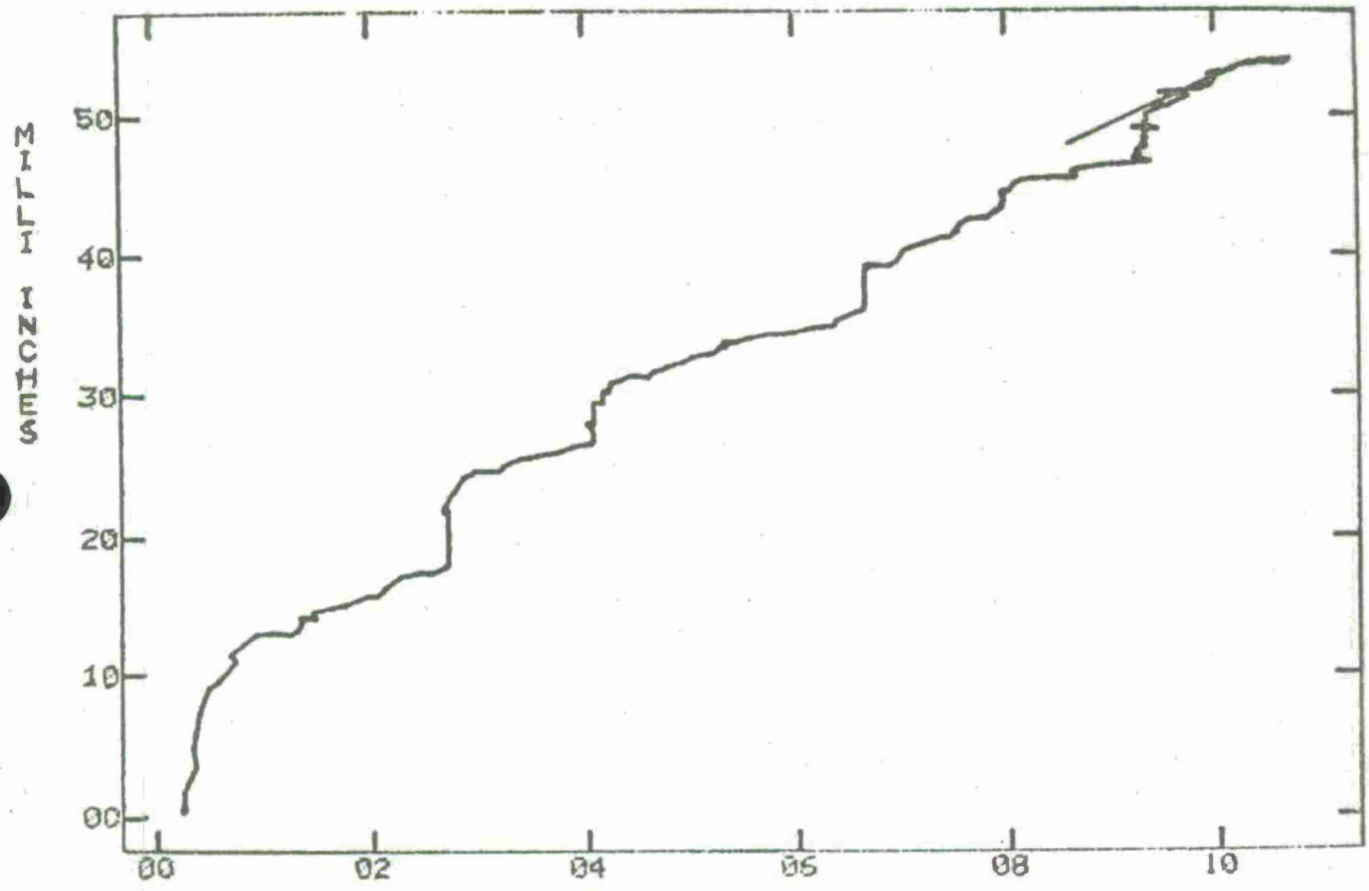
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 27 (23JUL75) AH1G BEND TESTS



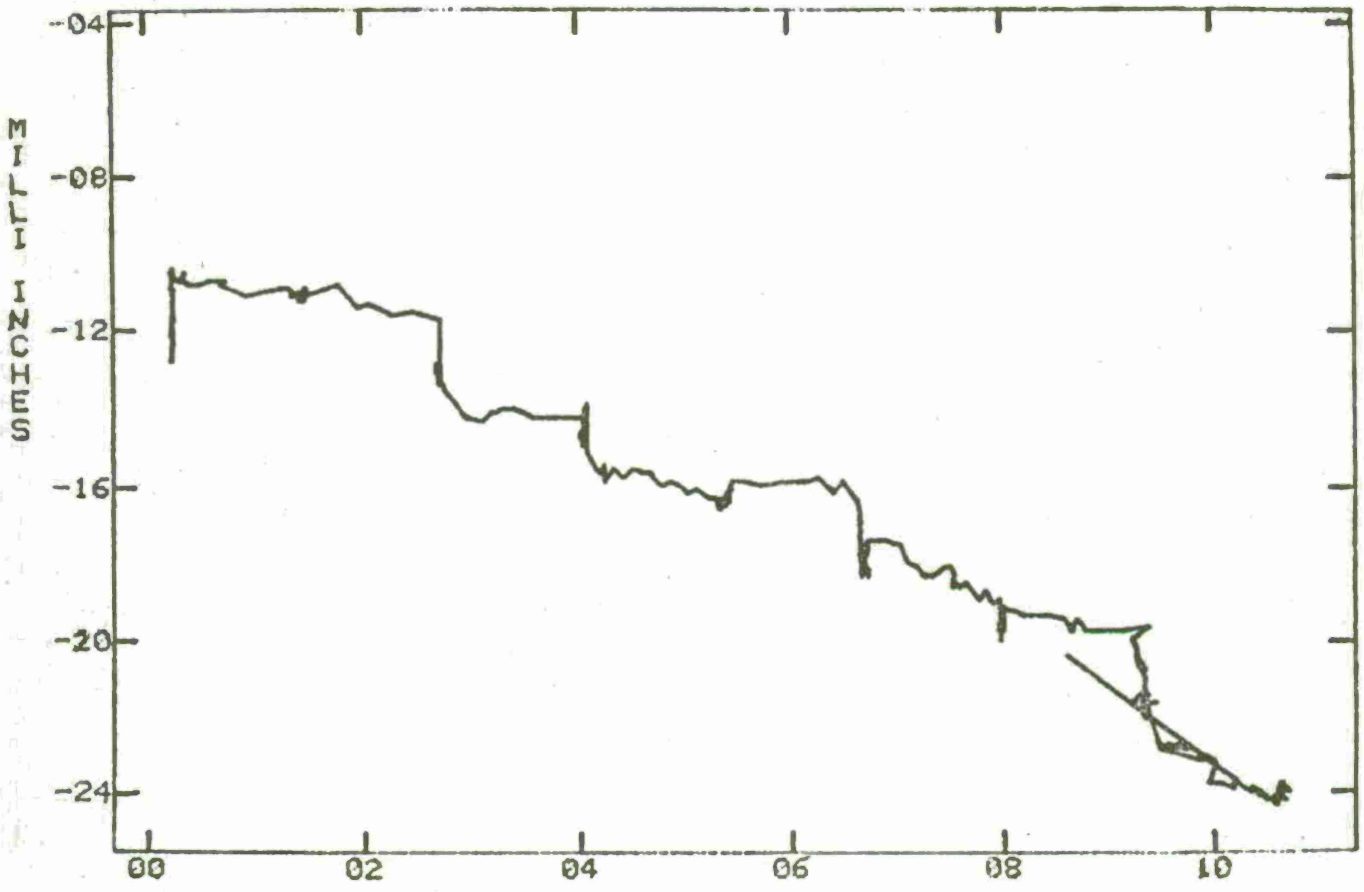
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 57.74 X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



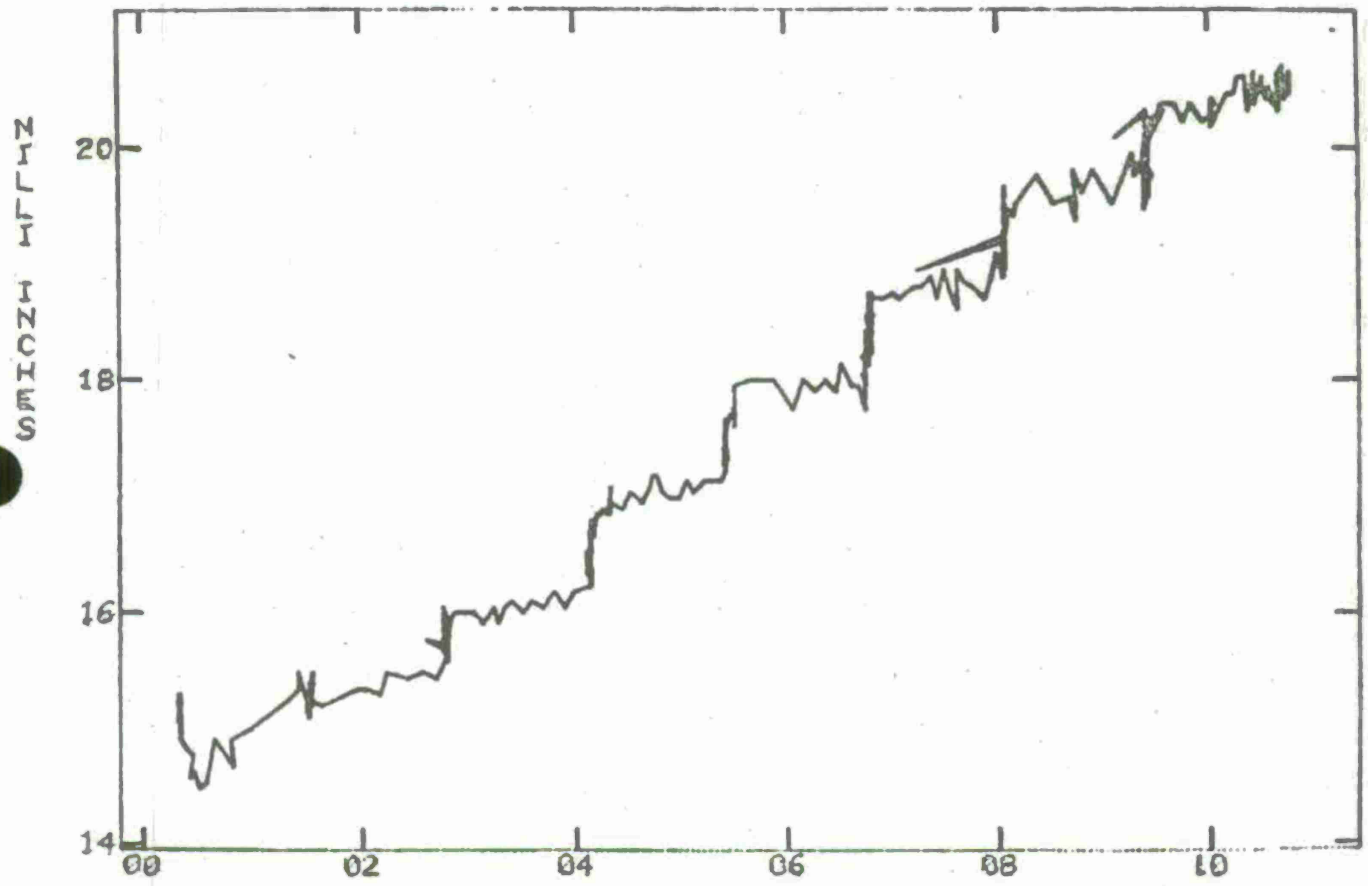
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 59.00 X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



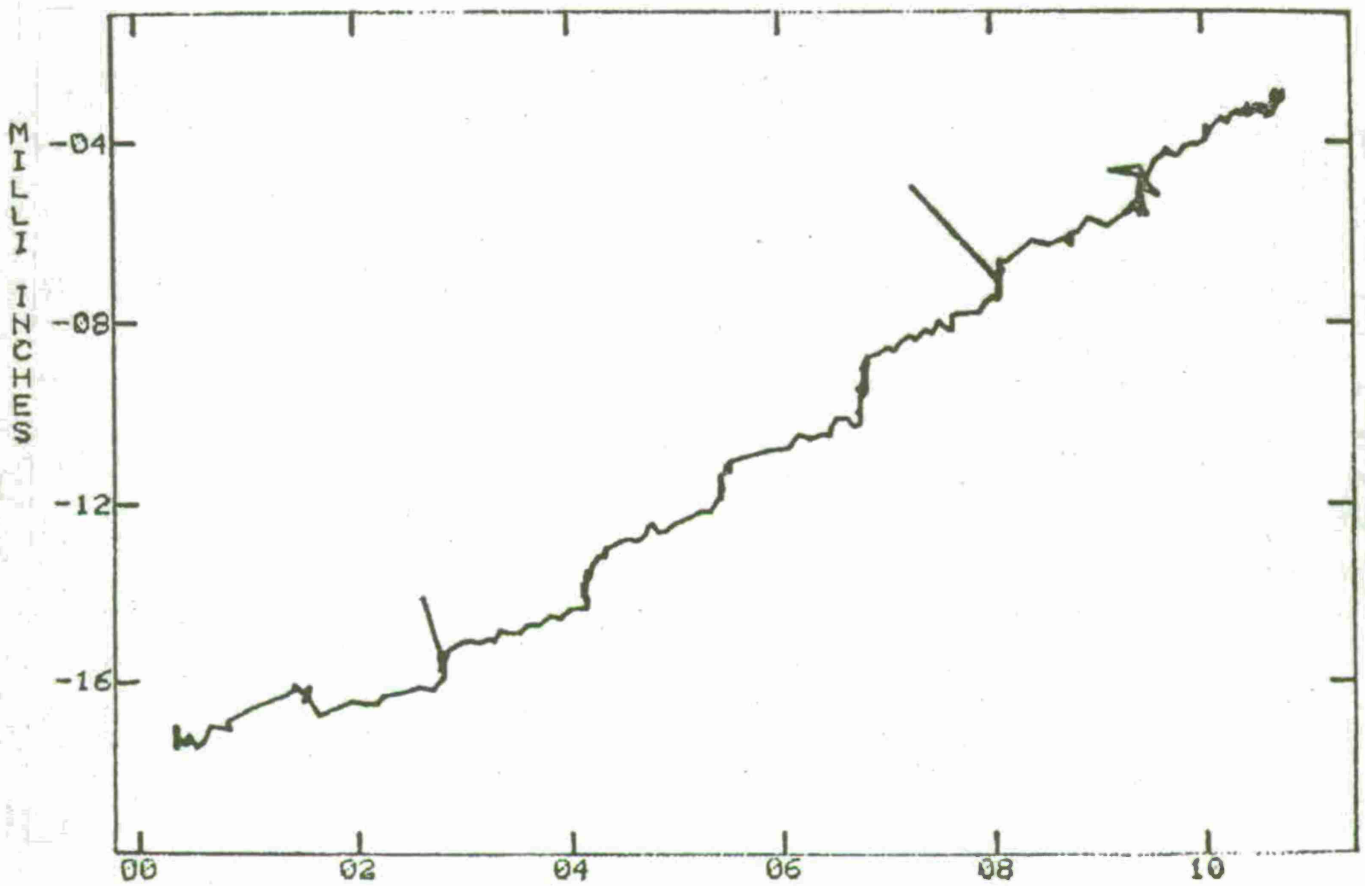
LOAD APPLIED - R.H VS WING VERT DISPL - WS 42.50 X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



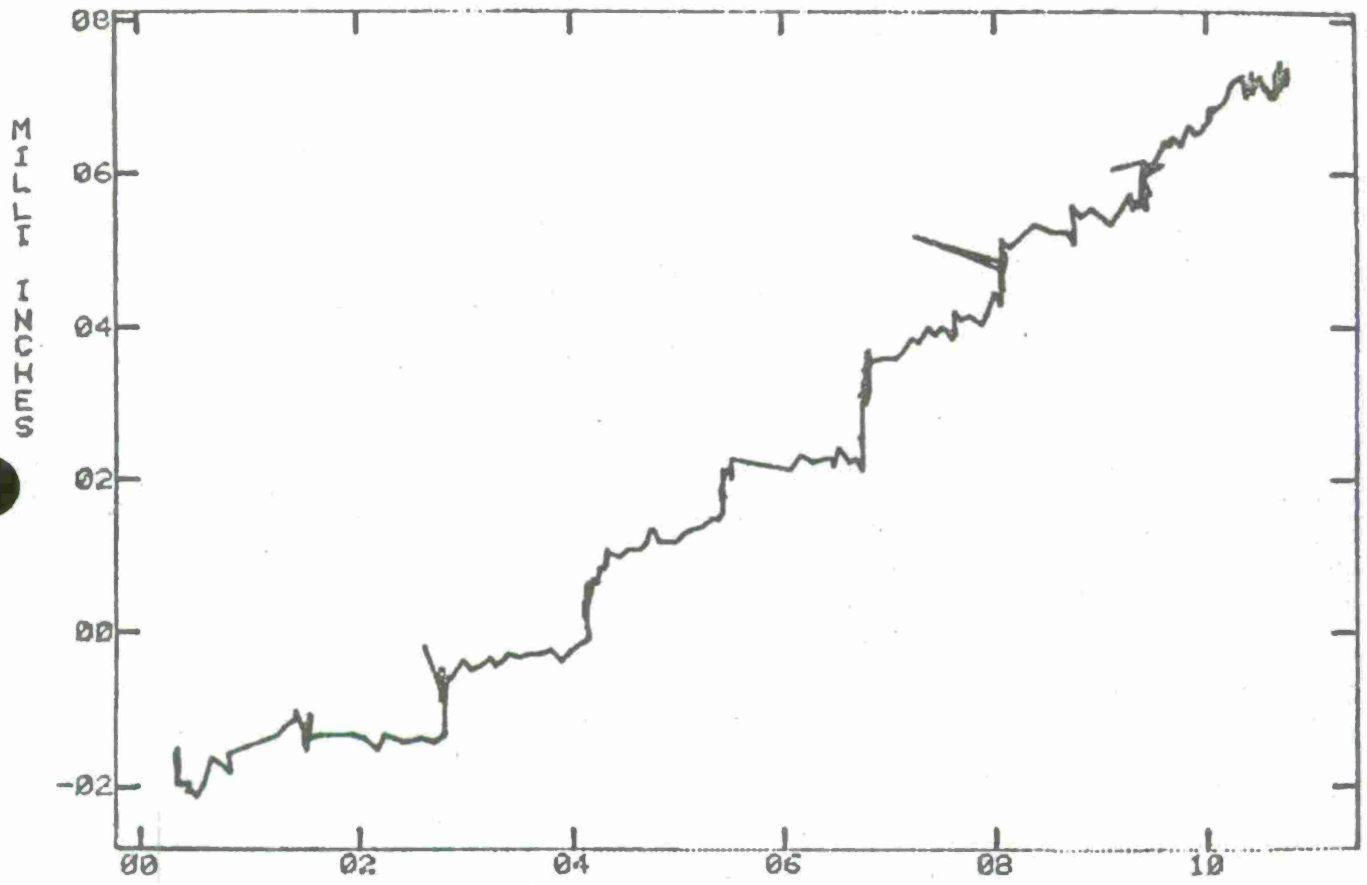
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 21.38 X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



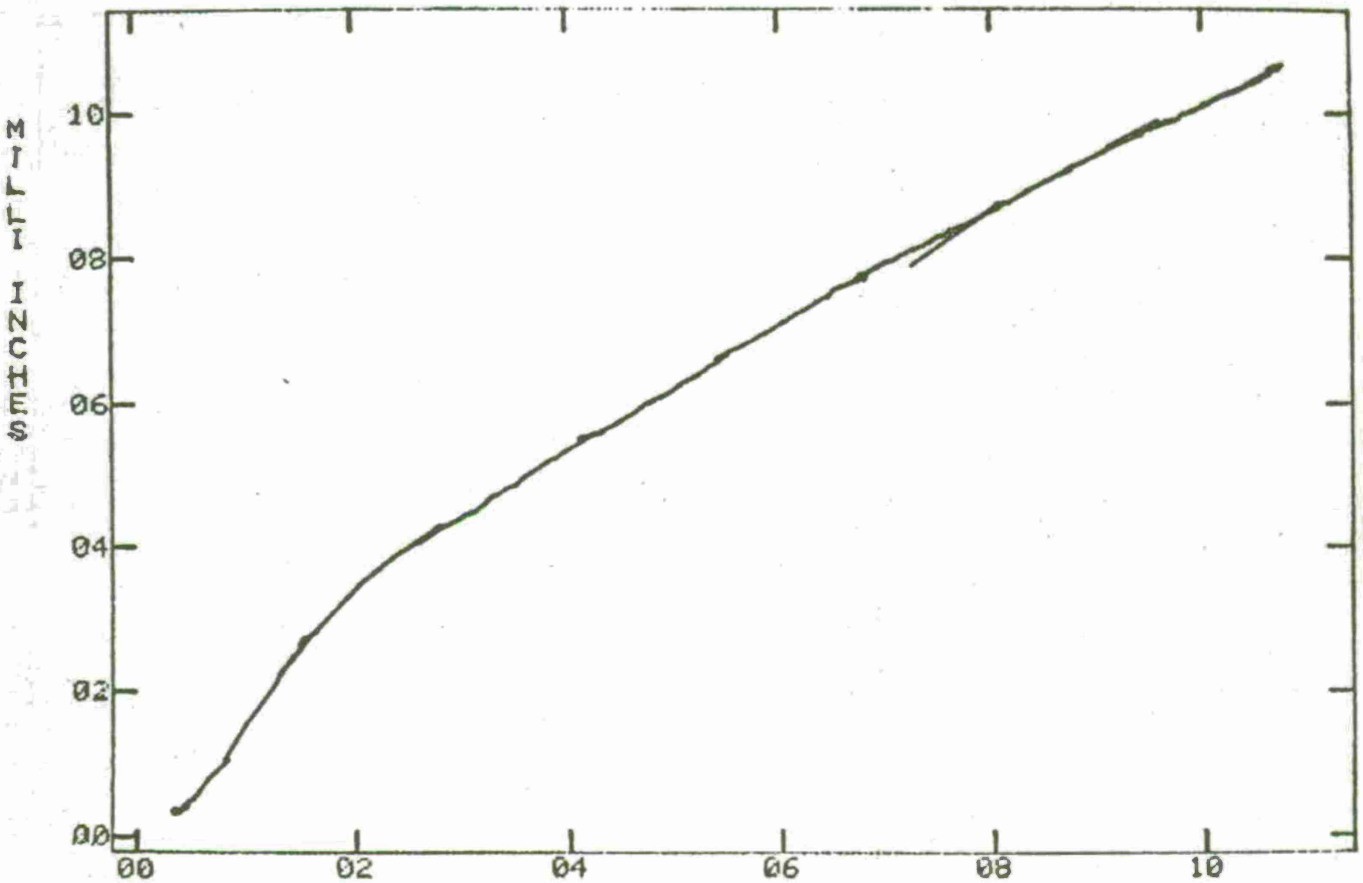
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 21.38 (CH5) X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



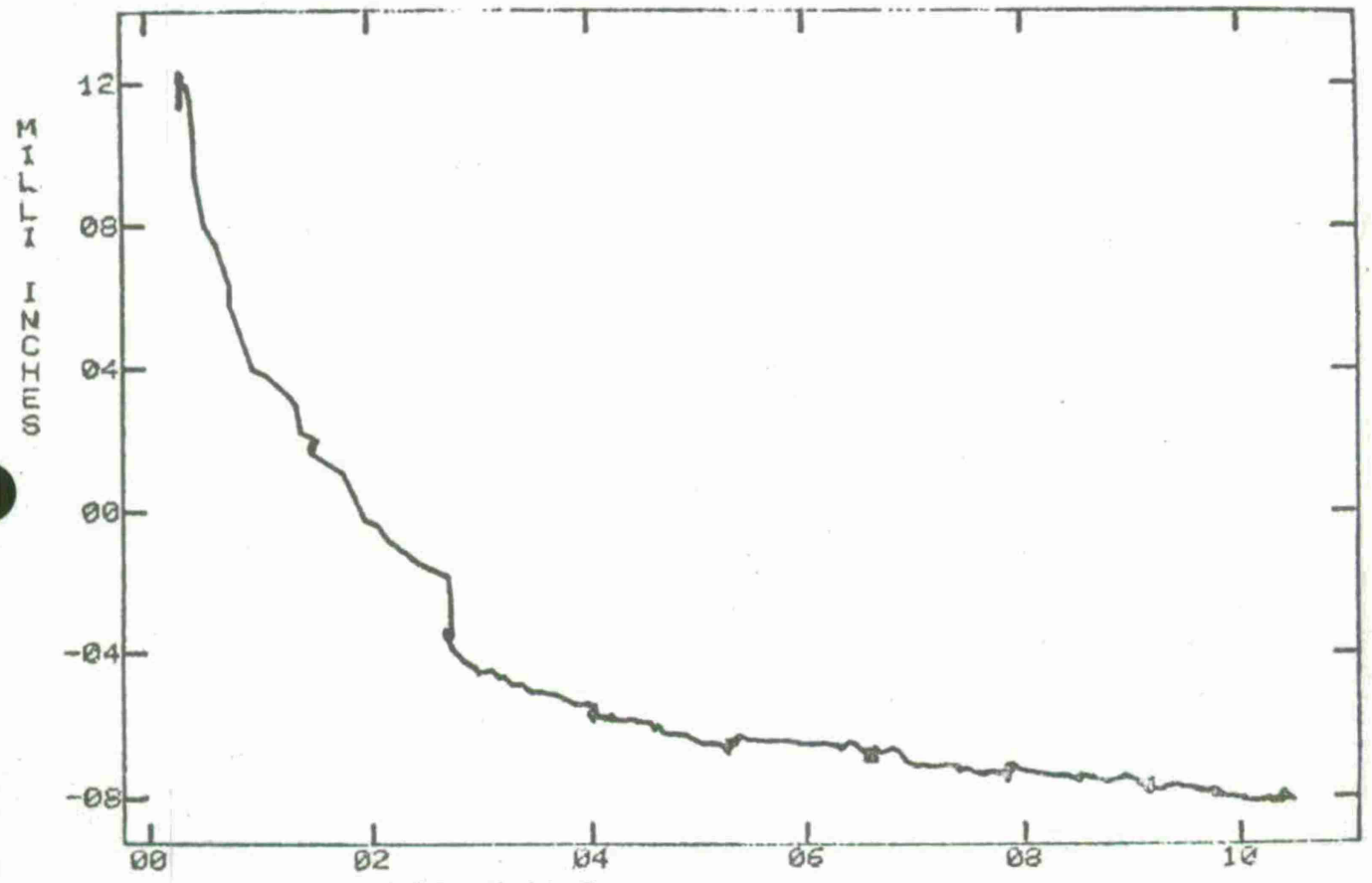
LOAD APPLIED - R.H. WS CENTER SPAR DISPL - L.H. X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



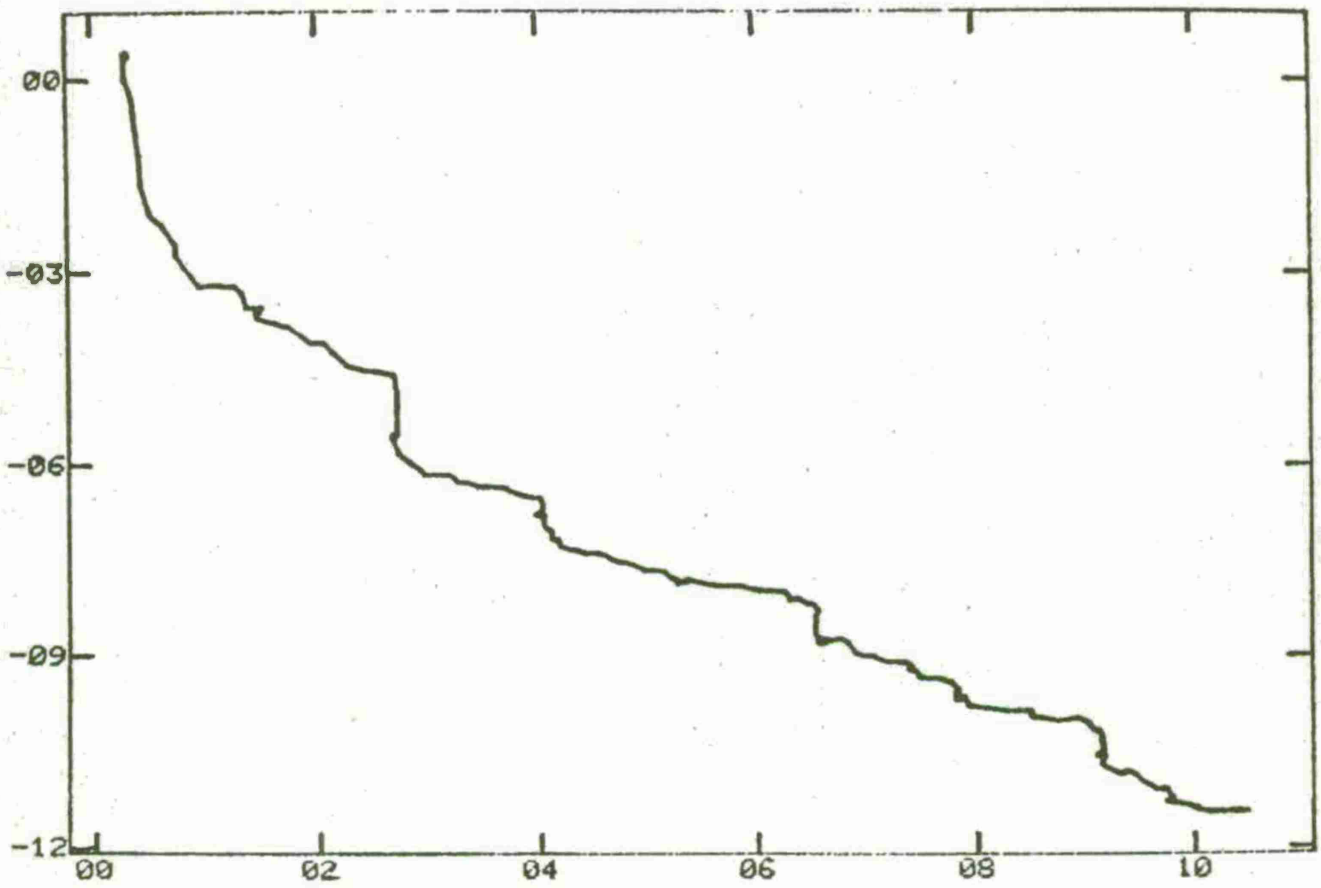
LOAD APPLIED - R.H. VS CENTER SPAR DISPL - R.H. X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



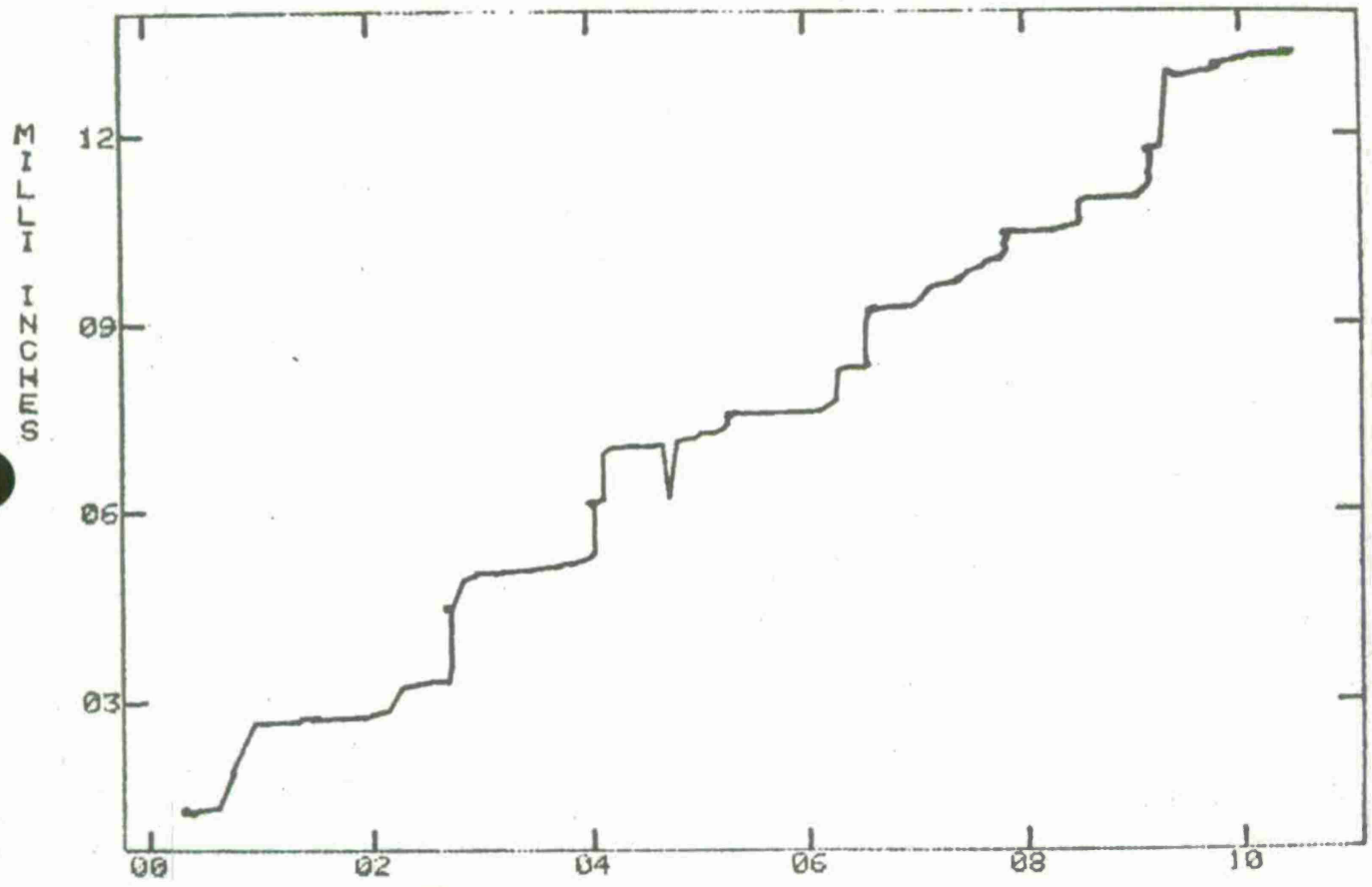
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 60 00 X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



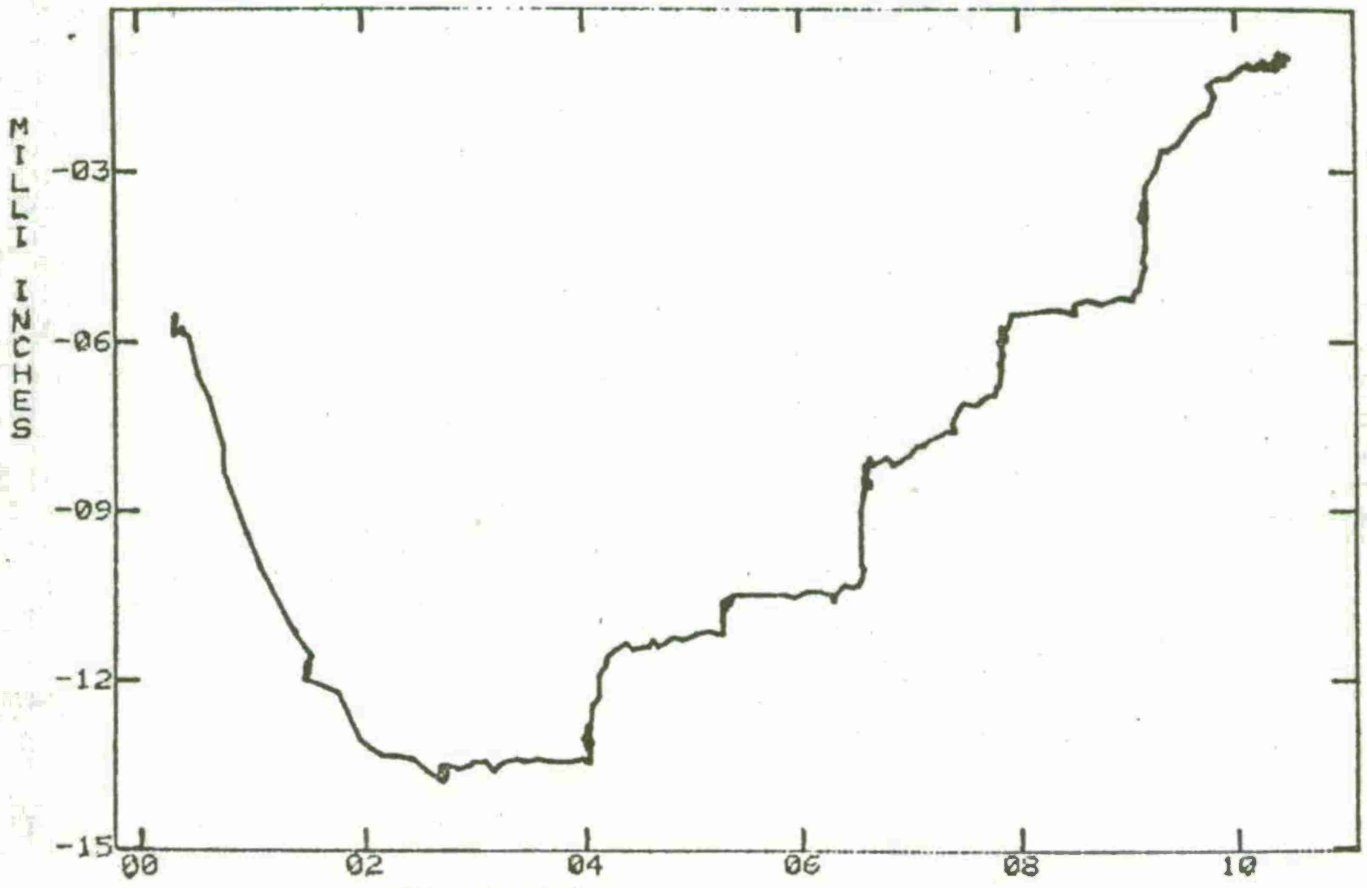
LOAD APPLIED - R.H. VS FUSLG SLOPE DISPL - BOTTOM X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



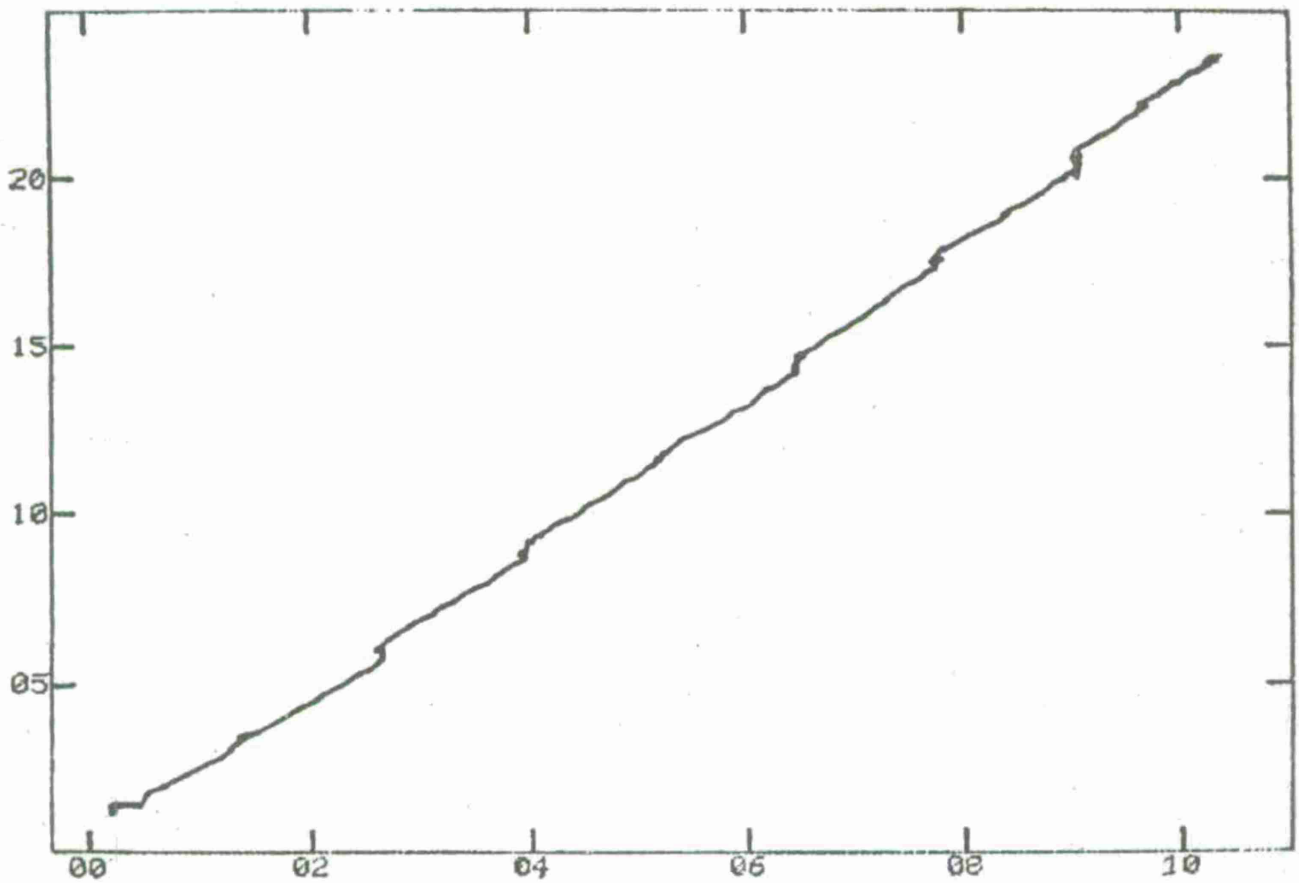
LOAD APPLIED - R.H. VS WING SLOPE DISPL - BOTTOM X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



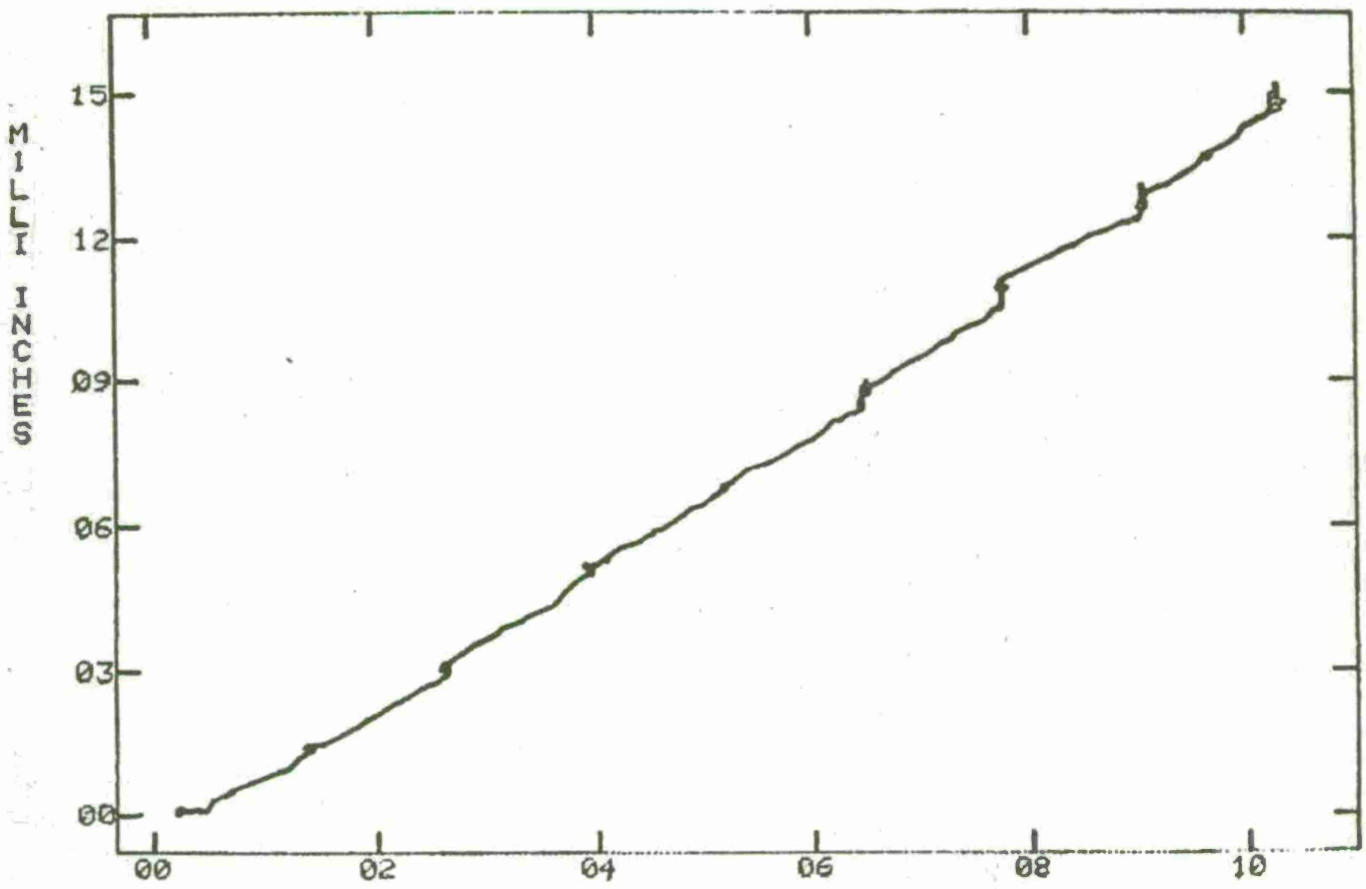
LOAD APPLIED - R.H. US WING SLOPE DISPL - TOP X 10+0
TEST 27 (23JUL75) AH1G BEND TESTS



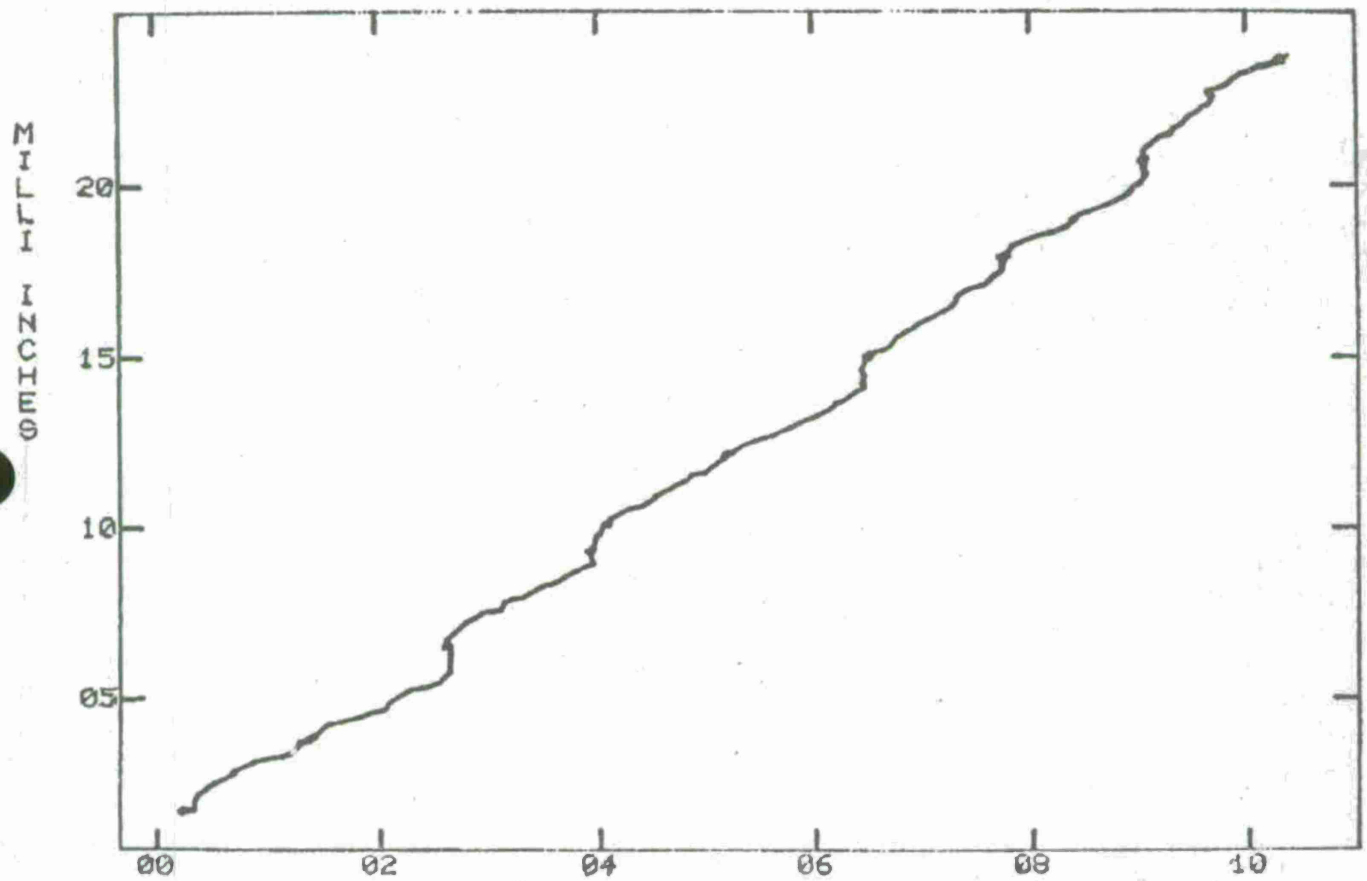
LOAD APPLIED - R.H. VS FUSLG SLOPE DISPL - TOP X 10+1
TEST 27 (23JUL75) AH1G BEND TESTS



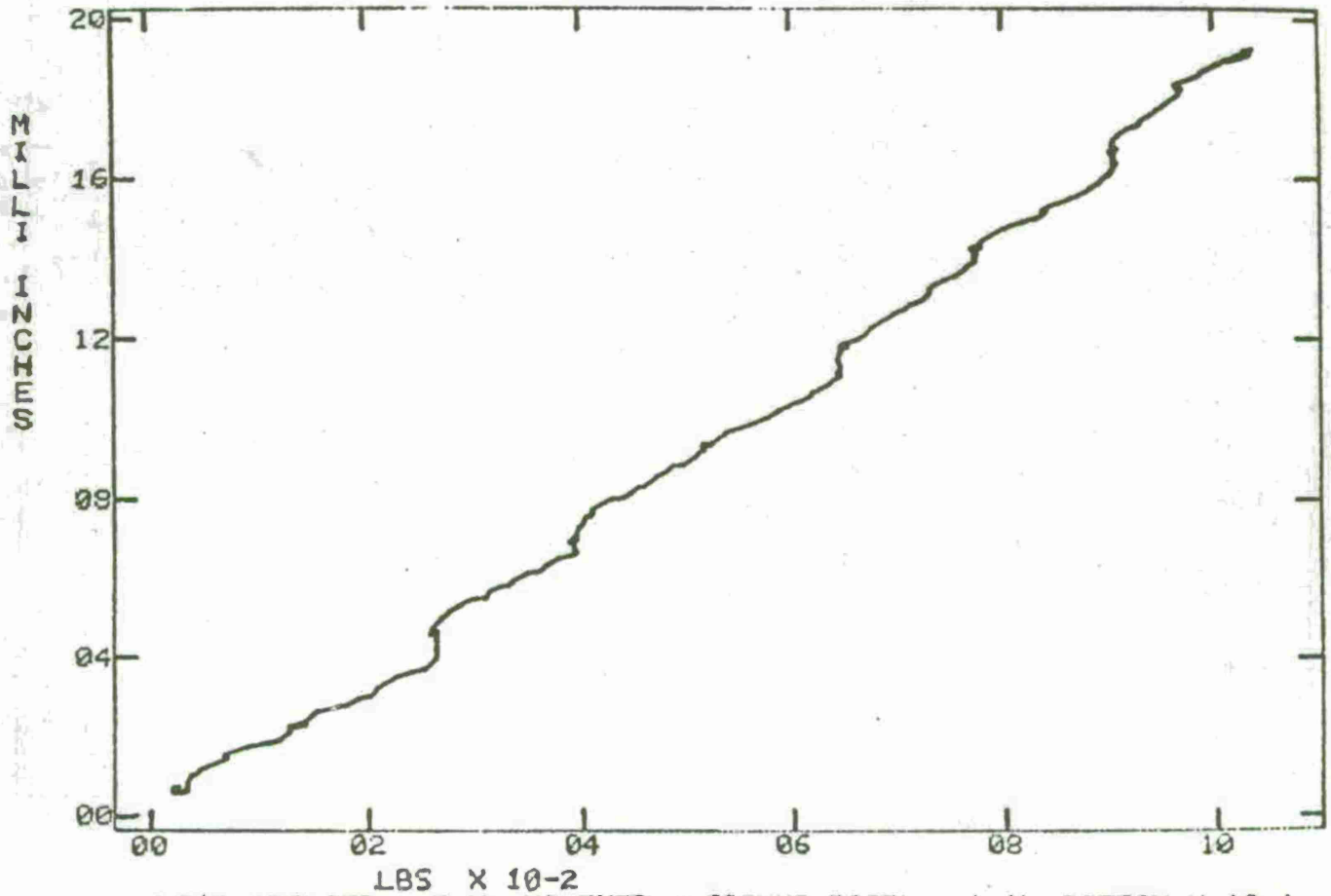
LOAD APPLIED - R.H. VS EXTR / GROUND DISPL - R.H. TOP X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



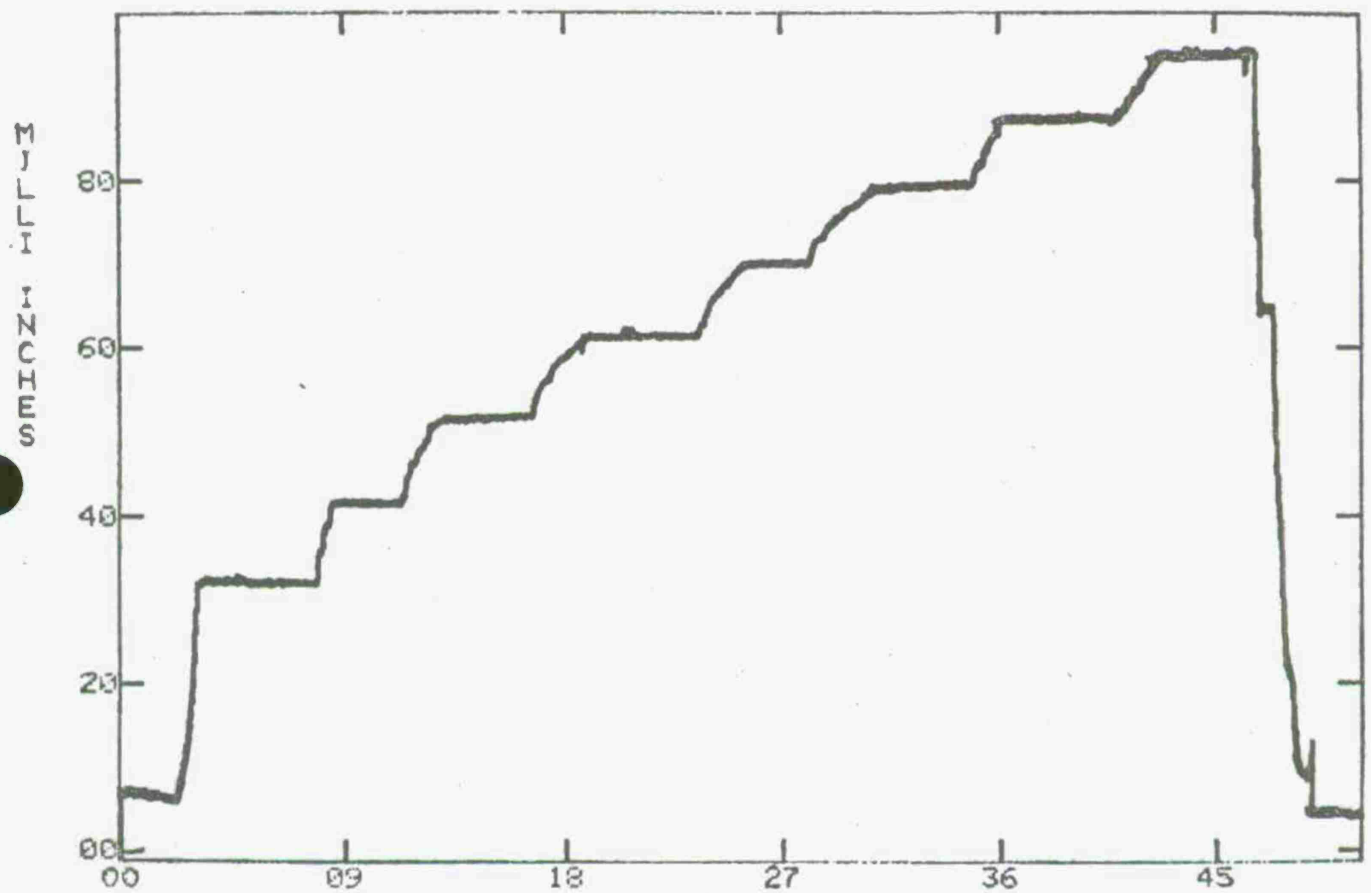
LOAD APPLIED - R.H. VS FXTR / GROUND DISPL - R.H. BOTTOM X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



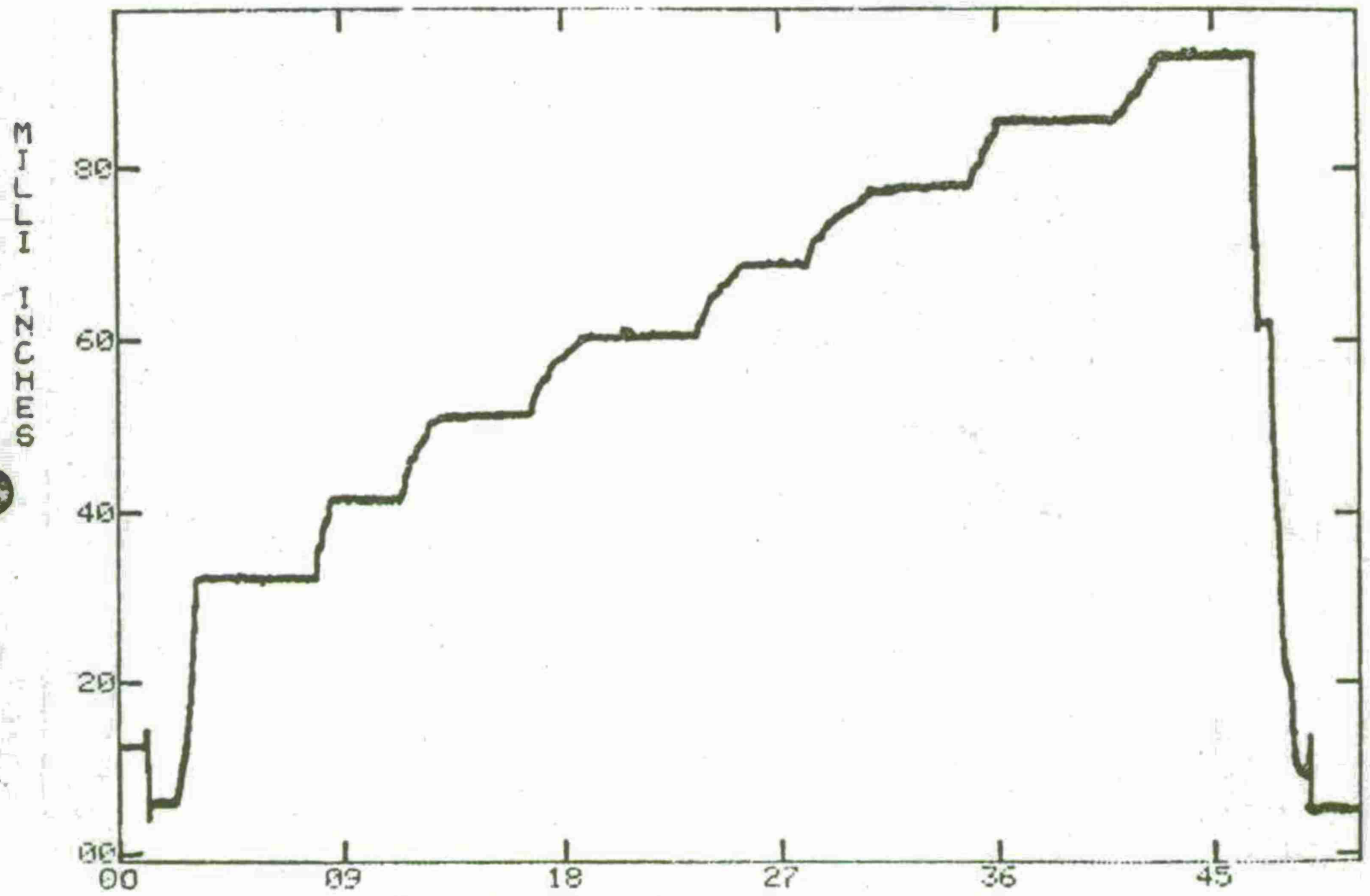
LOAD APPLIED - R.H. VS EXTR / GROUND DISPL - L.H. TOP X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



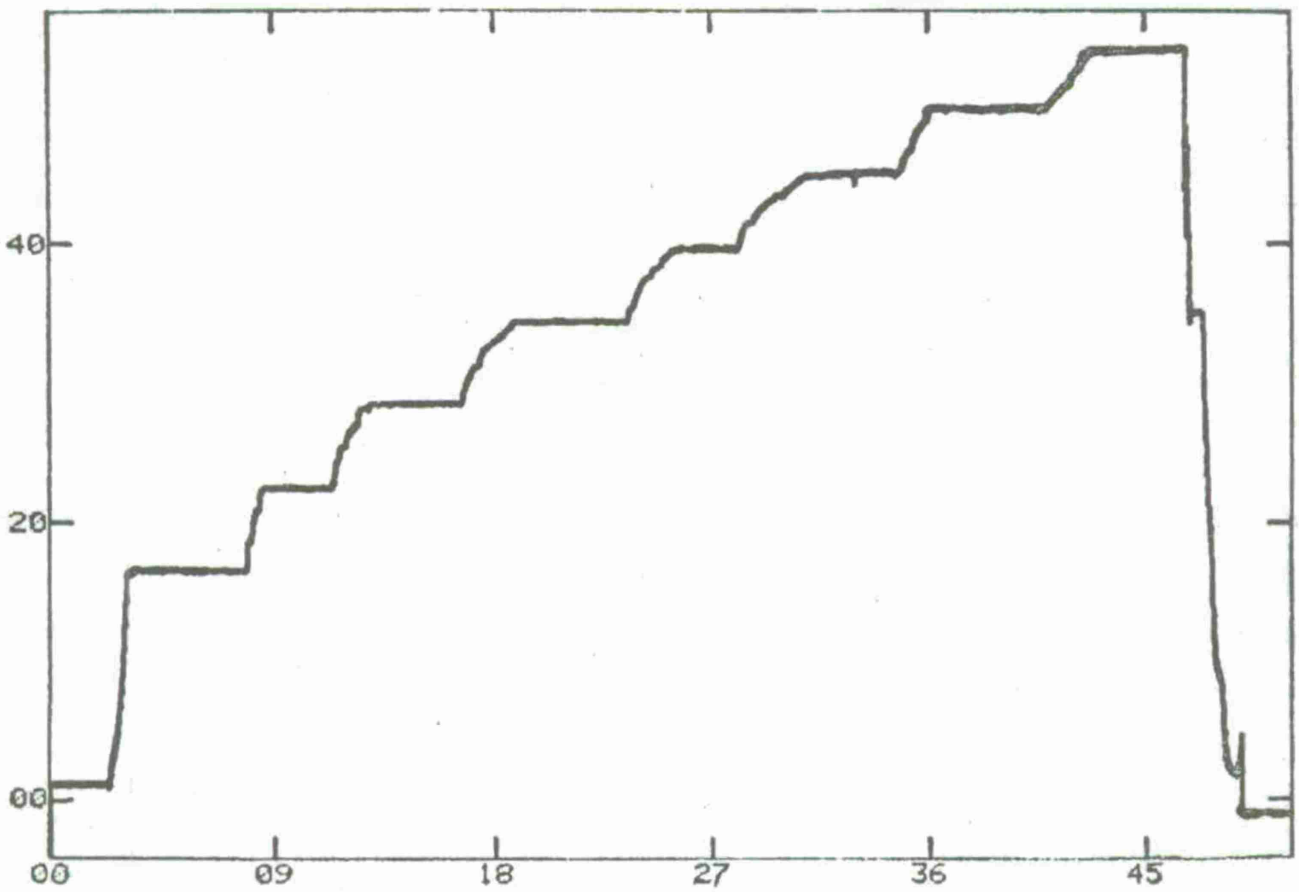
LOAD APPLIED - R.H. VS FXTR / GROUND DISPL - L.H. BOTTOM X 10-1
TEST 27 (23JUL75) AH1G BEND TESTS



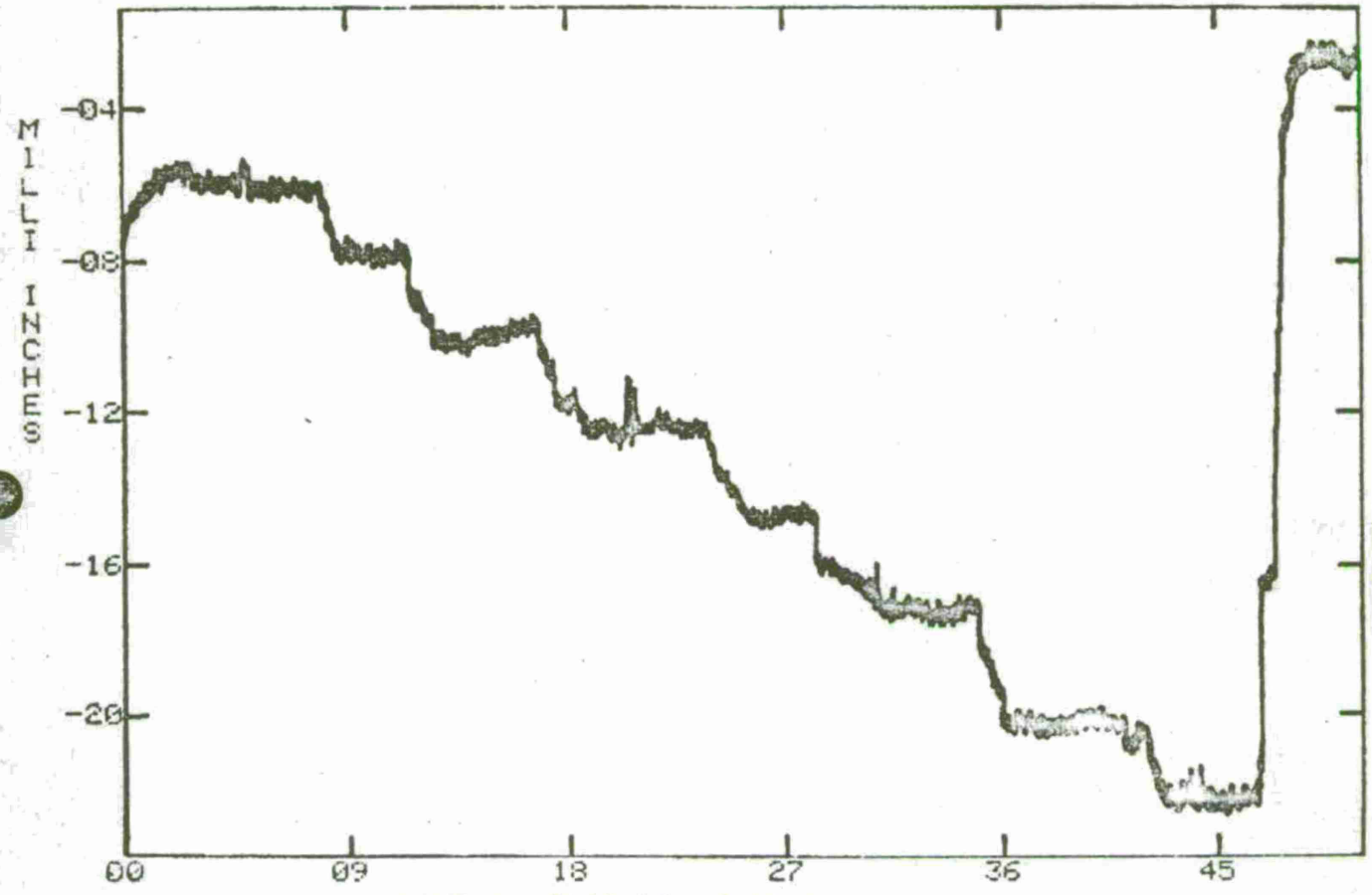
CH 1 WING VERT DISPLACEMENT - WS 57.74 X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



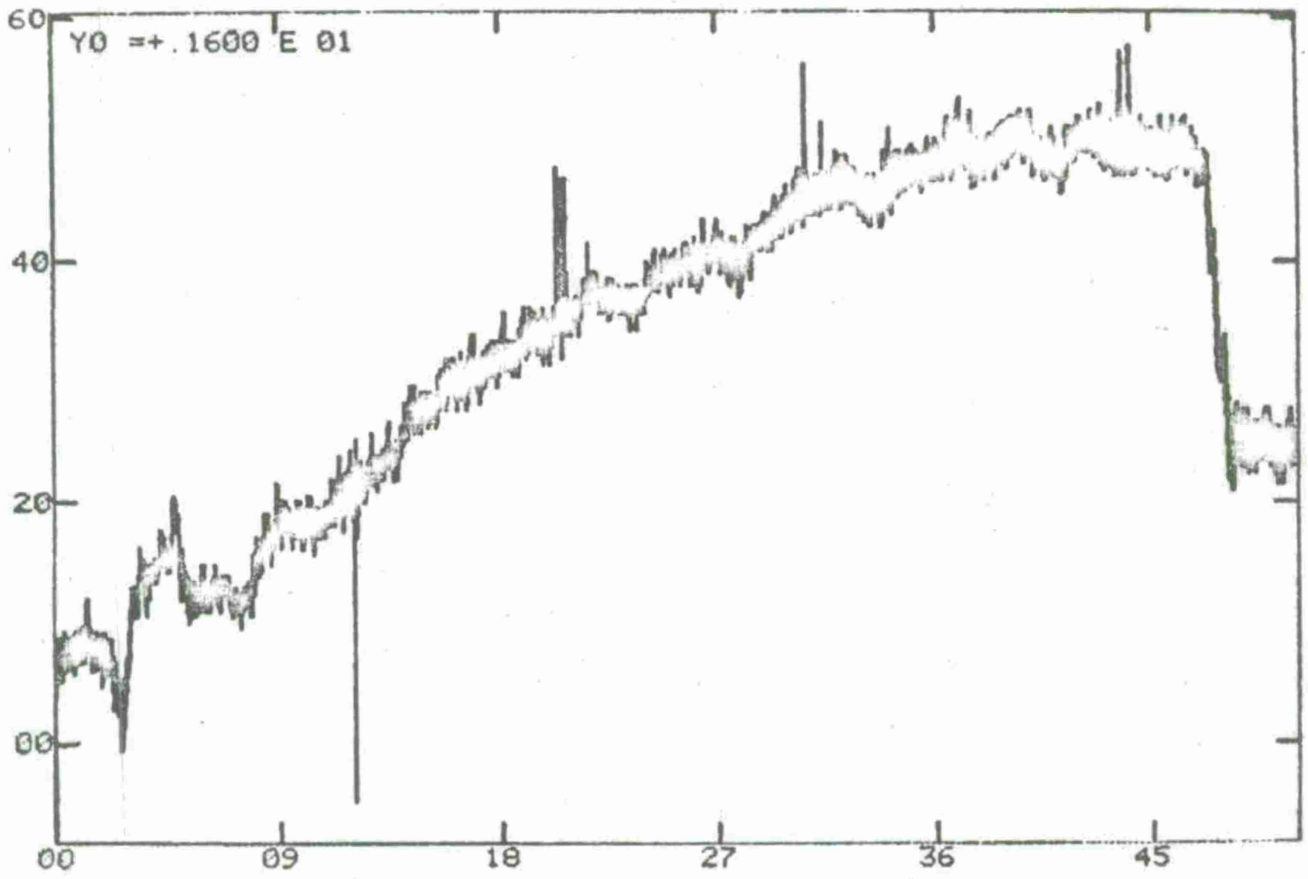
CH 2 WING VERT DISPLACEMENT - WS 59.00 X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



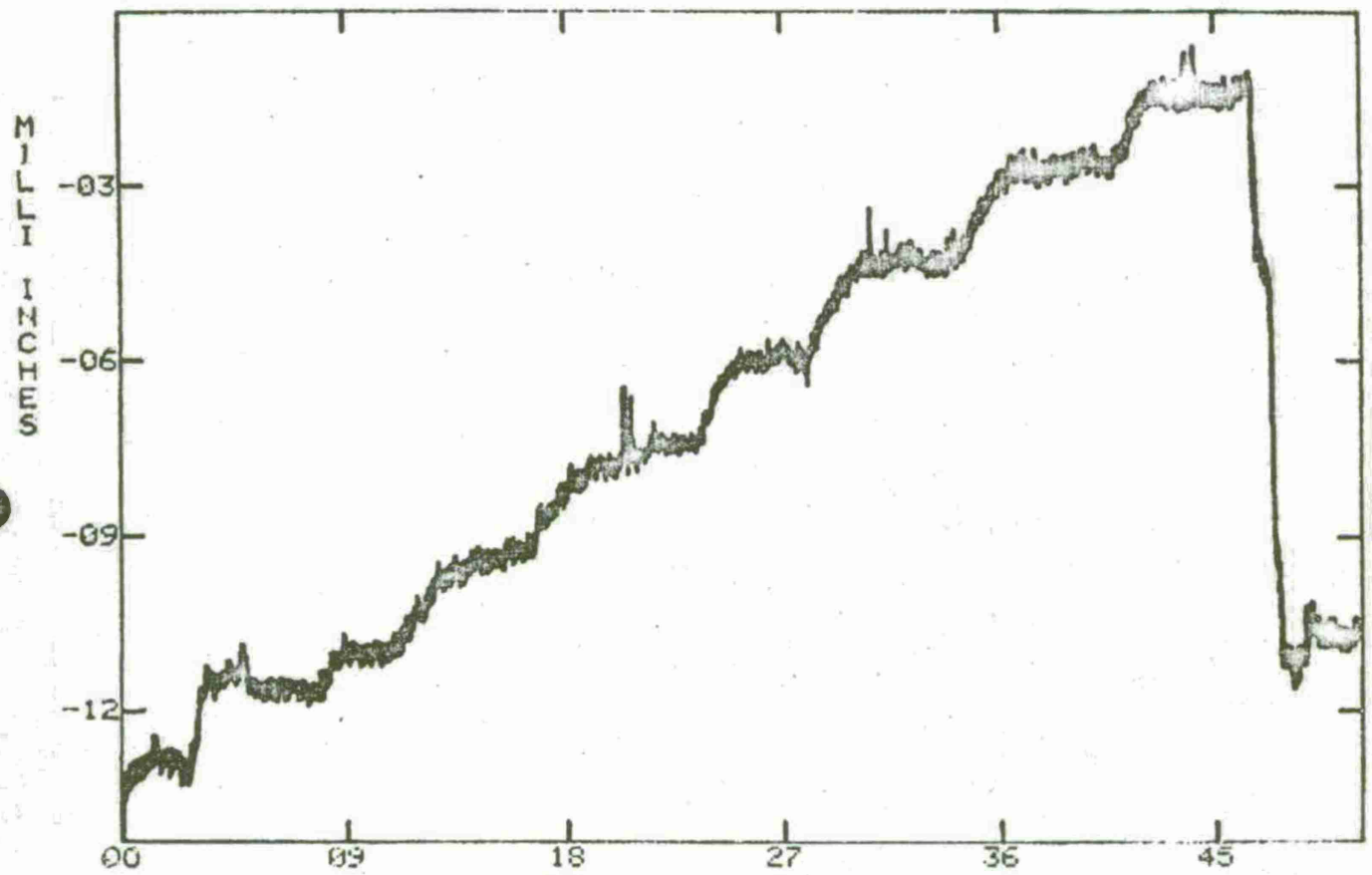
CH 3 WING VERT DISPLACEMENT - WS 42.50 X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



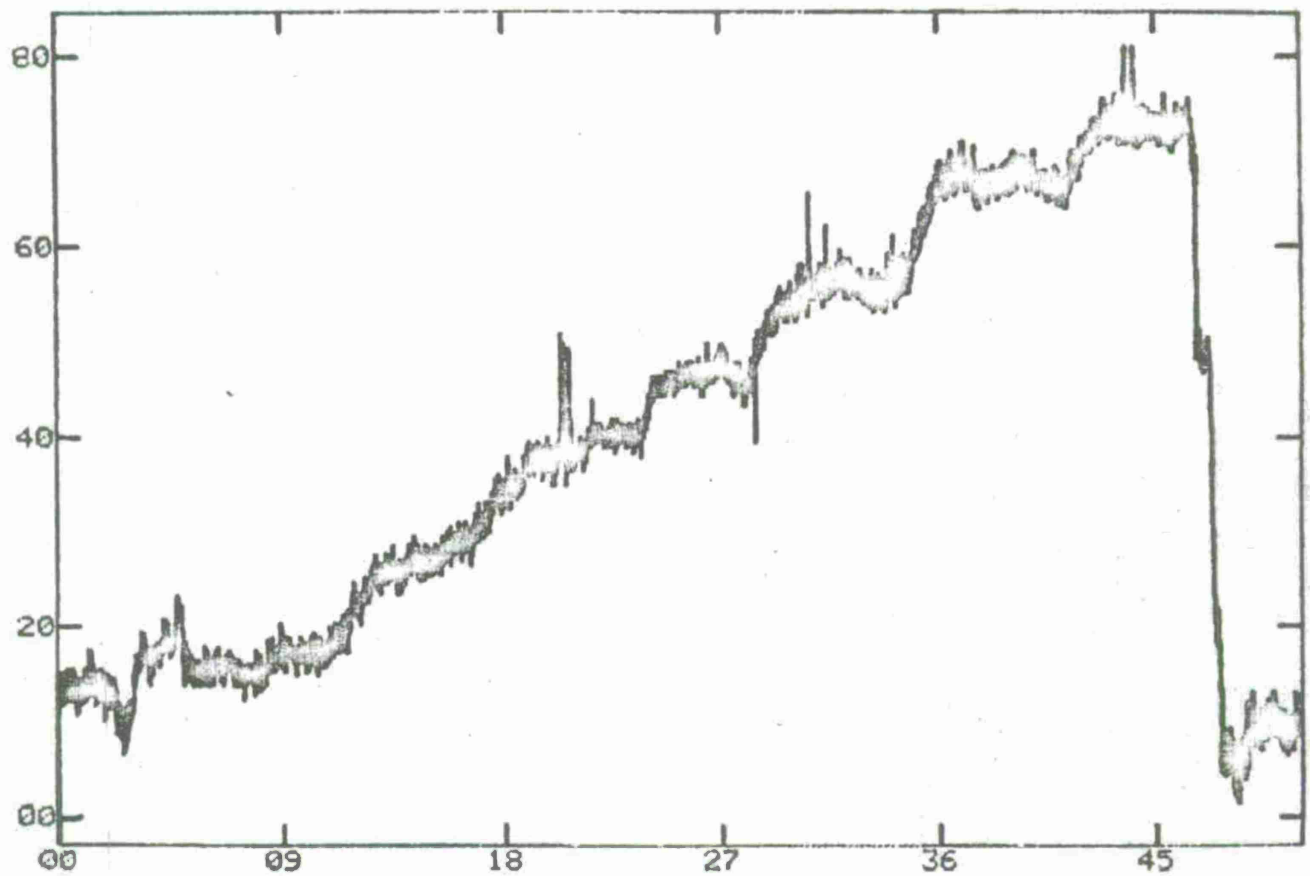
CH 4 WING VERT DISPLACEMENT - WS 21.38 X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



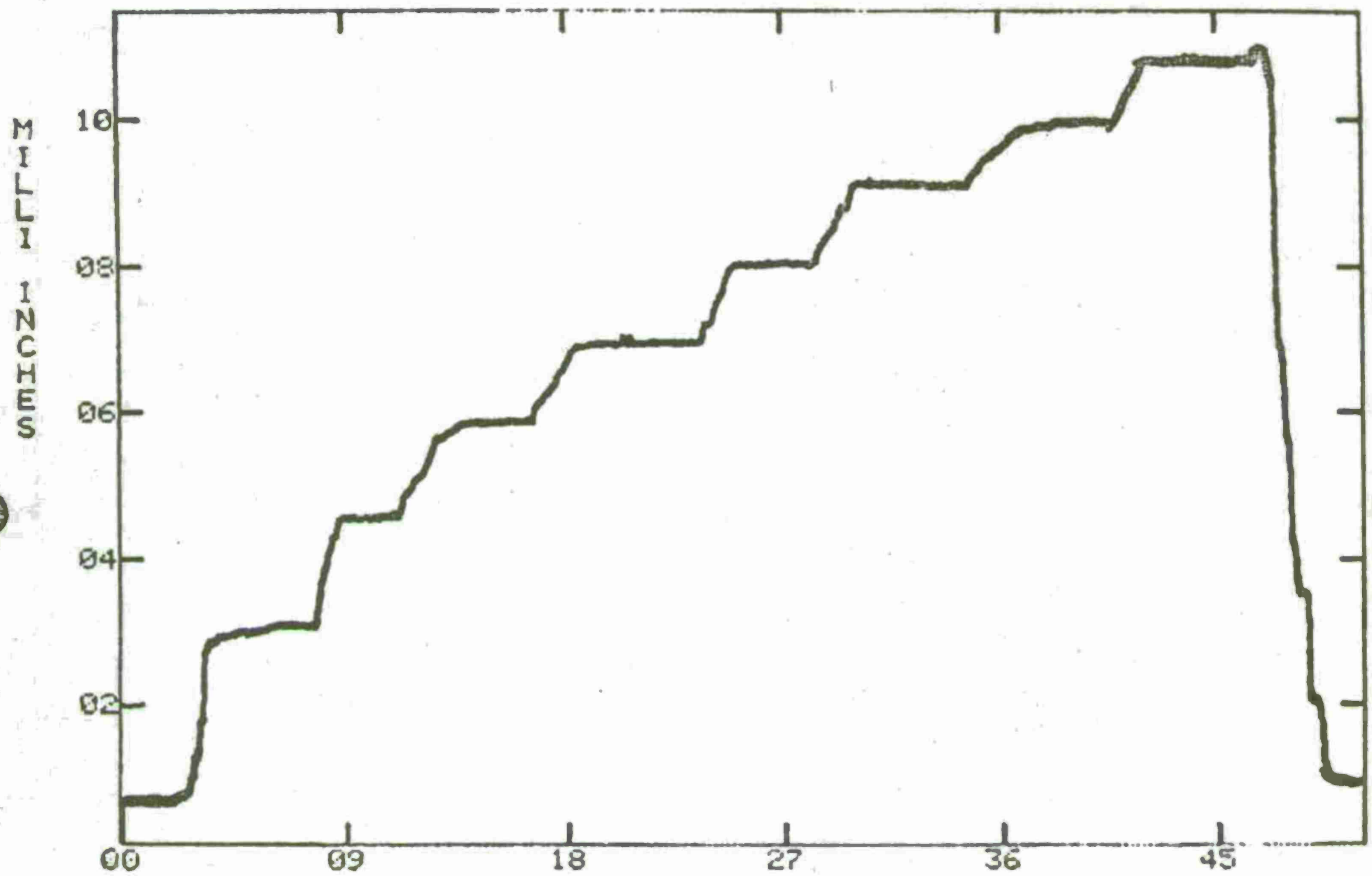
CH 5 WING VERT DISPLACEMENT - WS 21.38 X 10+2
TEST 28 (23JUL75) AH1G BEND TESTS



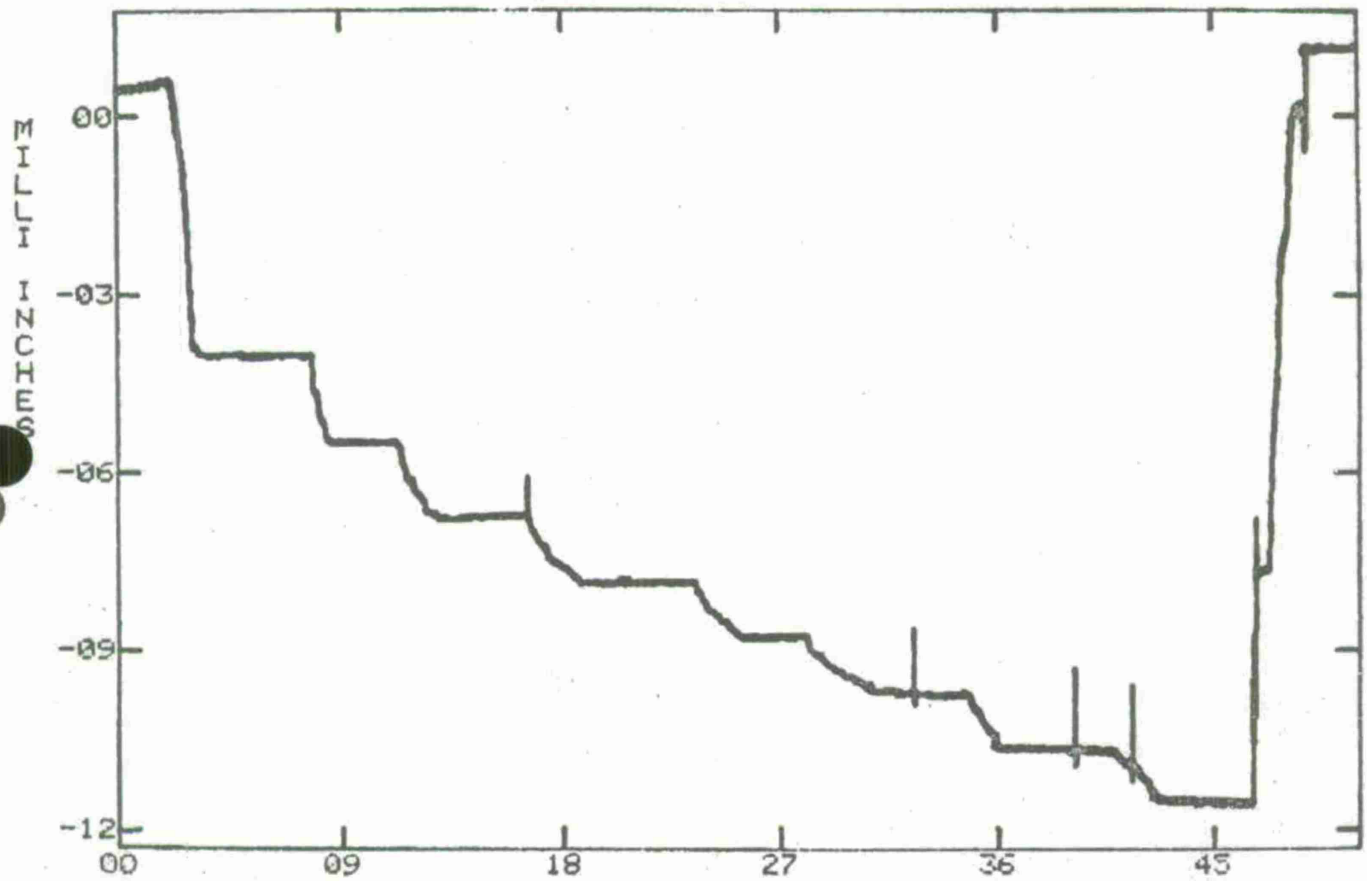
CH 6 CENTER SPAR DISPLACEMENT - L.H. X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



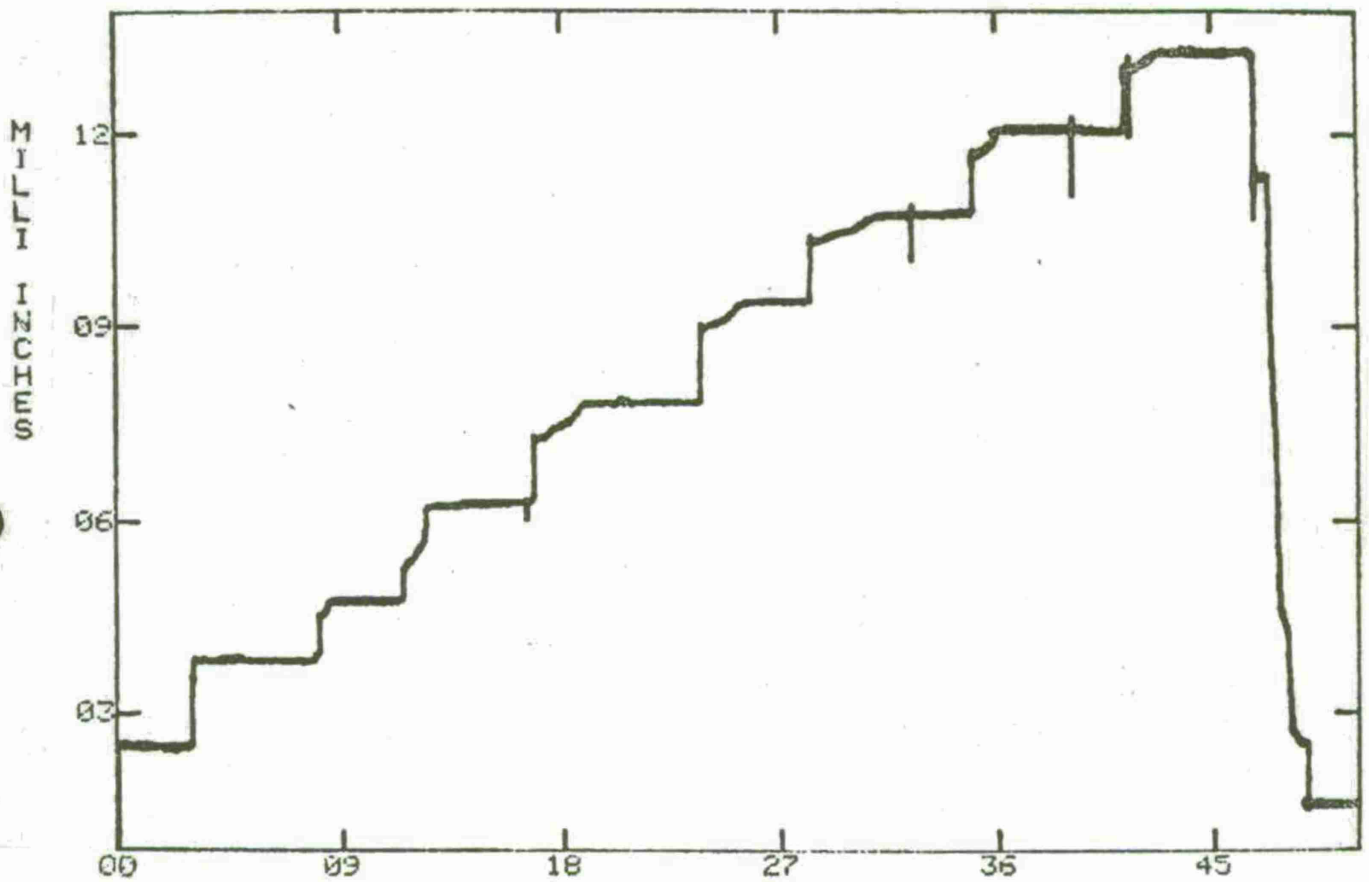
CH 7 CENTER SPAR DISPLACEMENT - R.H. X 10+2
TEST 28 (23JUL75) AH1G BEND TESTS



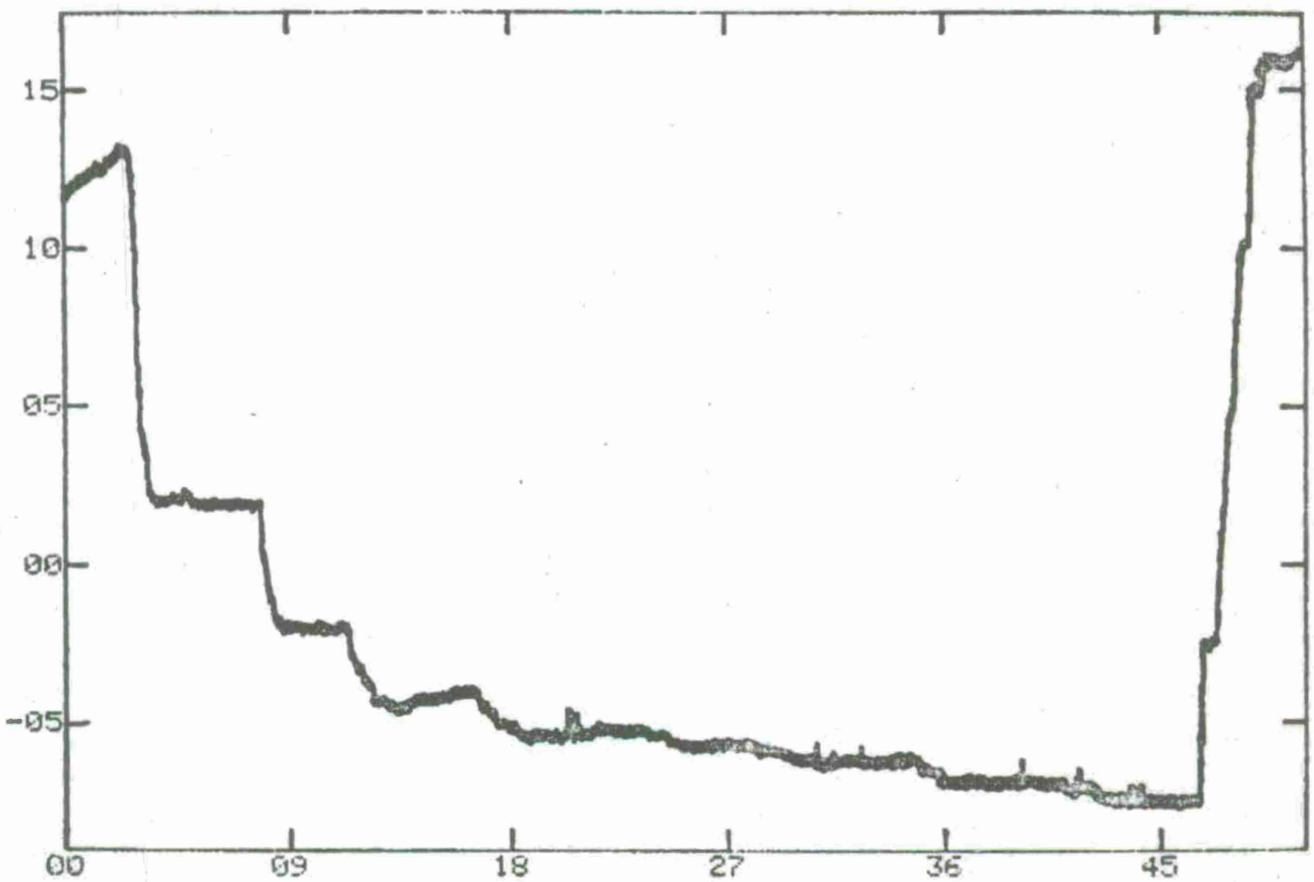
CH 8 WING VERT DISPLACEMENT - WS 60.00 X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



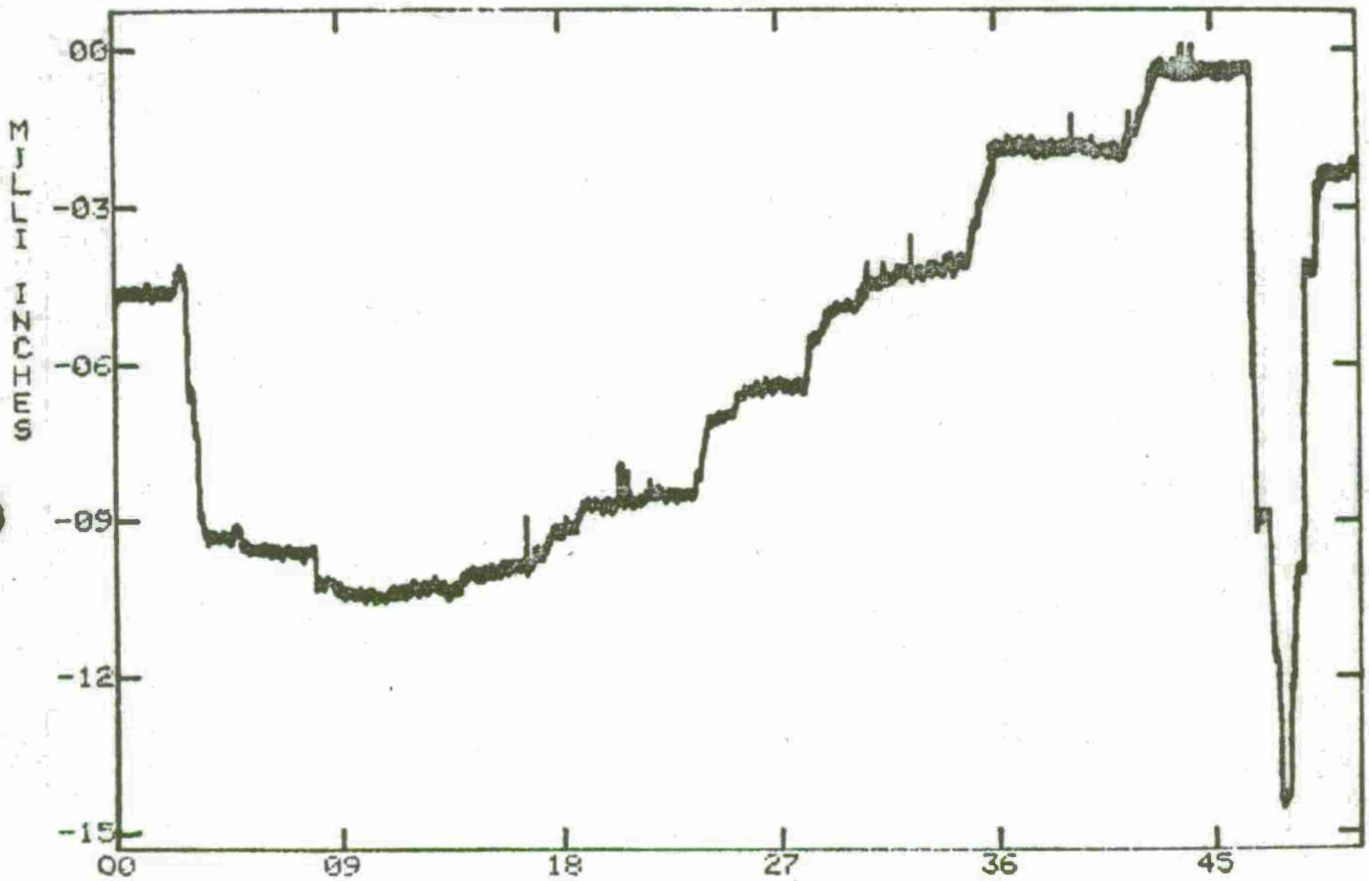
CH 9 WING SLOPE DISPLACEMENT - BOTTOM X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



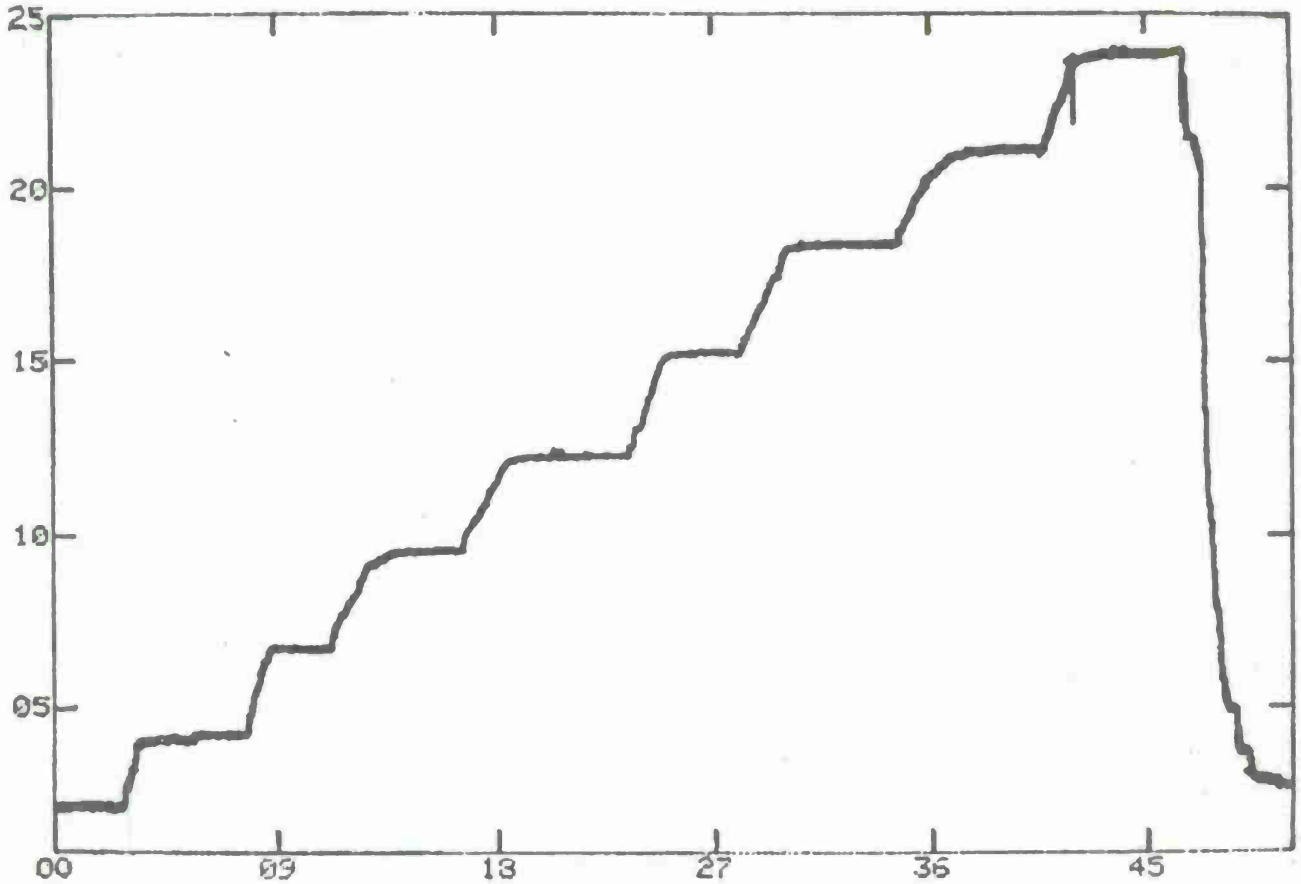
CH 10 WING SLOPE DISPLACEMENT - TOP X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



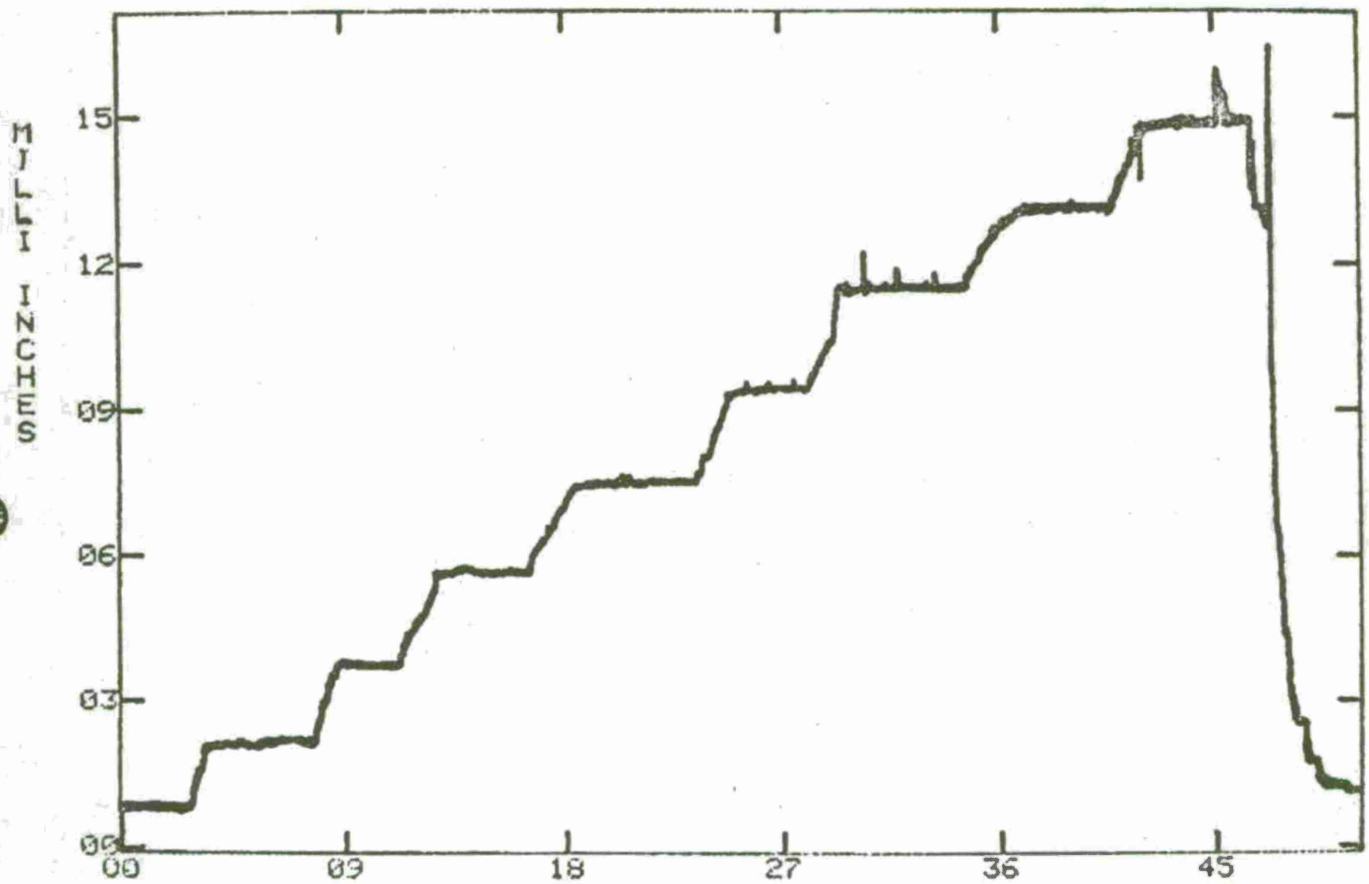
CH 11 FUSELAGE SLOPE DISPLACEMENT - BOTTOM X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



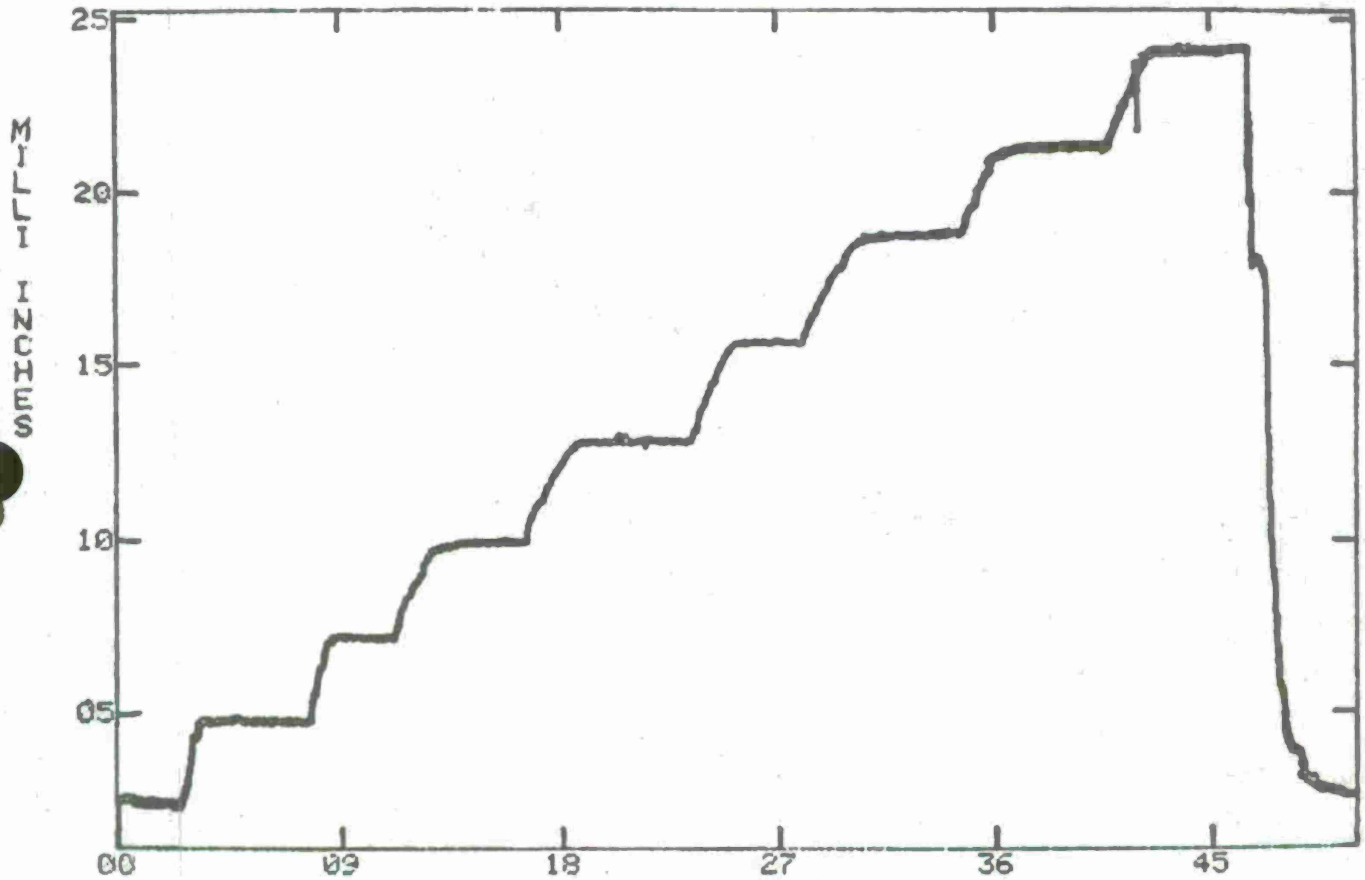
CH 12 FUSELAGE SLOPE DISPLACEMENT - TOP X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



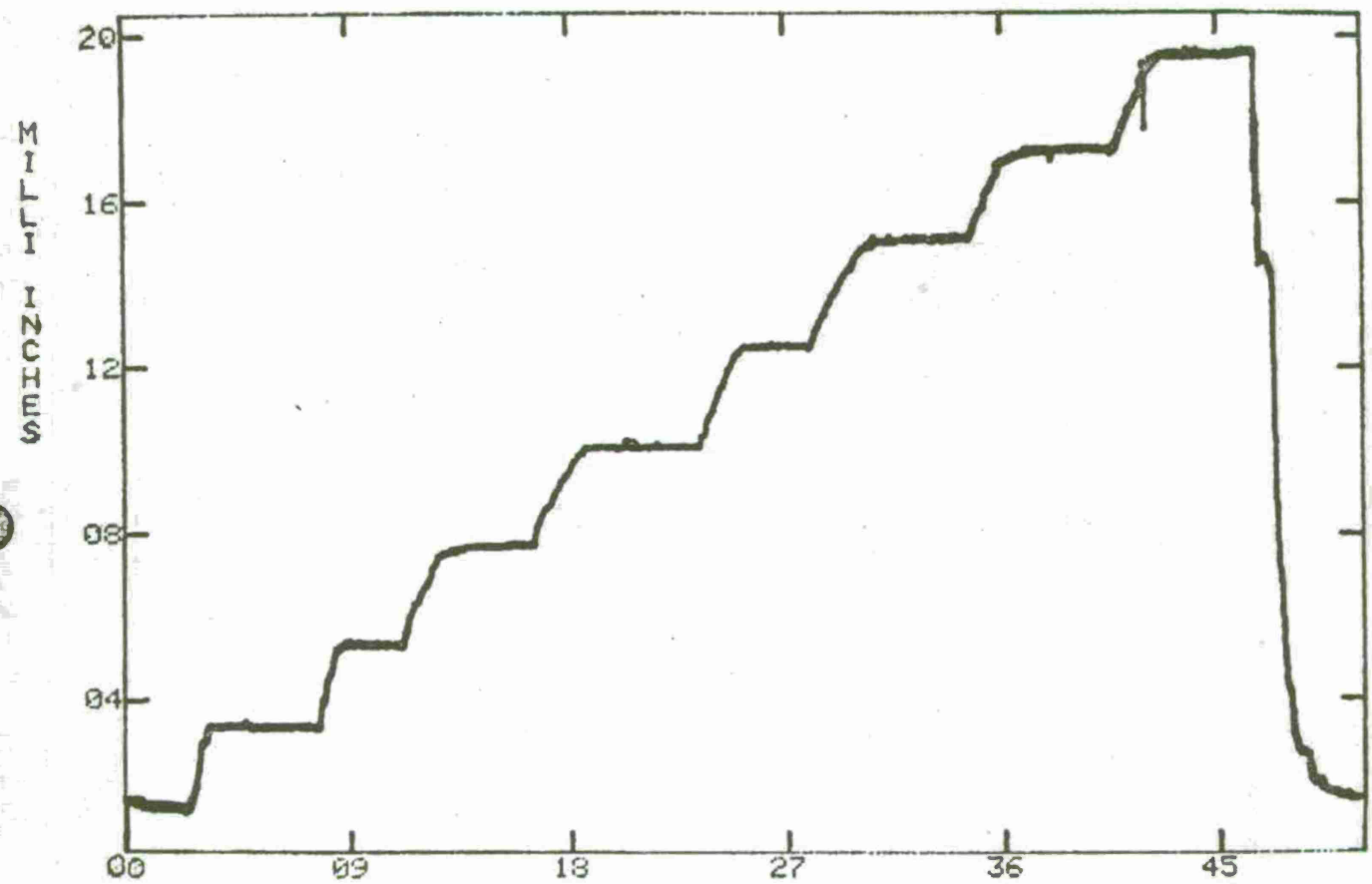
CH 13 FIXTURE / GROUND DISPLACEMENT - R.H. TOP X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



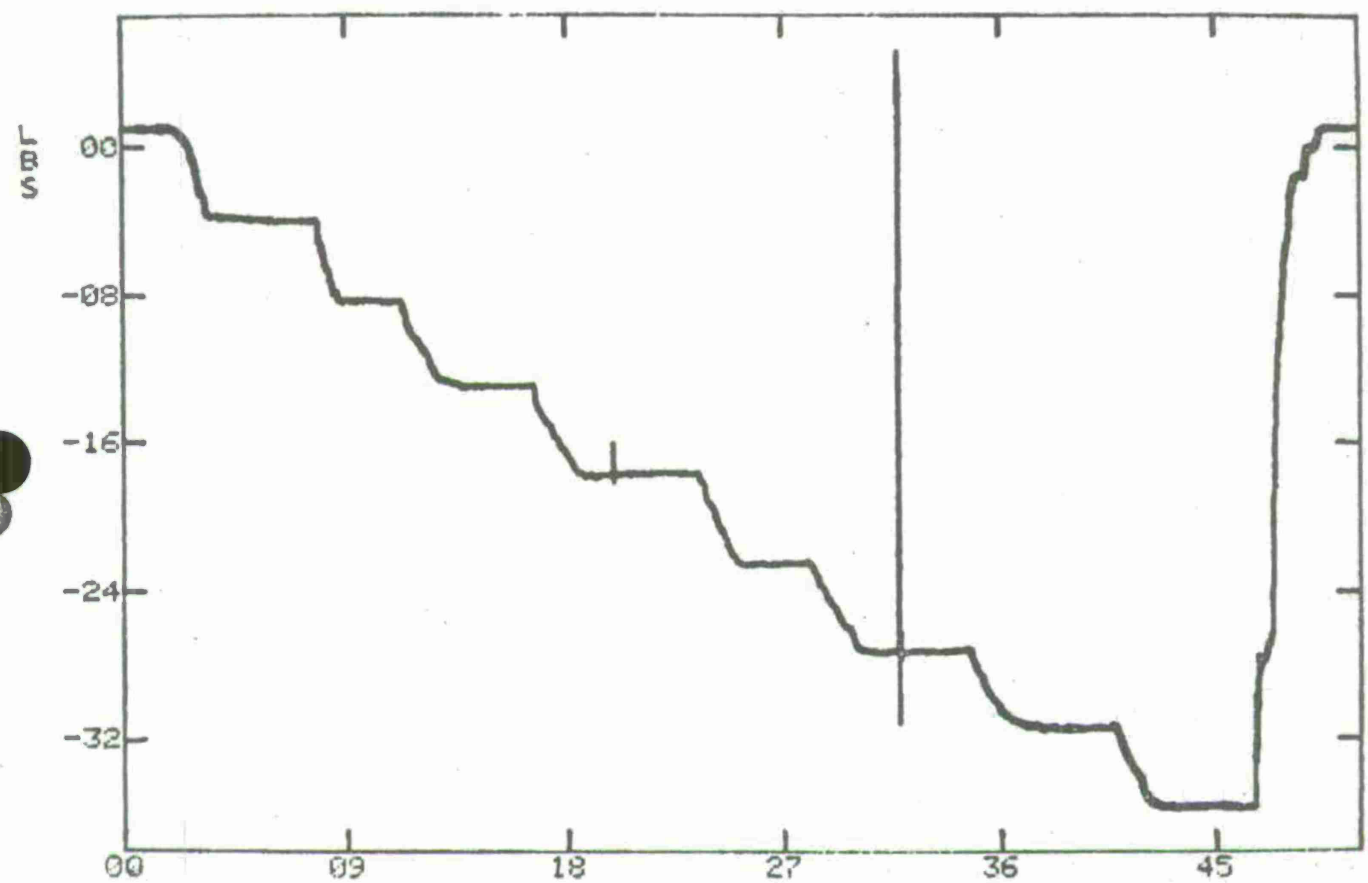
CH 14 FIXTURE / GROUND DISPLACEMENT - R.H. BOTTOM X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



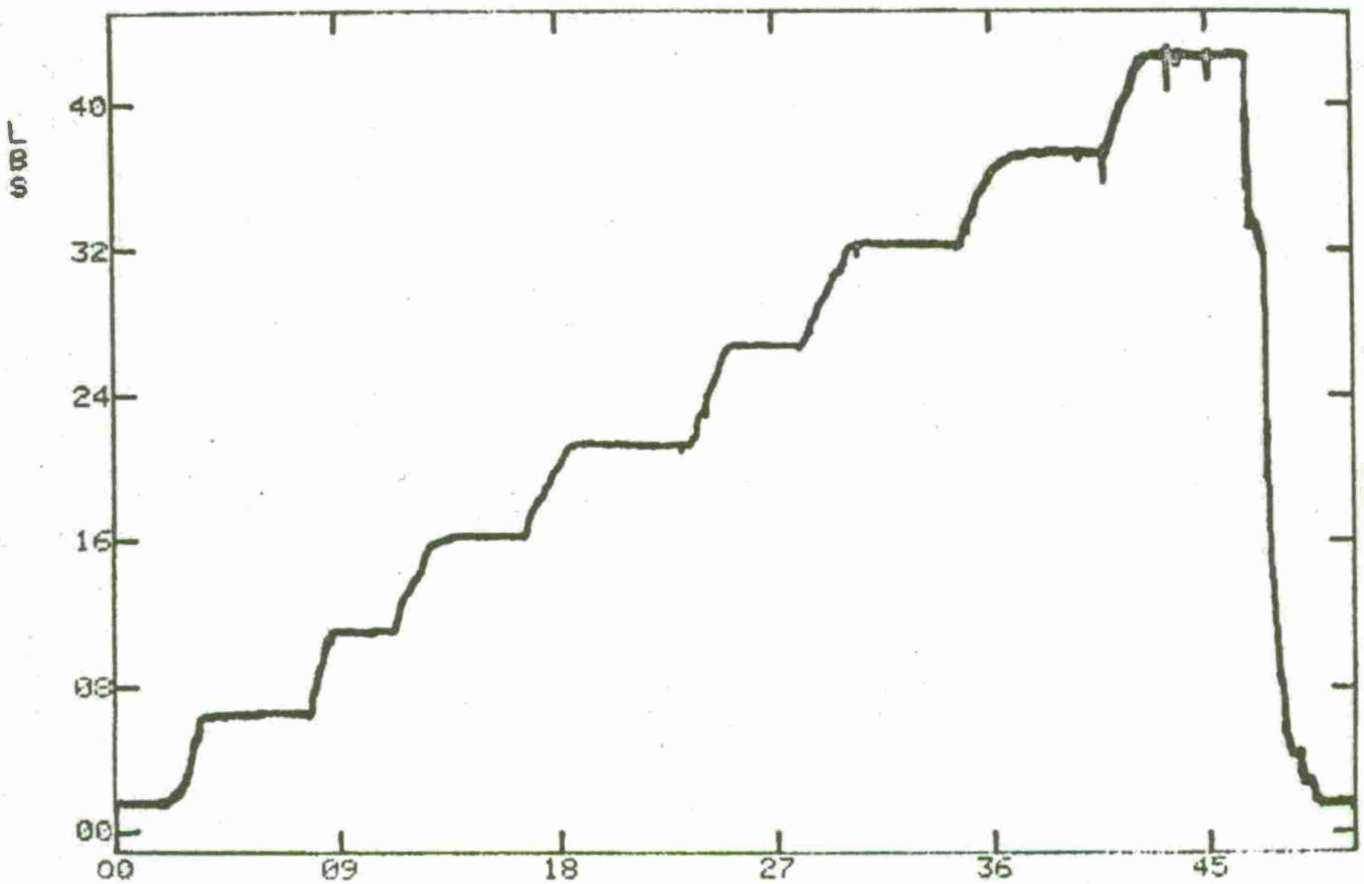
CH 15 FIXTURE / GROUND DISPLACEMENT - L.H. TOP X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



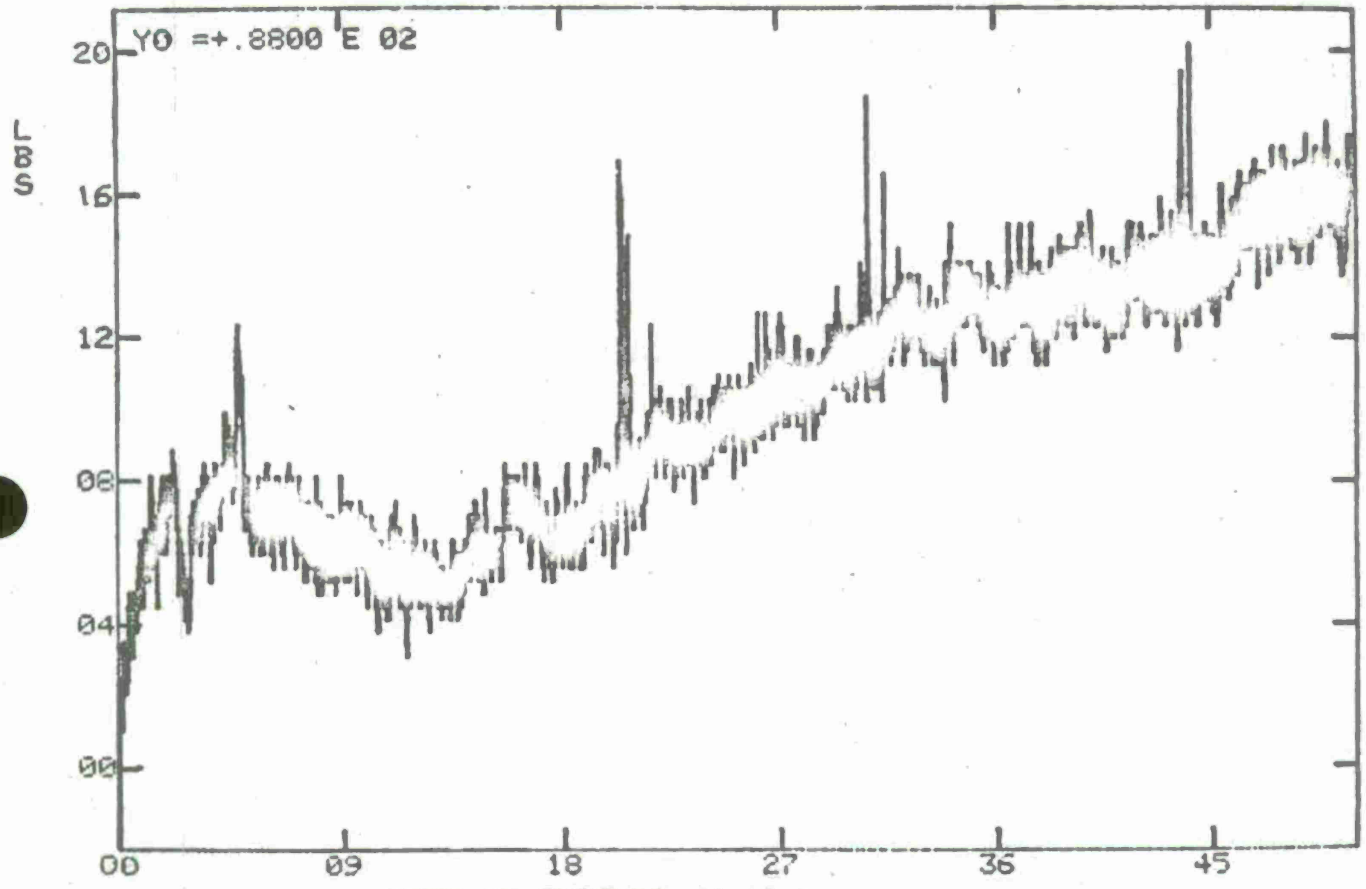
CH 17 FIXTURE / GROUND DISPLACEMENT - L.H. BOTTOM X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



CH 18 BASE LOAD - L H TOP X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS



CH 19 BASE LOAD - L.H. BOTTOM X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS


YO =+.8800 E 02
20
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12
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LBS
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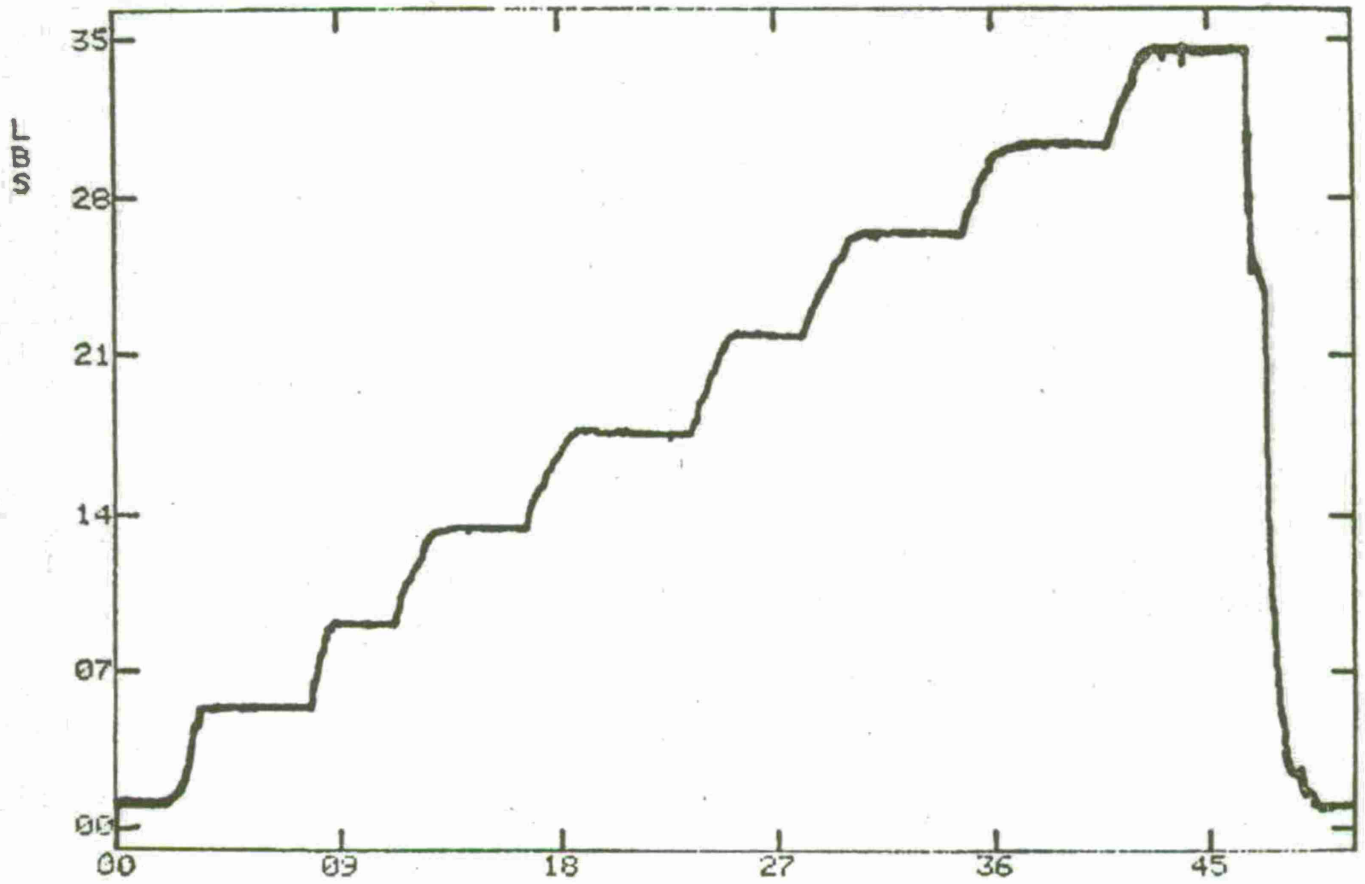
36
45
TIME IN SECONDS X 10-1
CH 20 BASE LOAD - R.H. TOP X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS


LBS
35
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21
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07
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18
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36
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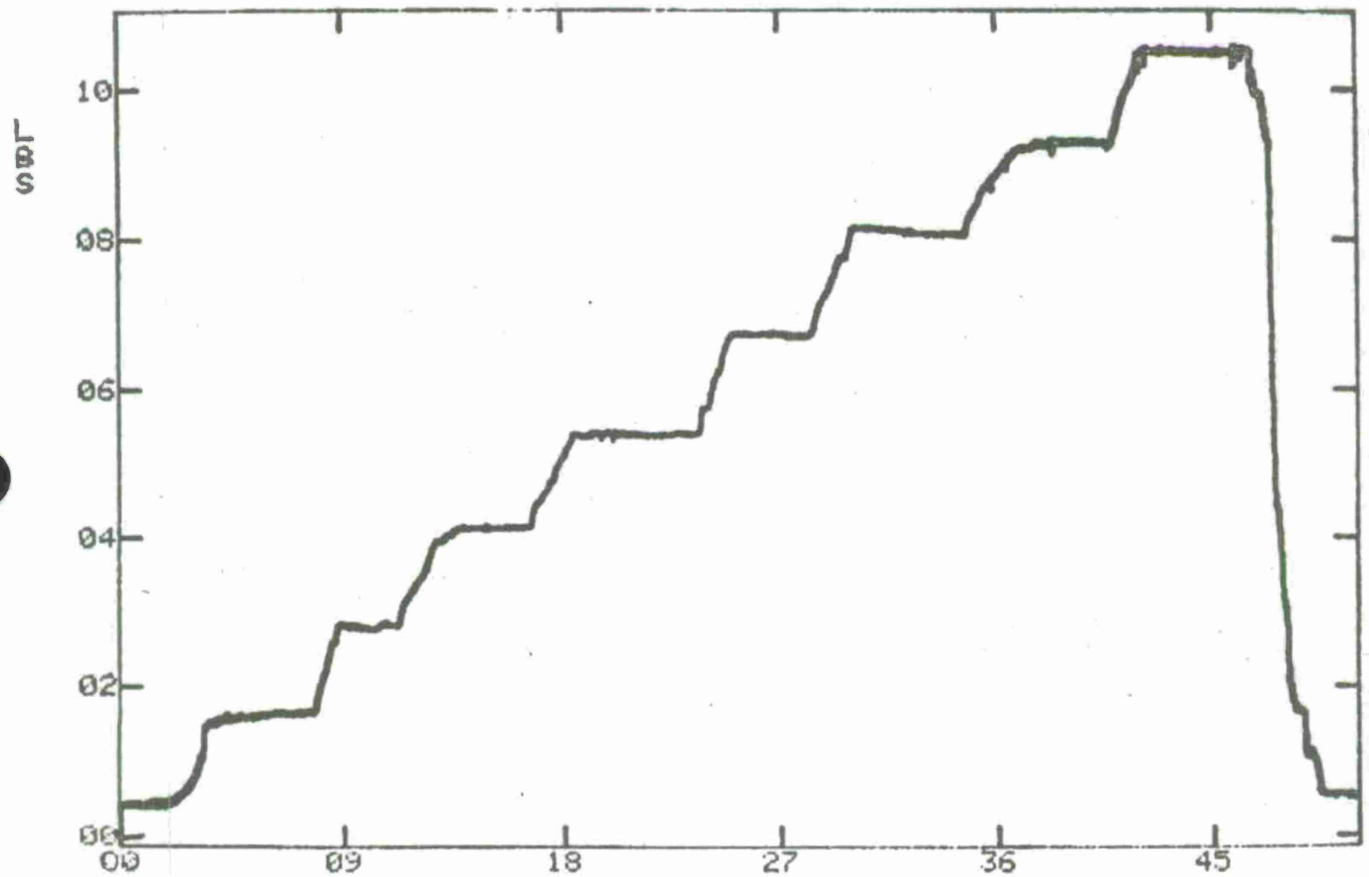
TIME IN SECONDS X 10-1
CH 21 BASE LOAD - R.H. BOTTOM X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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36
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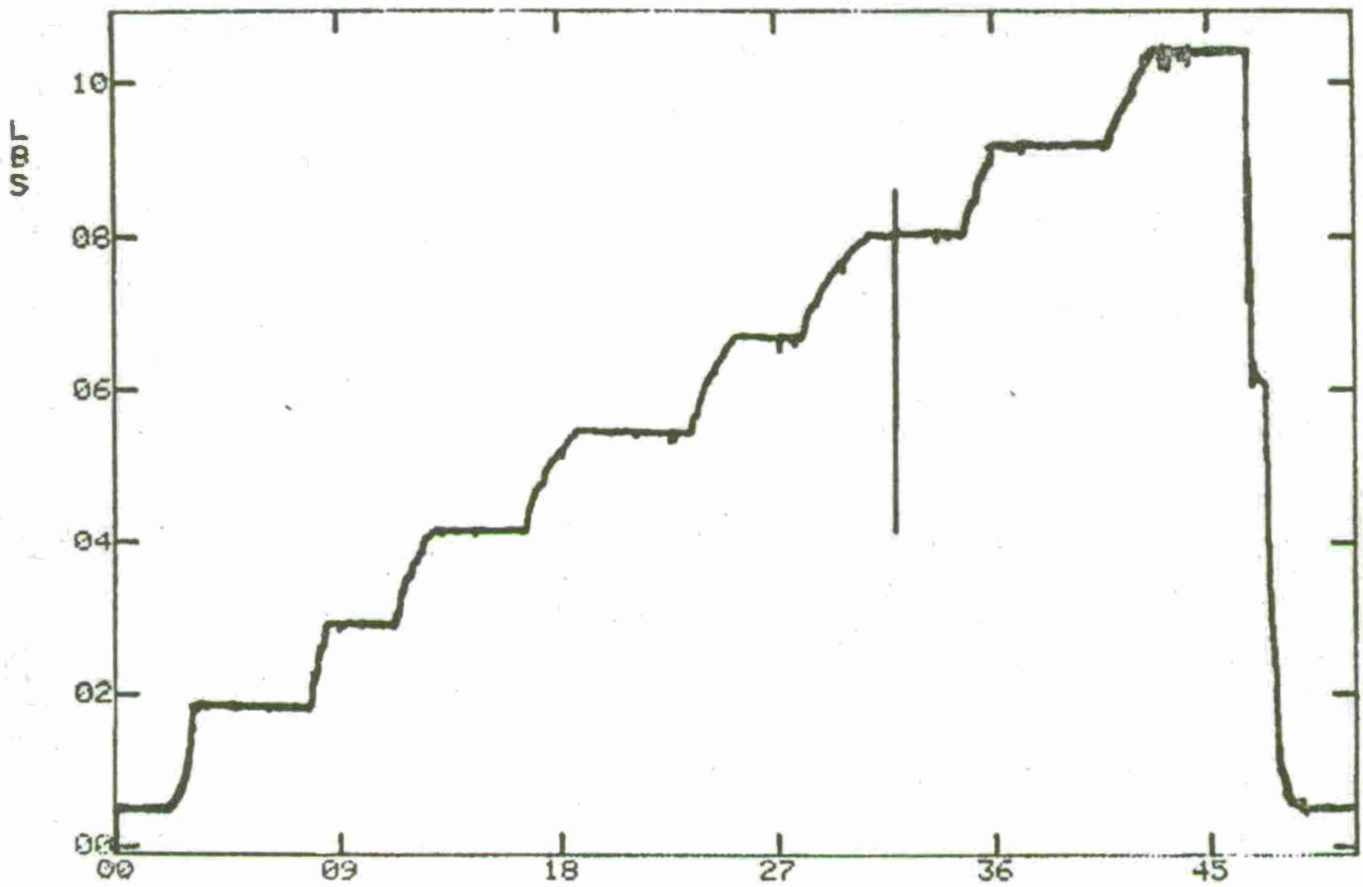
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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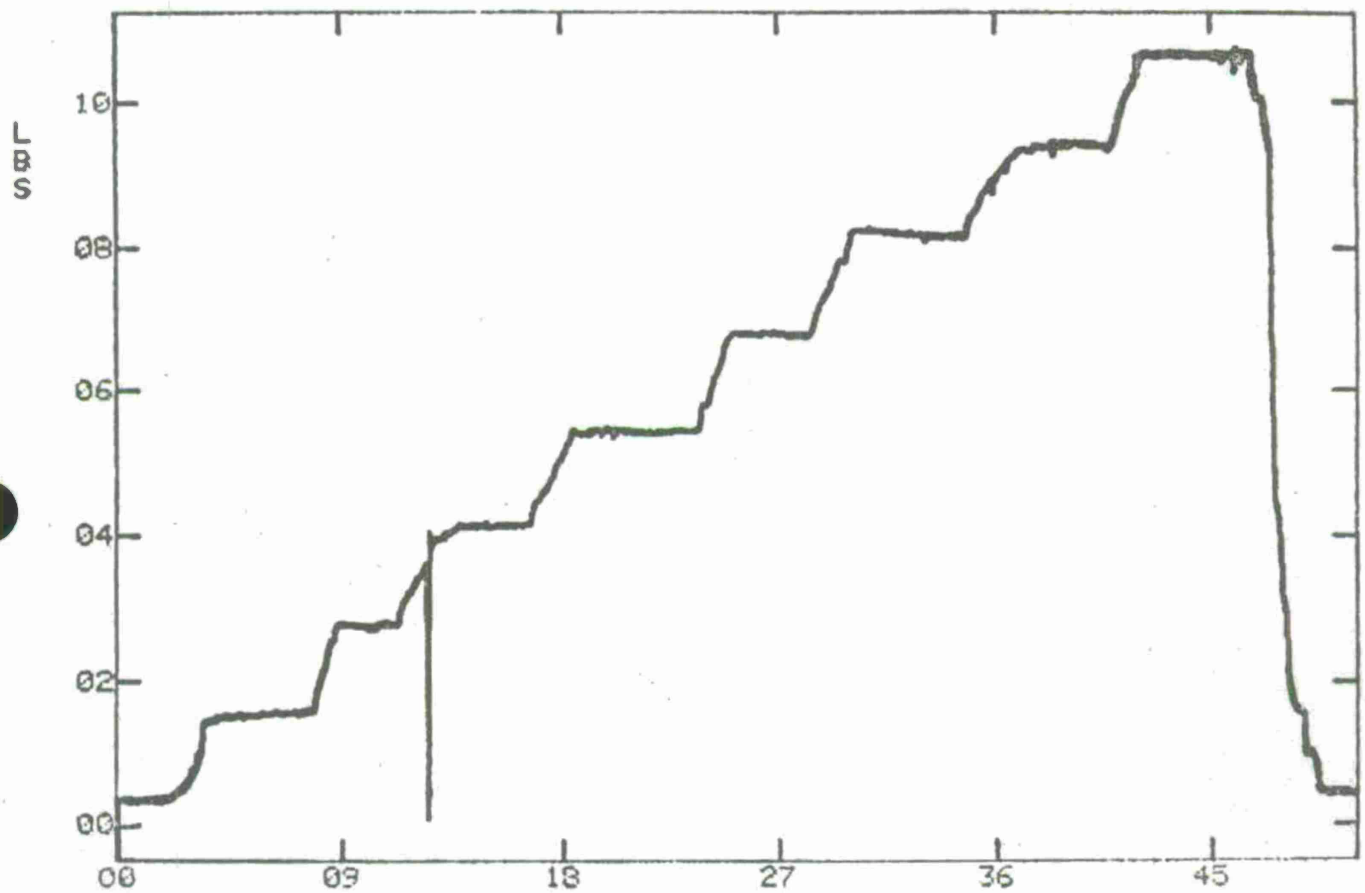
TIME IN SECONDS X 10--1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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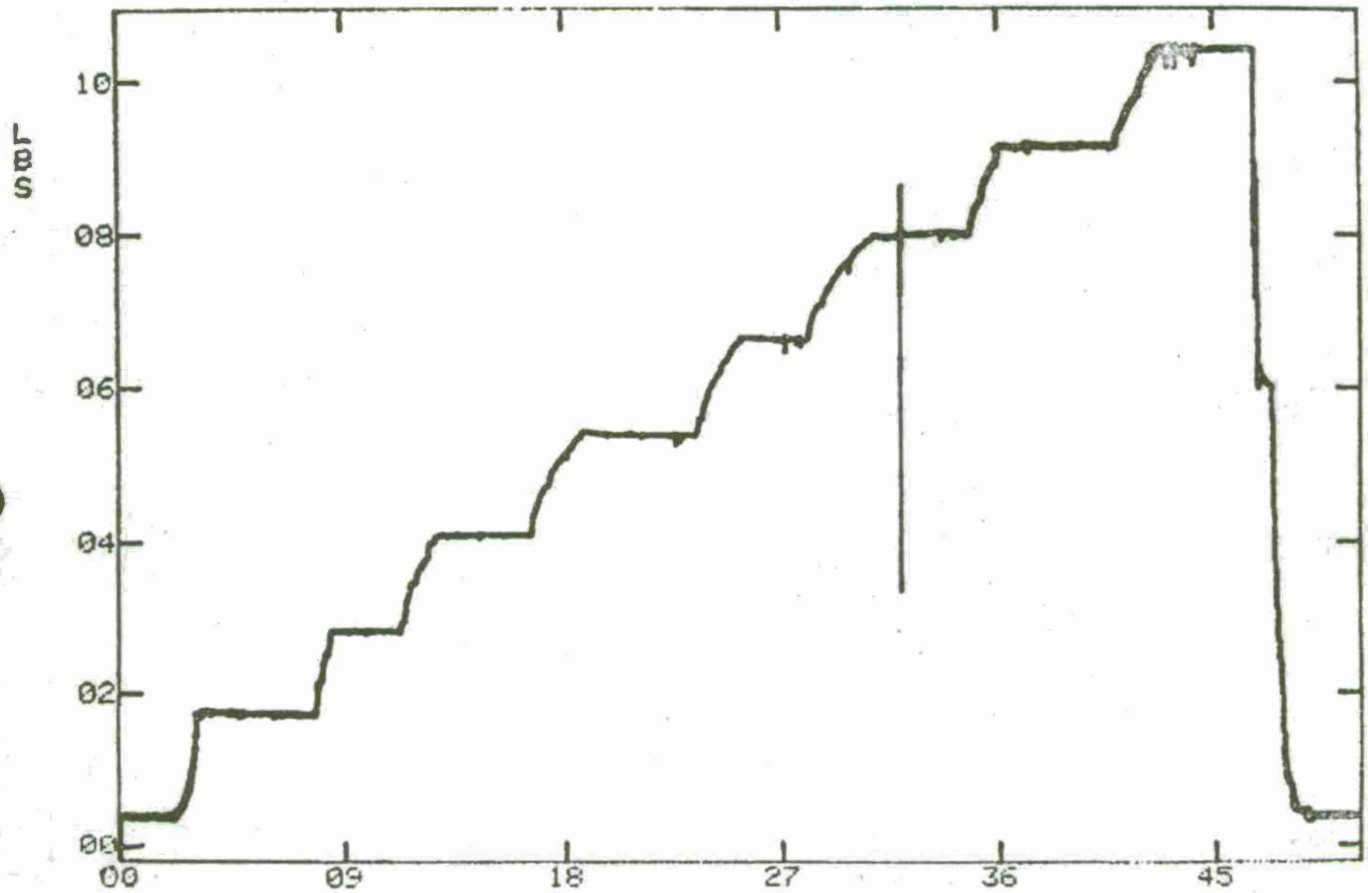
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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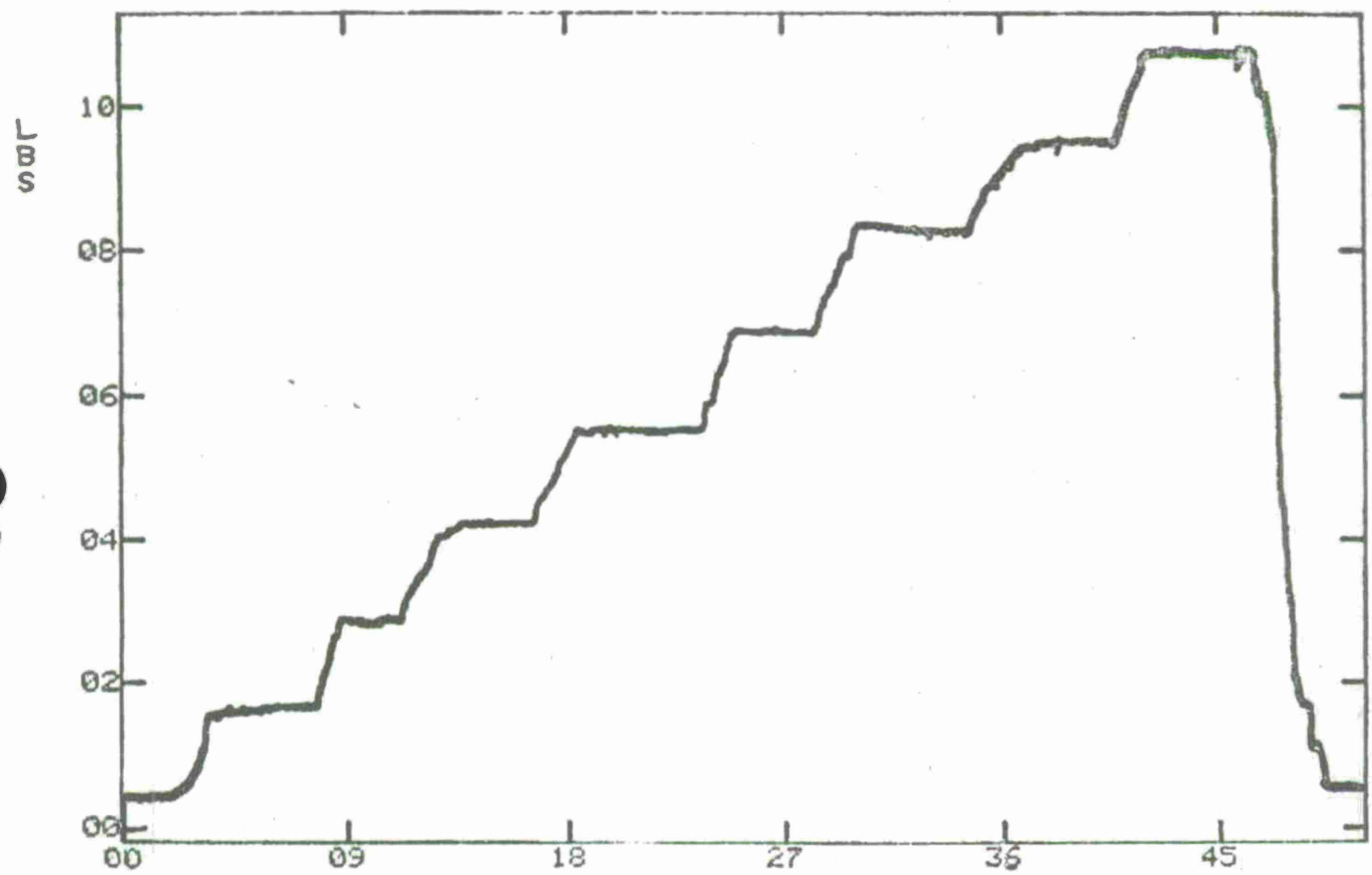
45
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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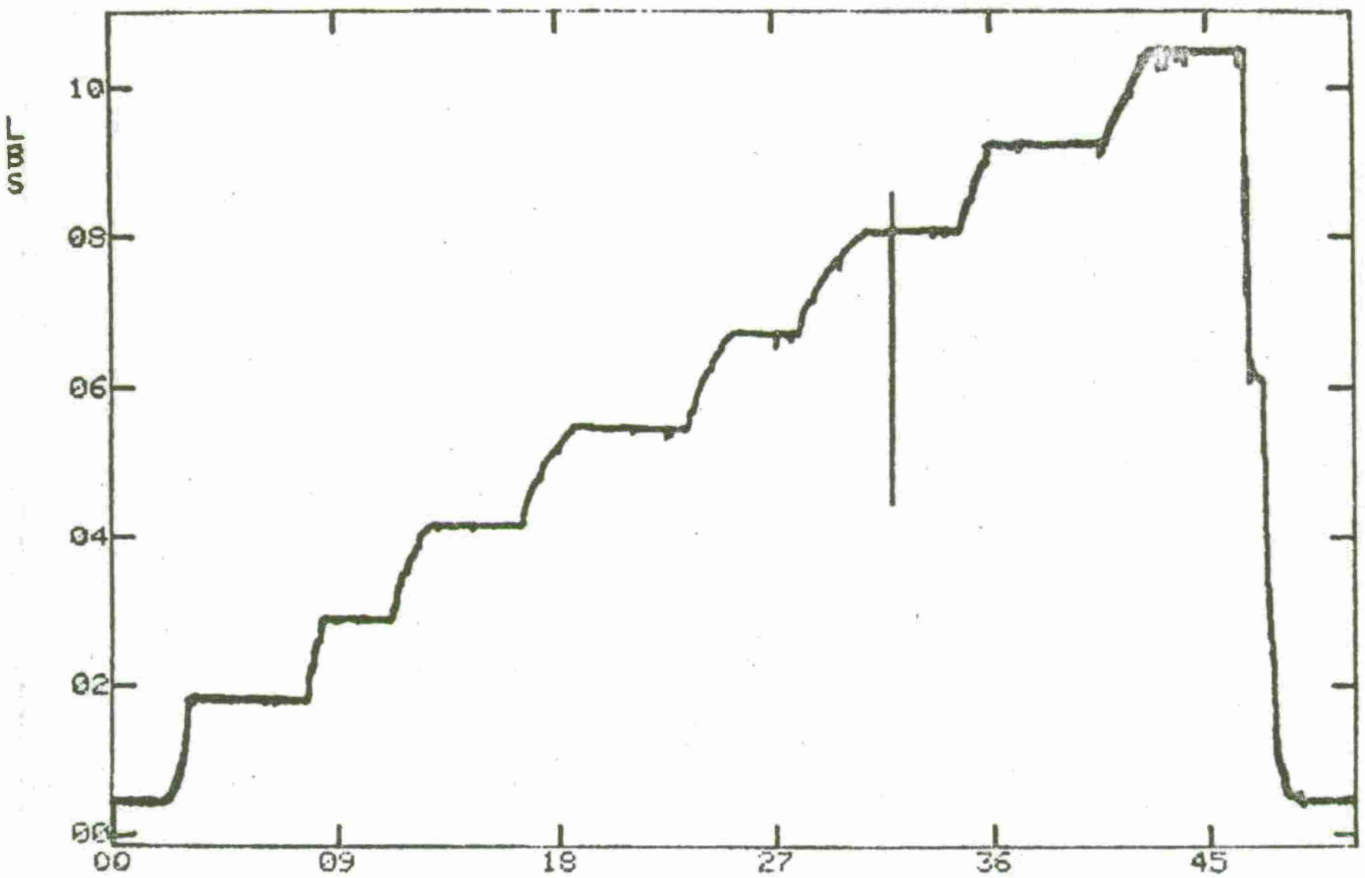
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS


LBS
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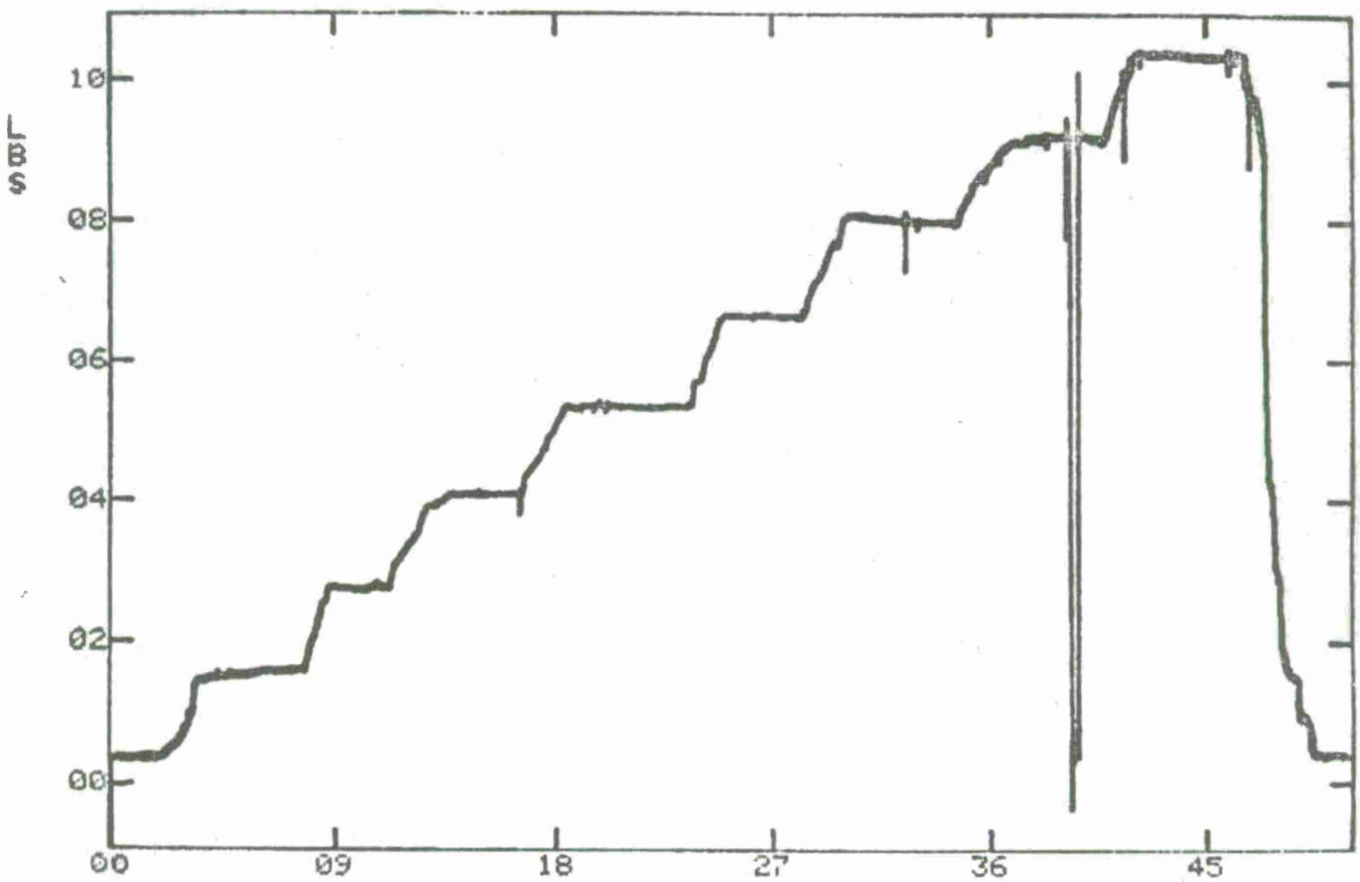
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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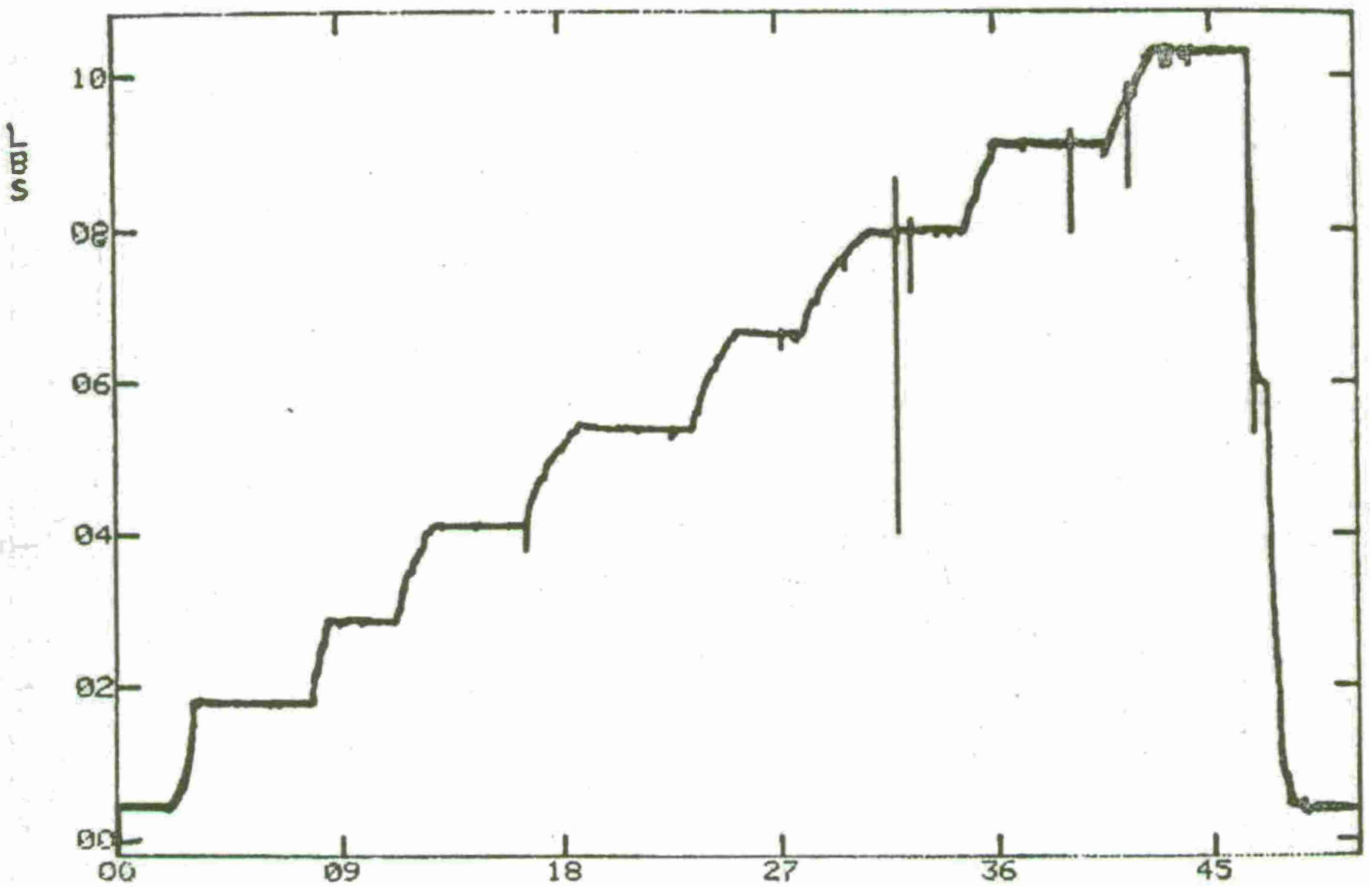
45
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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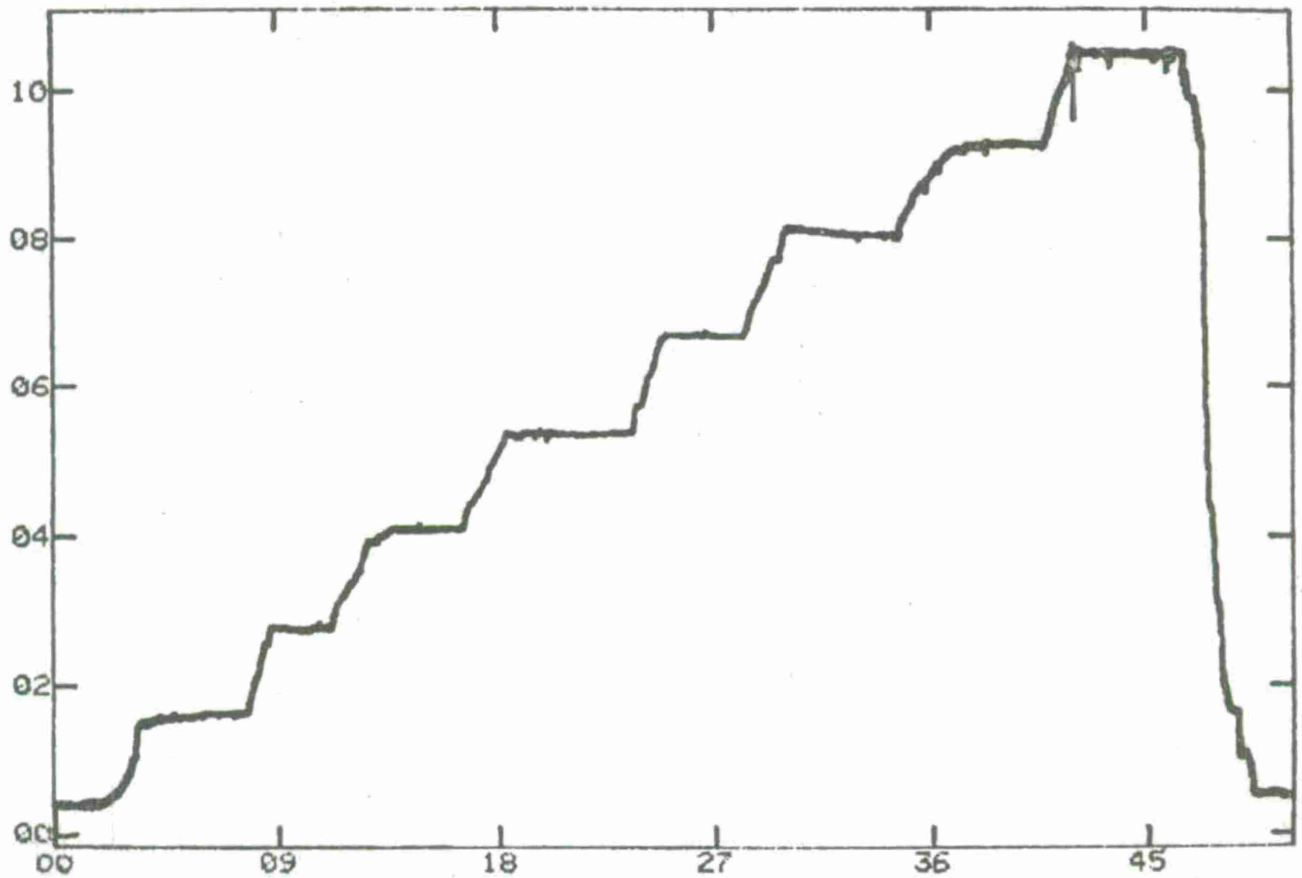
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS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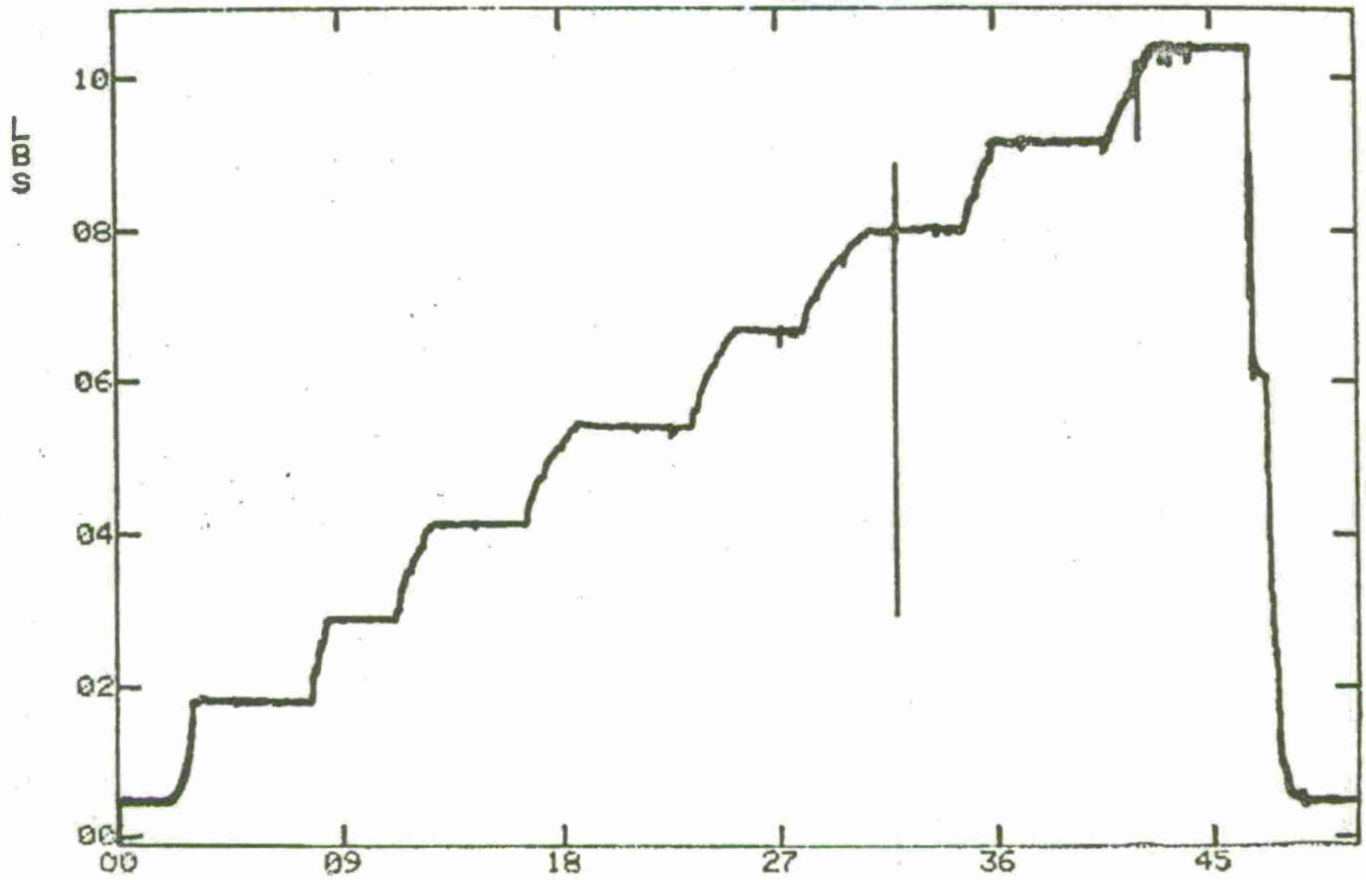
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS


LBS
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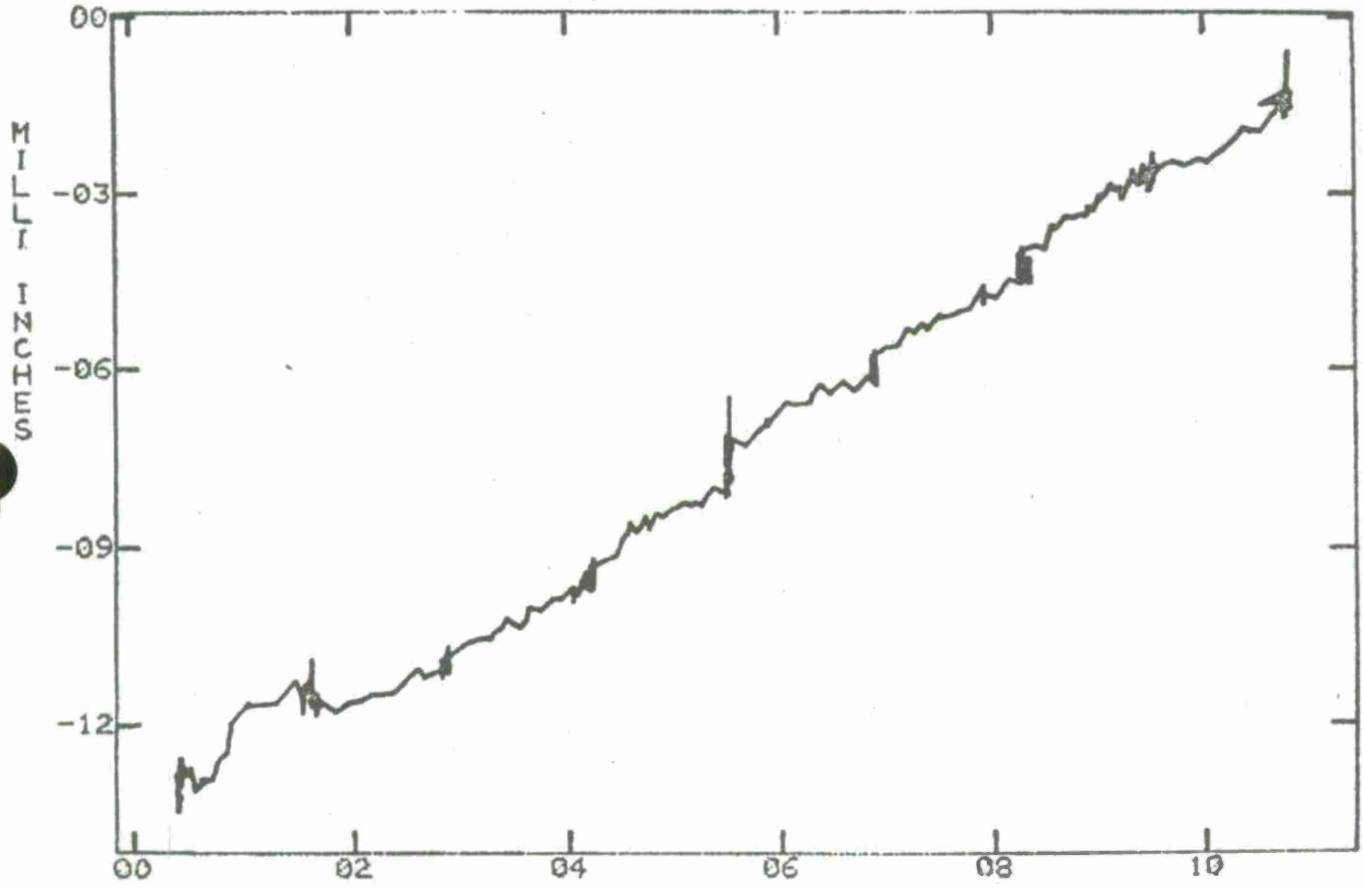
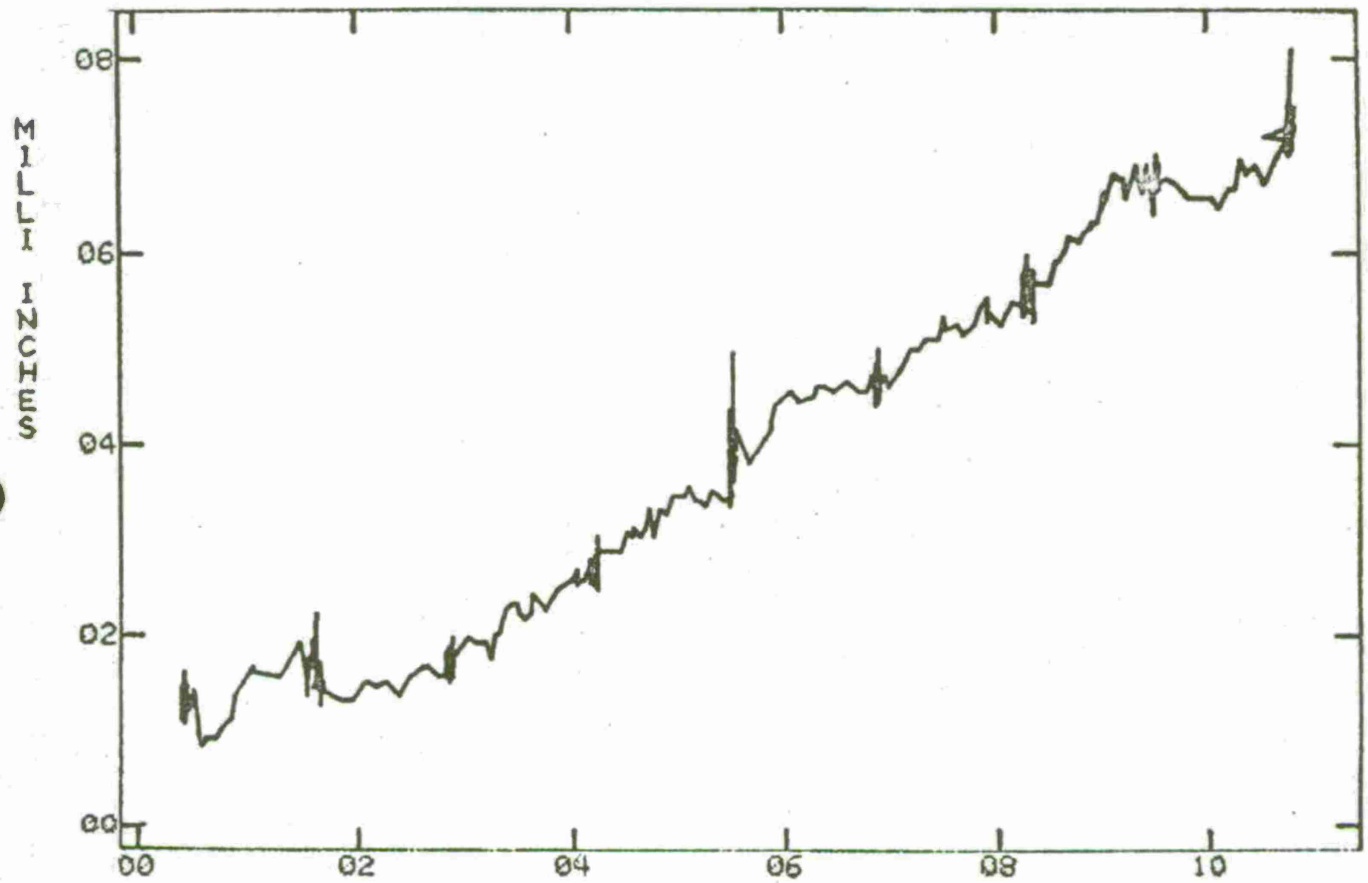
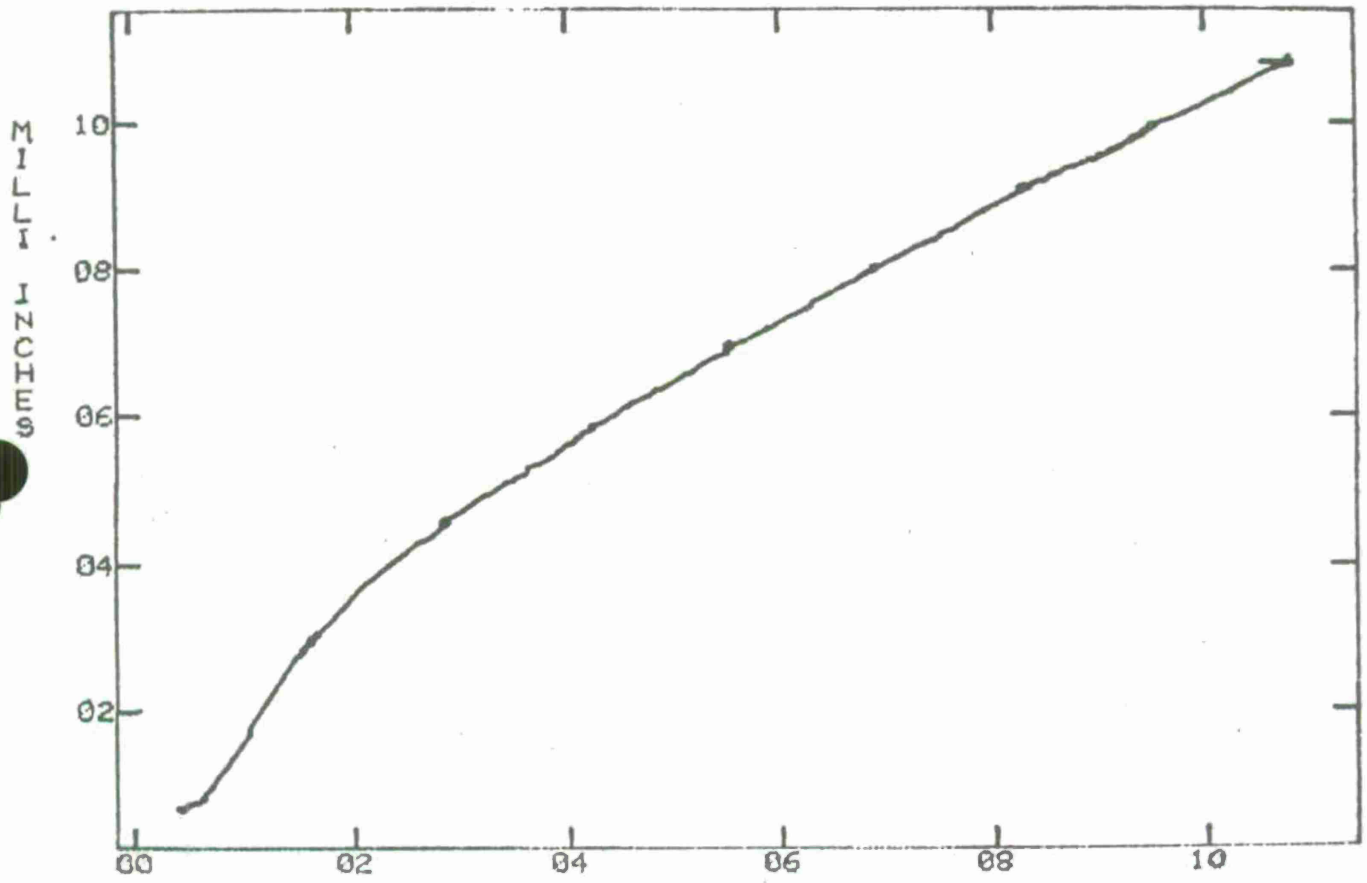
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. X 10-2
TEST 28 (23JUL75) AH1G BEND TESTS



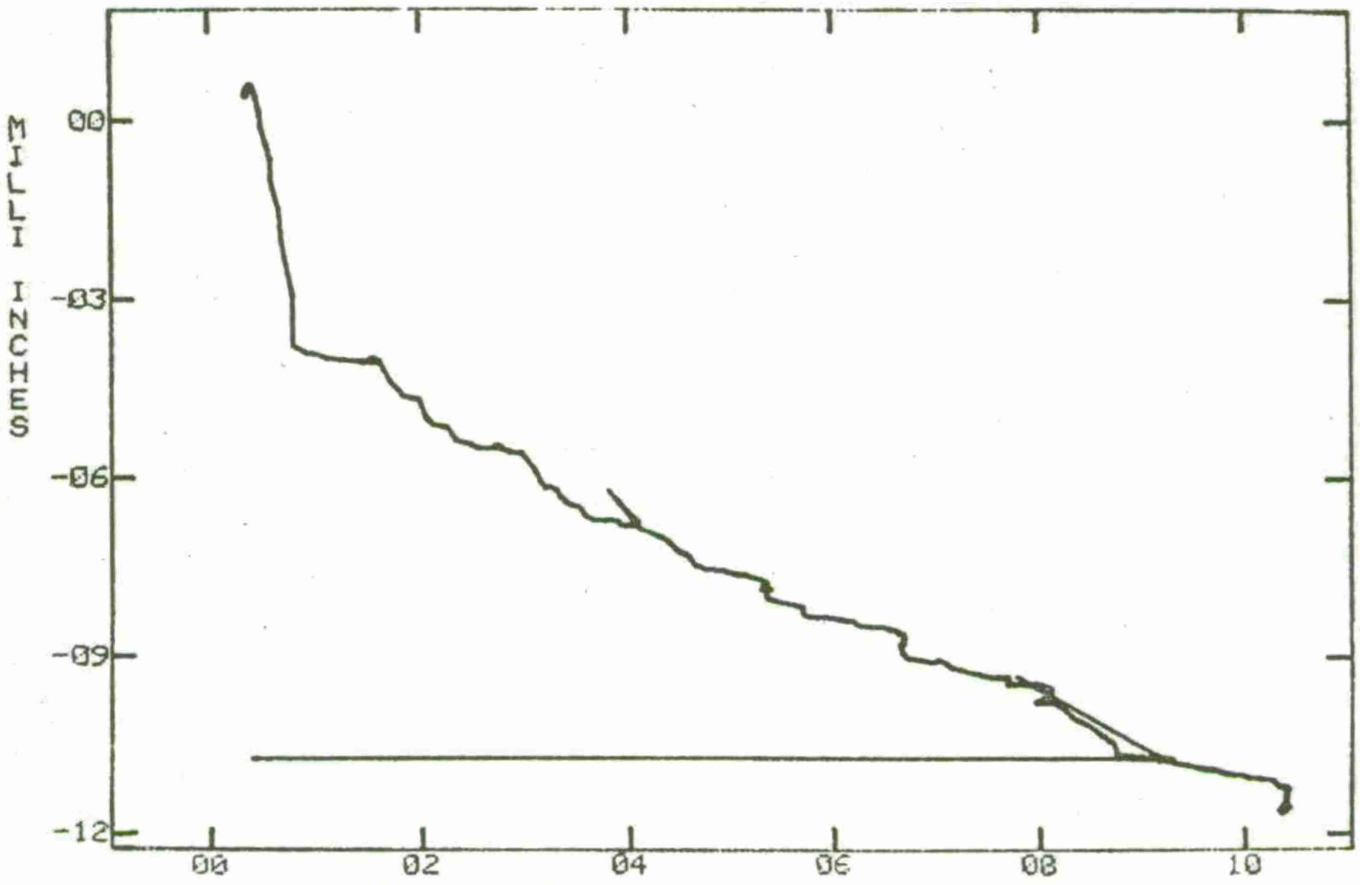
LOAD APPLIED - R.H. VS CENTER SPAR DISPL - L.H. X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



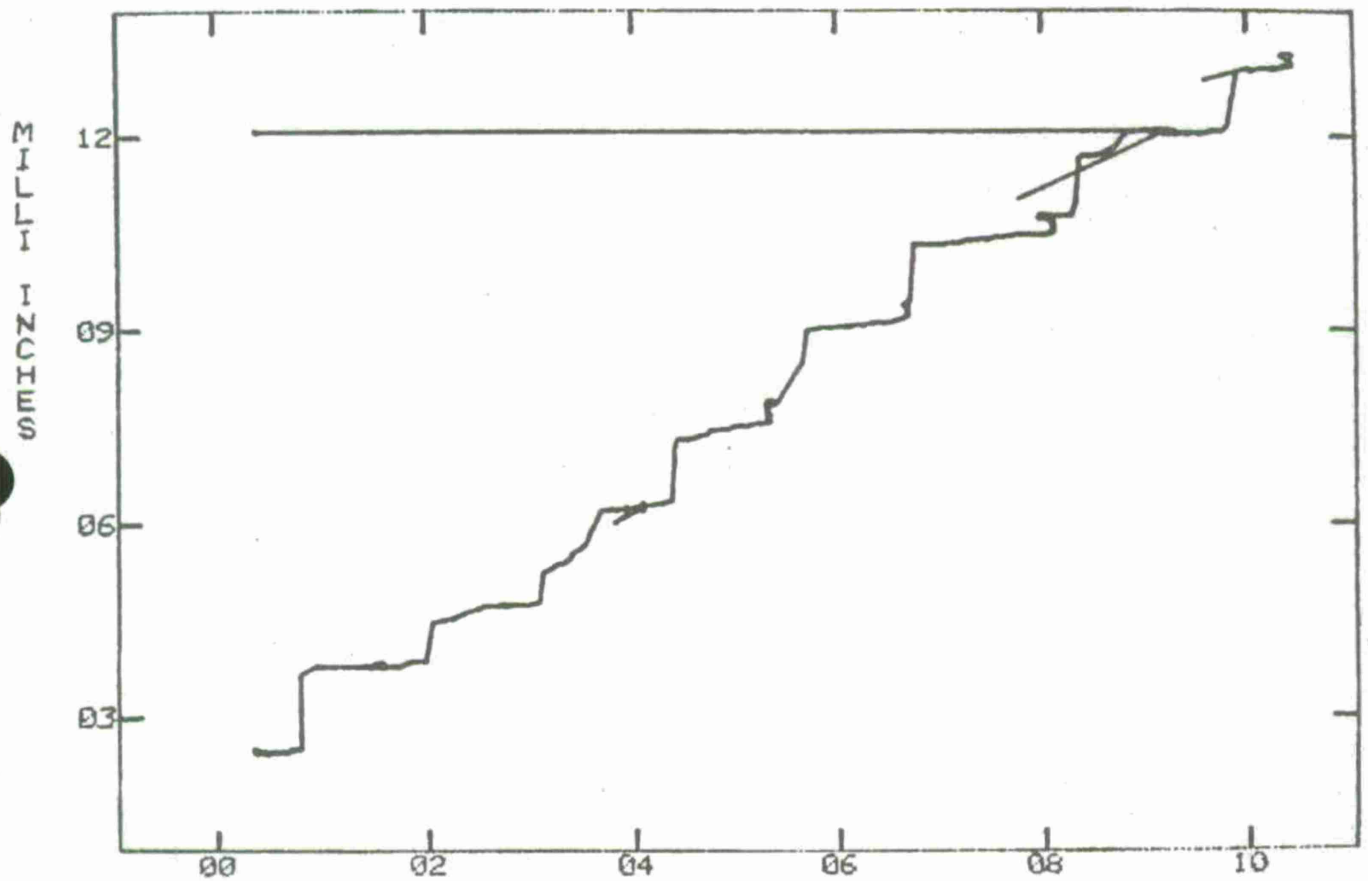
LOAD APPLIED - R.H. VS CENTER SPAR DISPL - R.H. X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



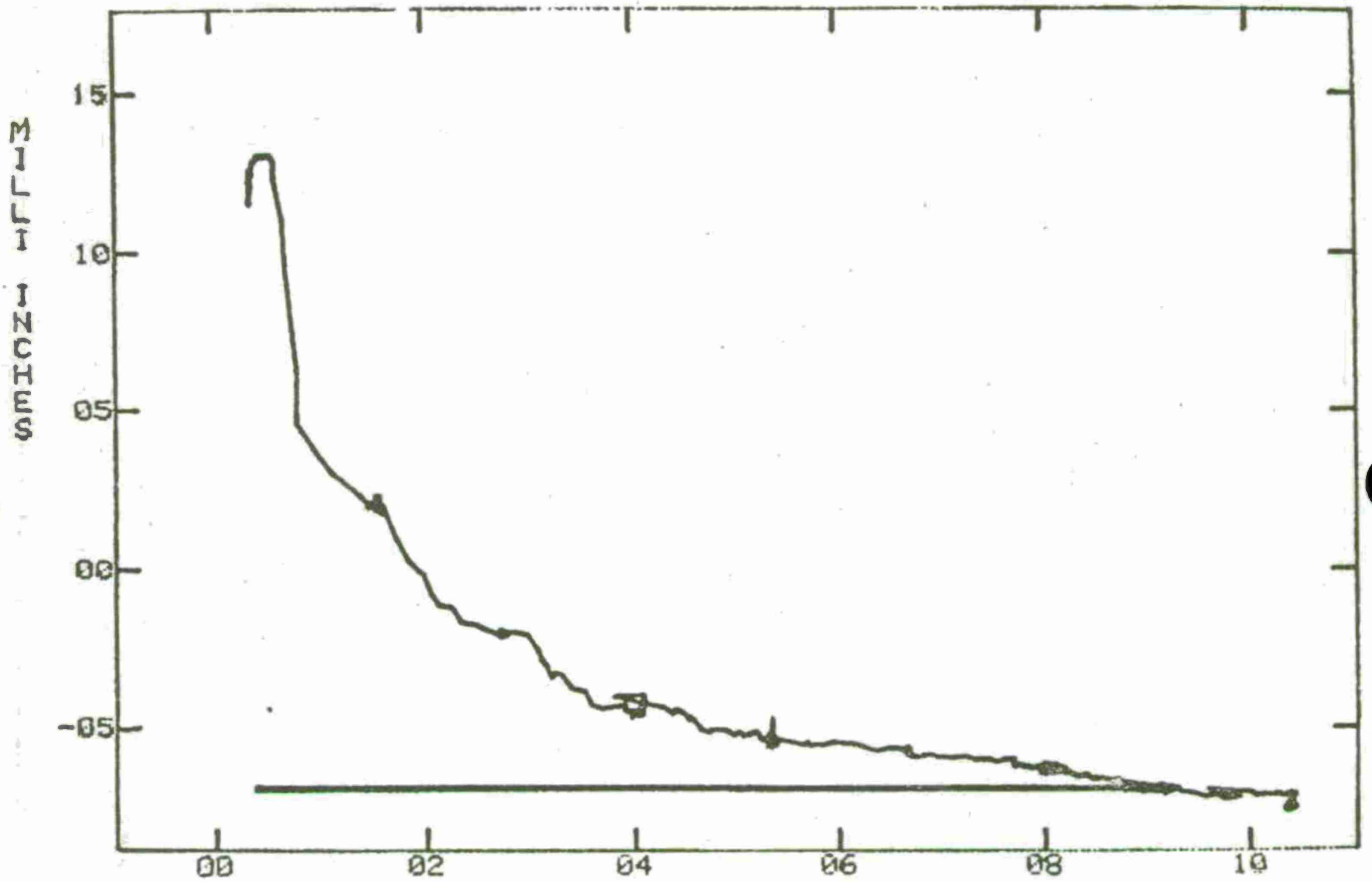
LOAD APPLIED - R.H. US WING VERT DISPL - WS 60.00 X 10-1
TEST 28 (23JUN.75) AH1G BEND TESTS



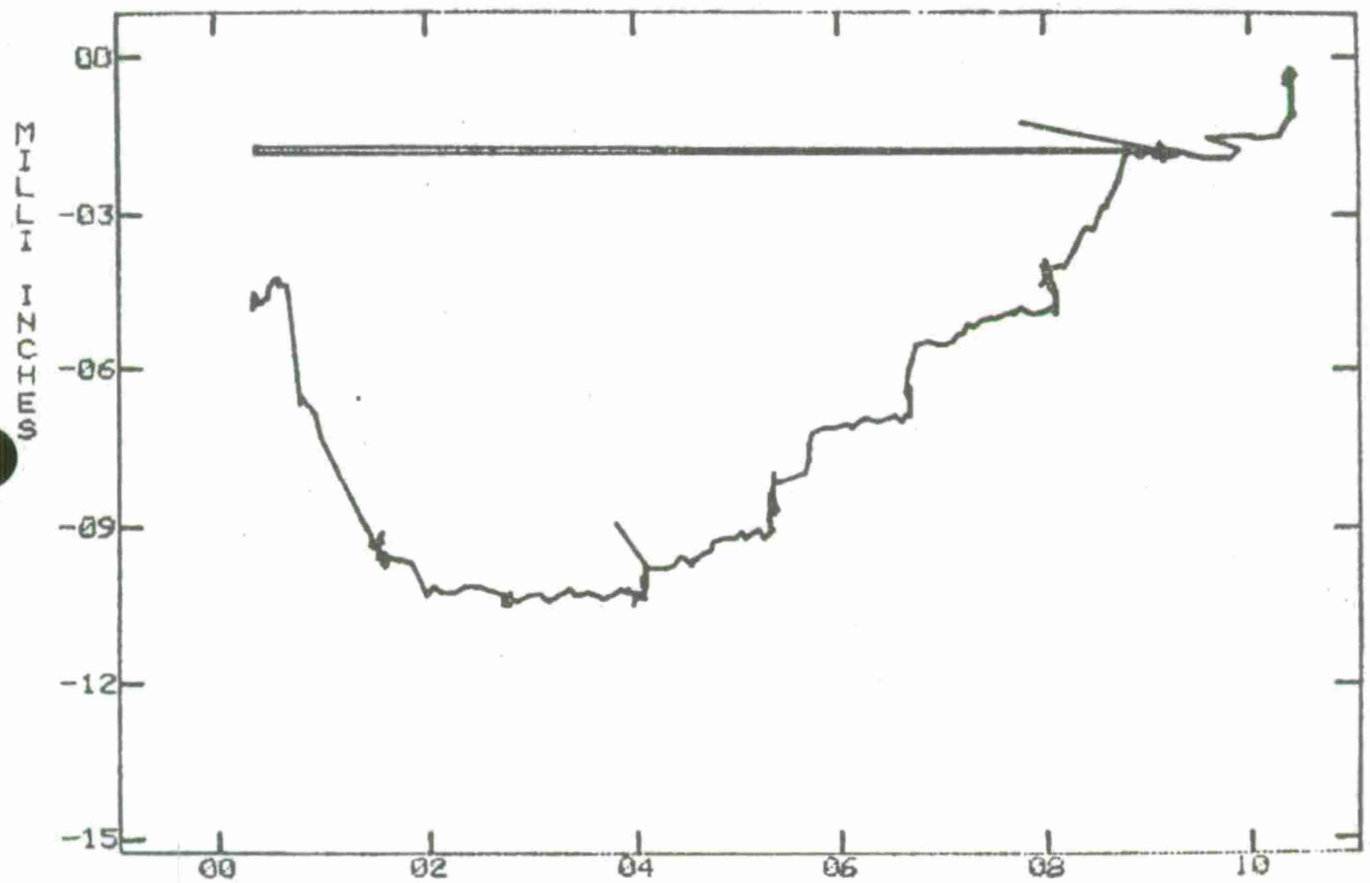
LOAD APPLIED - R.H. VS WING SLOPE DISPL - BOTTOM X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



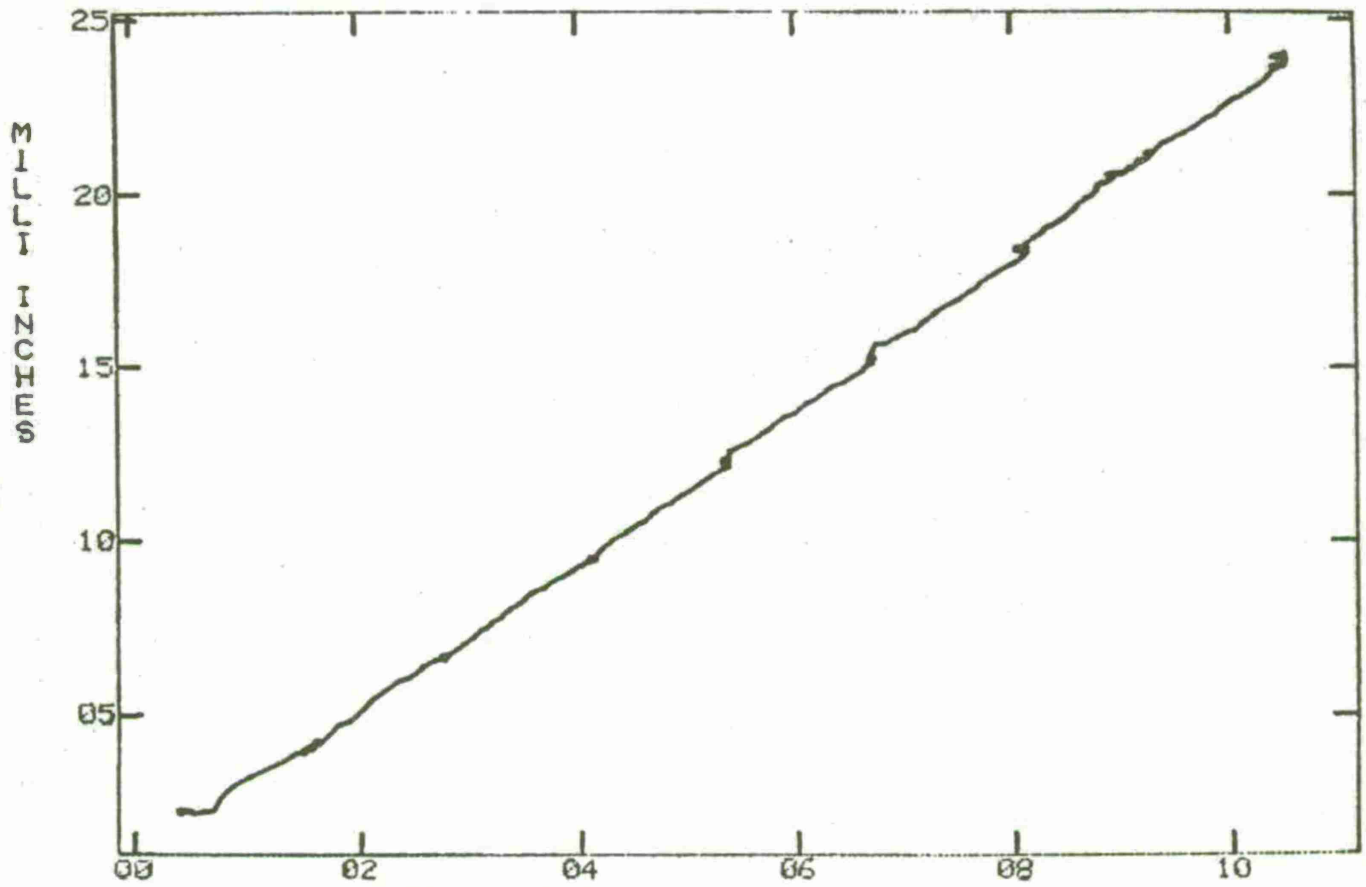
LOAD APPLIED - R.H. VS WING SLOPE DISPL - TOP X 10+0
TEST 28 (23JUL75) AH1G BEND TESTS



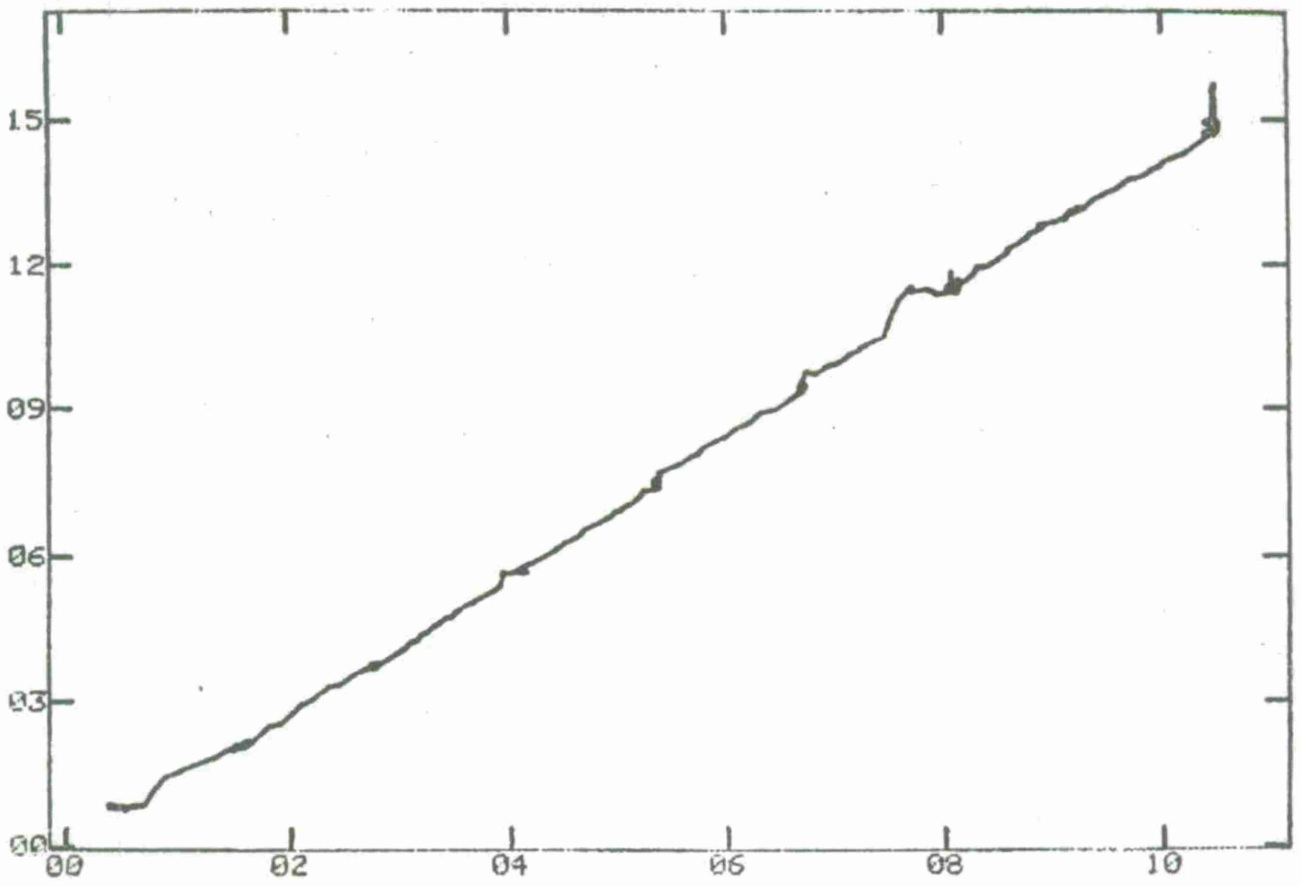
LOAD APPLIED - R.H. VS FUSLG SLOPE DISPL - BOTTOM X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



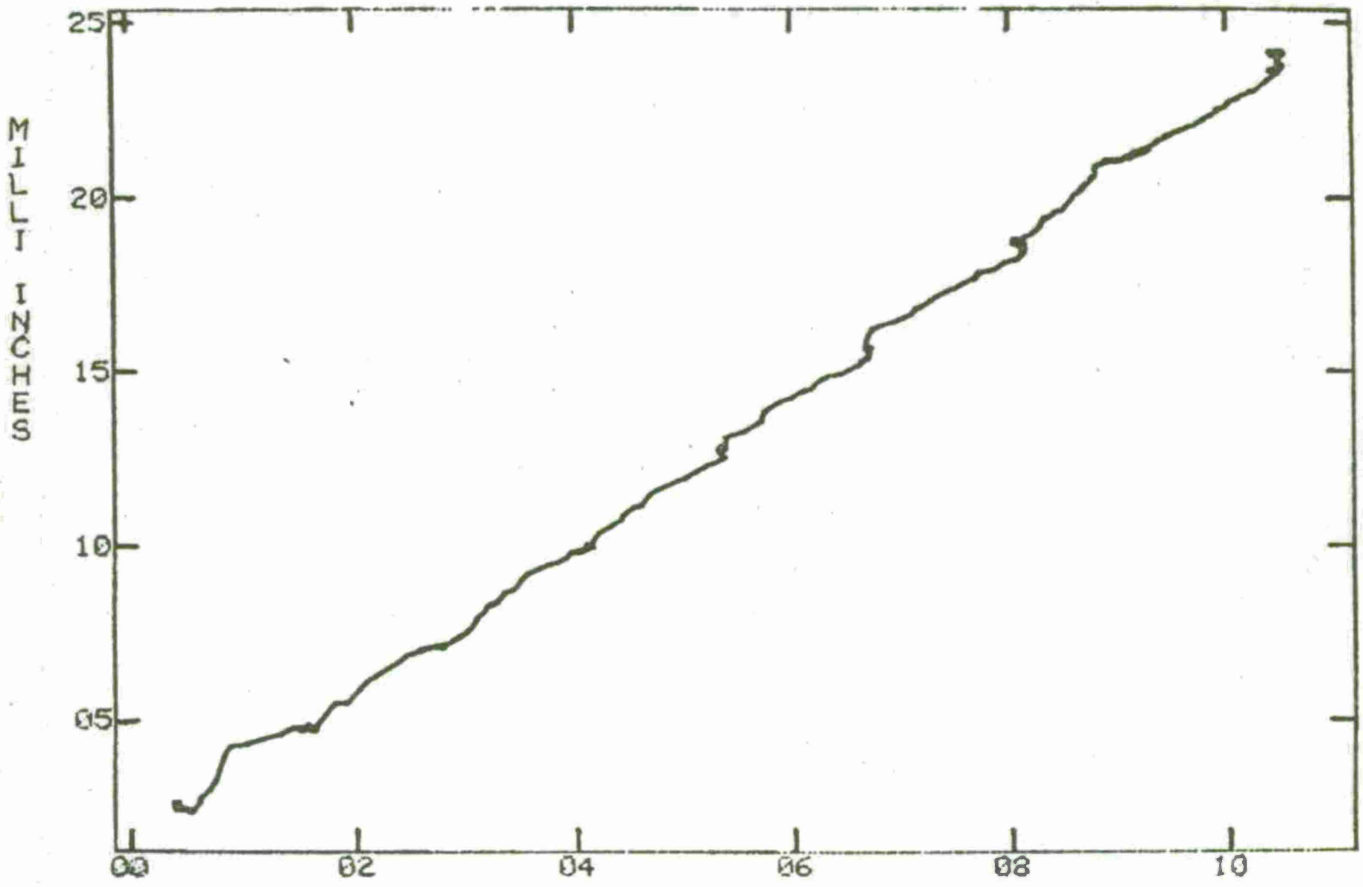
LOAD APPLIED - R.H. US FUSLG SLOPE DISPL - TOP X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



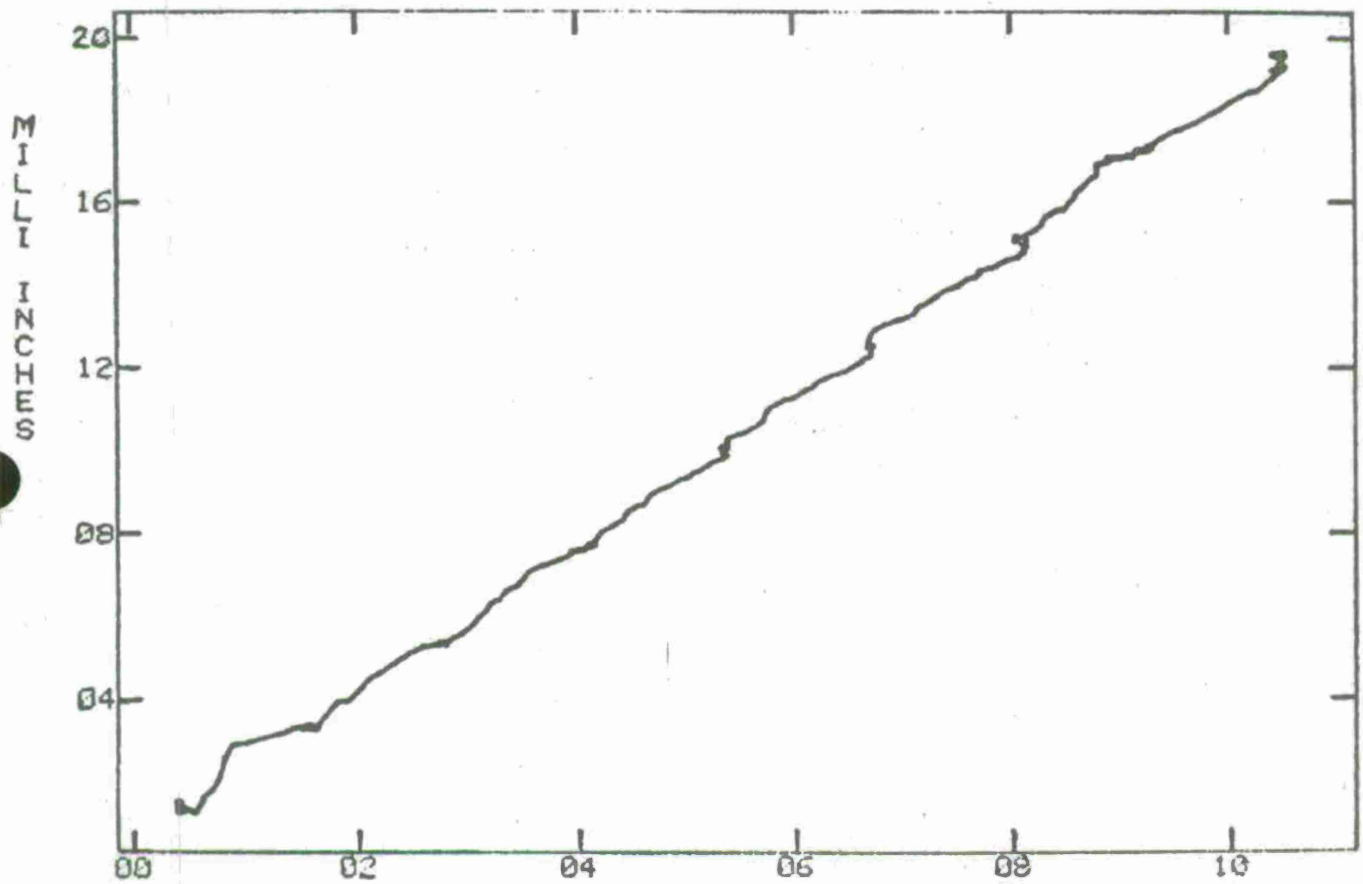
LOAD APPLIED - R.H. VS FXTR / GROUND DISPL - R.H. TOP X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



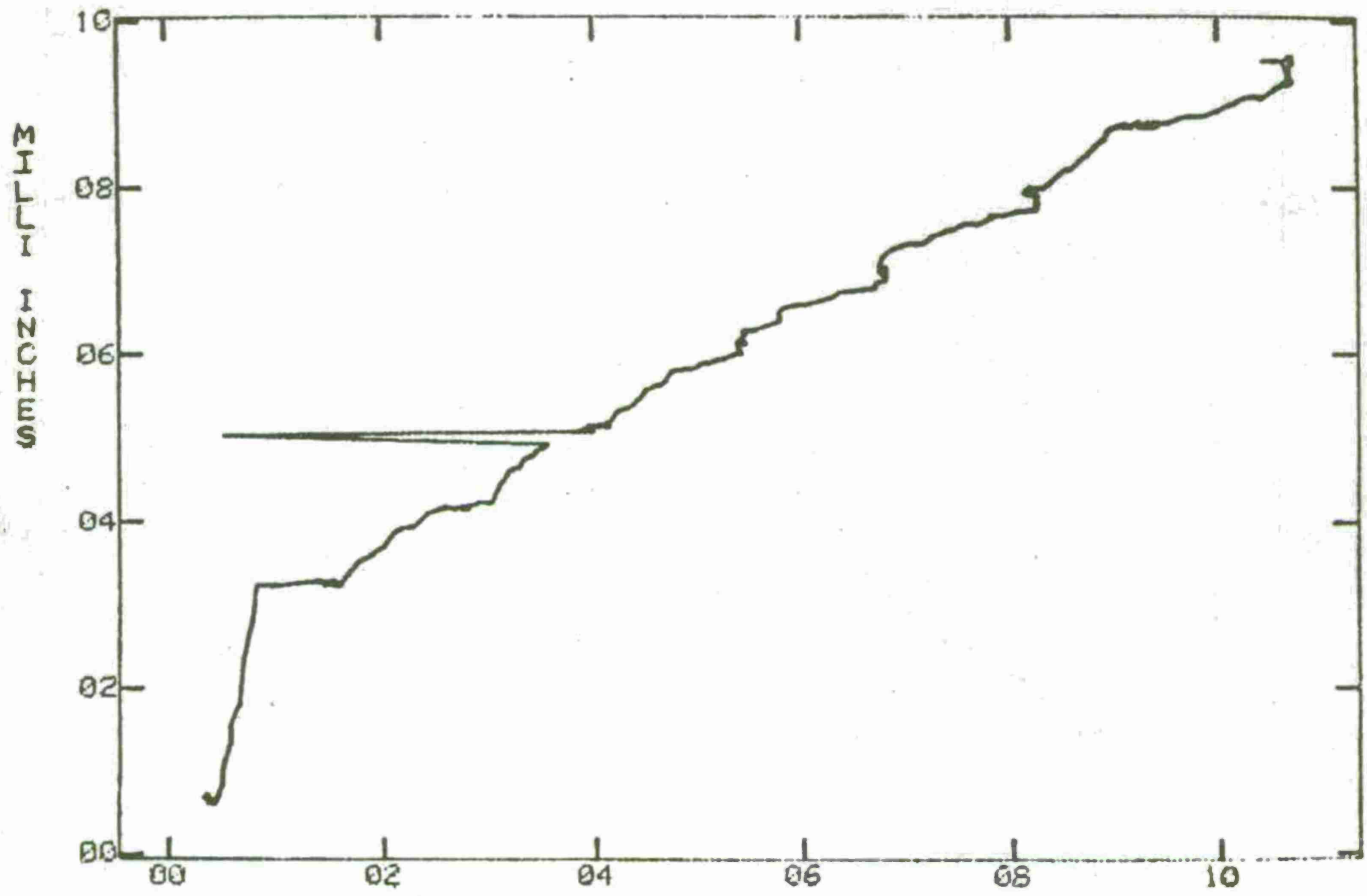
LOAD APPLIED - R.H. VS FXTR / GROUND DISPL - R.H. BOTTOM X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



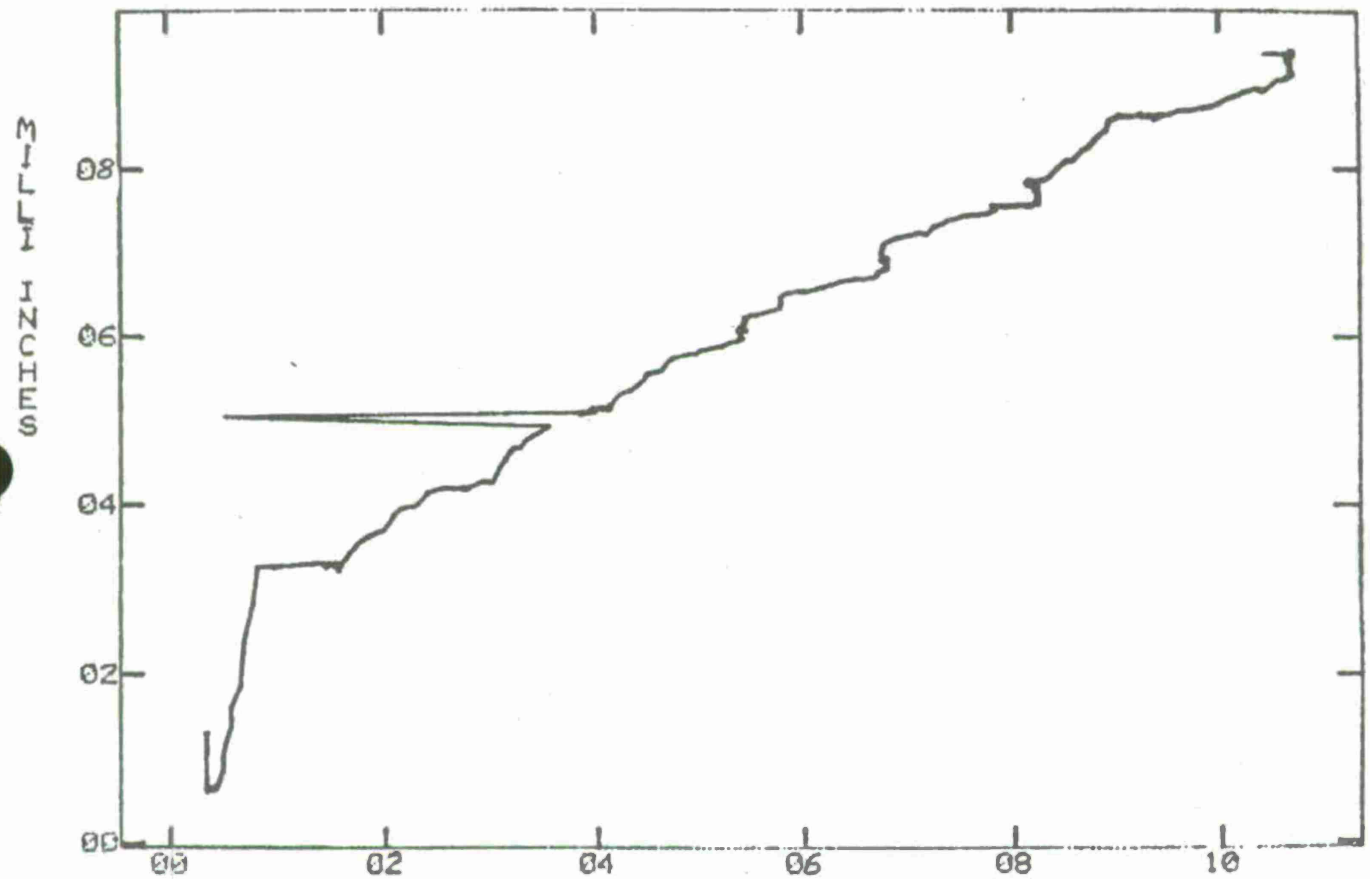
LOAD APPLIED - R.H. VS FXTE / GROUND DISPL - L H TOP X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



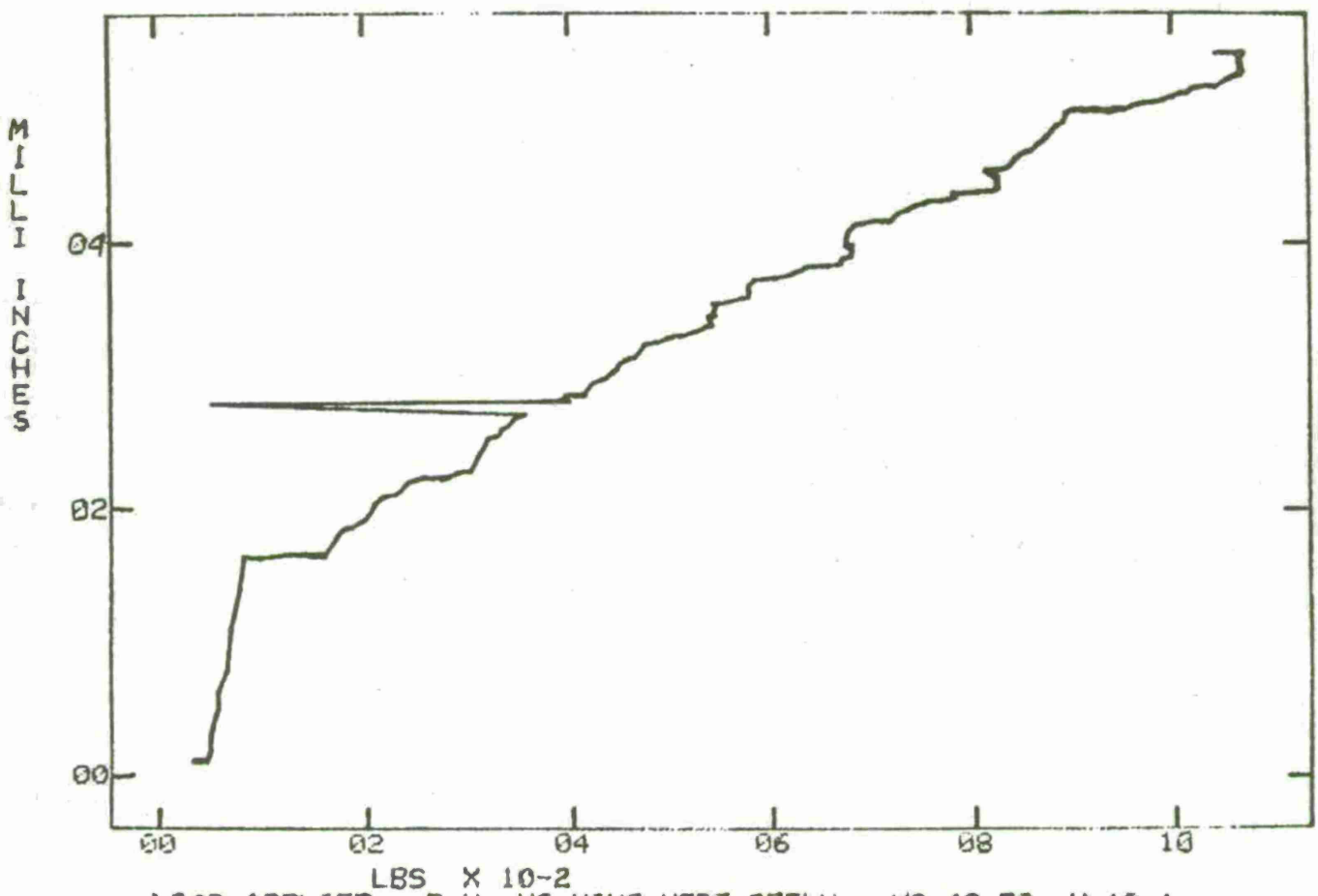
LOAD APPLIED - R.H. VS FXTE / GROUND DISPL - L. H. BOTTOM X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



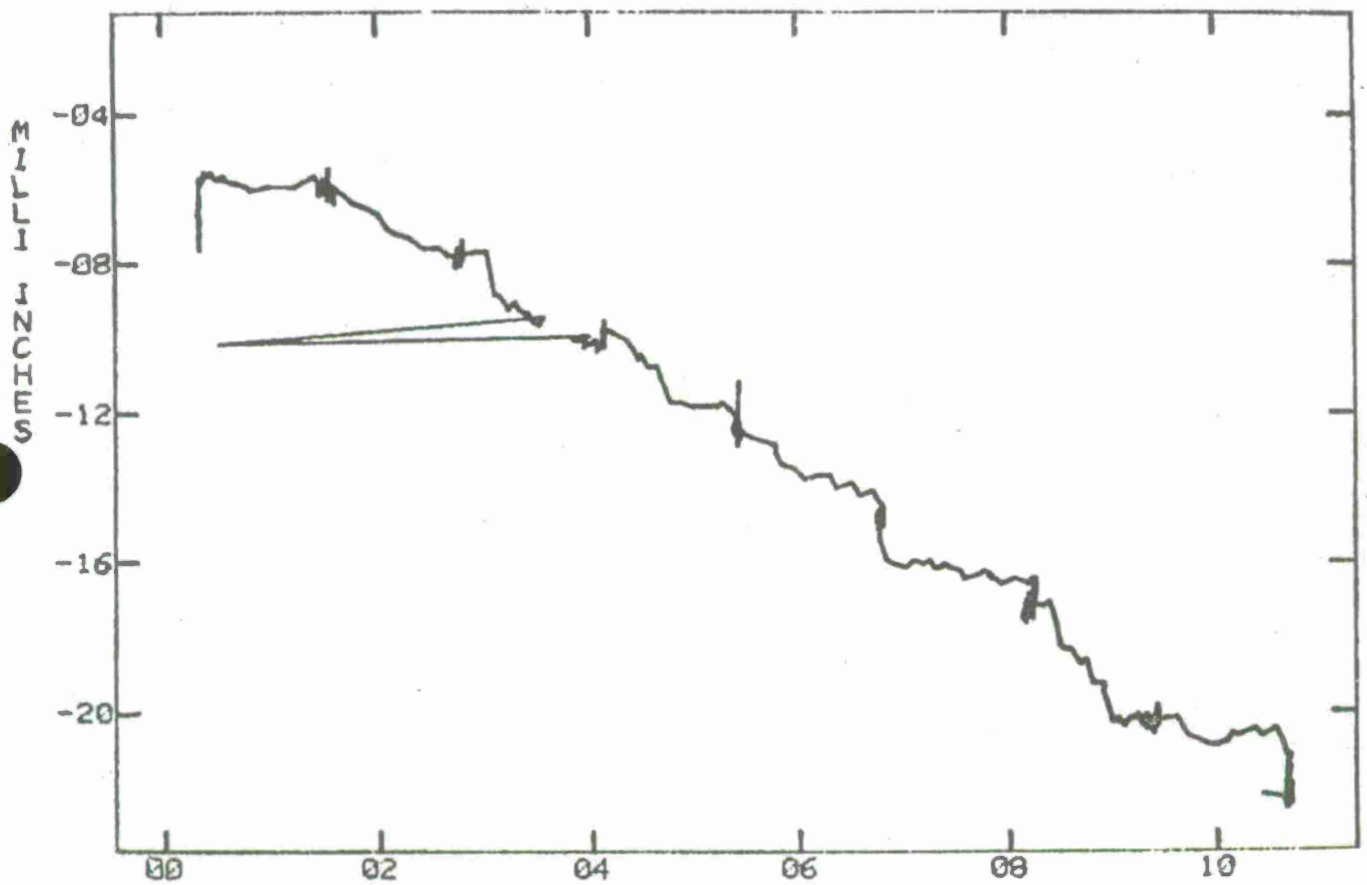
LOAD APPLIED - R.H. VS WING VERT DISPL - WS 57.74 X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



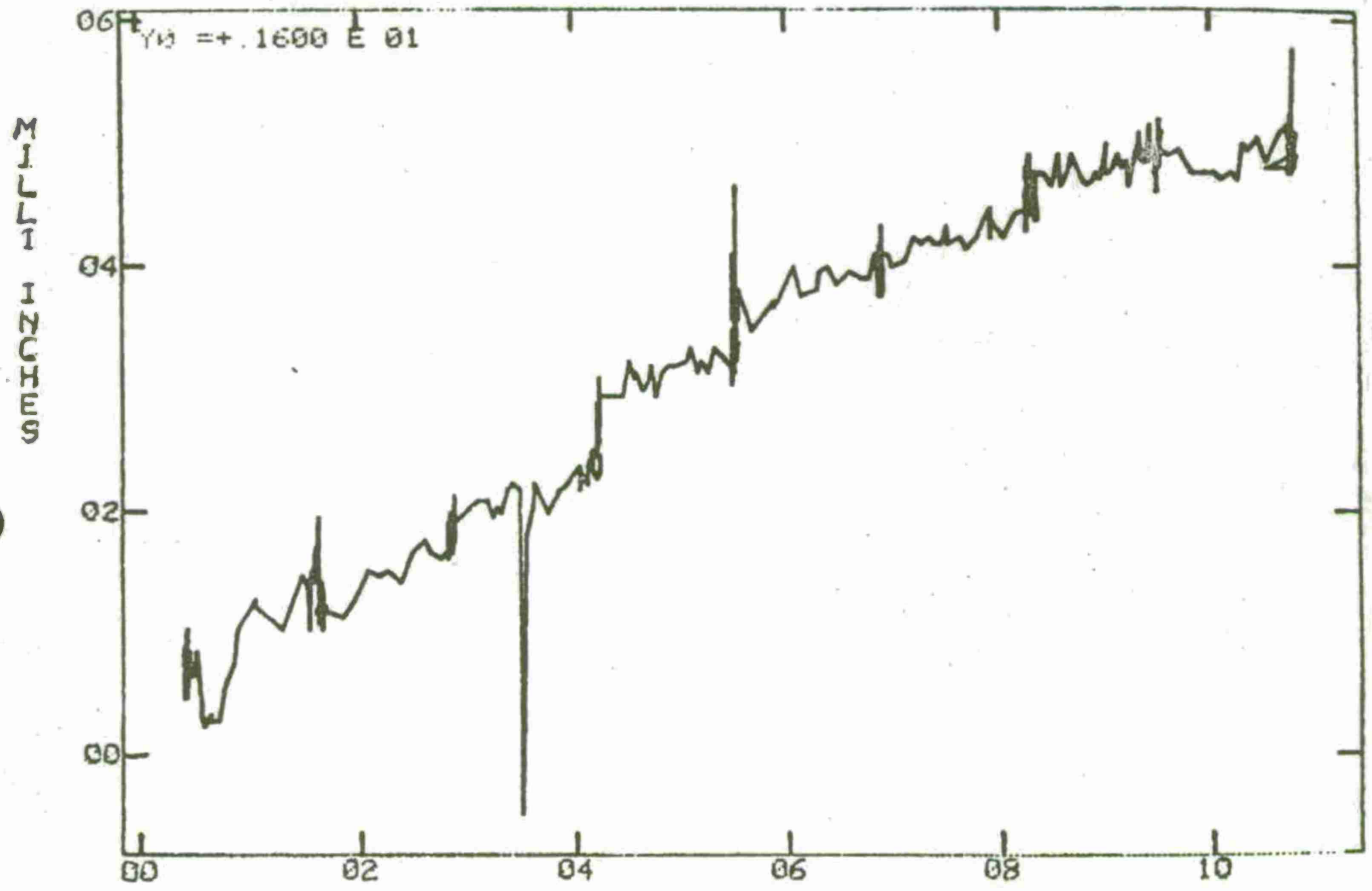
LOAD APPLIED - R.H. VS WING VERT DEFLN - WS 59.00 X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



LOAD APPLIED - R.H. VS WING VERT DEFLN - WS 42.50 X 10-1
TEST 28 (23JUL75) AH1G BEND TESTS



LOAD APPLIED - R.H. VS WING VERT DISPL - W3 21.38 X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS



LOAD APPLIED - R.H. US WING VERT DISPL - WS 21.38 (CH5) X 10+1
TEST 28 (23JUL75) AH1G BEND TESTS

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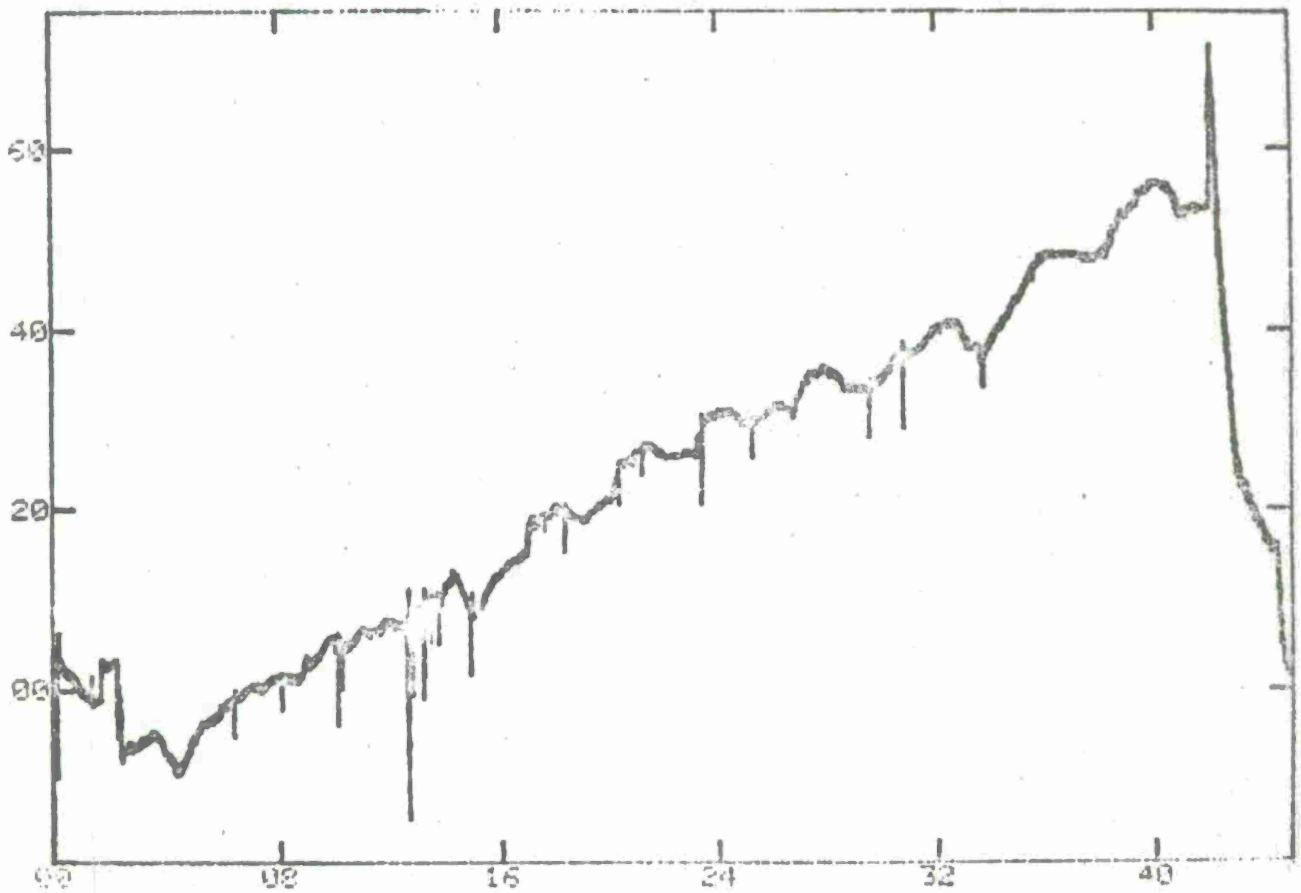
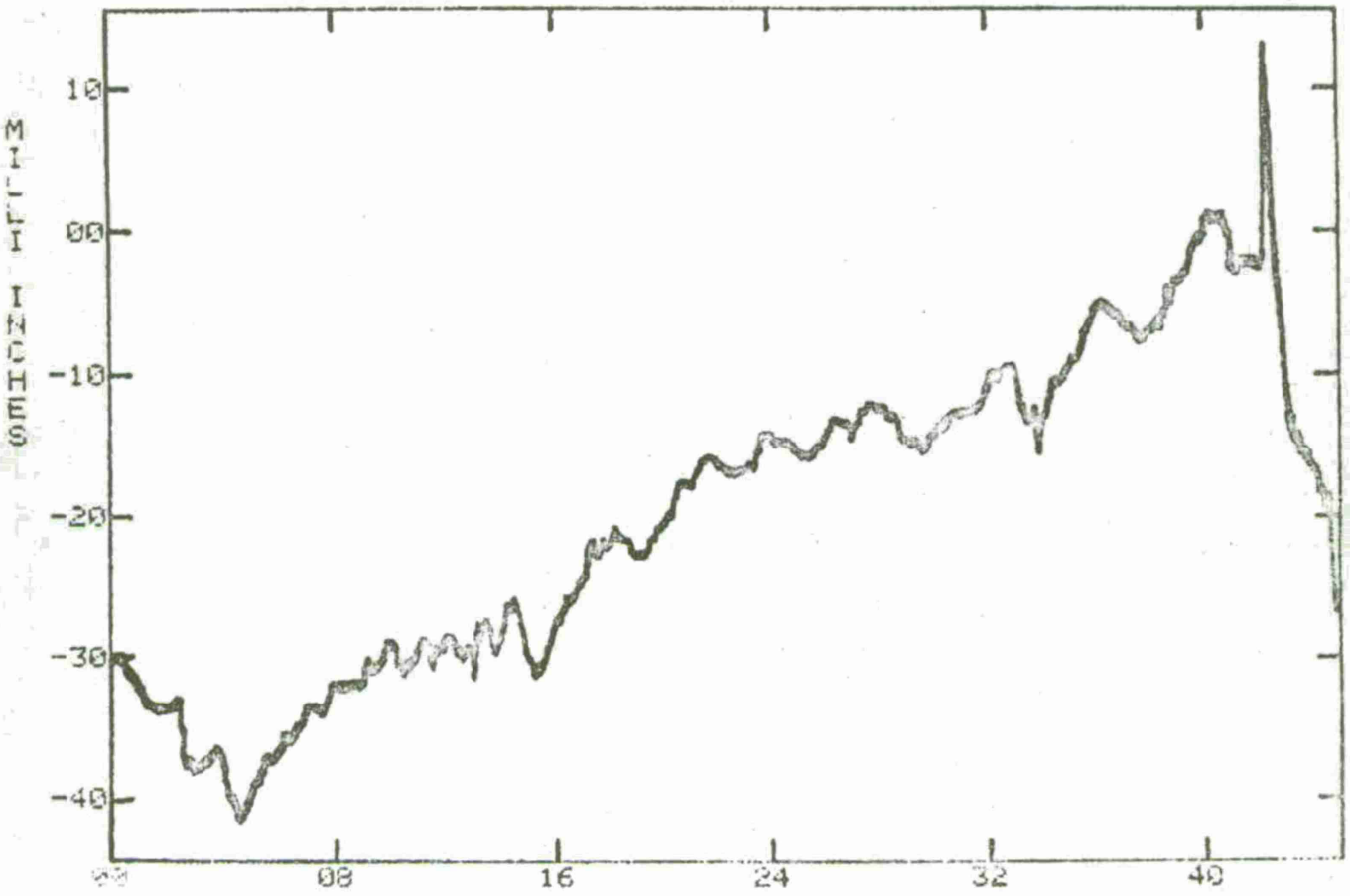
APPENDIX E

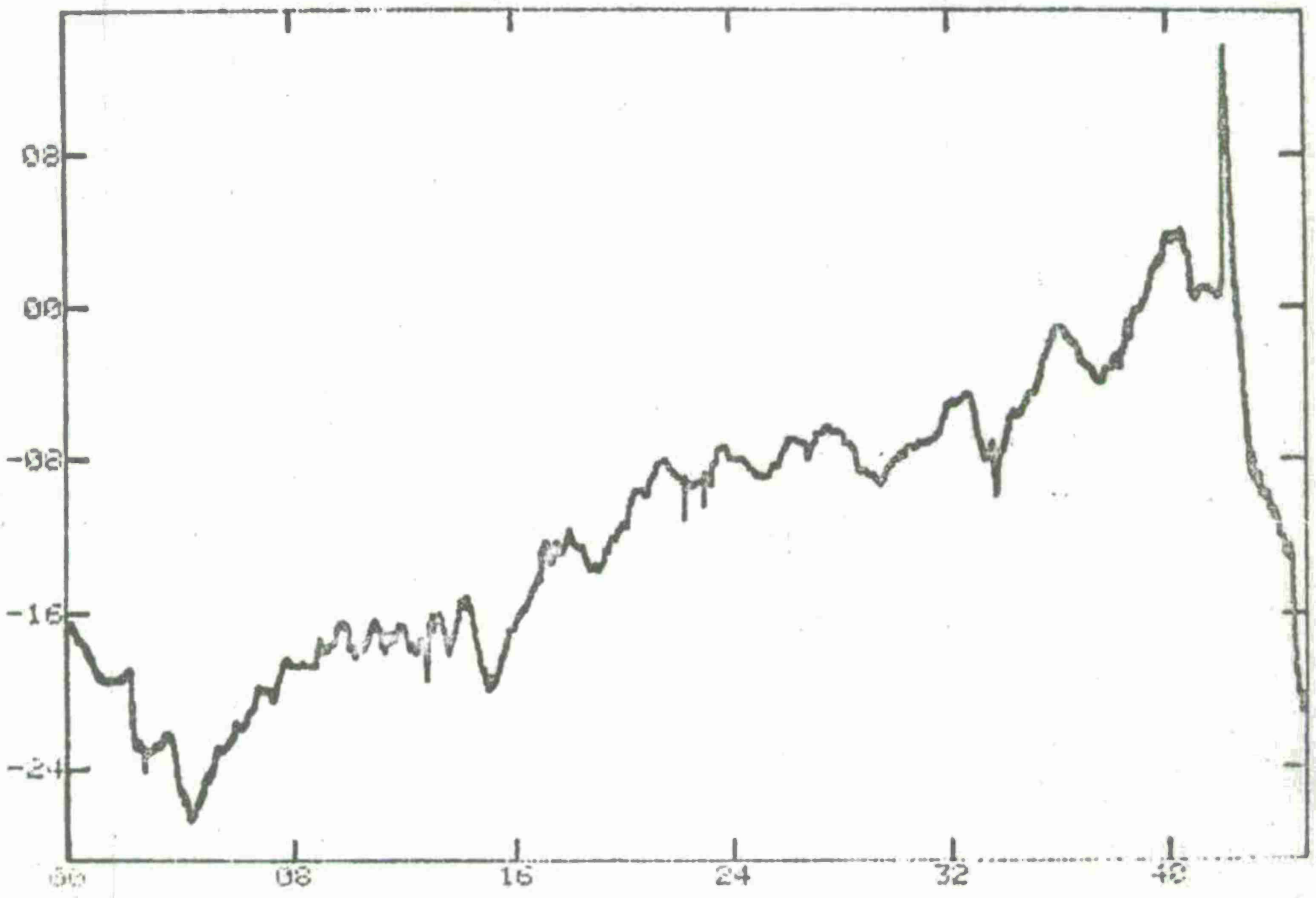
Data Sheets for Wing Torsion Test



CH 1 TRSN DEFLECTION - ST 93.00 L.H. X 10+0
TEST 19 X 2JUL75 > PHIG GEND TEST



CH 2 TRSN DEFLECTION - ST. 138.70 L.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST


MILLI INCHES
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-08
-16
-24
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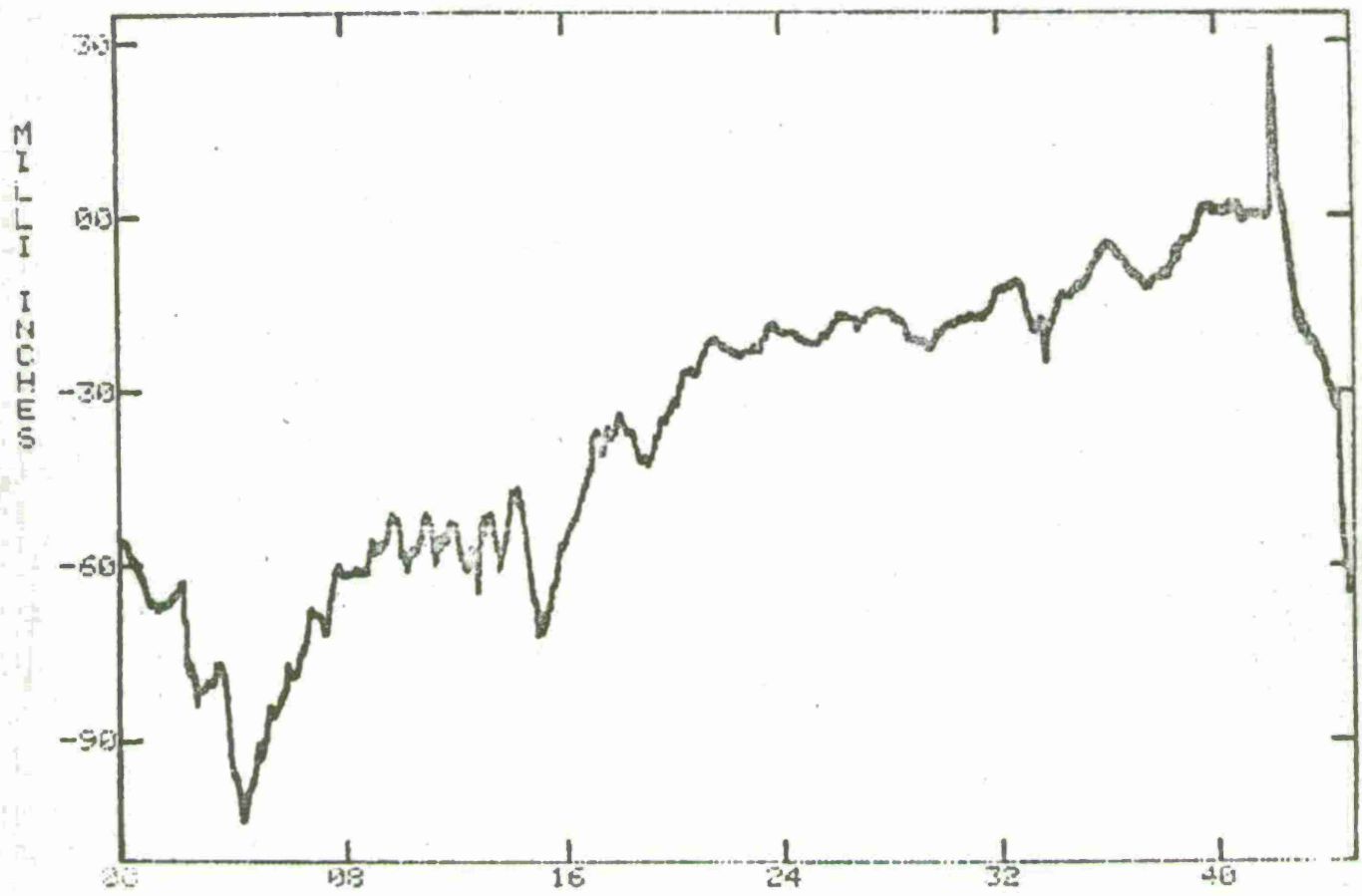
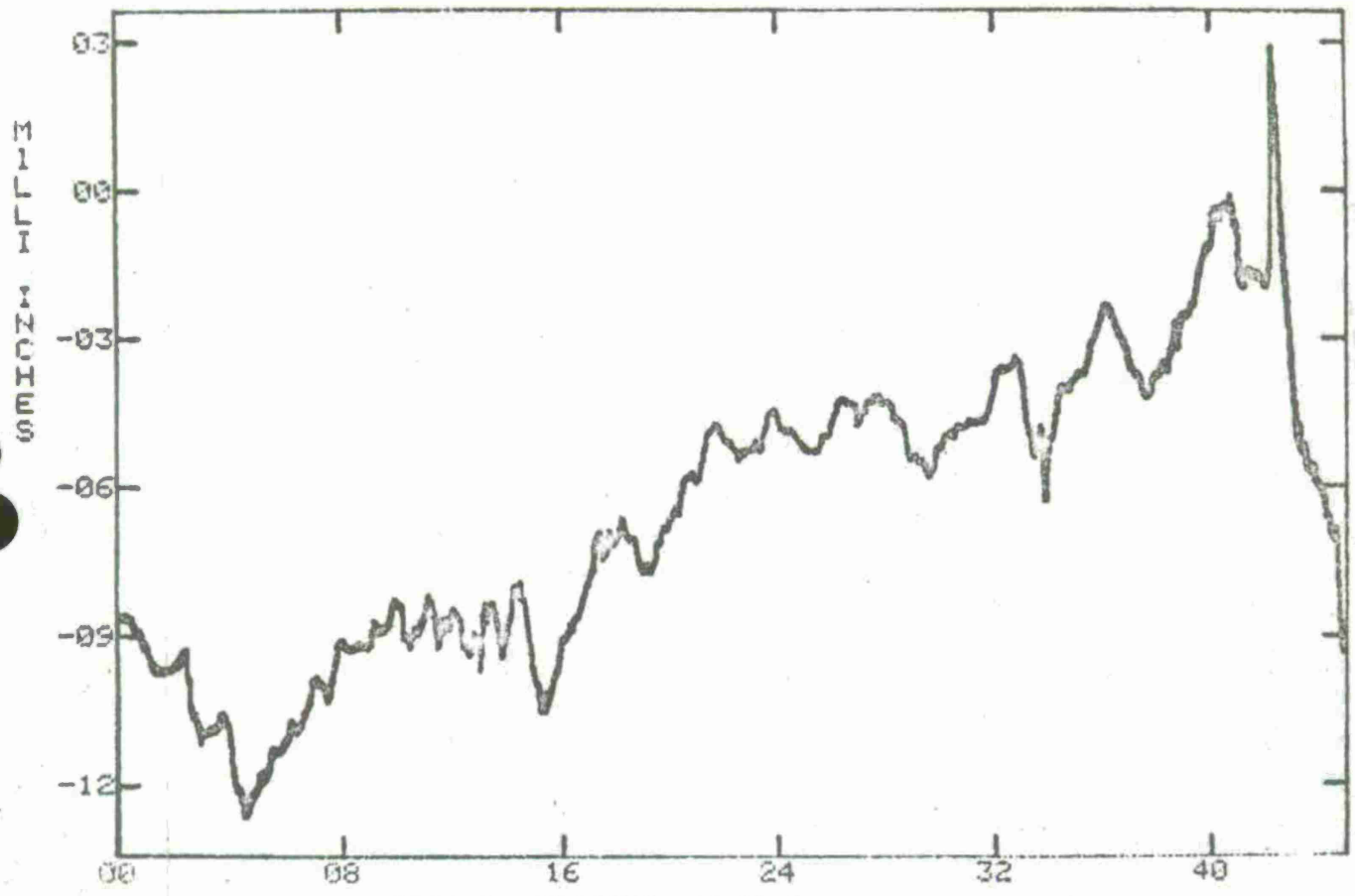
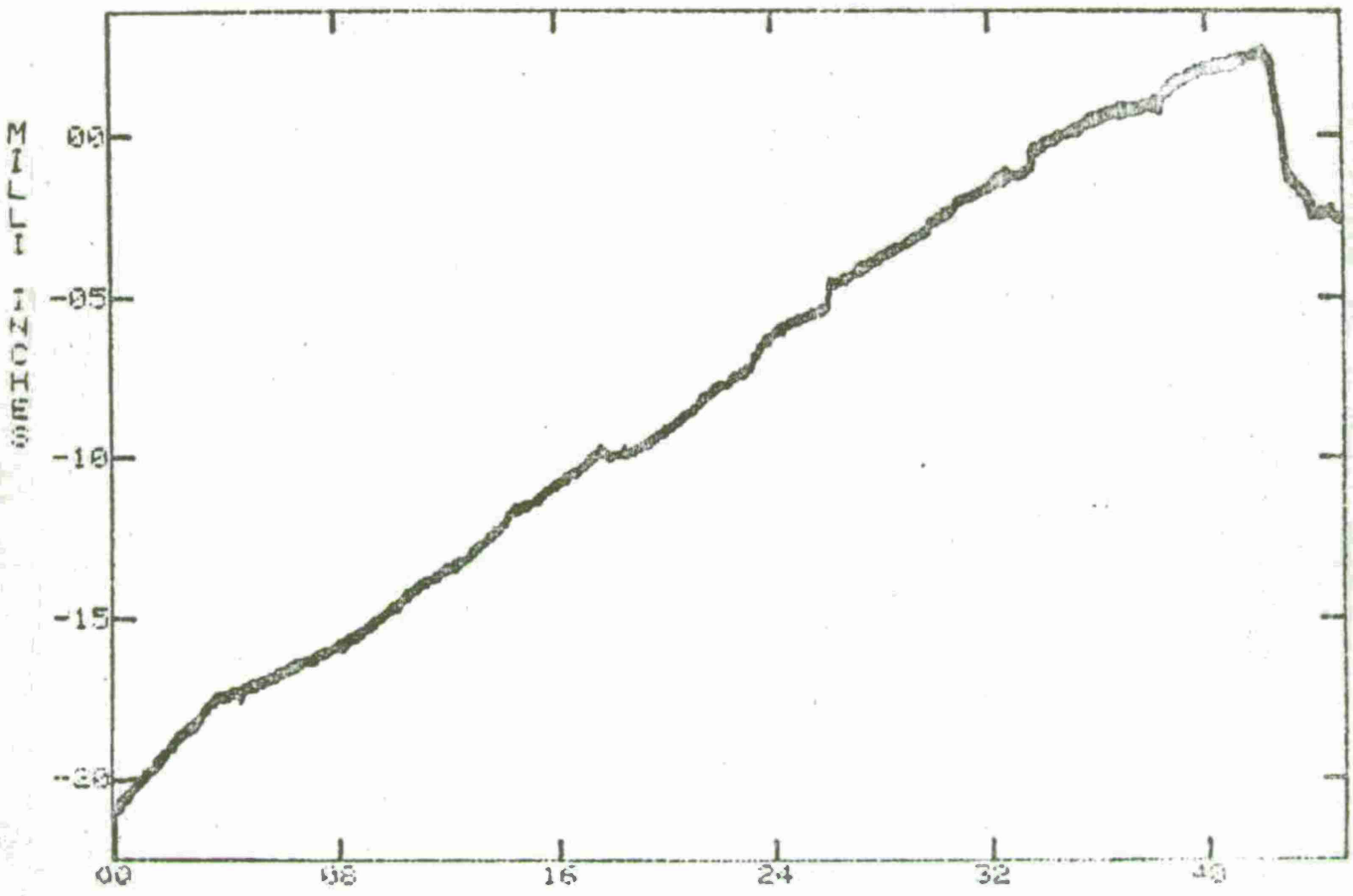
32
40
TIME IN SECONDS X 10-1
CH 3 TRSN DEFLECTION - ST. 148 50 L.H X 10+0
TEST 19 (2JUL75) AHTG BEND TEST



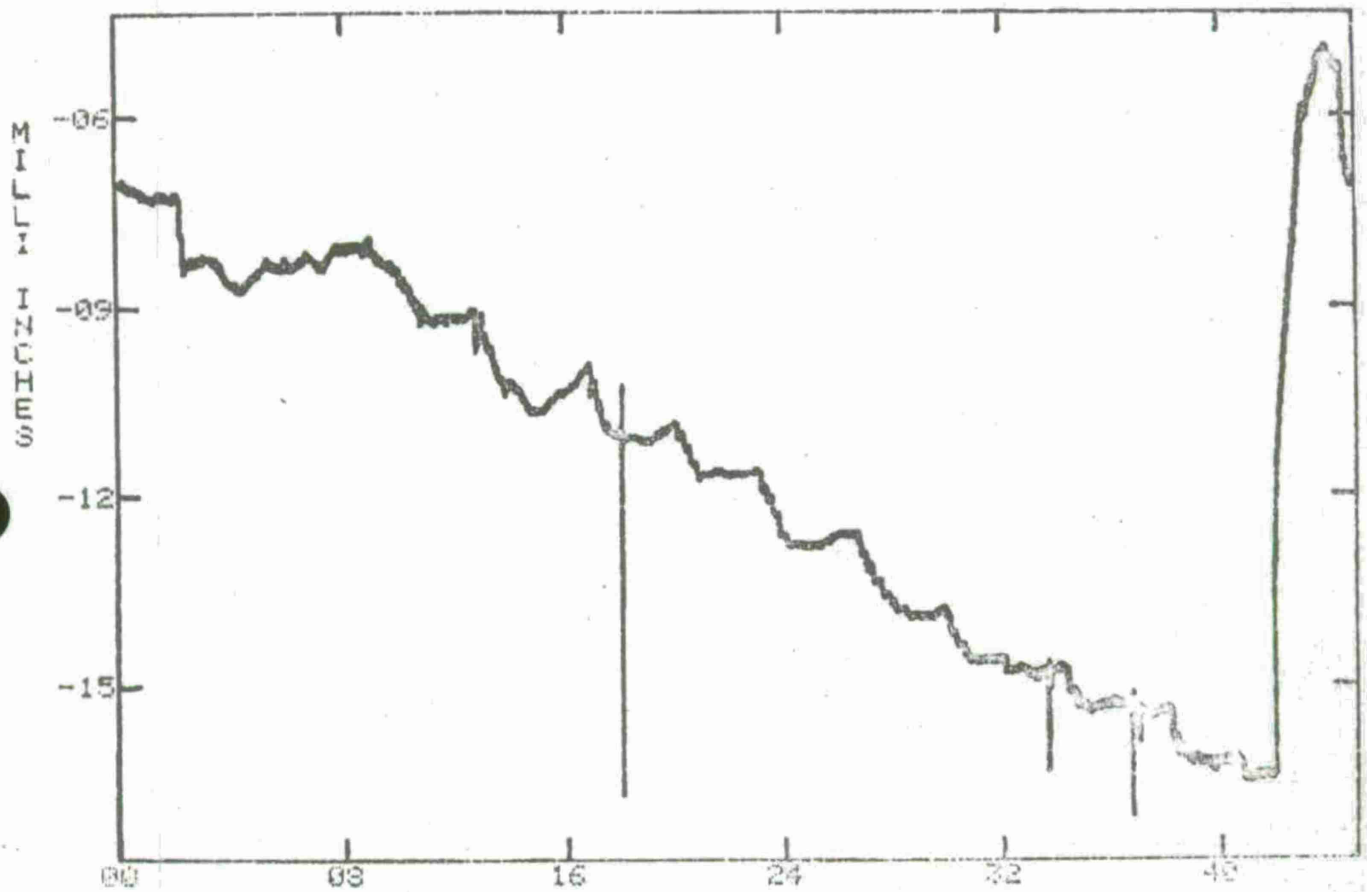
CH 4 TRSN DEFLECTION - ST 186.25 L H X 10+1
TEST 19 (2JUL75) RH1G BEND TEST



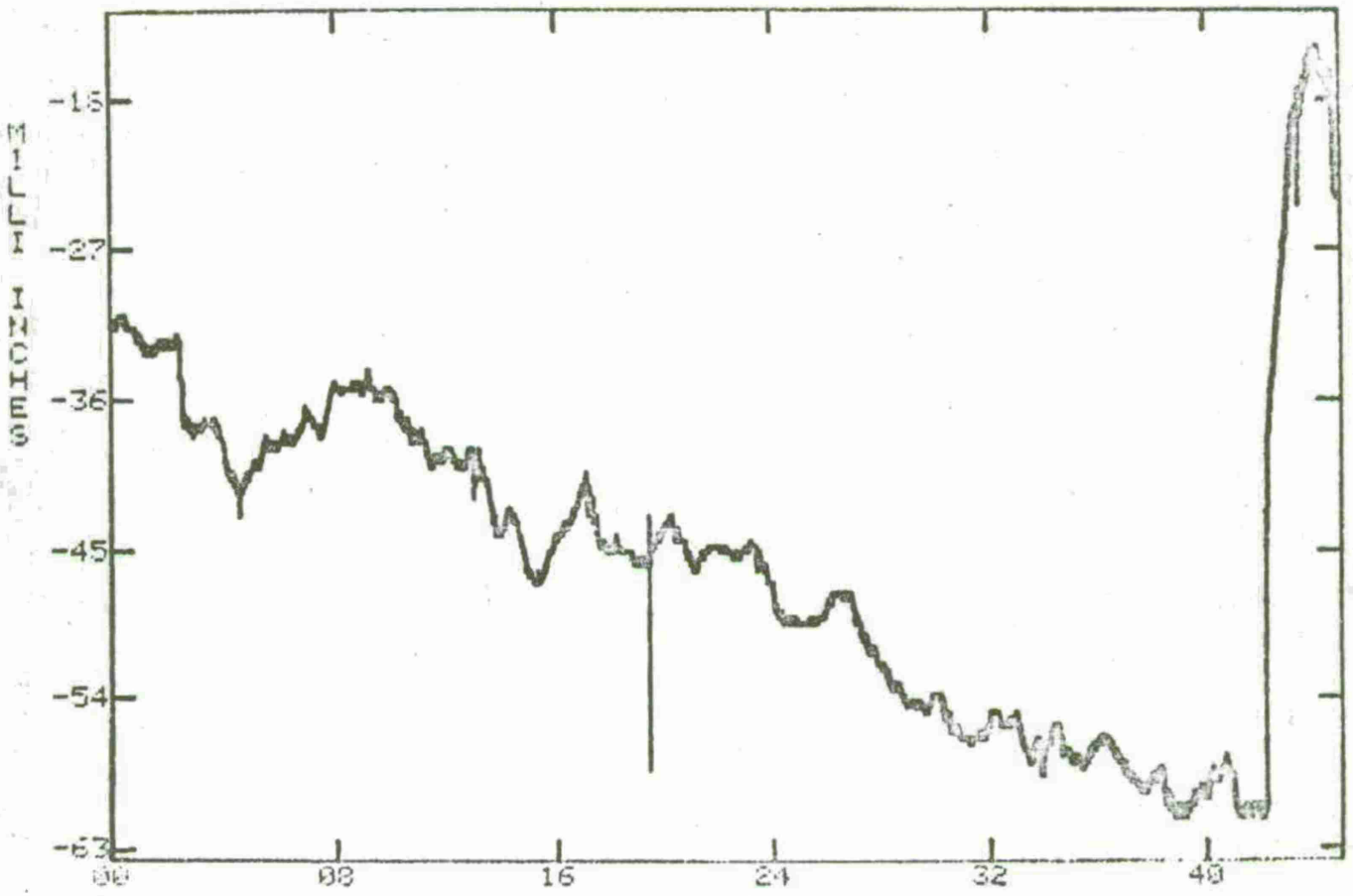
CH 6 TRSH DEFLECTION - ST. 213.90 L.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST



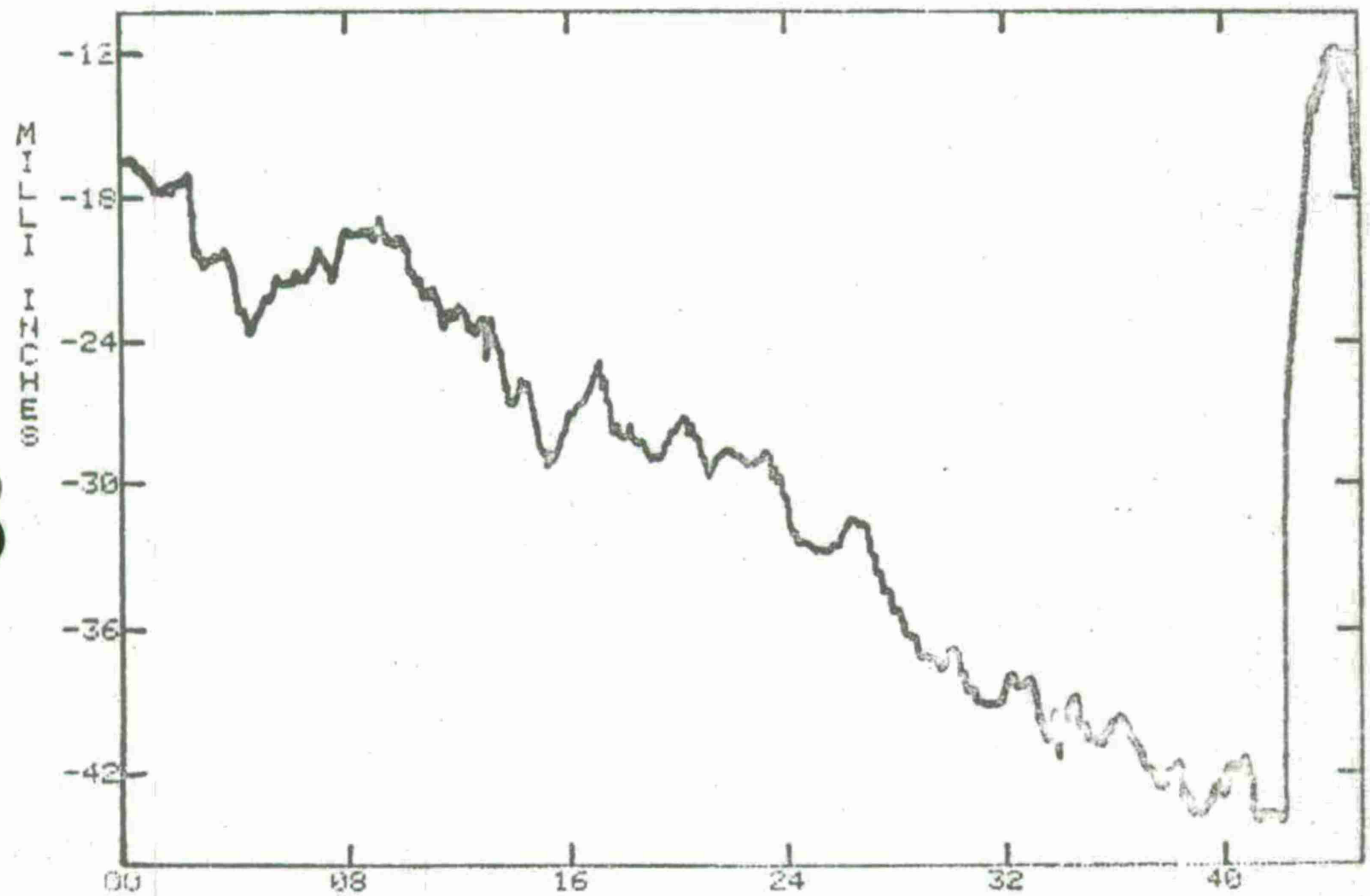
CH 6 TRSN DEFLECTION - ST. 300 43 L.H X 10+1
TEST 19 (2JUL75) AH1G BEND TEST



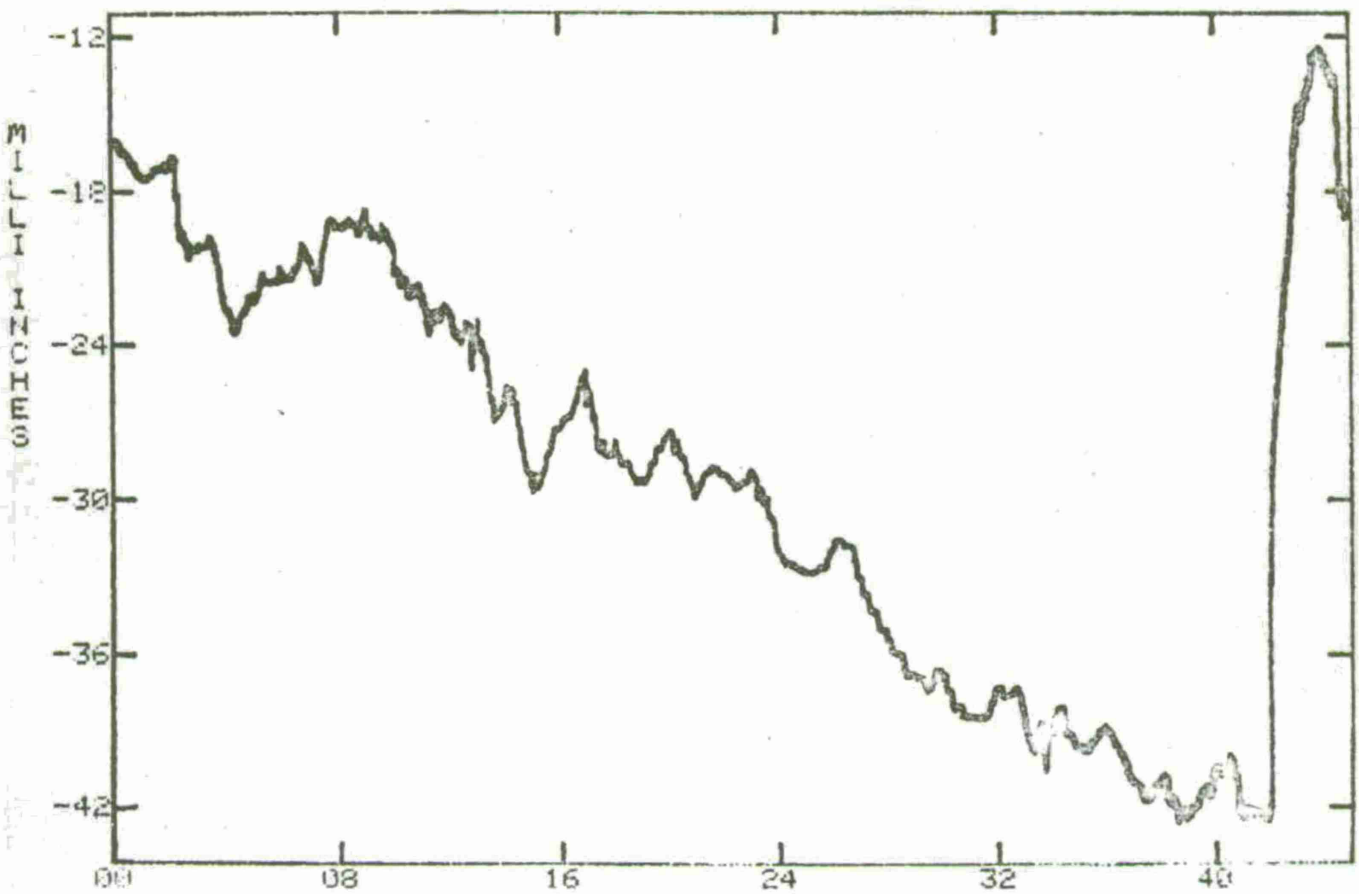
TIME IN SECONDS X 10-1
CH 7 TRSN DEFLECTION - ST. 93.00 R.H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST



CH 8 TRSN DEFLECTION - ST. 138.70 R.H. X 10+0
TEST 13 (2JUL75) AH1G BEND TEST



CH 9 TRSN DEFLECTION - ST. 148.50 R.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST


-12
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-24
-30
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-42
MILLI INCHES
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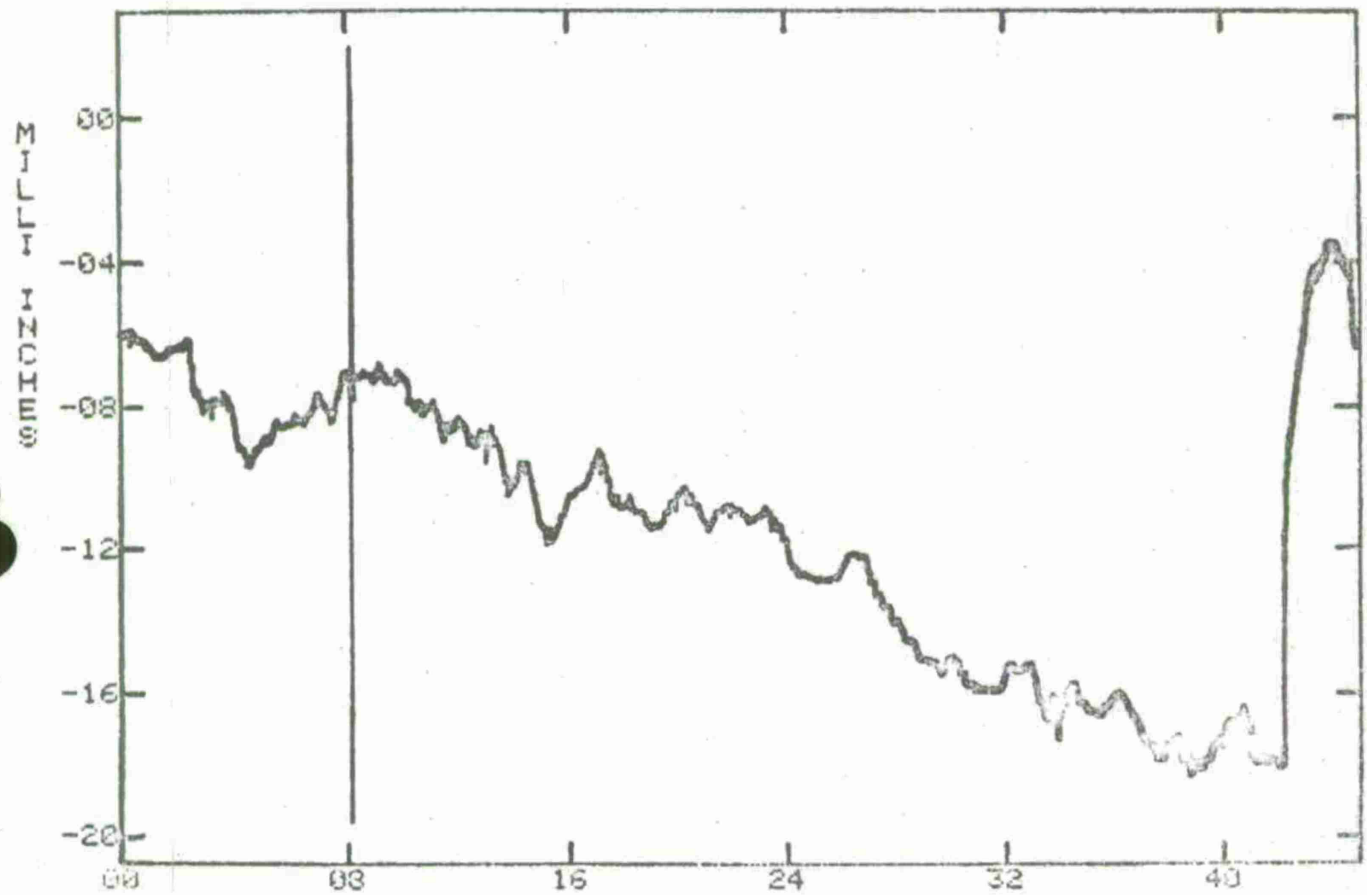
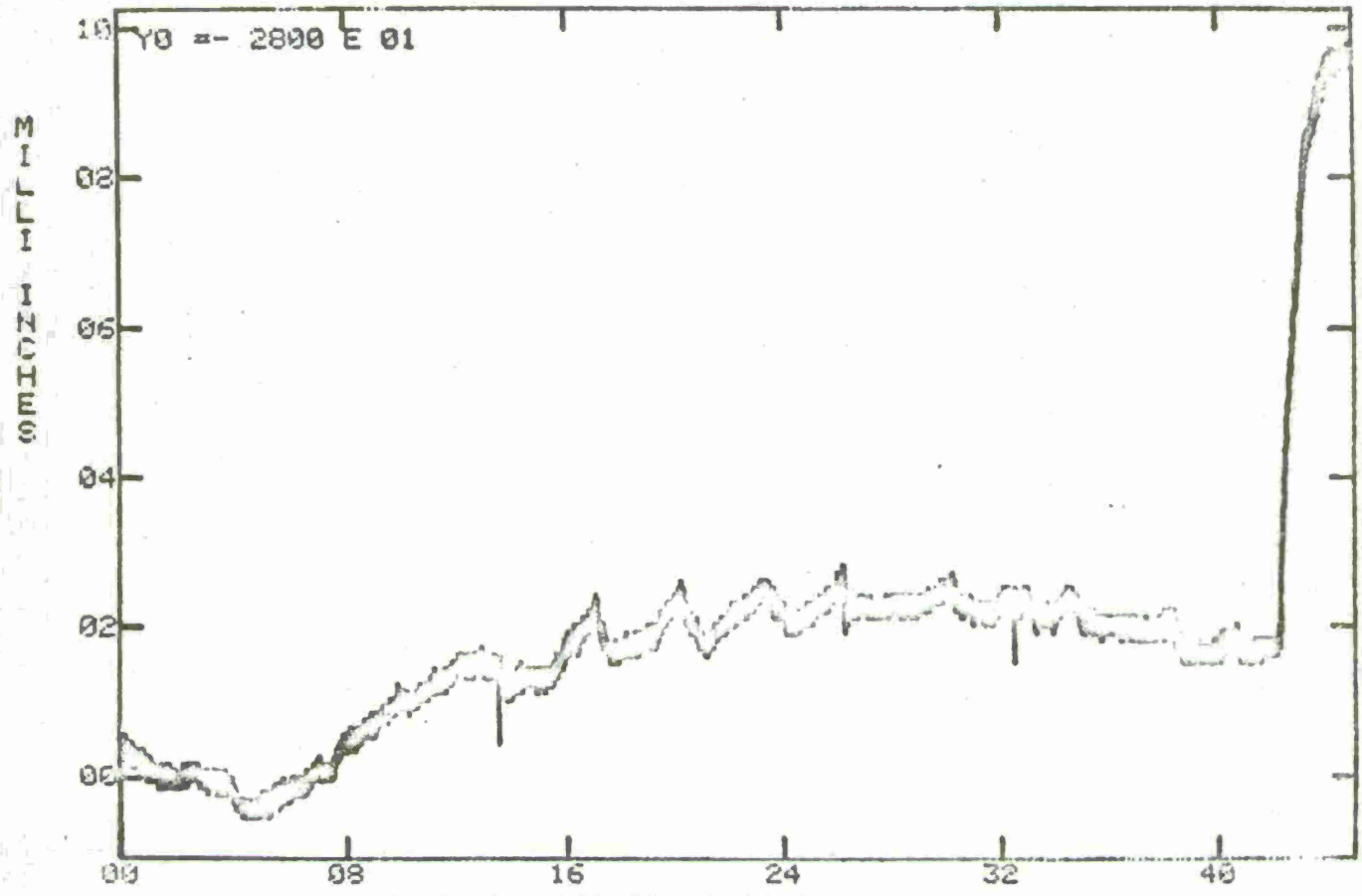
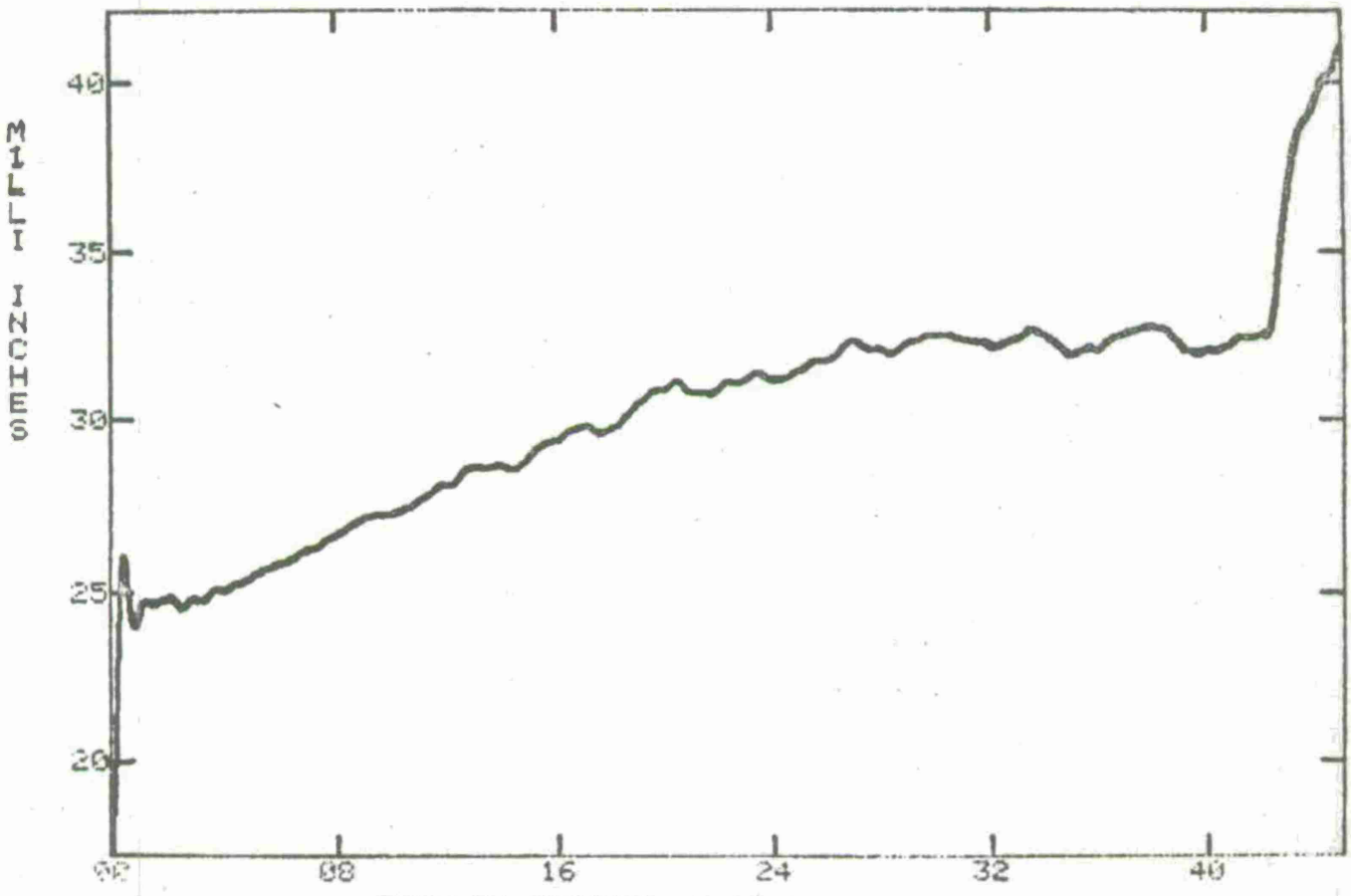
TIME IN SECONDS X 10-1
CH 10 TRSN DEFLECTION - ST. 195.25 R.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST



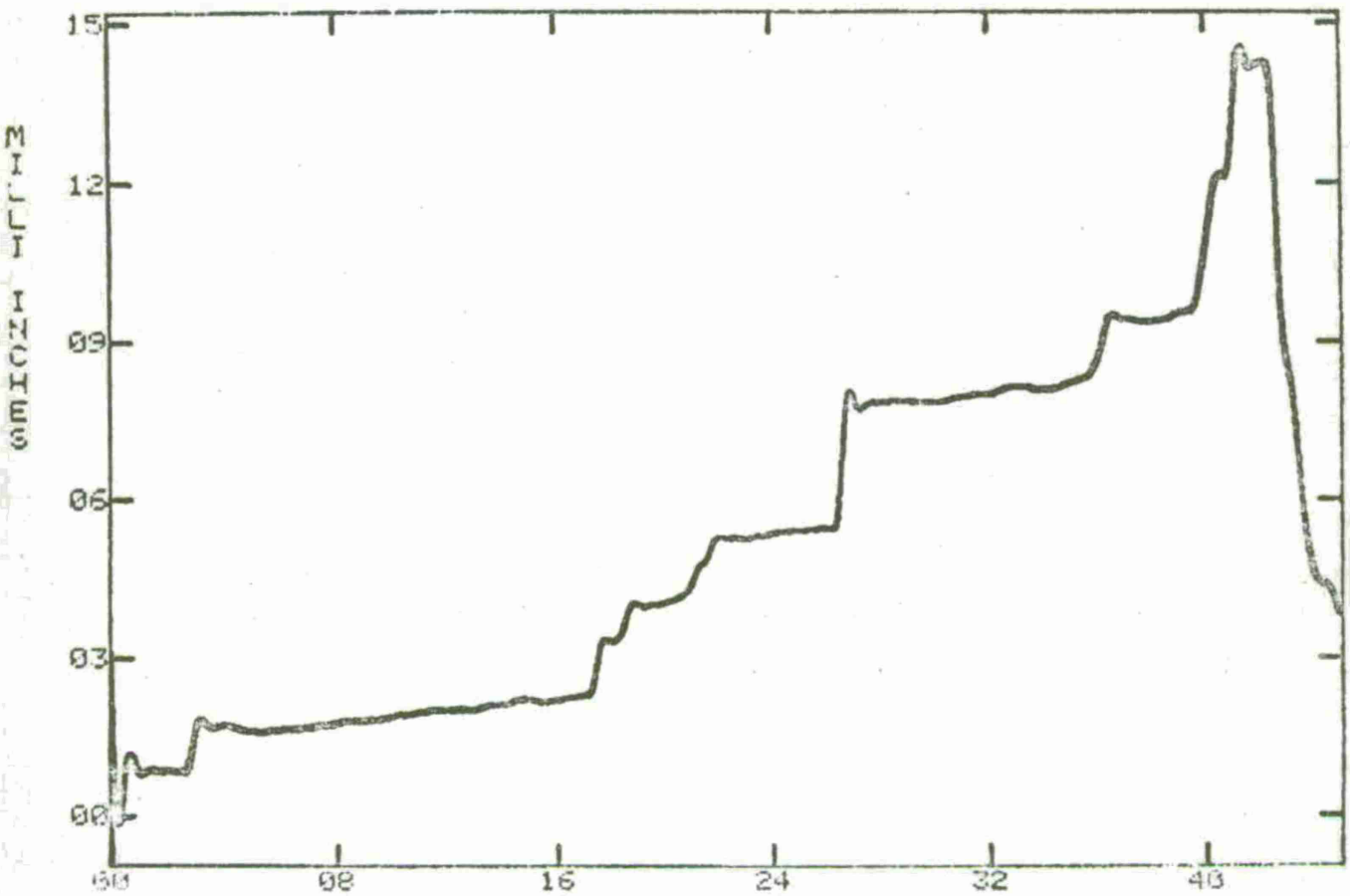
TIME IN SECONDS X 10-1
CH 11 TRSN DEFLECTION - ST. 213.90 R.H. X 10+0
TEST 19 < 2JUL75 > AH1G BEND TEST



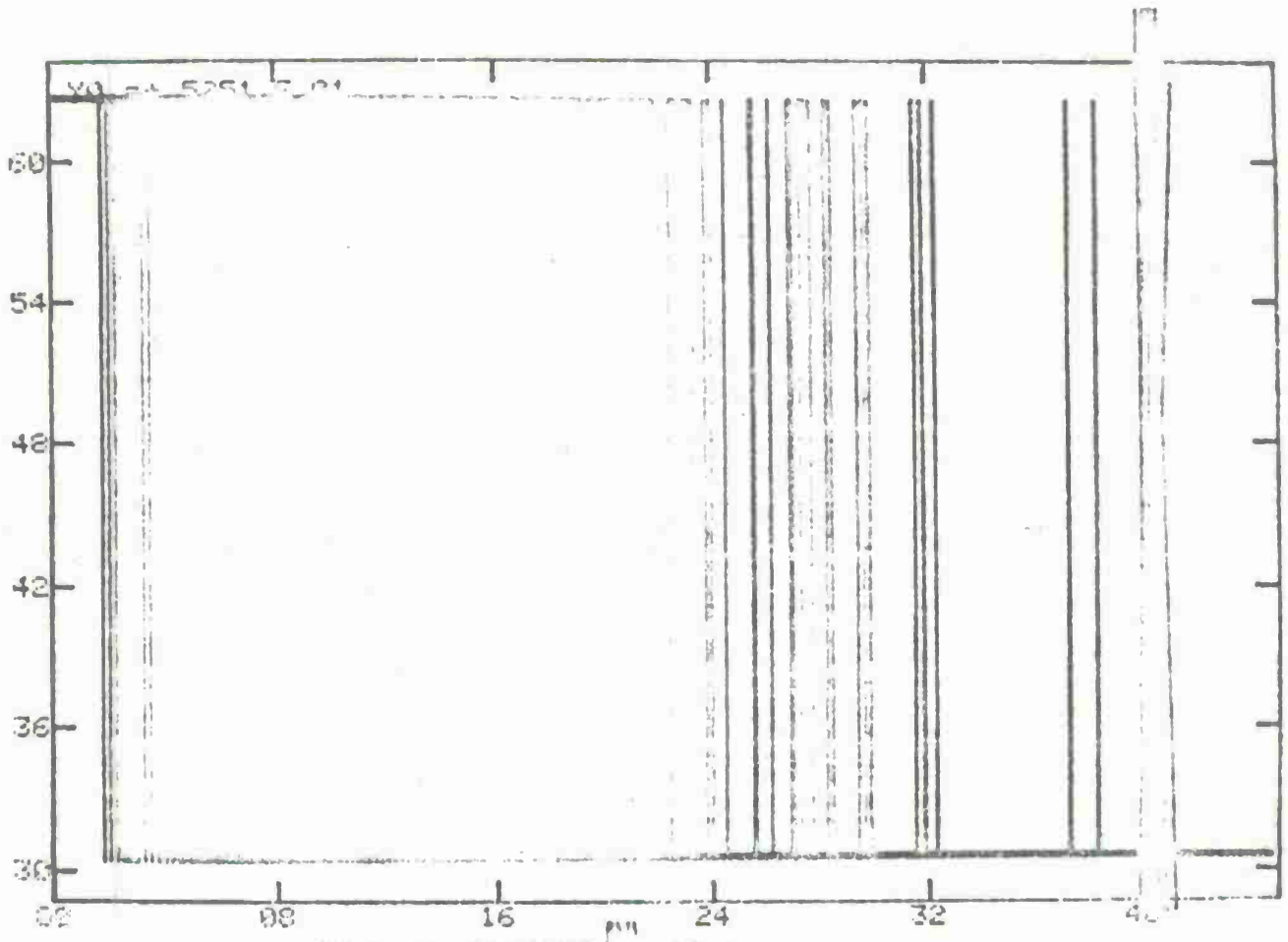
CH 12 TRSN DEFLECTION - ST. 300.42 R.H. X 10+1
TEST 19 (2JUL75) AH1G BEND TEST



CH 13 BASE ROTATION - UPPER L.H. X 10+2
TEST 19 (2JUL75) 4H1G BEND TEST



CH 14 BASE ROTATION - LOWER L.H. X 10+1
TEST 19 (2JUL75) AH1G BEND TEST


MILLI INCHES
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54
48
42
36
30
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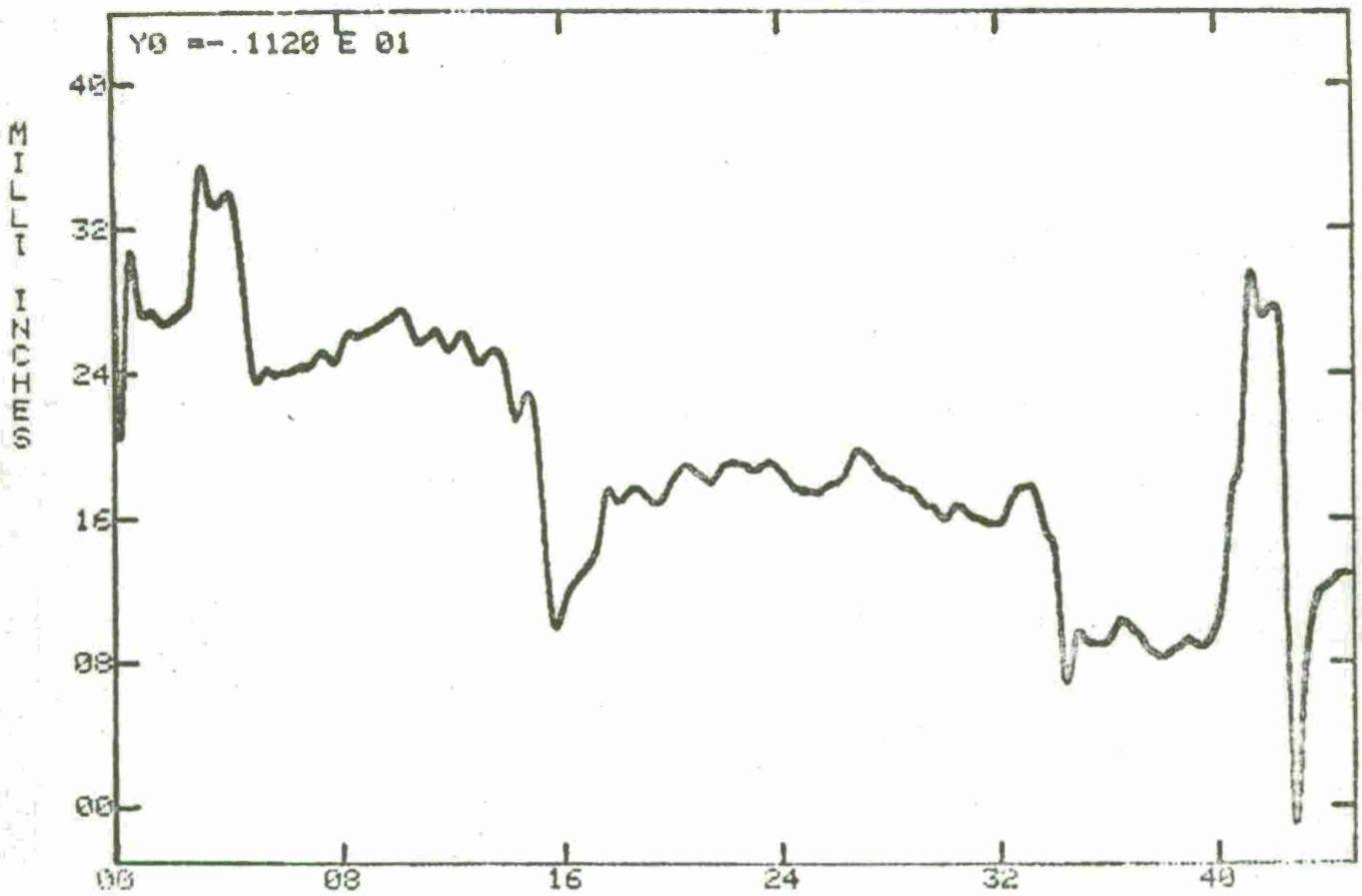
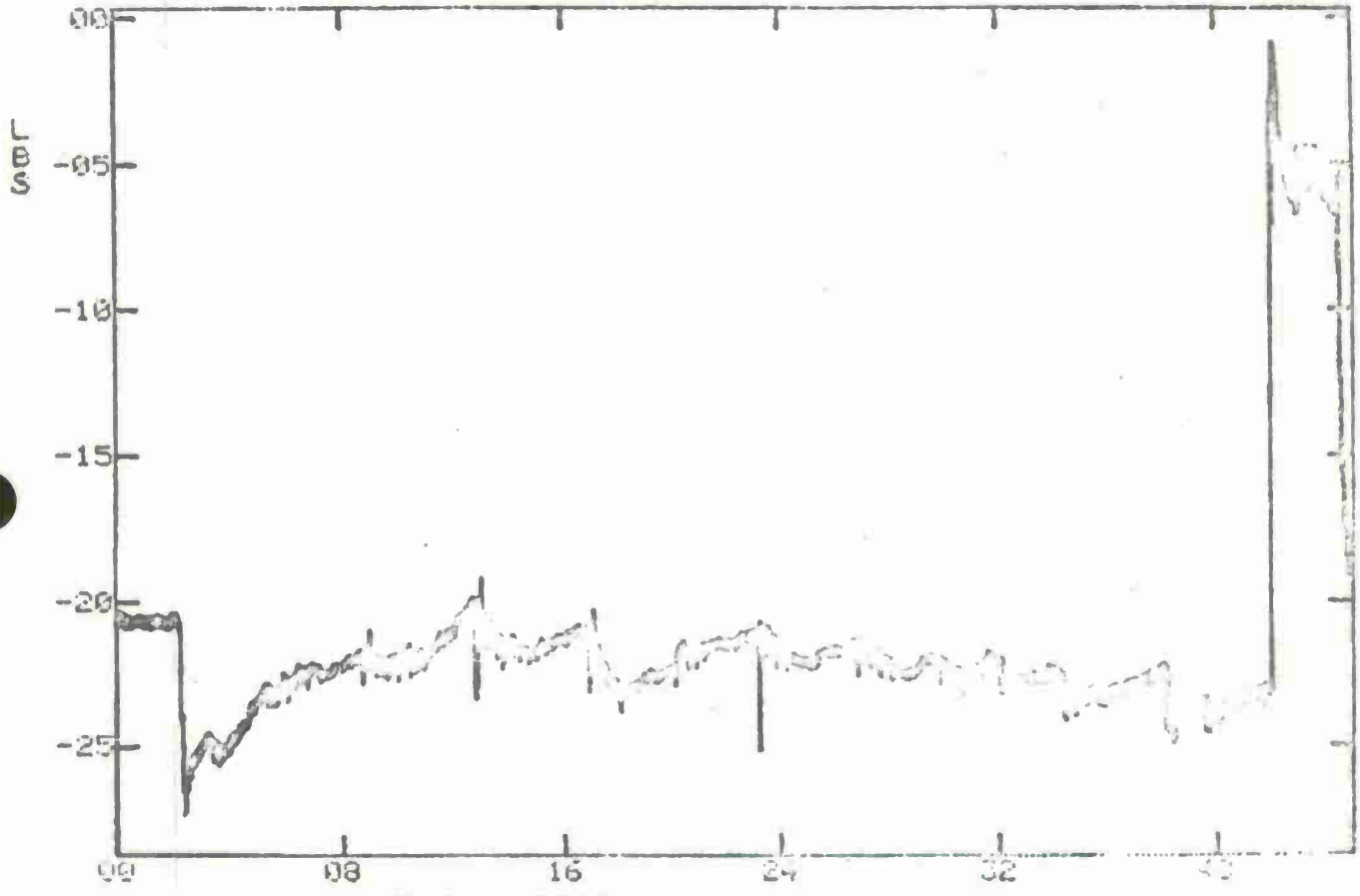
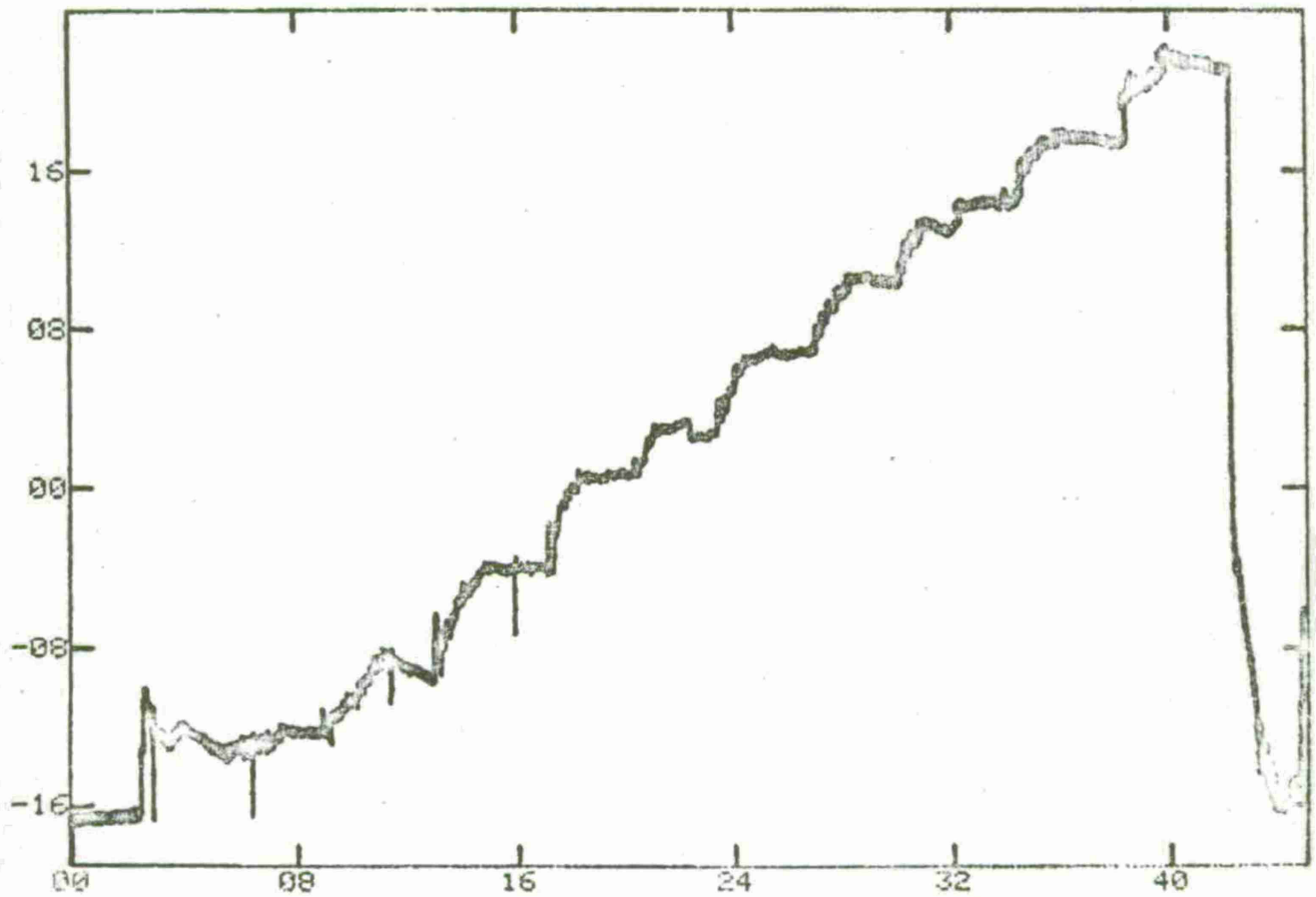
08
16
24
32
TIME IN SECONDS
10-1
CH 15 BASE ROTATION - UPPER P.H. X 10+4
TEST 19 (2JUL75) AH1G BEND TEST



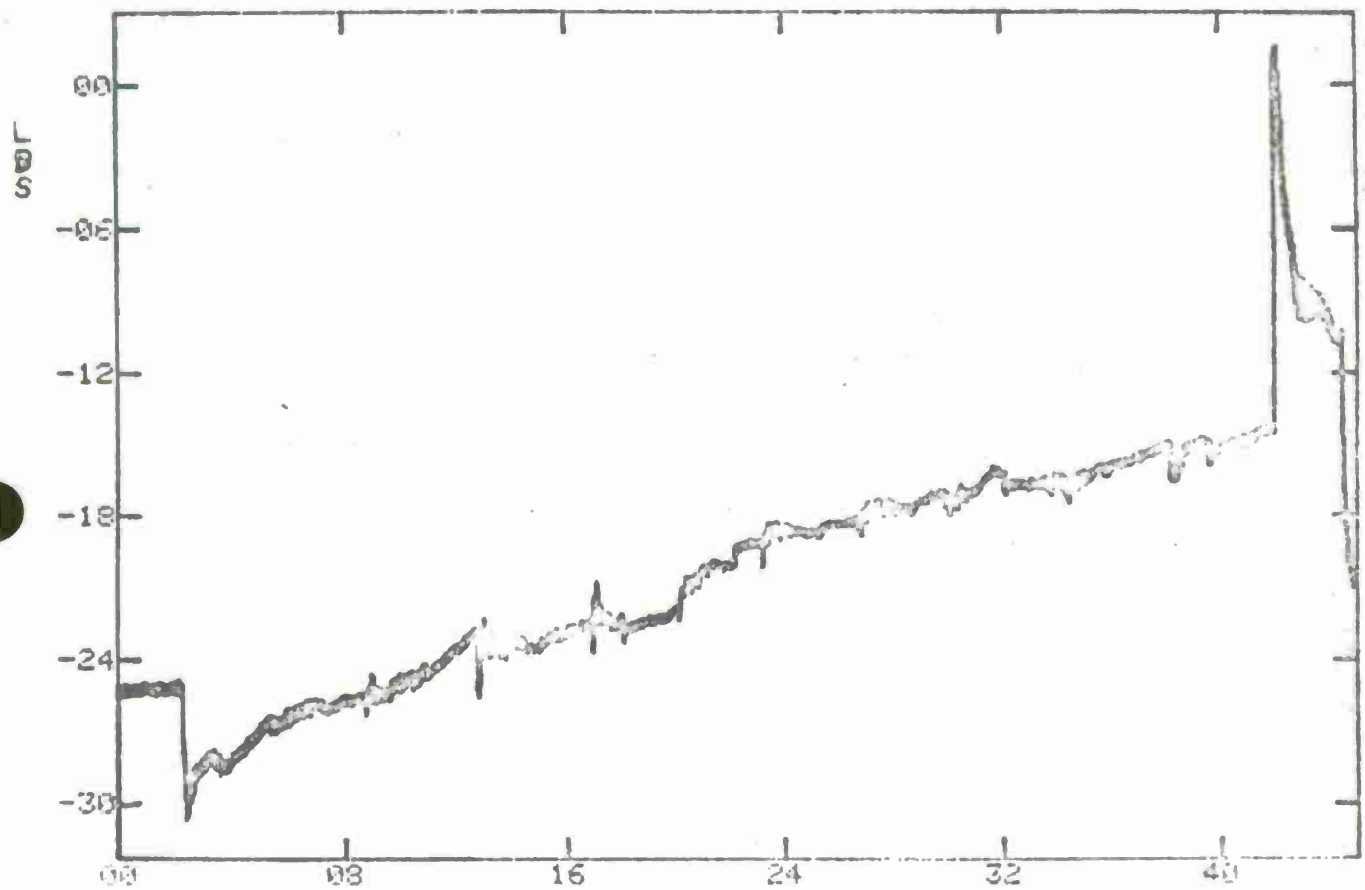
CH 17 BASE ROTATION - LOWER R.H. X 10+2
TEST 19 (2JUL75) AH1G BEND TEST



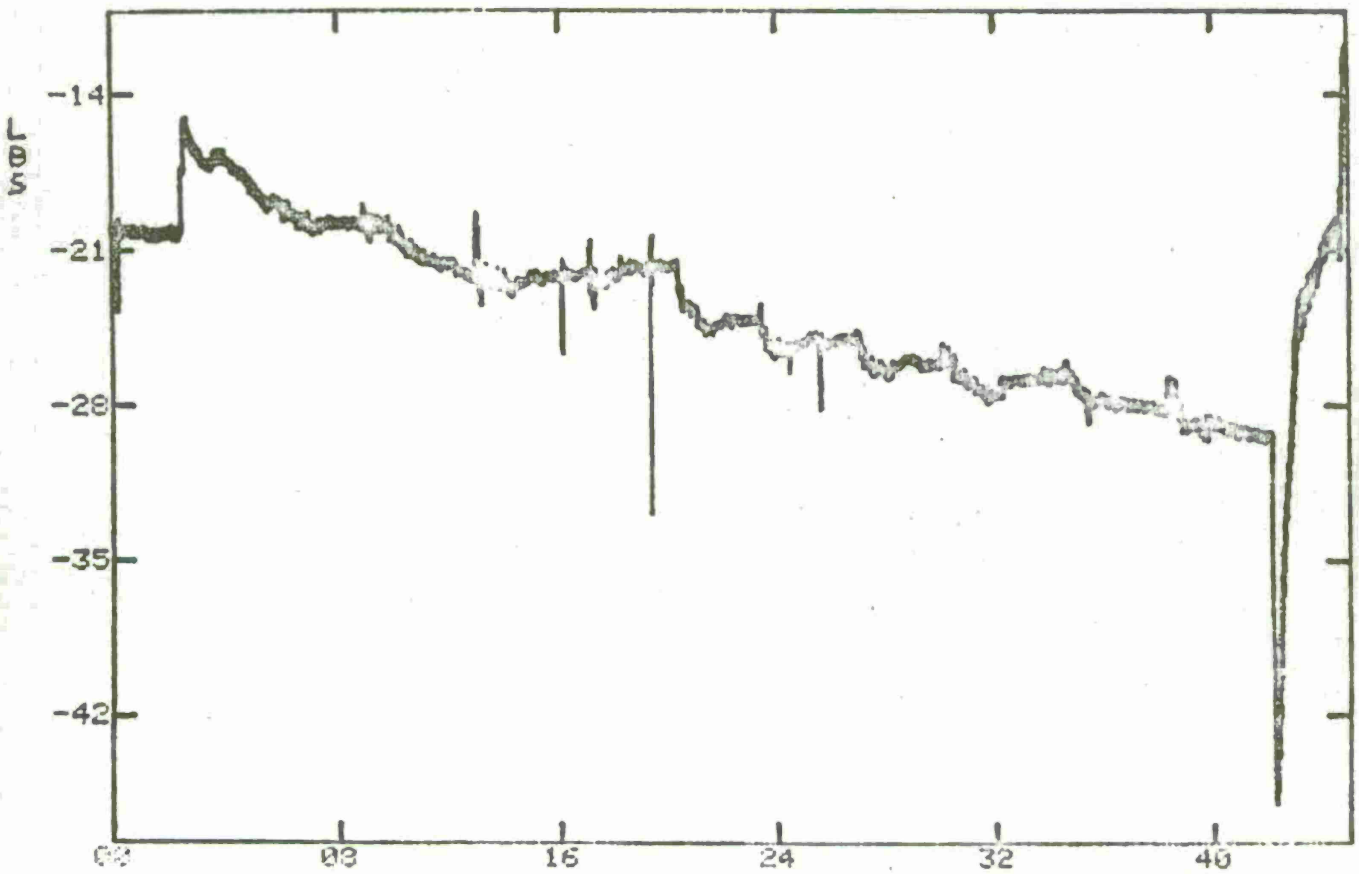
CH 18 LOAD - UPPER L.H X 10-1
TEST 19 (2JUL75) AH1G BEND TEST



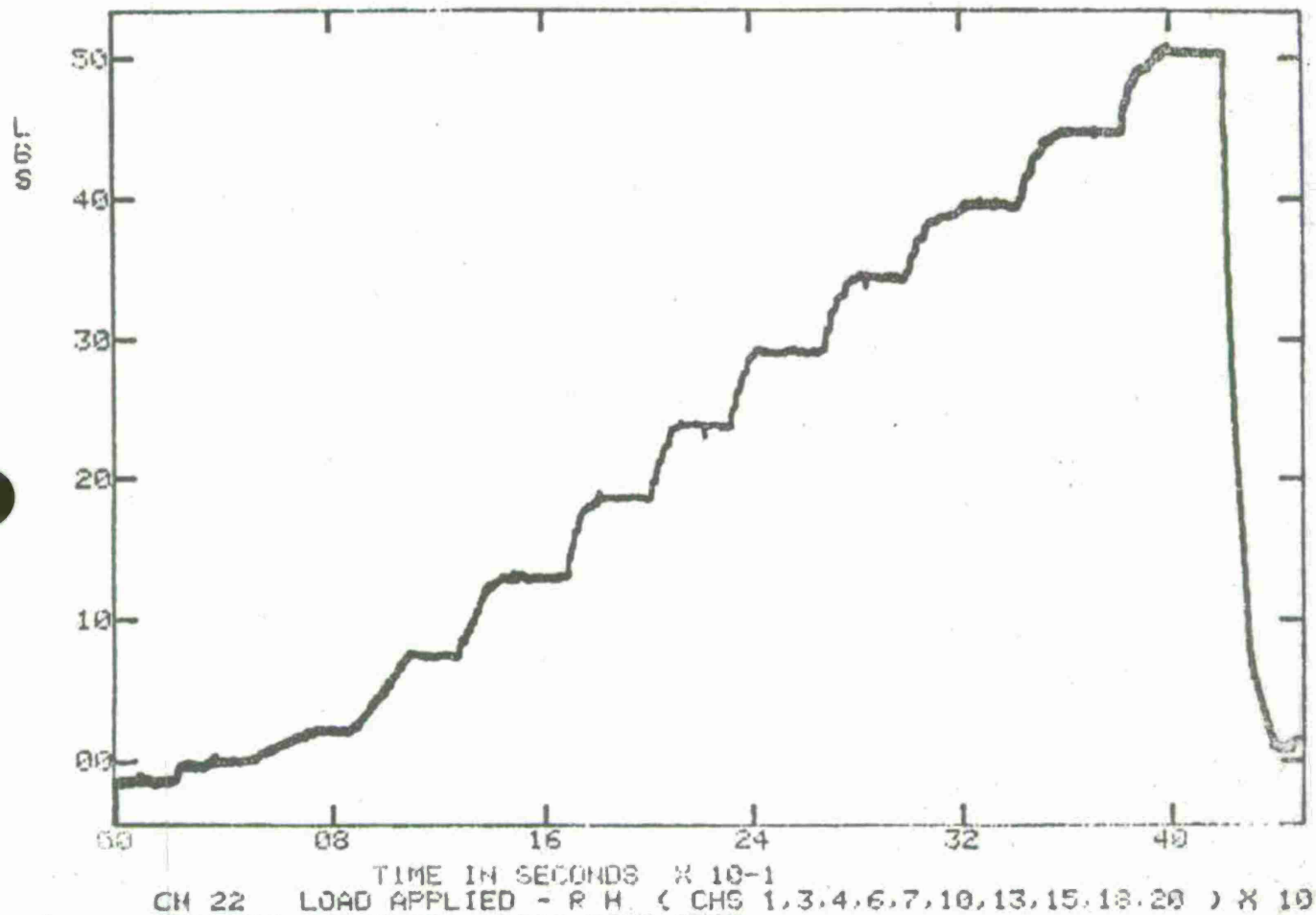
CH 19 LOAD - LOWER L.H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST

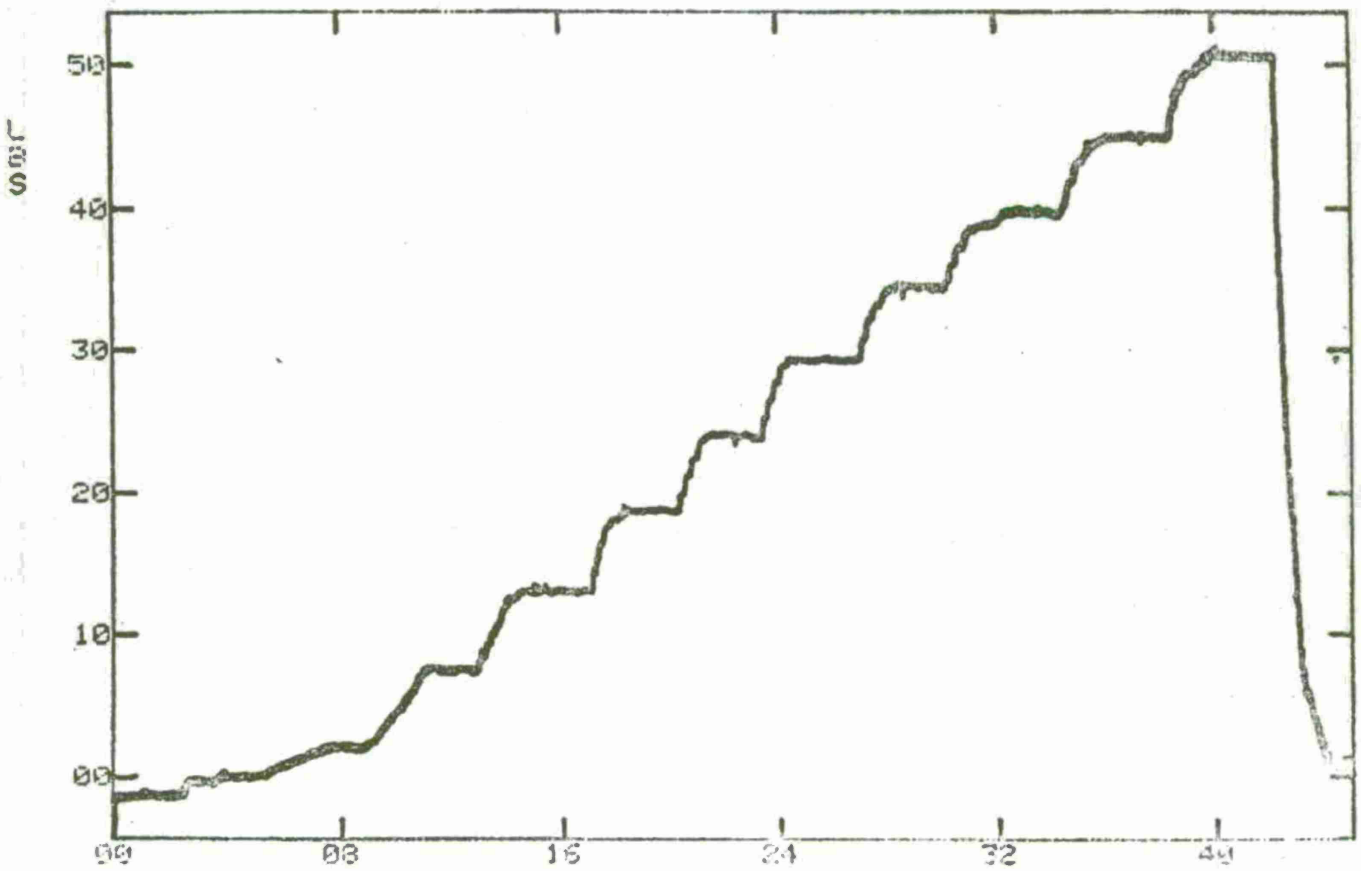


CH 20 LOAD - UPPER R.H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST

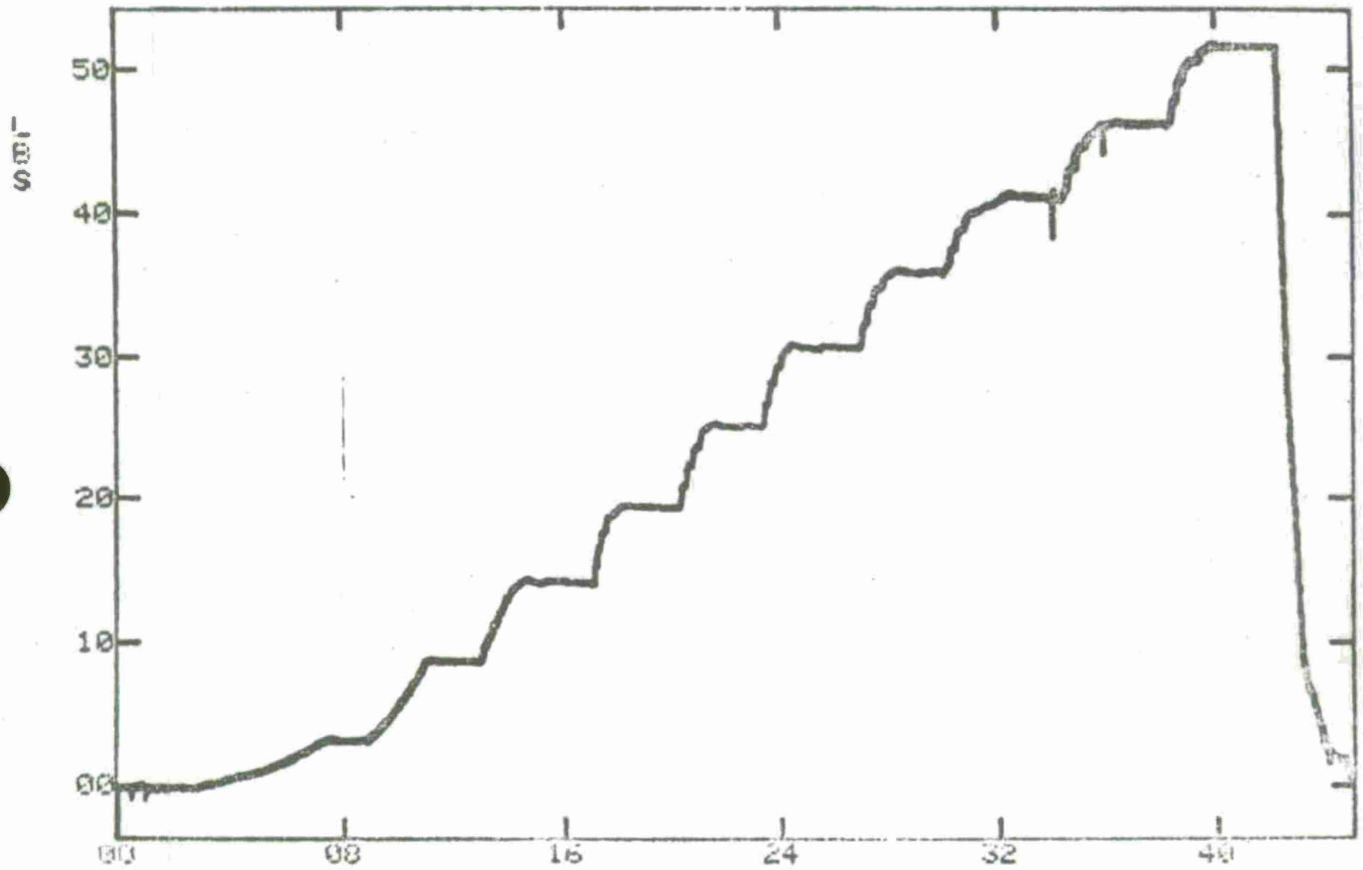


CH 21 LOAD - LOWER R.H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST

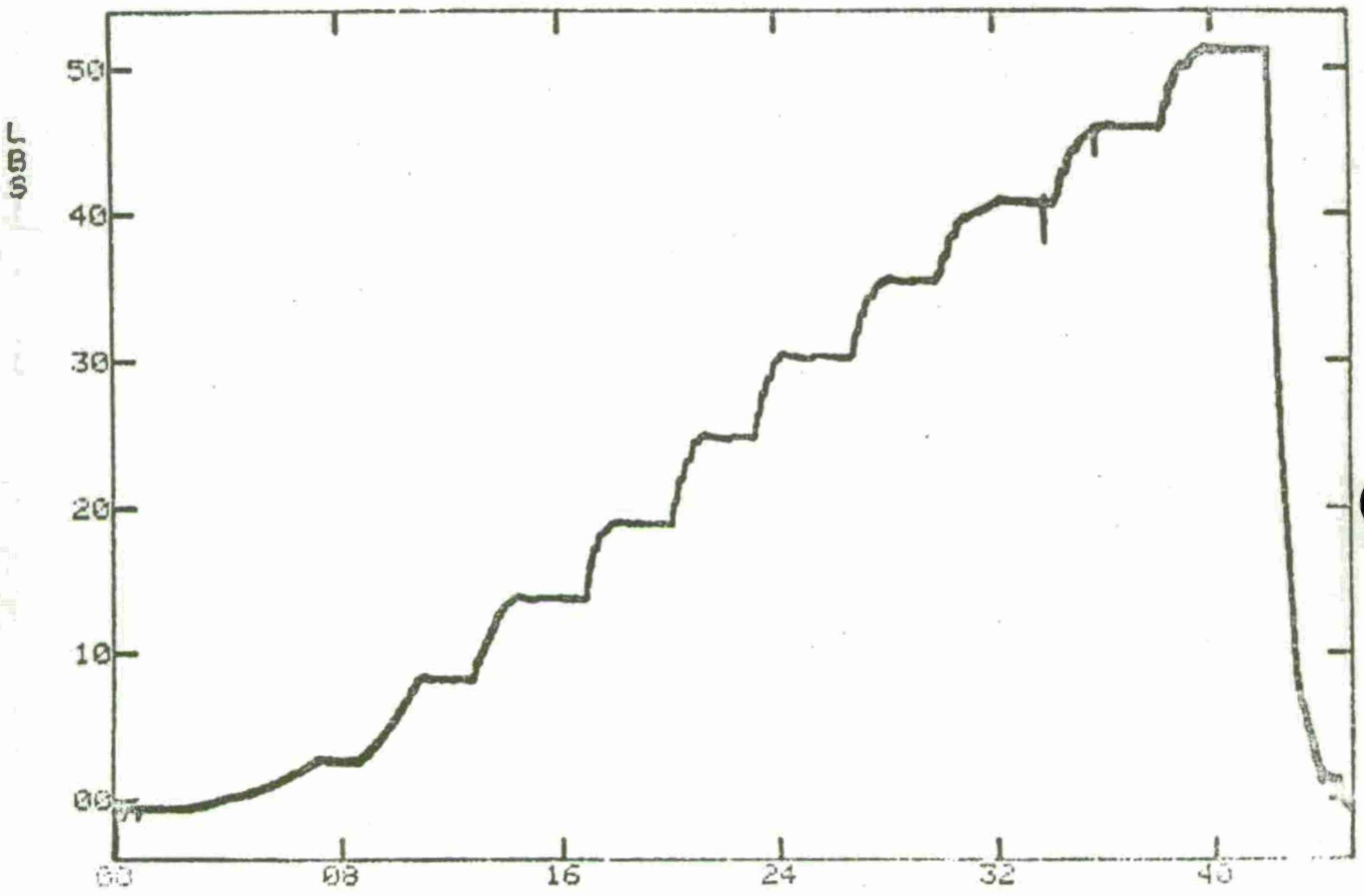

LBS
50
40
30
20
10
00
00
08
16
24
32
40
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R H (CHS 1,3,4,6,7,10,13,15,18,20) X 10
-1
TEST 19 (2JUL75) AH1G BEND TEST



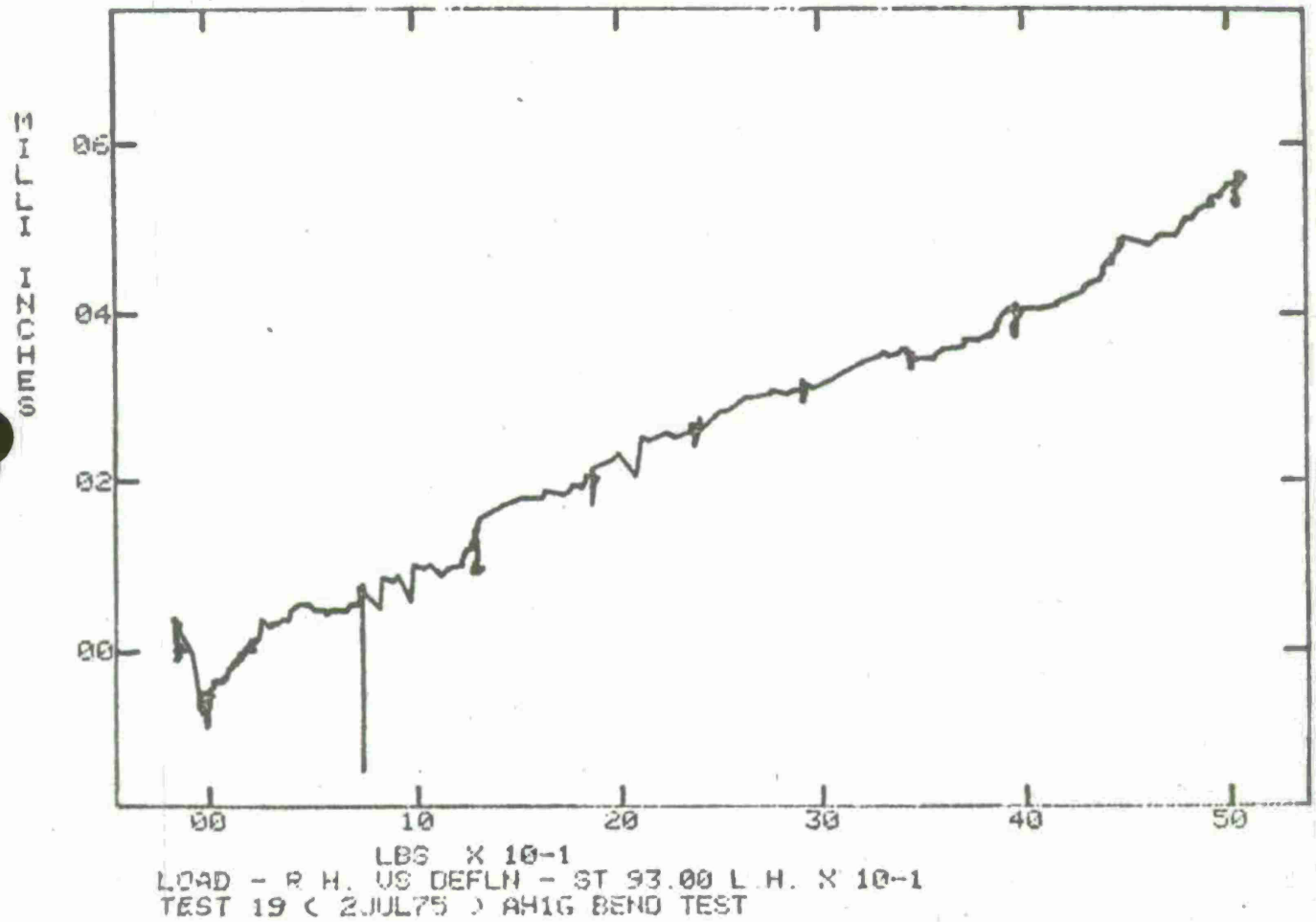
TIME IN SECONDS X 10-1
CH 22 LOAD APPLIED - R.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 19 (2JUL75) AH1G BEND TEST

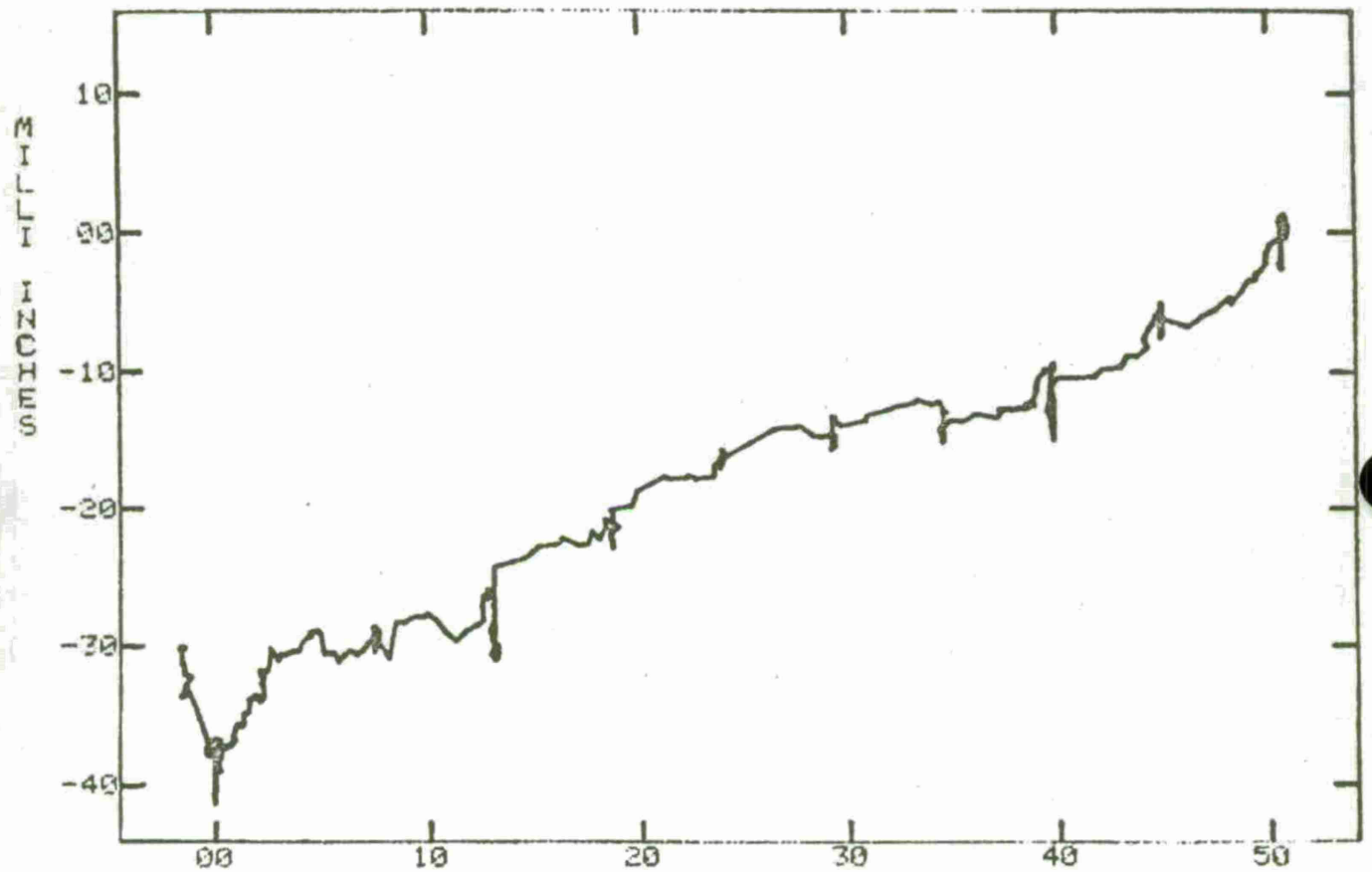


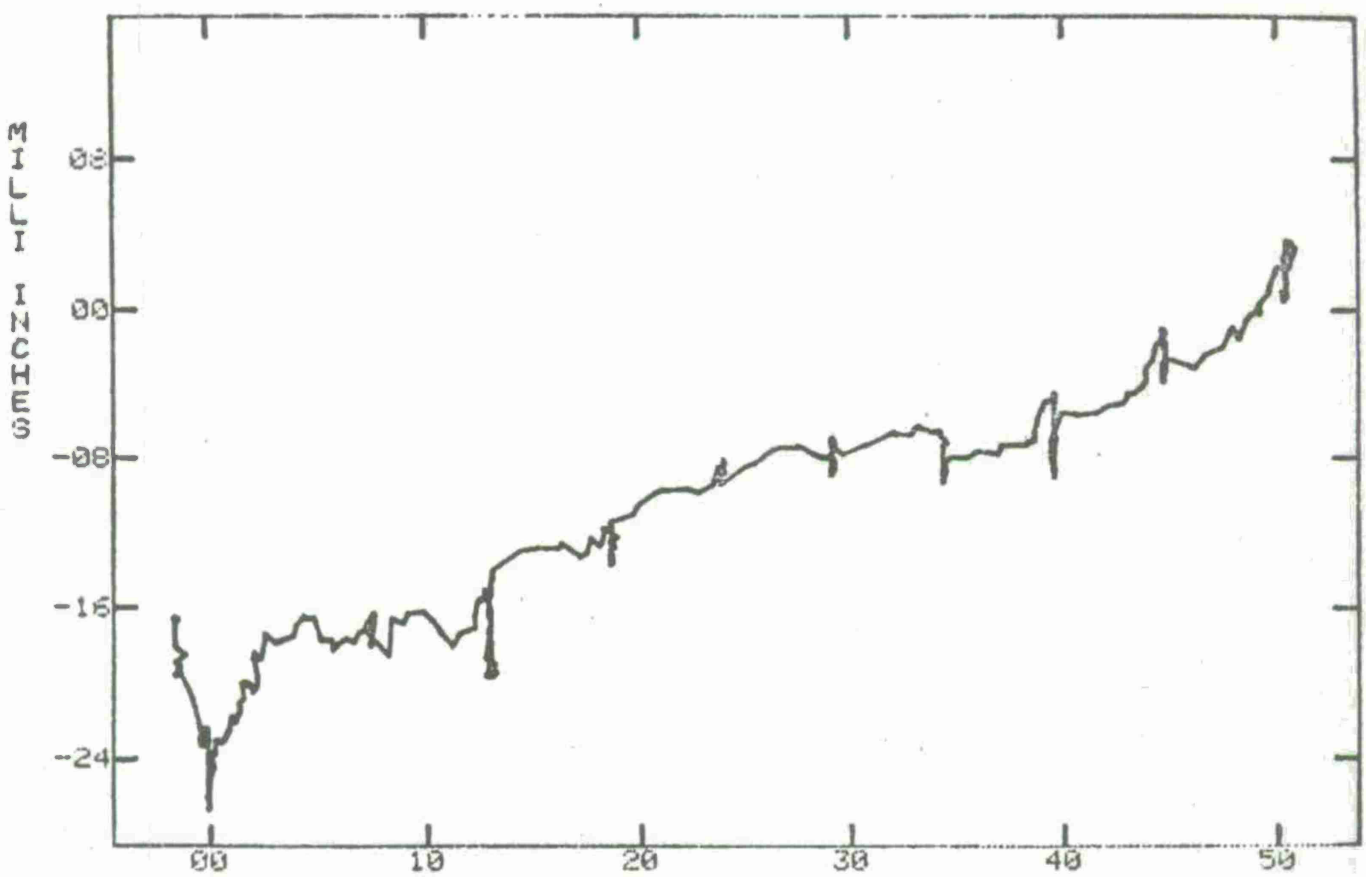
CH 23 LOAD APPLIED - L.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 19 (2JUL75) AH1G BEND TEST



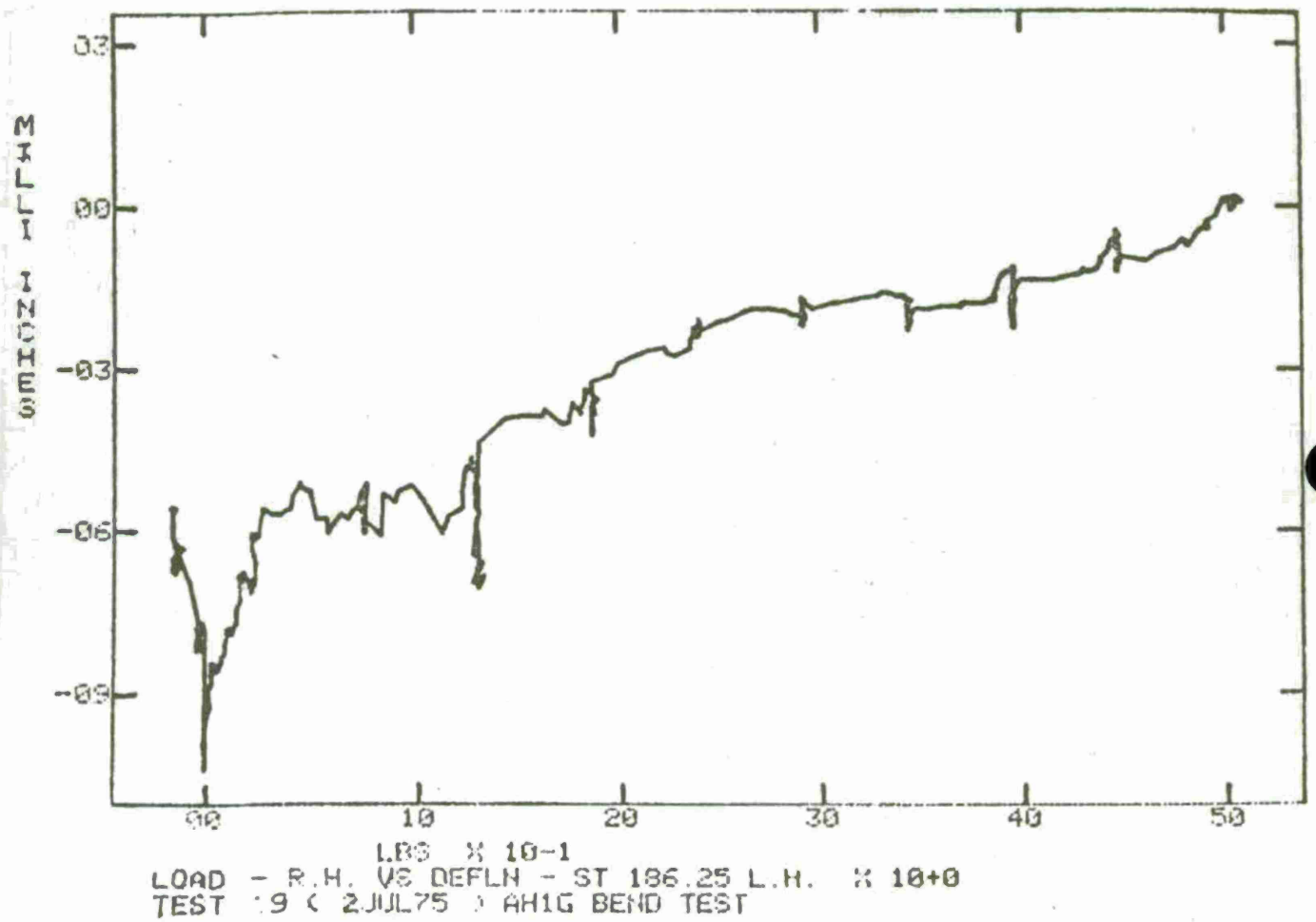
CH 23 LOAD APPLIED - L.H (CHS 1,3,4,6,7,10,13,15,18,20) X 10
-1 TEST 19 (2JUL75) AH1G BEND TEST

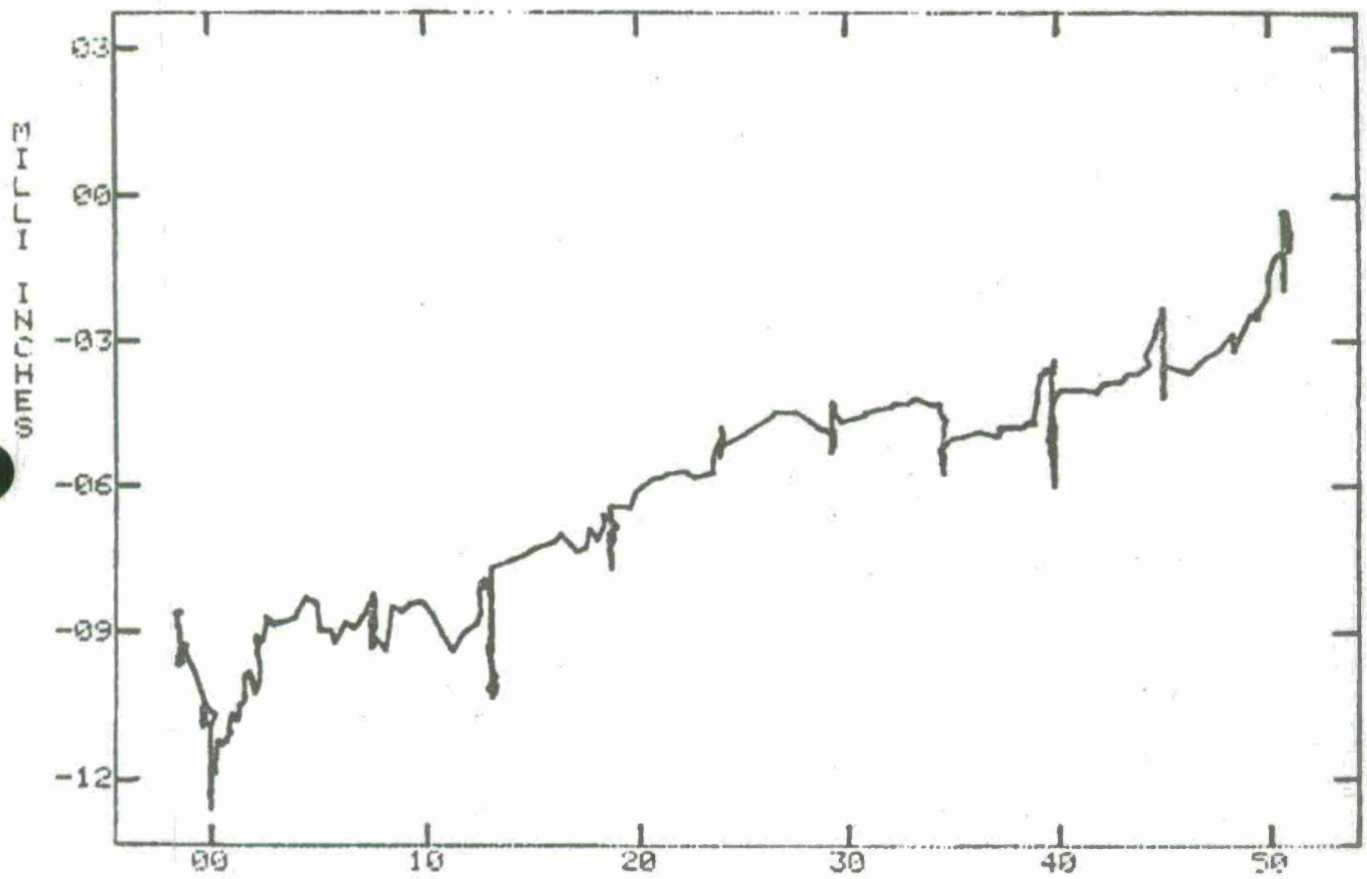

MILLI INCHES
06
04
02
00
00
10
20
30
40
50
LBS X 10-1
LOAD - R H. US DEFLN - ST 93.00 L H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST


MILLI INCHES
10
00
-10
-20
-30
-40
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. US DEFLN - ST 138.70 L.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST

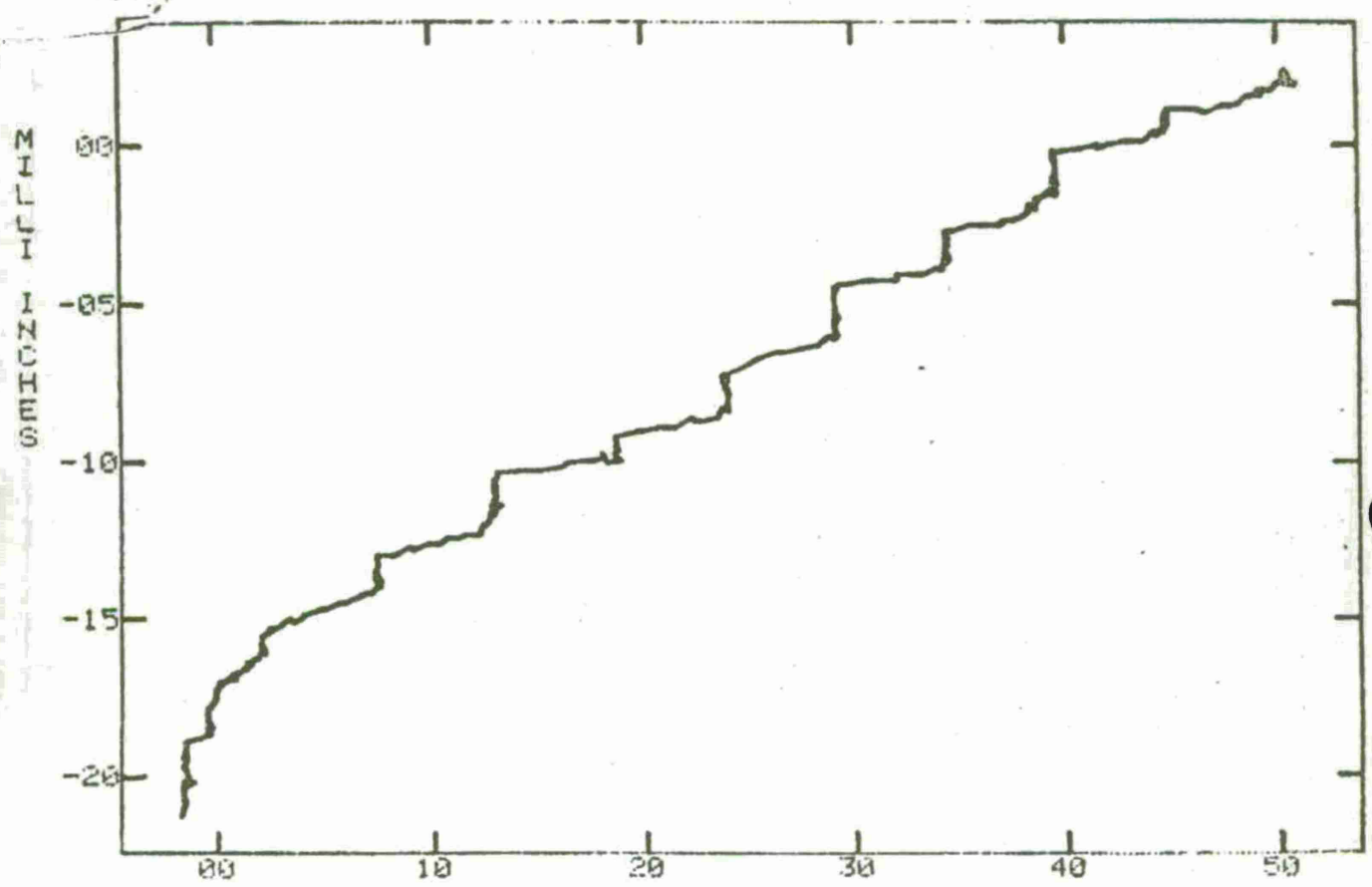


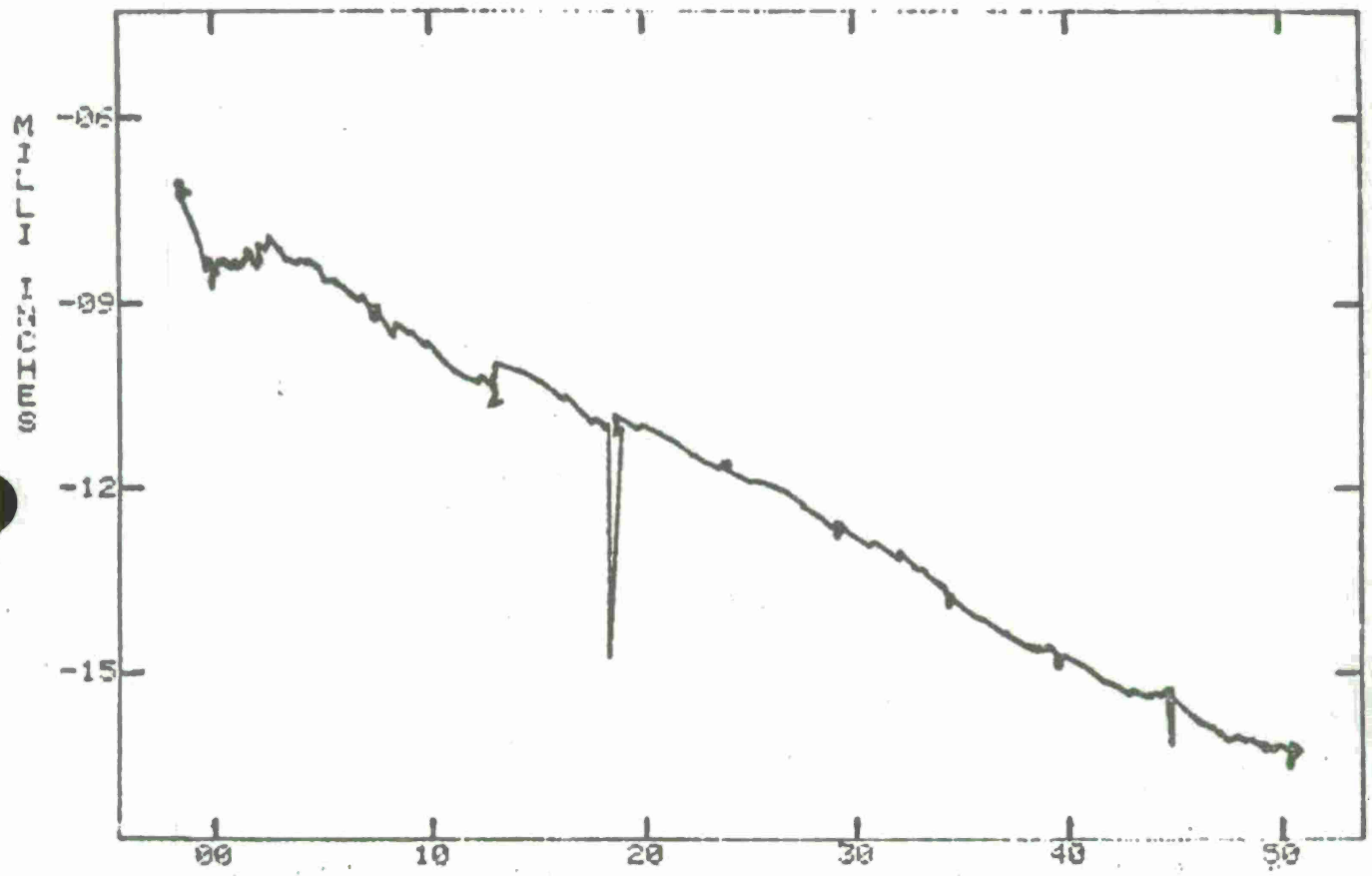
LOAD - R.H. VS DEFLN - ST 148.50 L.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST

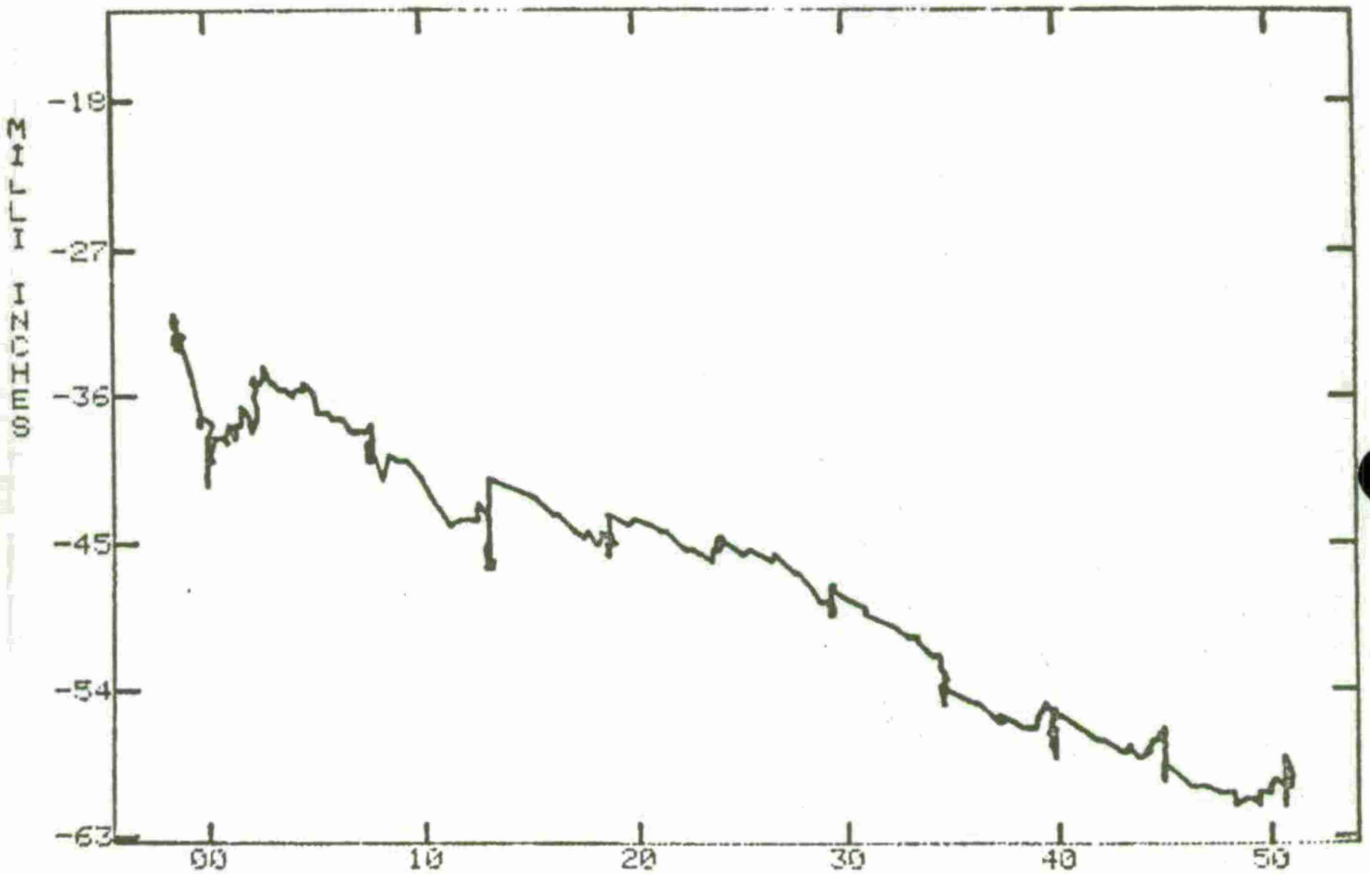

03
00
-03
-06
-09
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 186.25 L.H. X 10+0
TEST 9 (2JUL75) AH1G BEND TEST



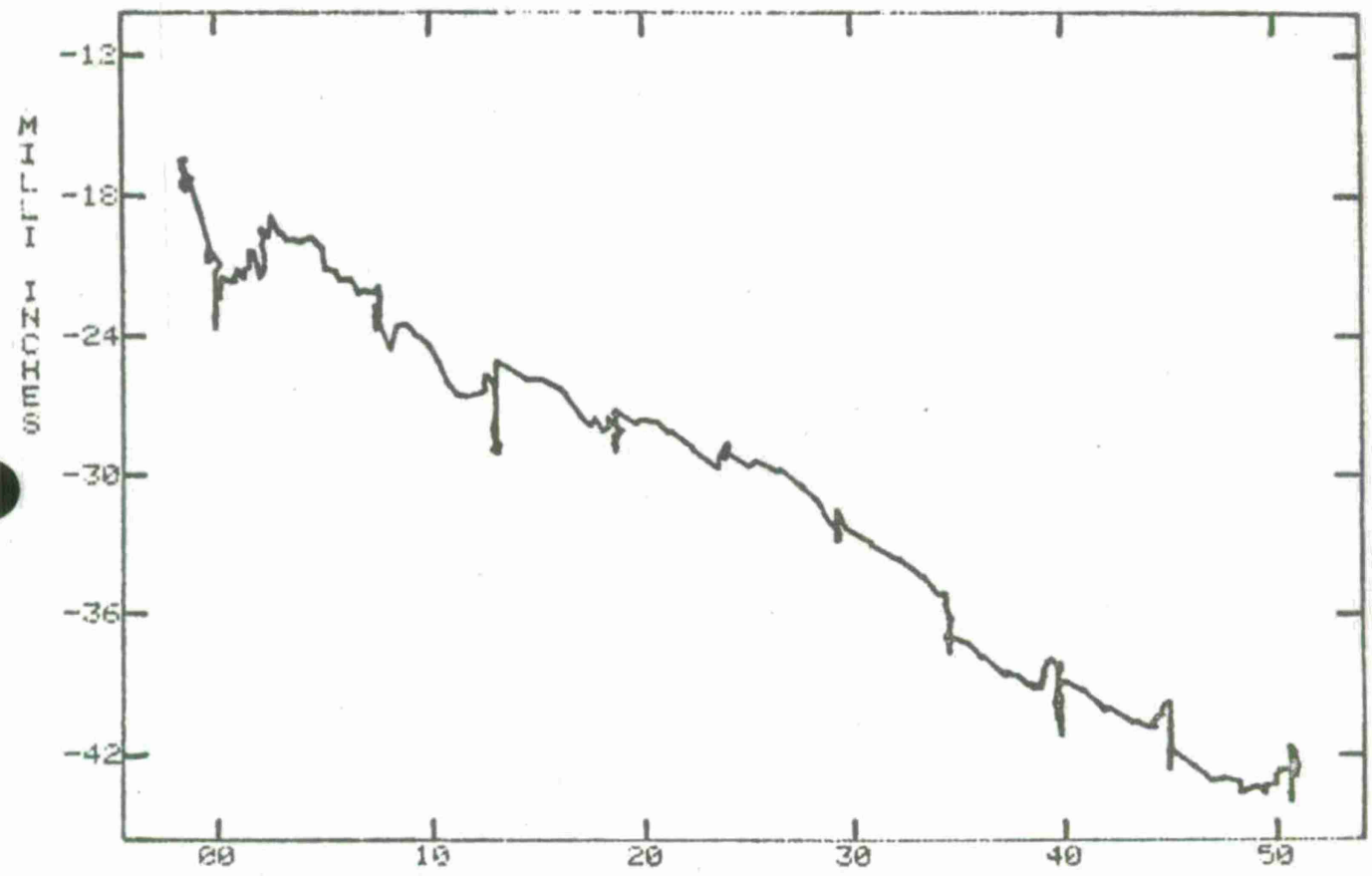
LOAD - R.H. VS DEFLN - ST 213 90 L.H. X 10+0
TEST 13 (2JUL75) AH1G BEND TEST

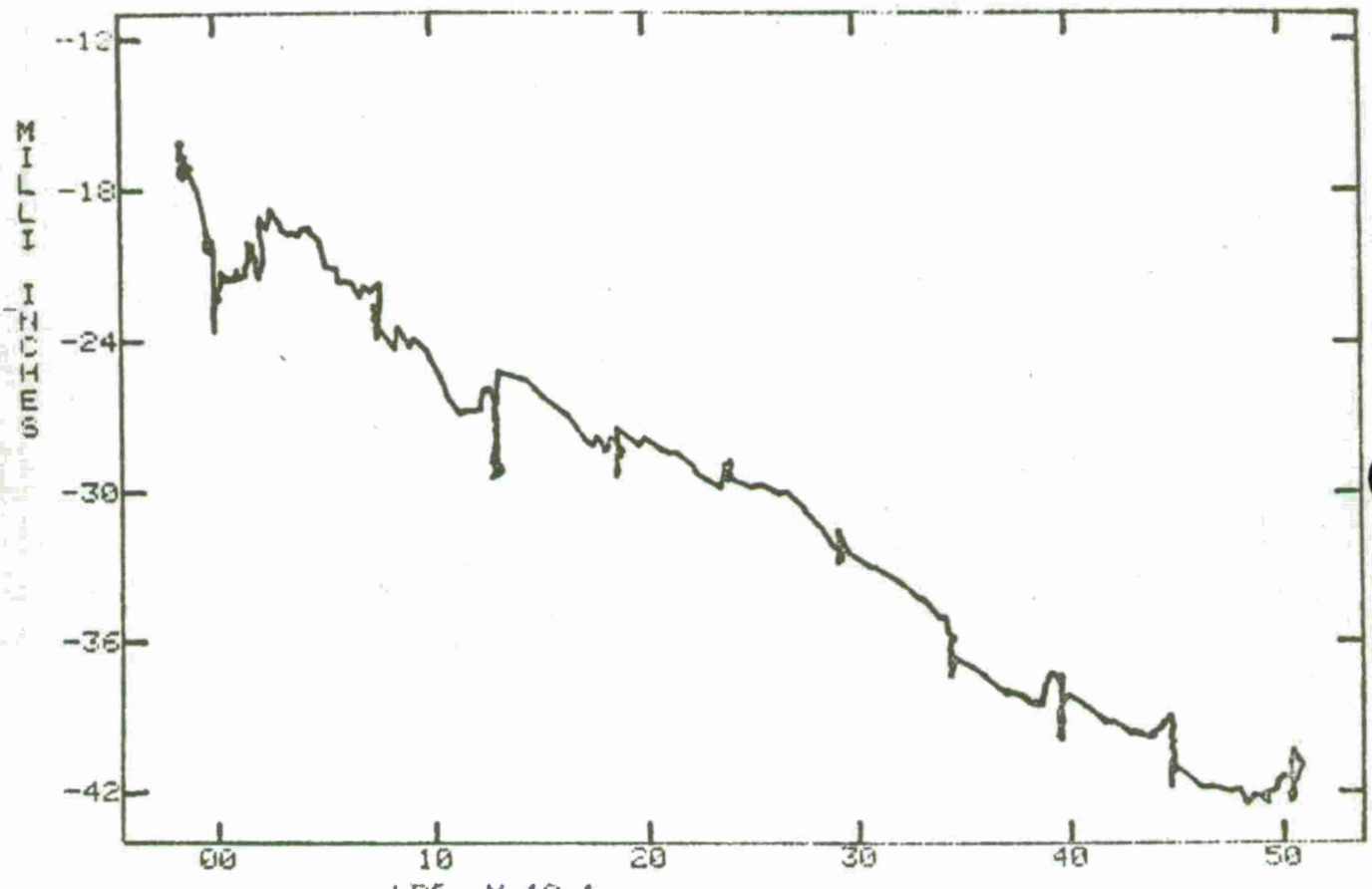

MILLI INCHES
00
-05
-10
-15
-20
00
10
20
30
40
50
LBS X 10-1
LOAD - R H DB DEFLN - ST 300.42 L H. X 10+1
TEST 19 (2JUL75) AHIG BEND TEST


MILLI INCHES
-06
-09
-12
-15
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 93.00 R.H. X 10-1
TEST 19 (2JUL75) AH1G BEND TEST

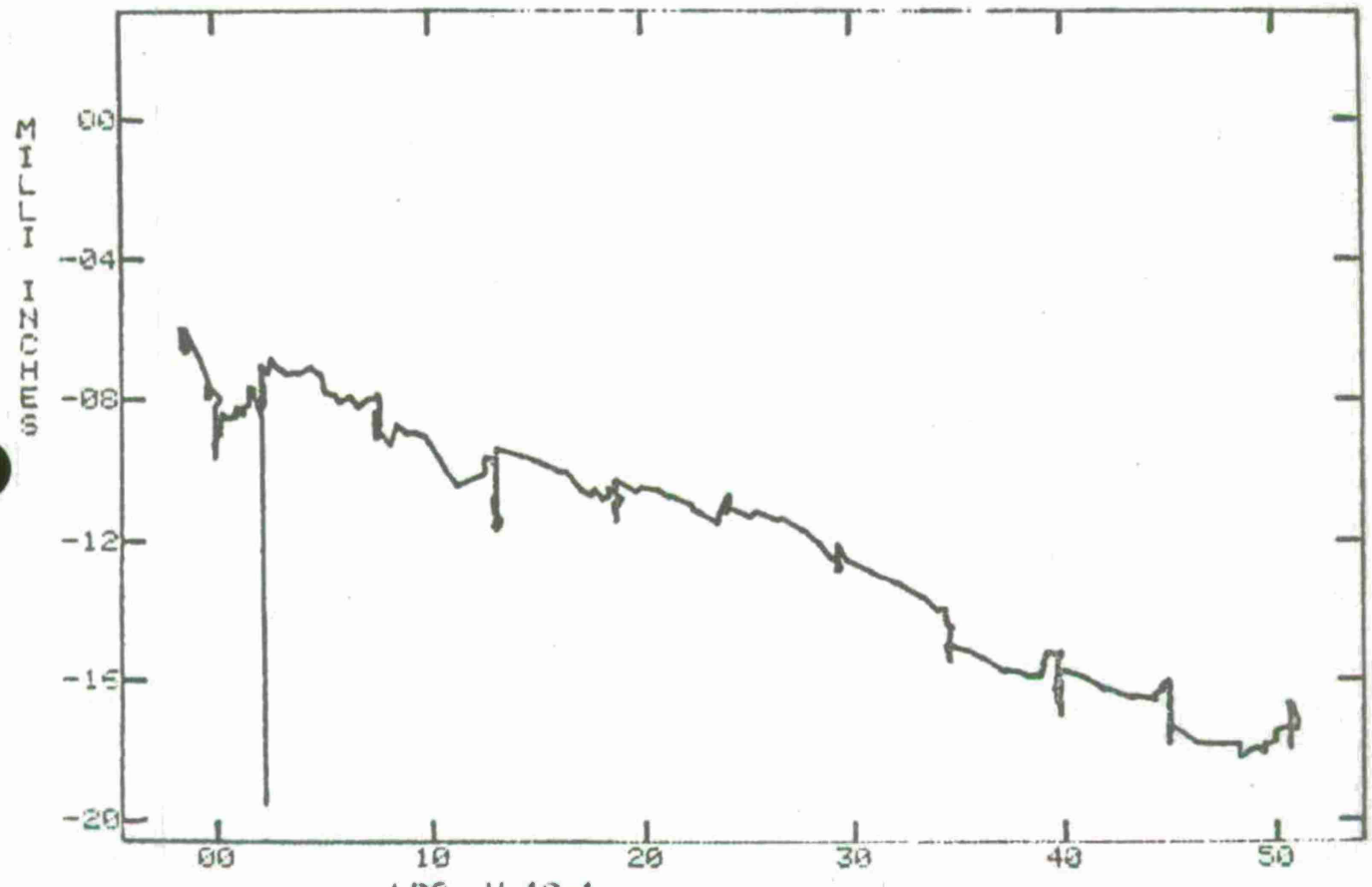


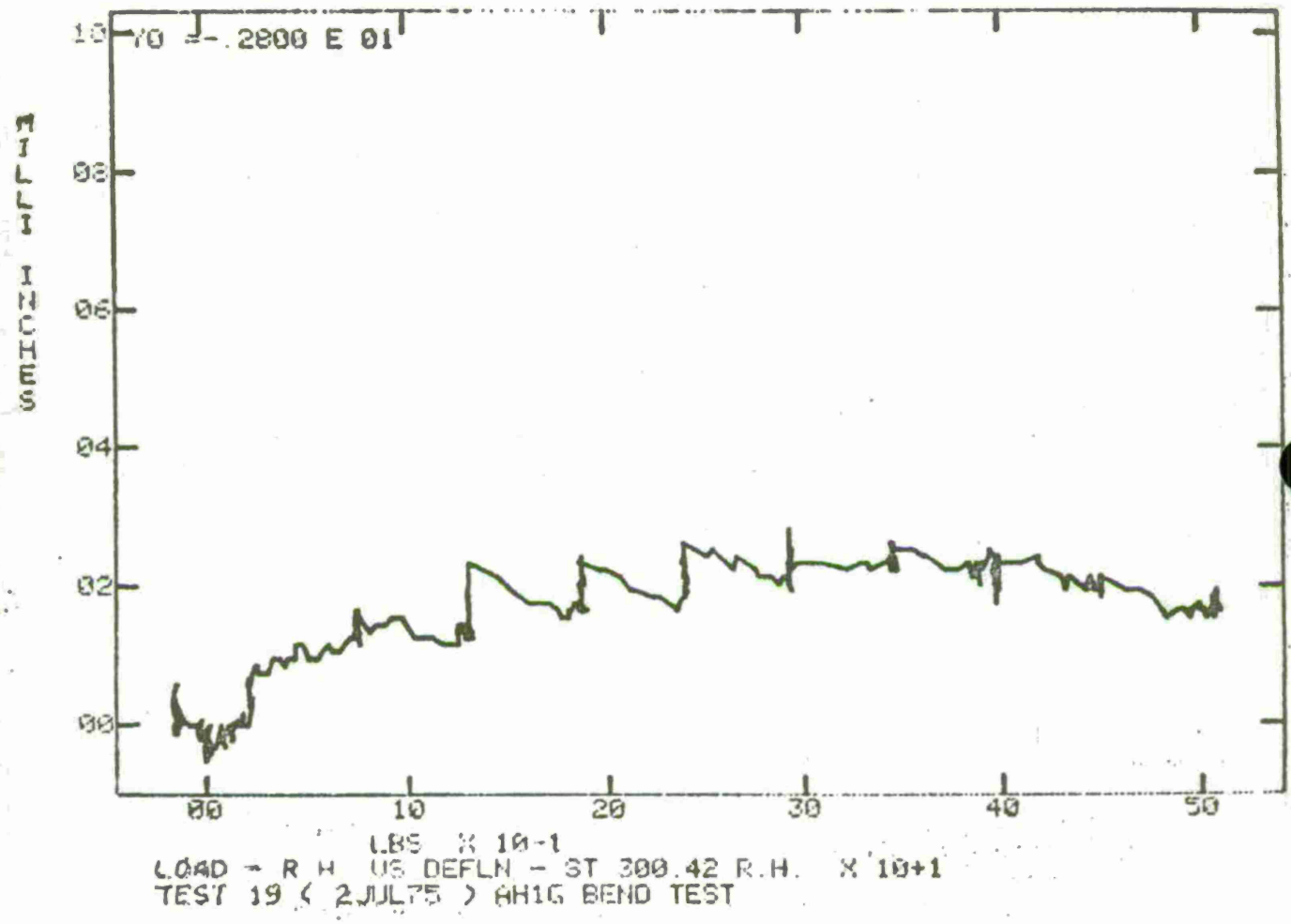
LOAD - R H. VS DEFLN - ST 138.70 R H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST

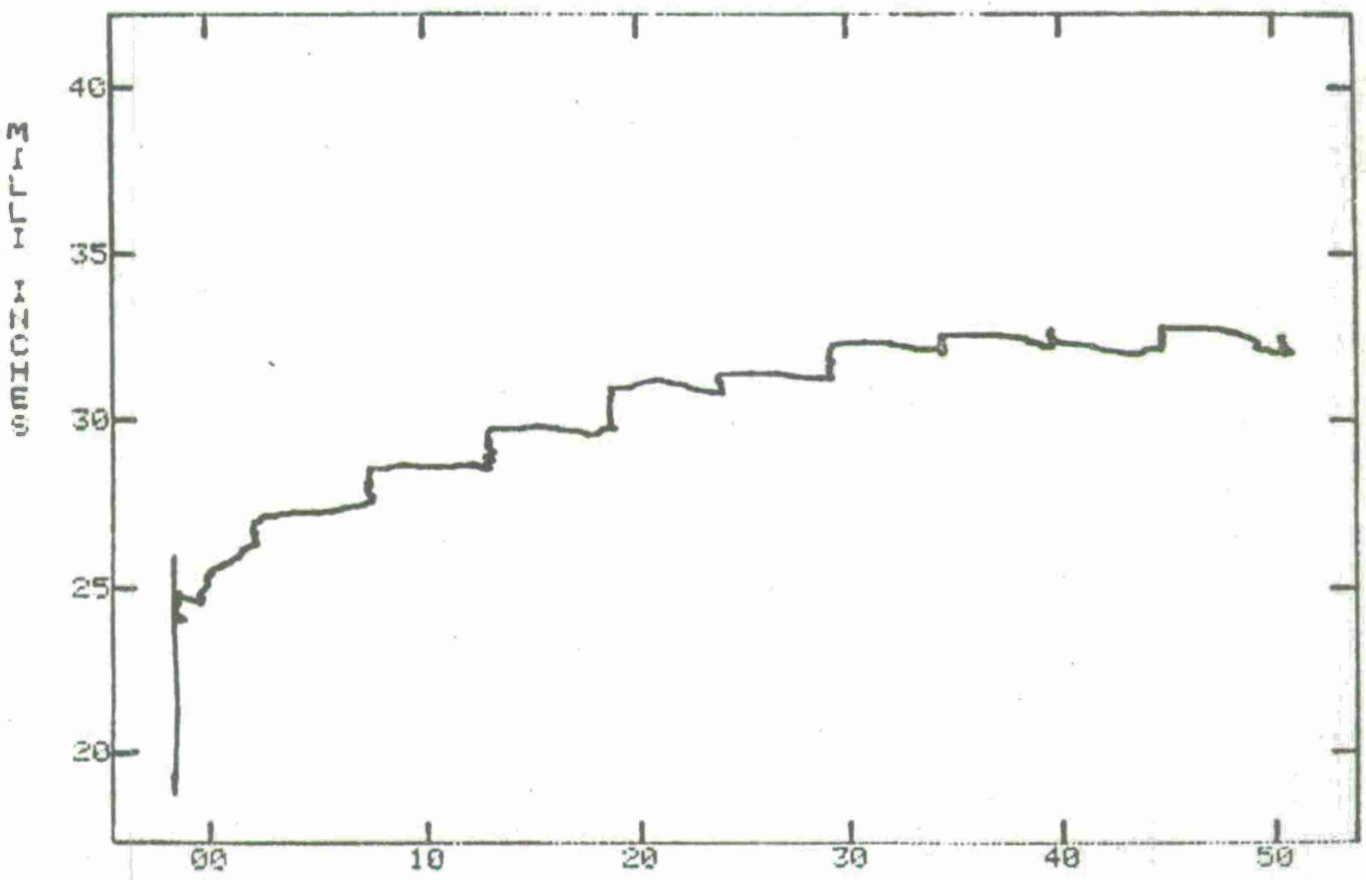

-12
-18
-24
-30
-36
-42
MILLI INCHES
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 148.50 R.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST



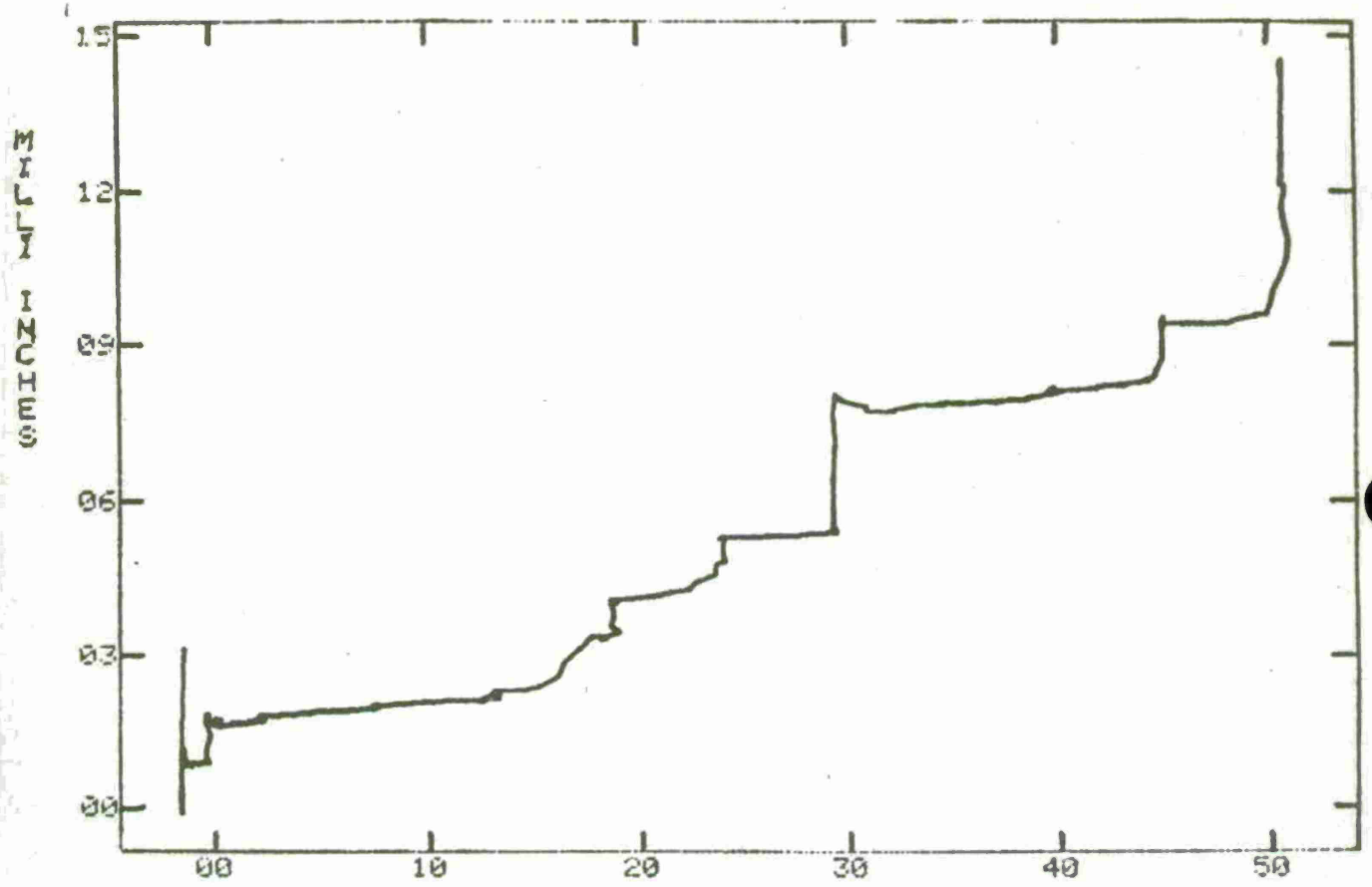
LOAD - R.H. VS DEFLN - ST 186.25 R.H. X 10+0
TEST 19 (2JUL75) AH1G BEND TEST


MILLI INCHES
00
-04
-08
-12
-16
-20
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 213.90 R.H. X 10+0
TEST 19 (2JUL75) RH1G BEND TEST

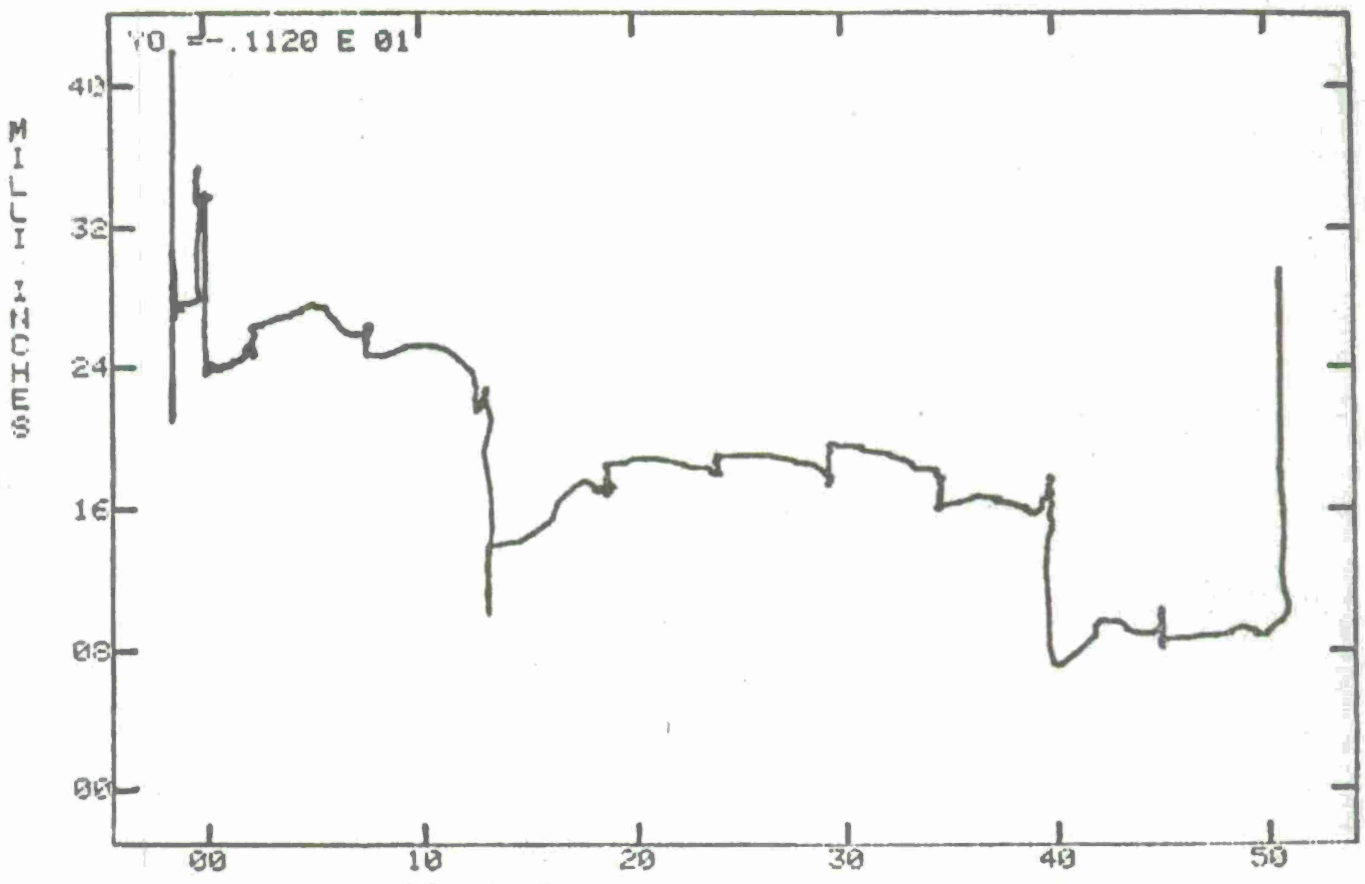

Y0 = -.2800 E 01
MILLI INCHES
10
08
06
04
02
00
00
10
20
30
40
50
LBS X 10-1
LOAD - R H US DEFLN - ST 300.42 R.H. X 10+1
TEST 19 (2JUL75) AH1G BEND TEST

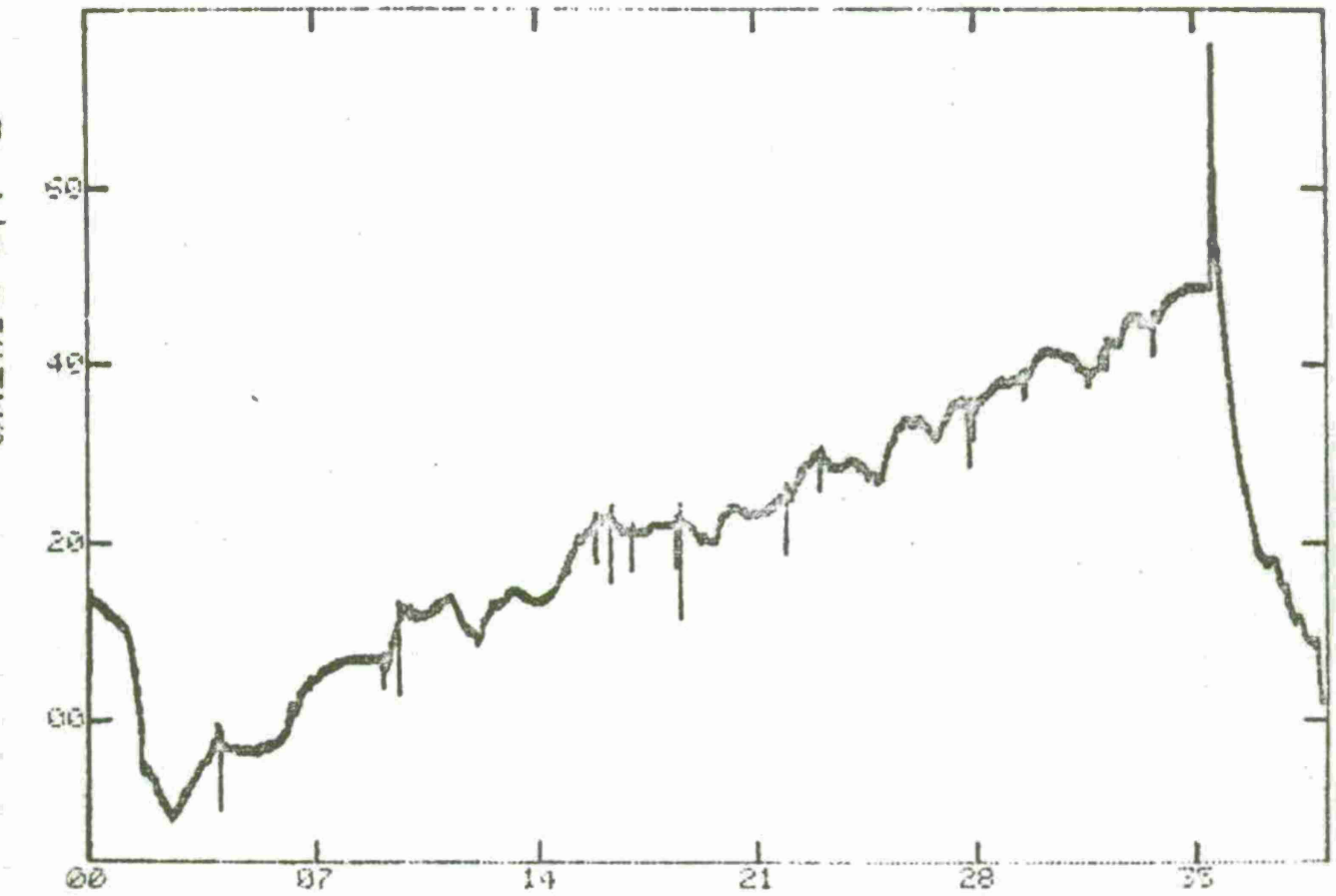


LOAD - R.H. VS BASE ROTATION - UPPER L.H. X 10+2
TEST 19 (2JUL75) AH1G BEND TEST

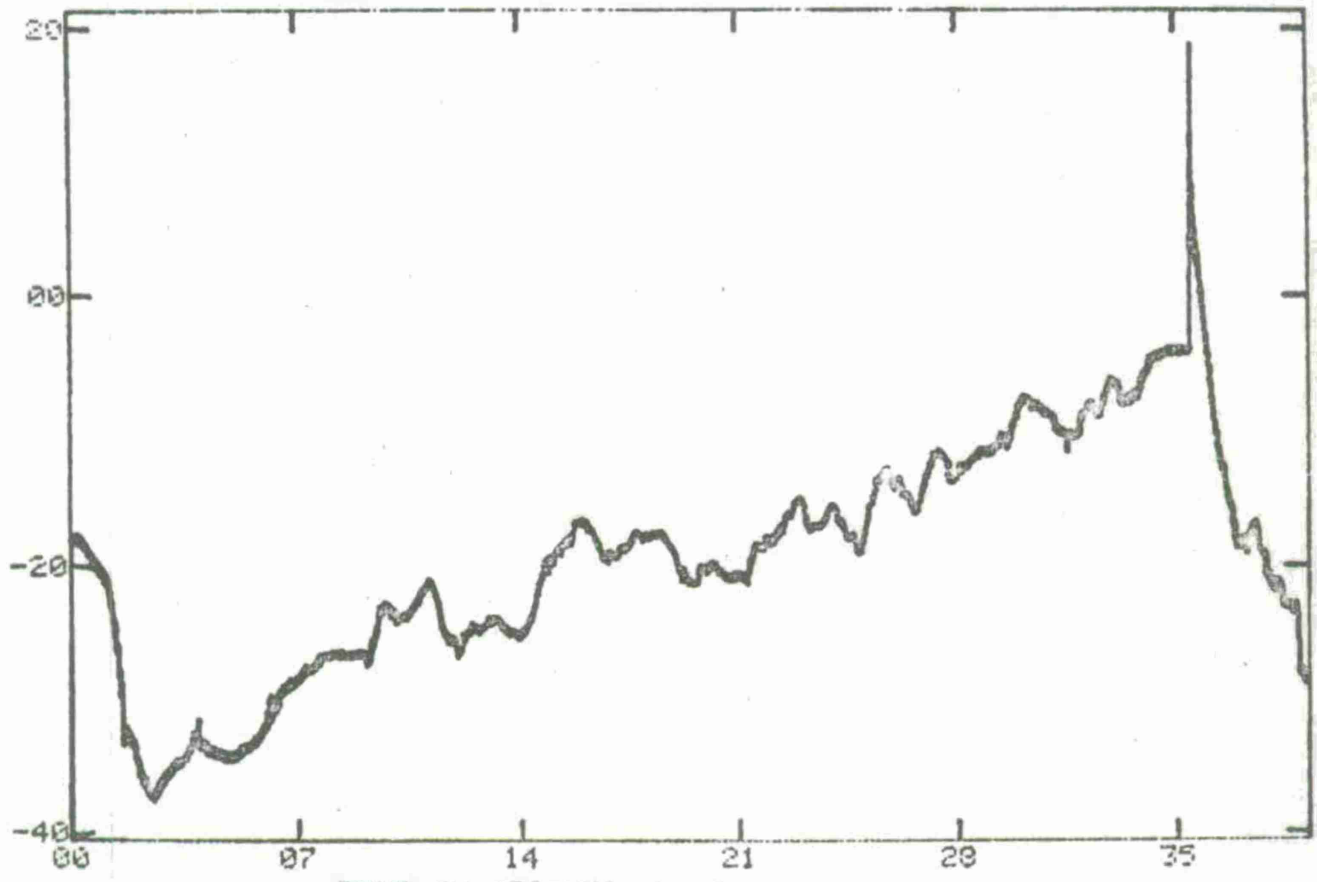


LOAD - R.H. US BASE ROTATION - LOWER L.H. X 10+1
TEST 19 (2JUL75) AH1G BEND TEST

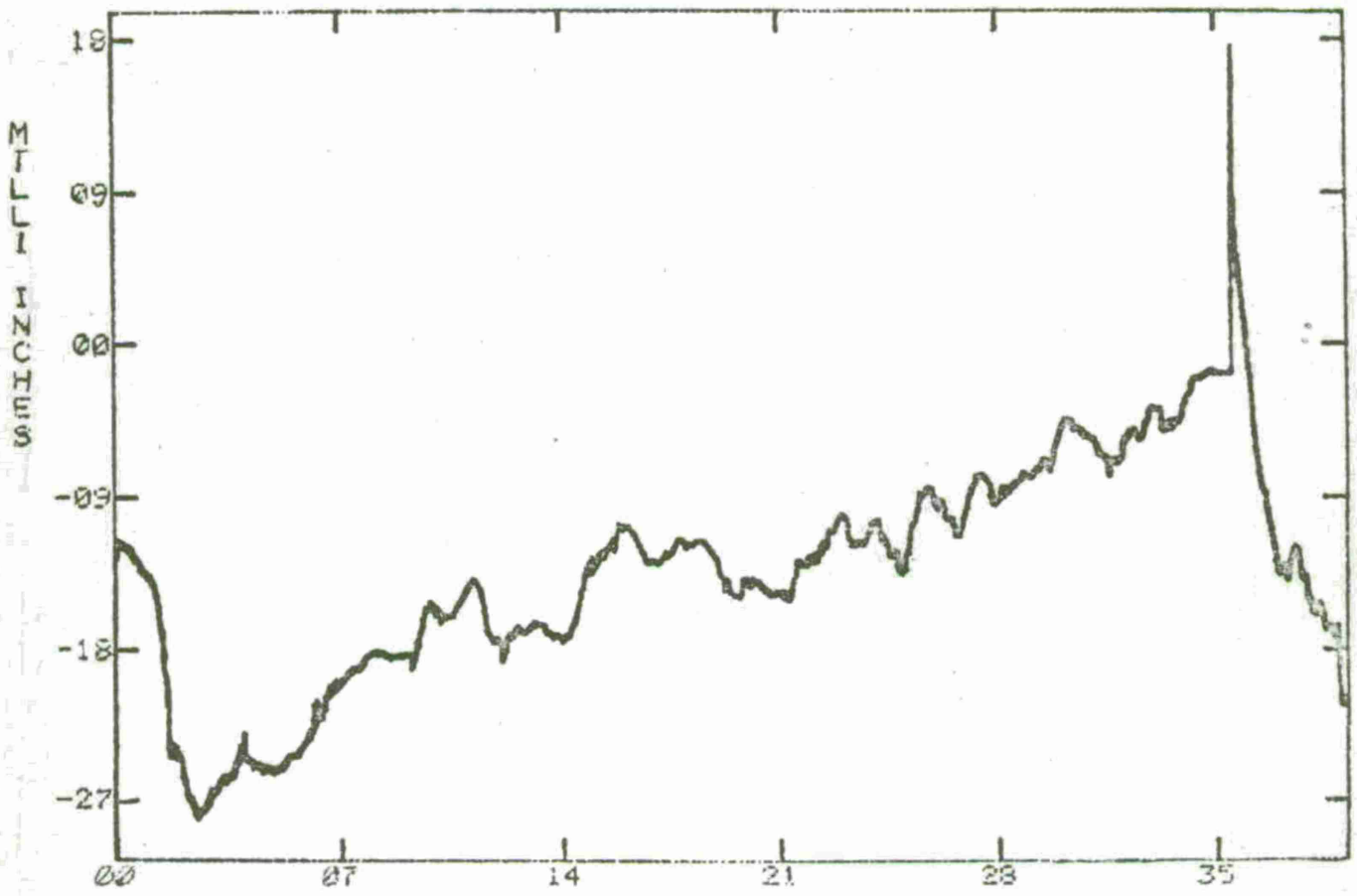

YO =-.1120 E 01
40
32
24
16
08
00
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS BASE ROTATION - LOWER R.H. X 10+2
TEST 19 (2JUL75) AH1G BEND TEST



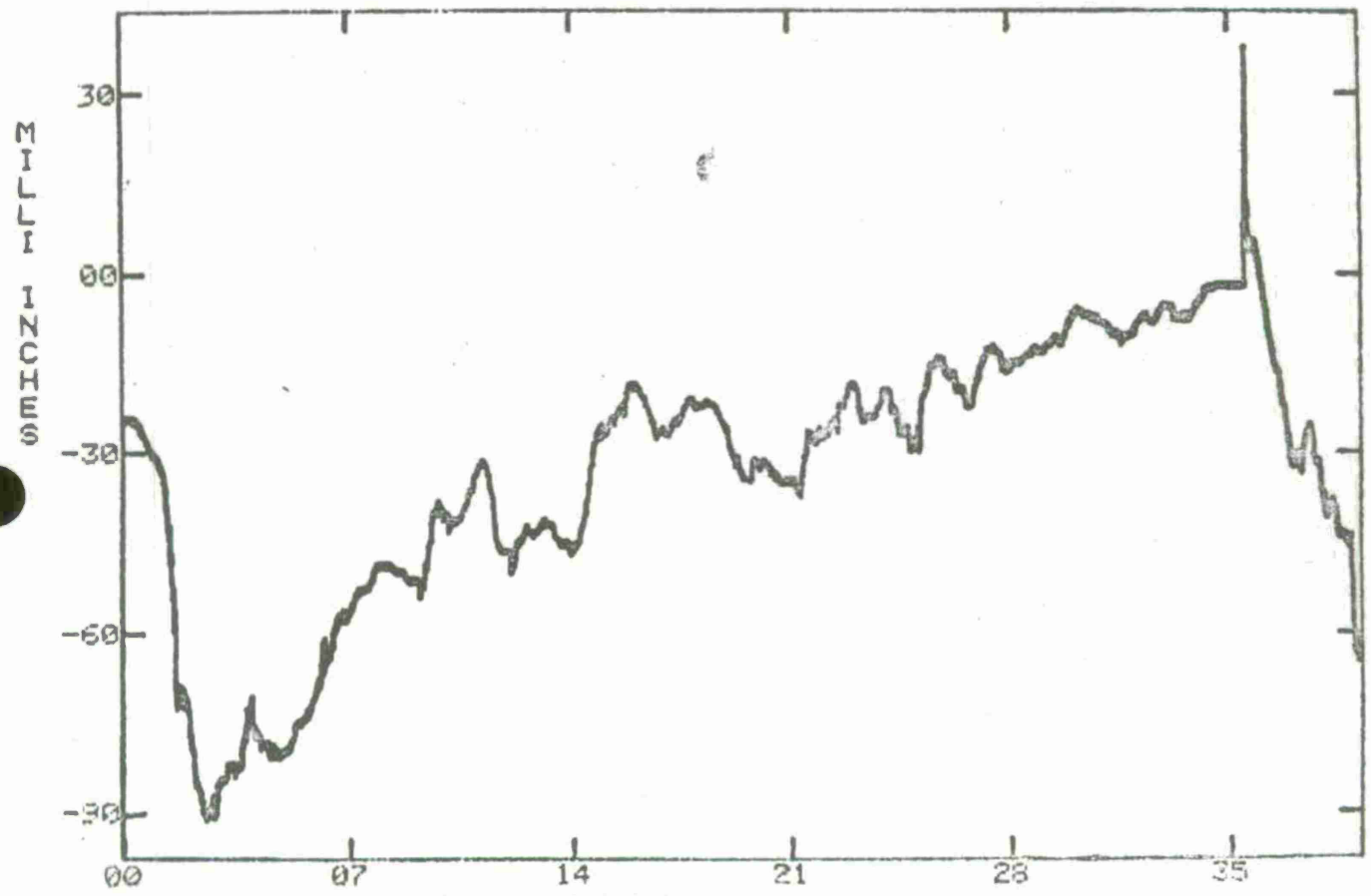
TIME IN SECONDS X 10-1
CH 1 TRSN DEFLECTION - ST. 93.00 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



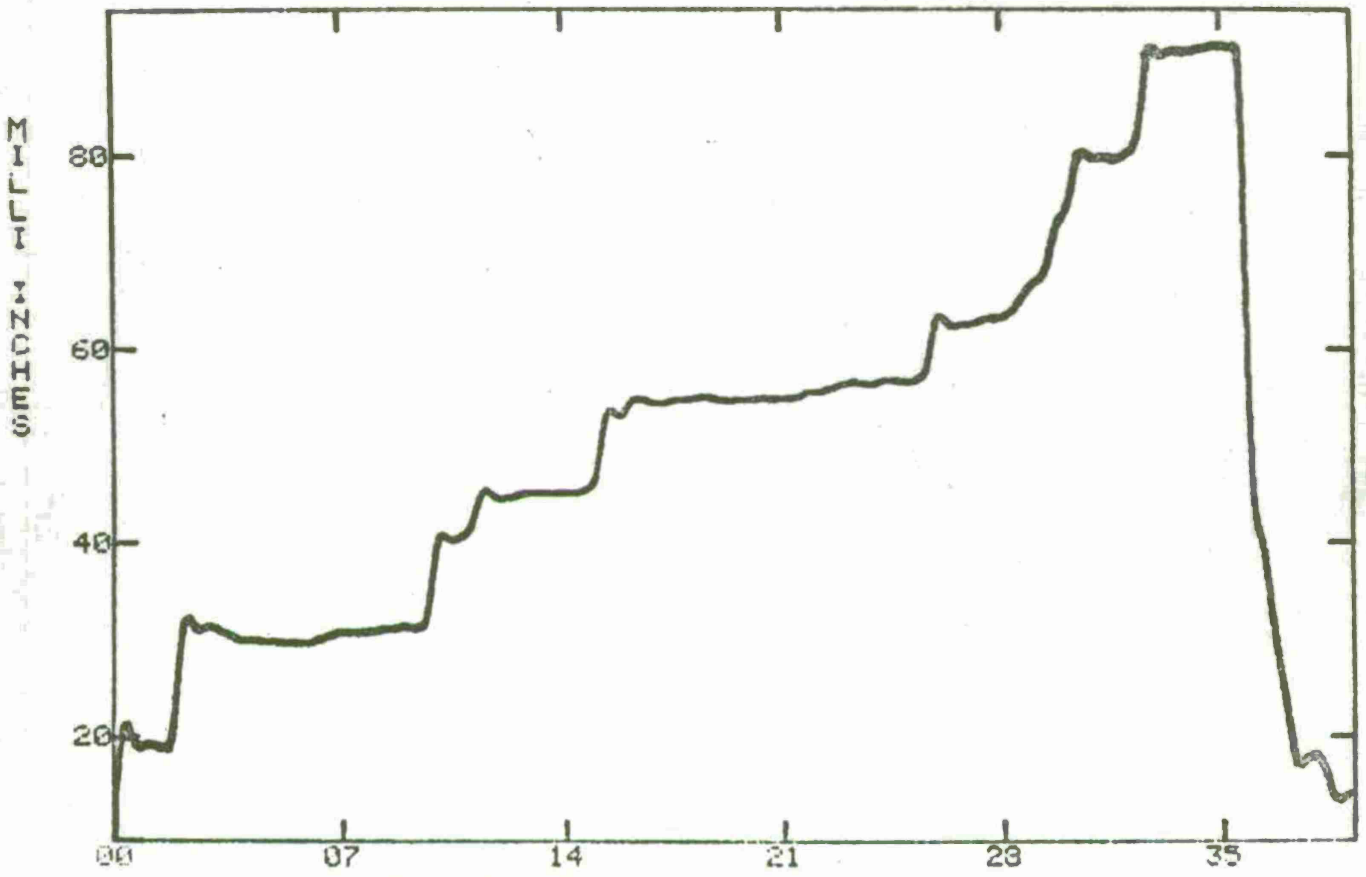
CH 2 TRSN DEFLECTION - ST. 138.70 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



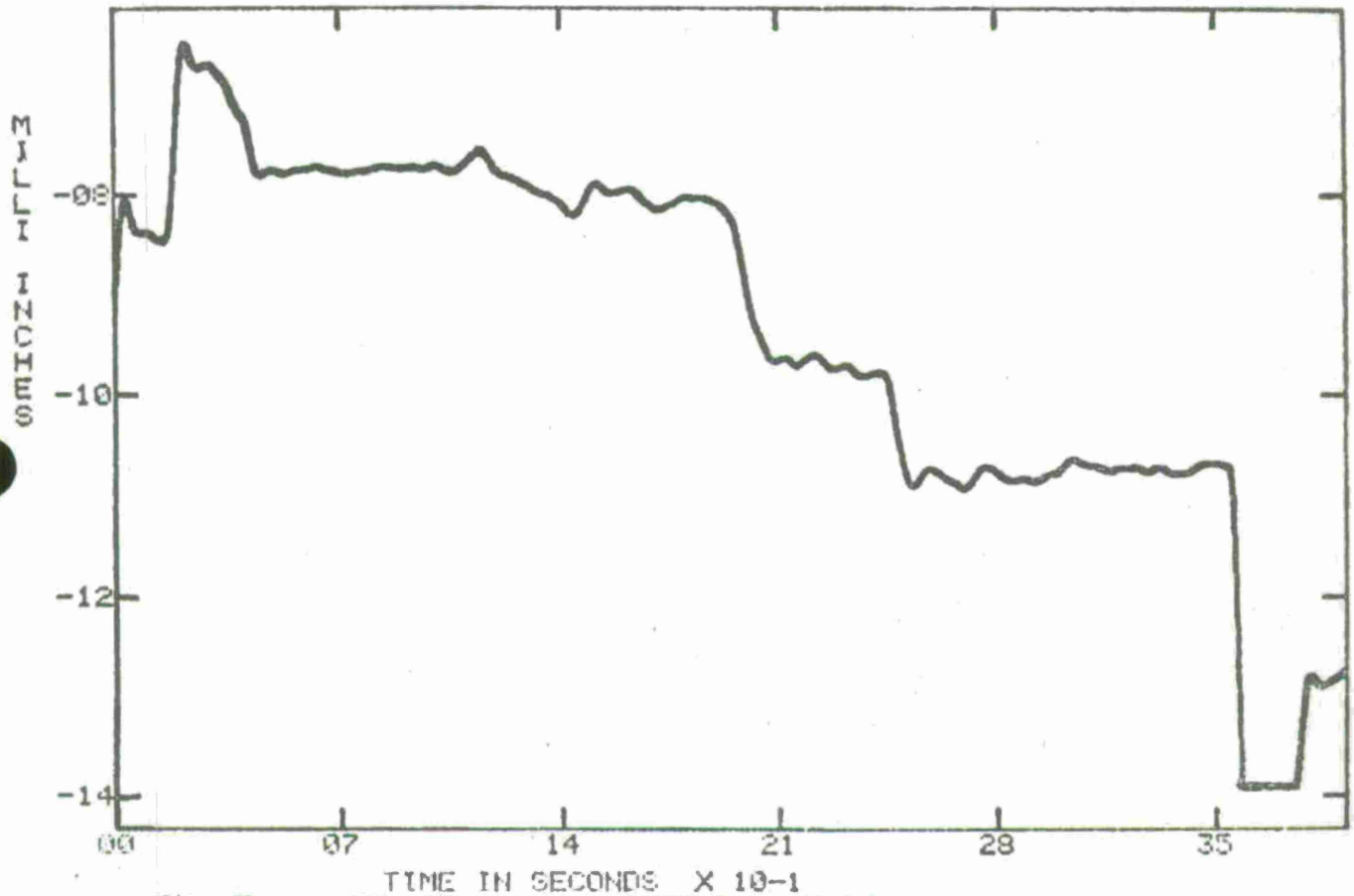
CH 3 TRSN DEFLECTION - ST. 148.50 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



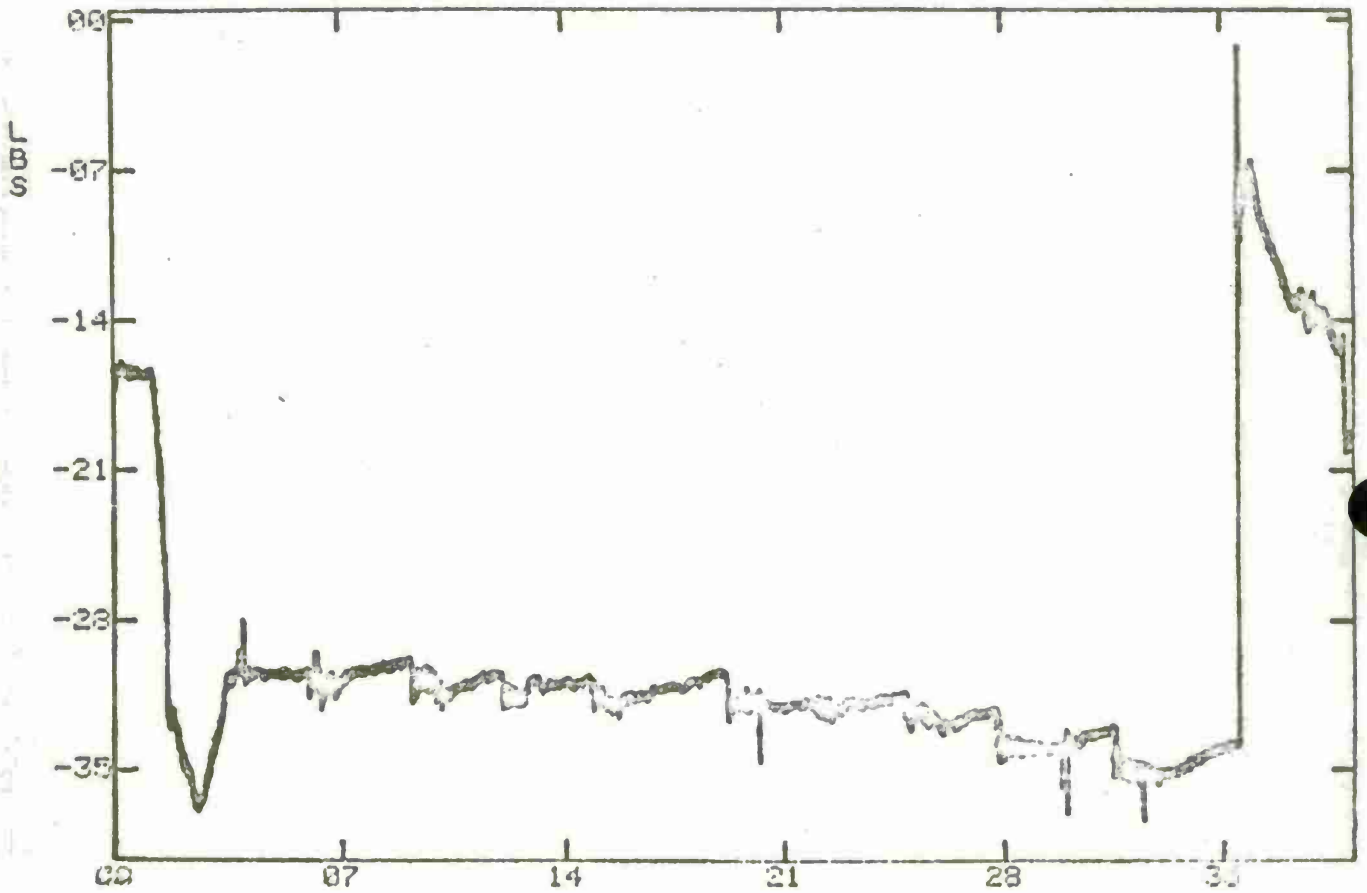
CH 4 TRSN DEFLECTION - ST. 186.25 L.H X 10+1
TEST 20 (2JUL75) AH1G BEND TEST



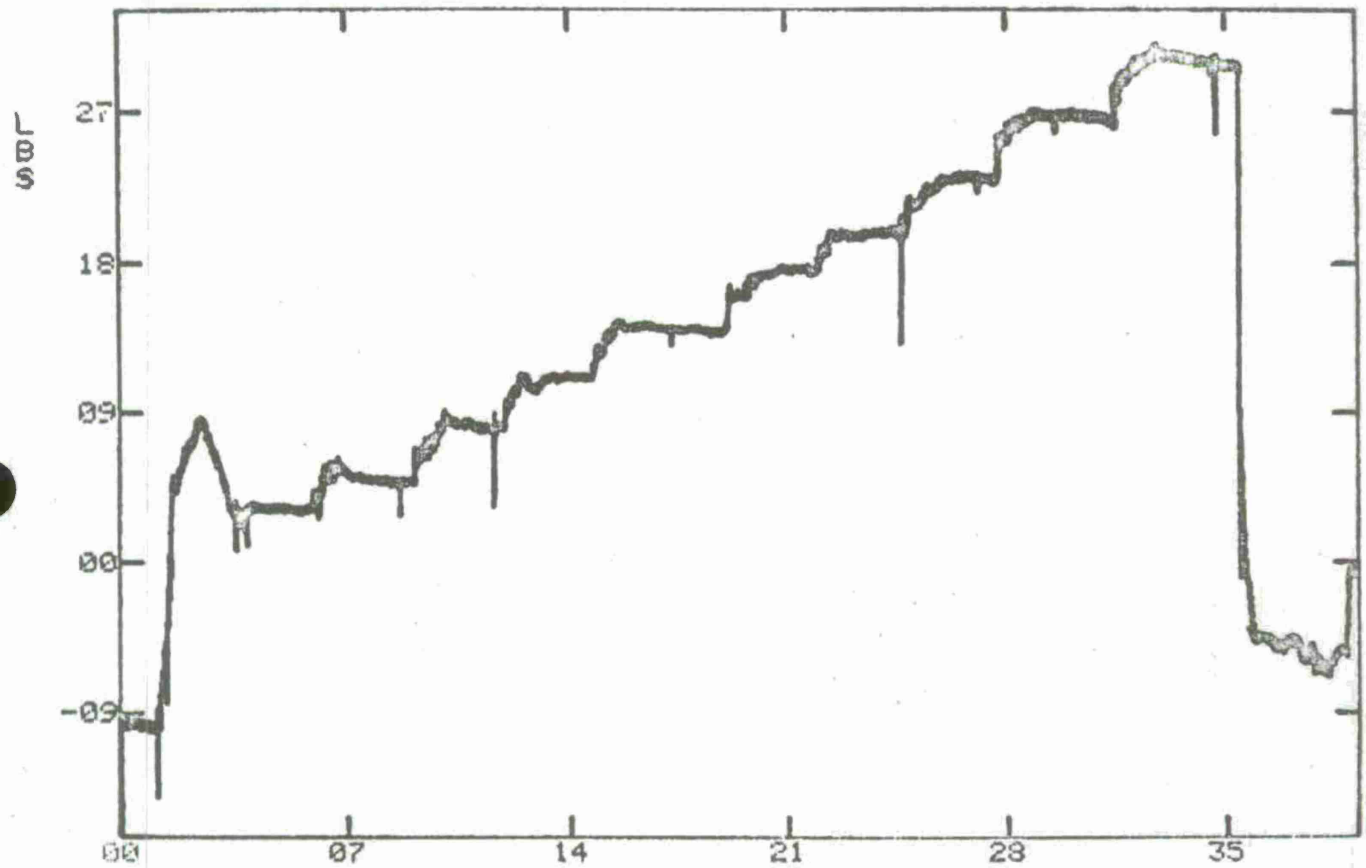
CH 14 BASE ROTATION - LOWER L.H. X 10+2
TEST 20 (2JUL75) AH1G BEND TEST



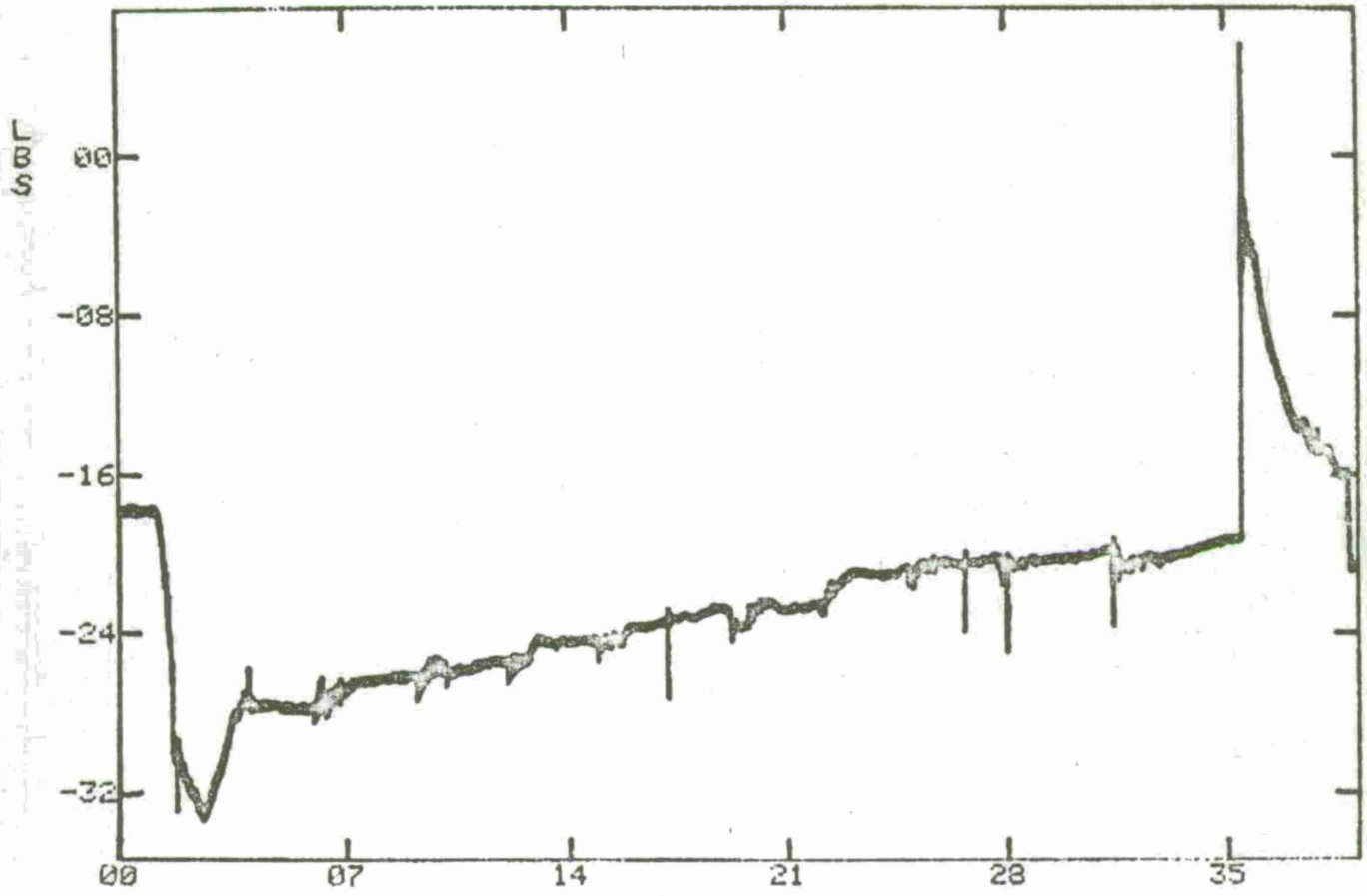
CH 17 BASE ROTATION - LOWER R.H. X 10+1
TEST 20 (2JUL75) AH1G BEND TEST



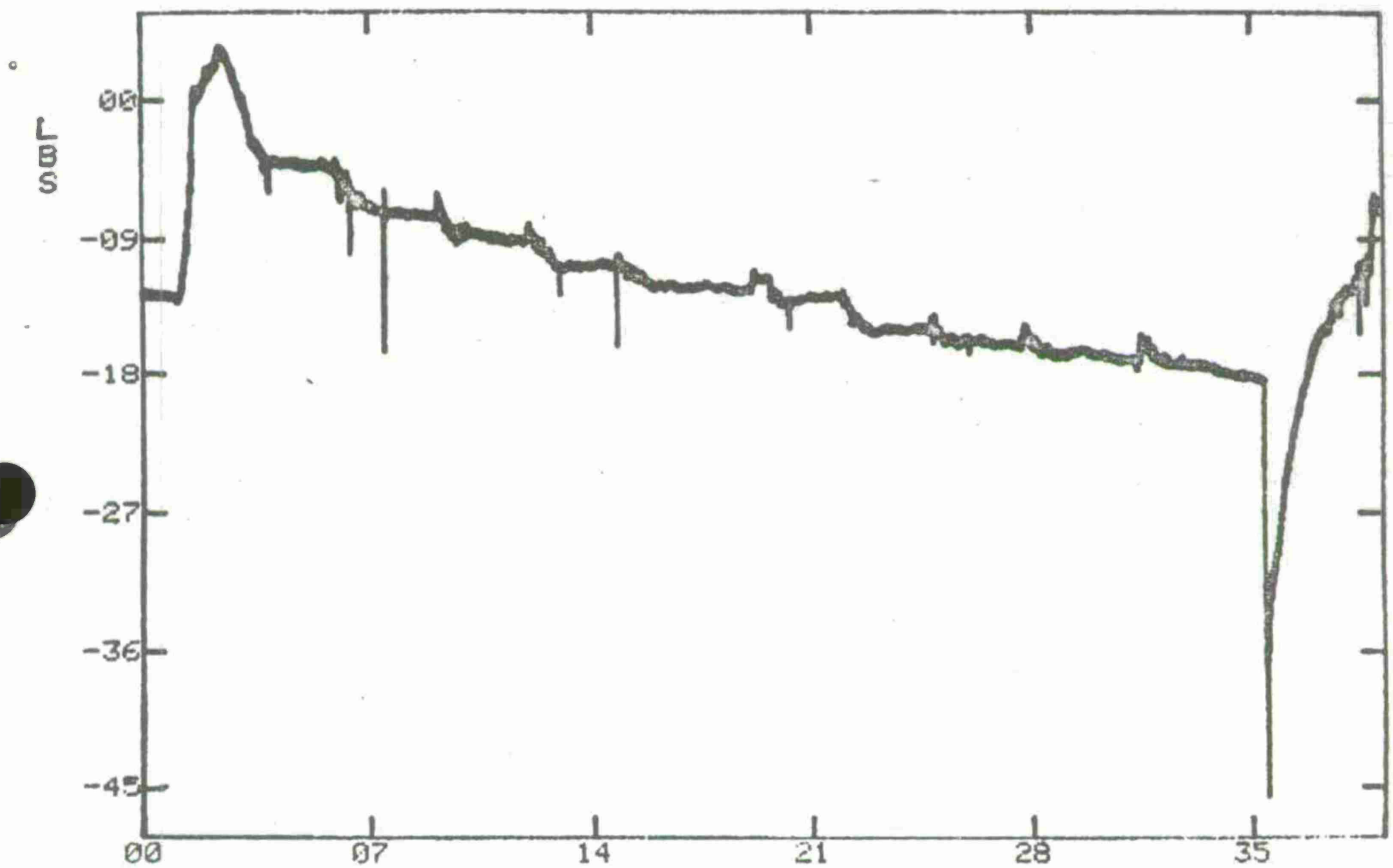
CH 10 LOAD - UPPER L.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST

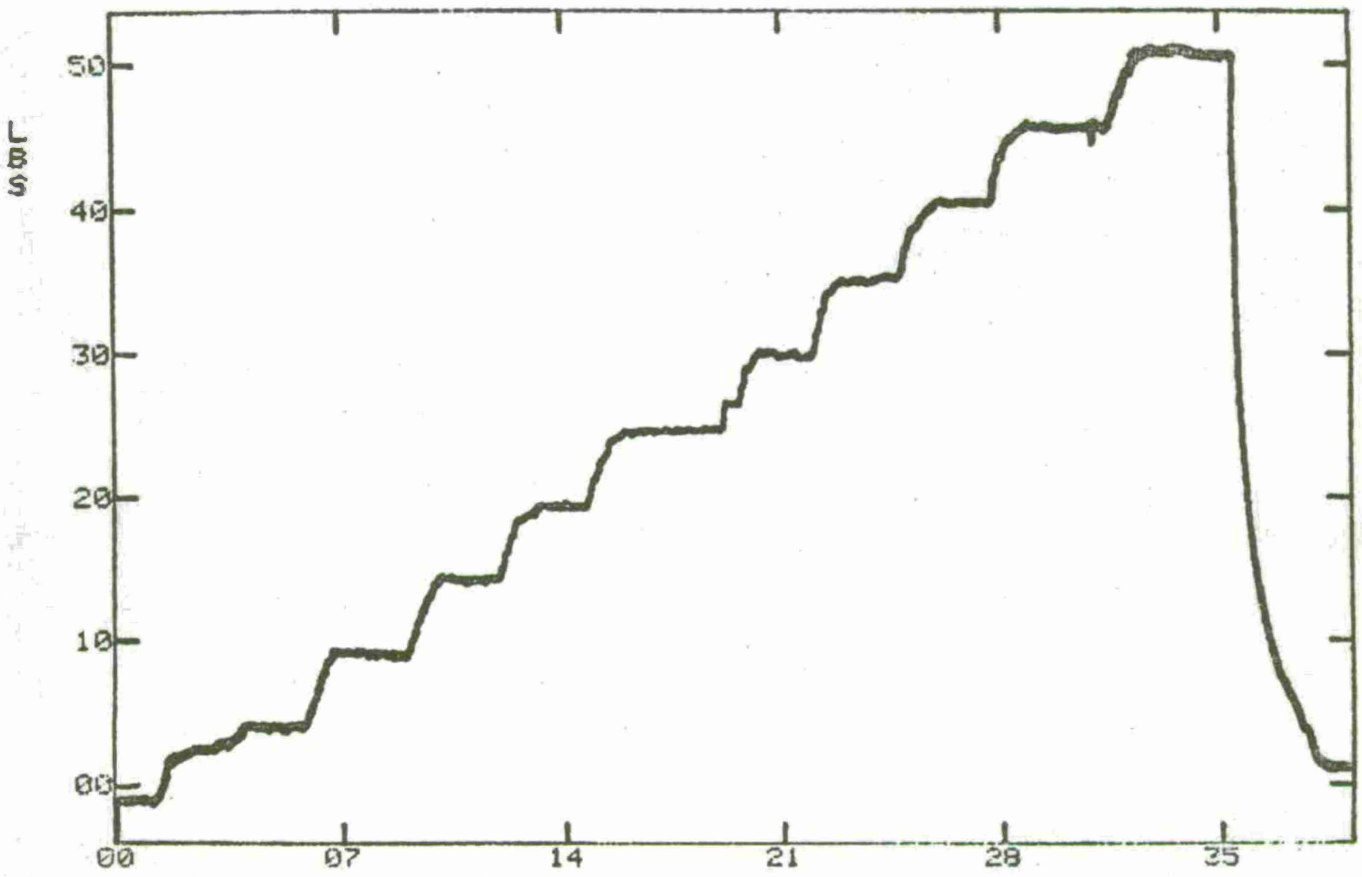


CH 19 LOAD - LOWER L.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST

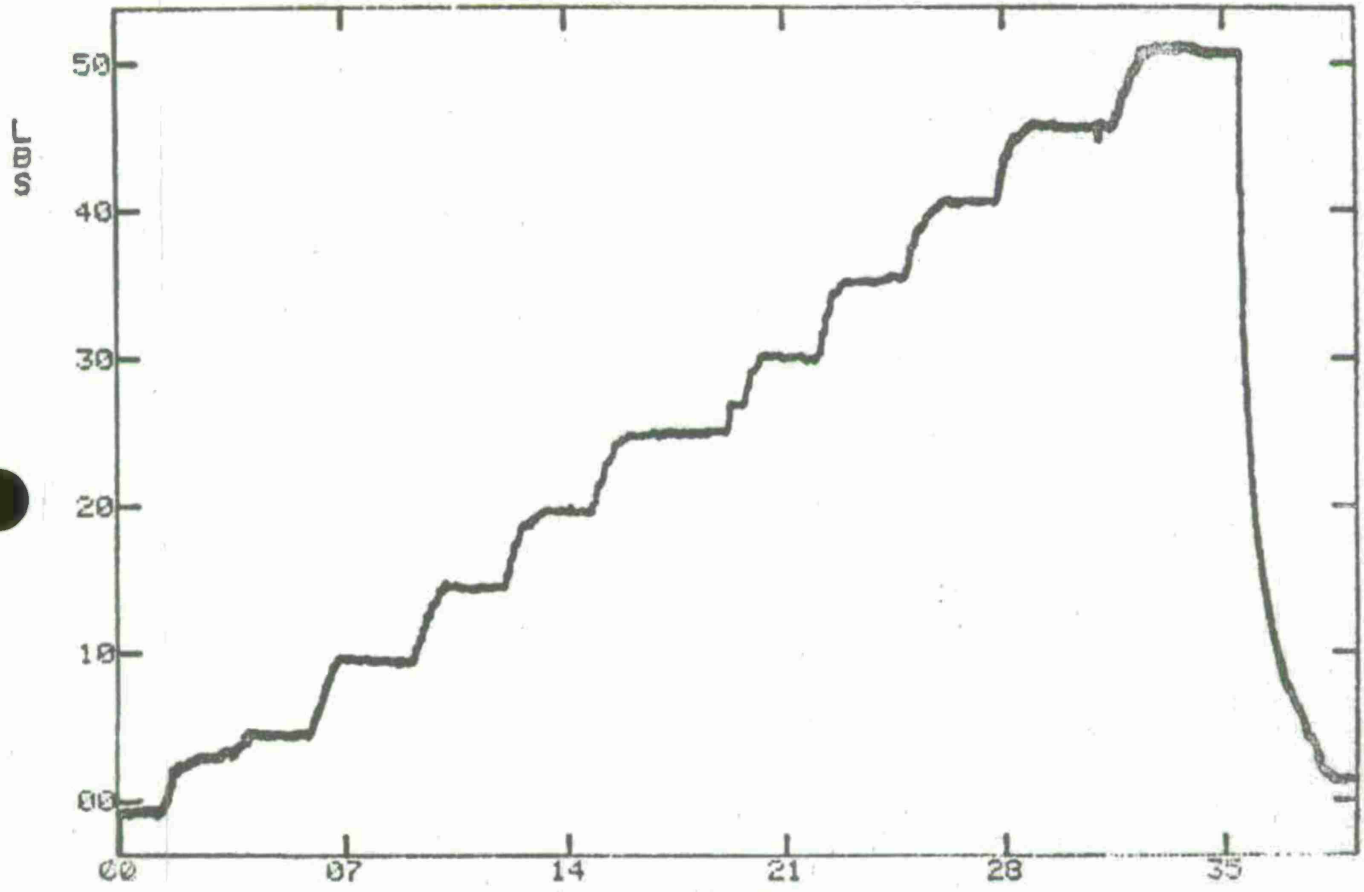


CH 20 LOAD - UPPER R H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST

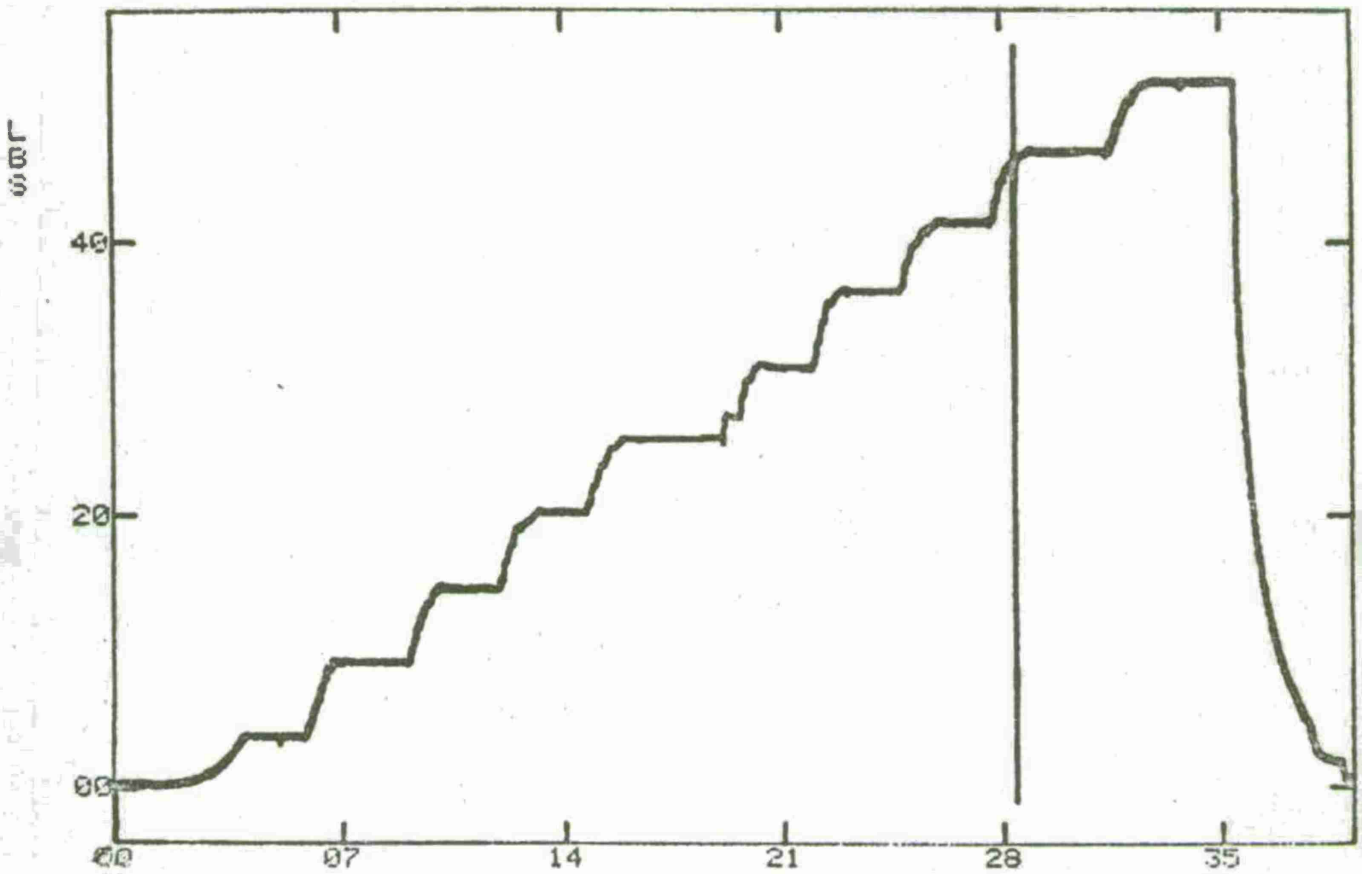

LBS
00
-09
-18
-27
-36
-45
00
07
14
21
28
35
TIME IN SECONDS X 10-1
CH 21 LOAD - LOWER R.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



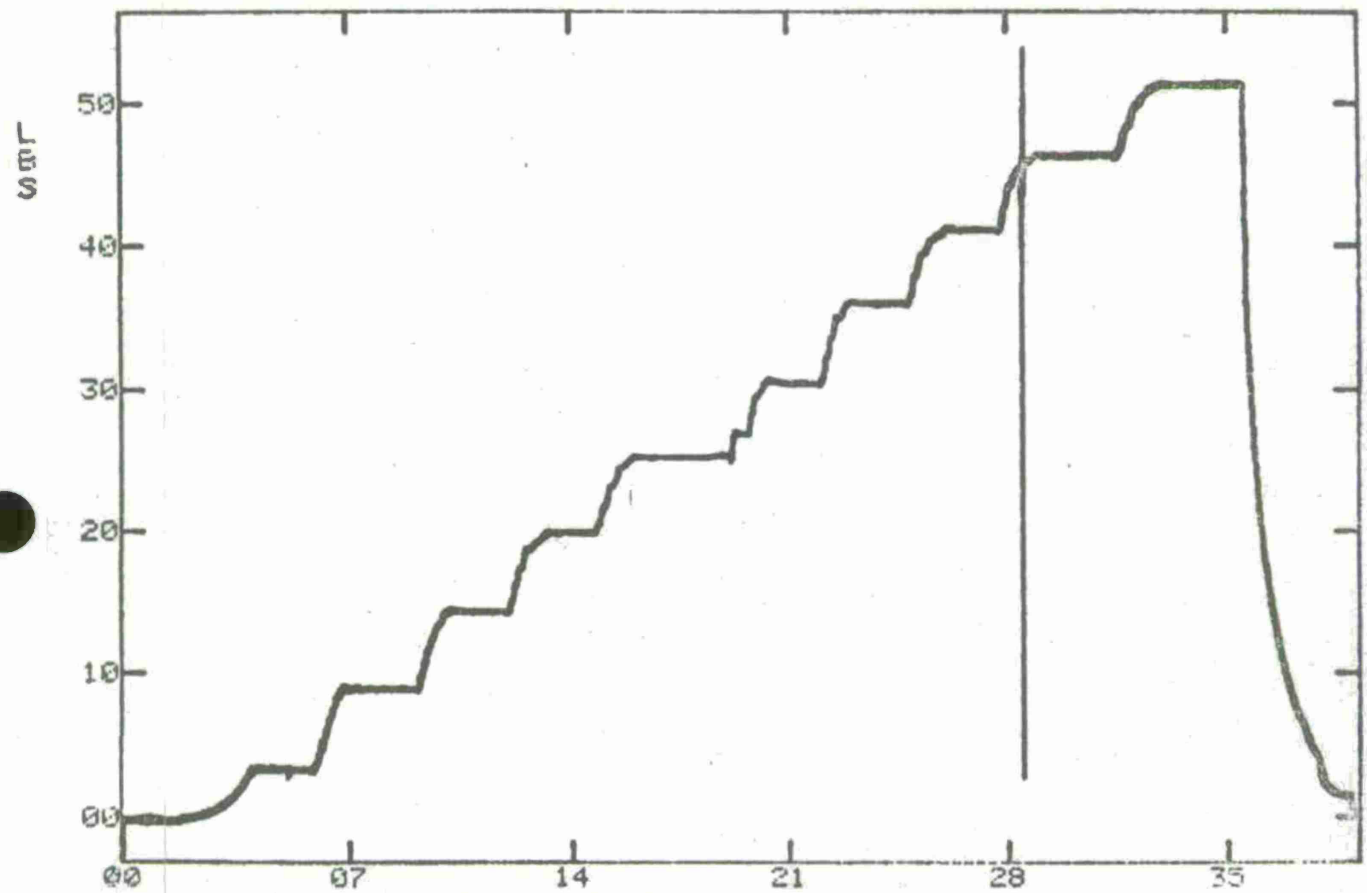
CH 22 LOAD APPLIED - R.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



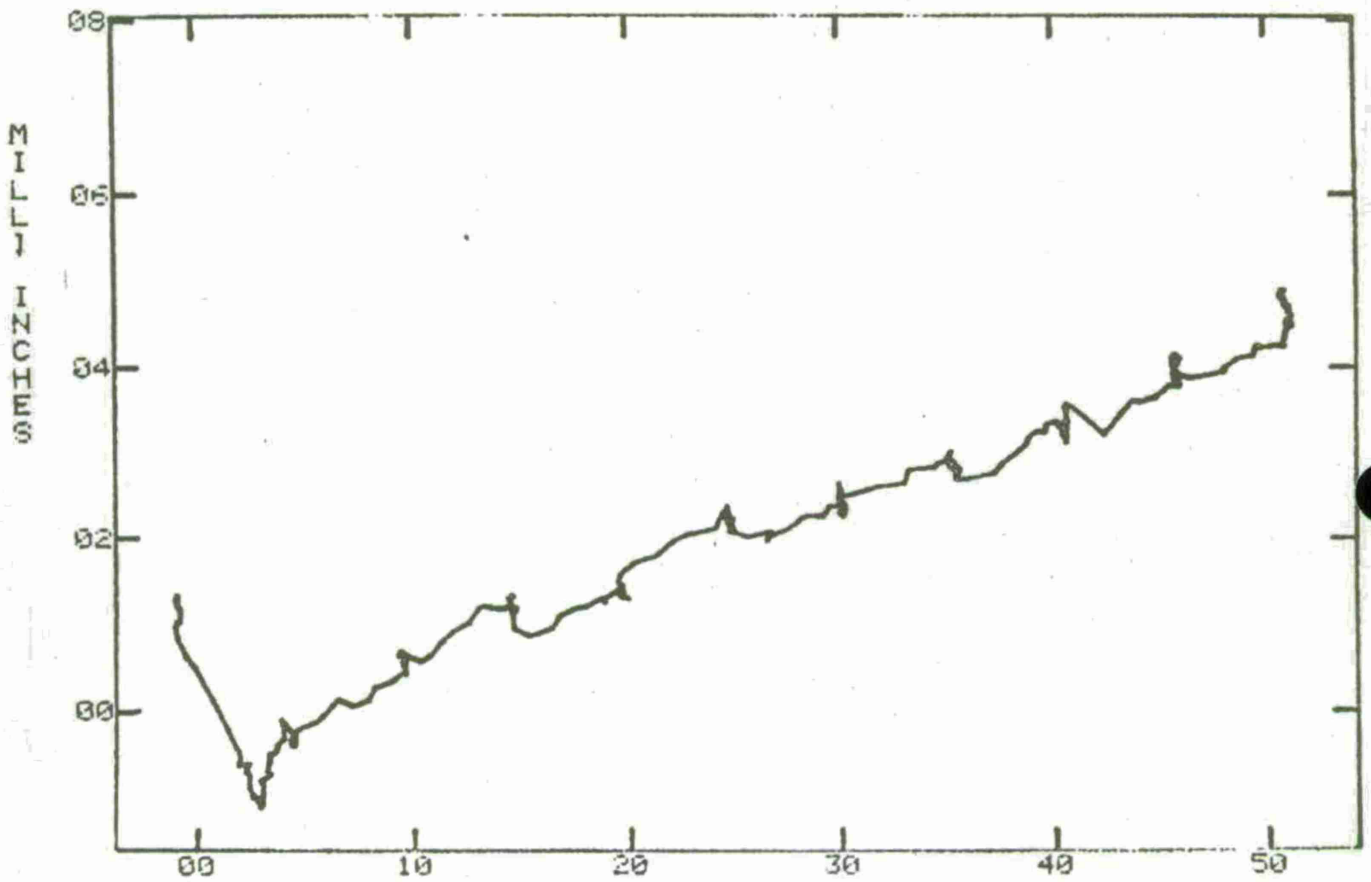
CH 22 LOAD APPLIED - R.H. (CHS 1,3,4,6,7,10,13,15,18,20) X 10
-1 TEST 20 (2JUL75) AH1G BEND TEST



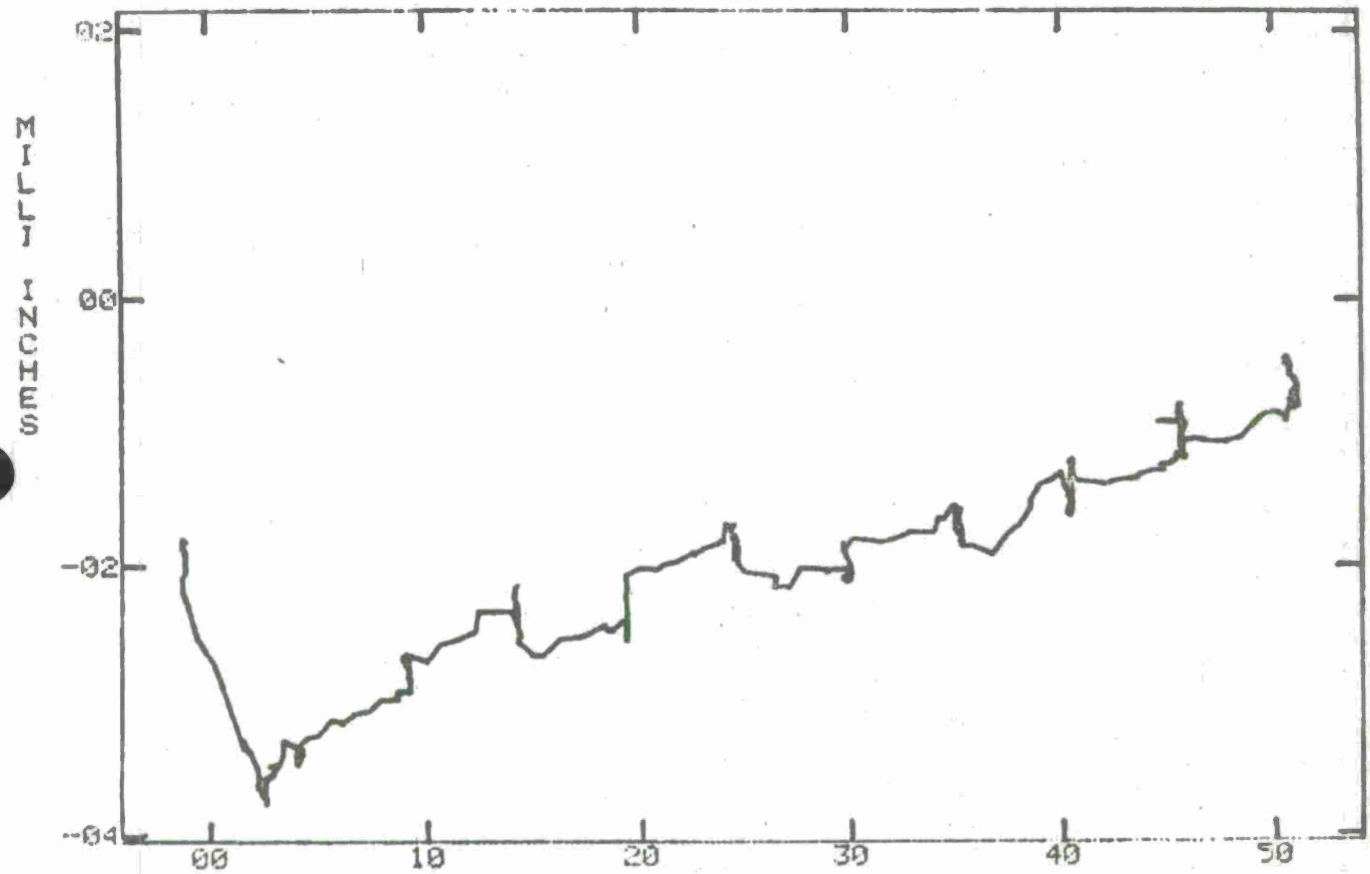
CH 23 LOAD APPLIED - L.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



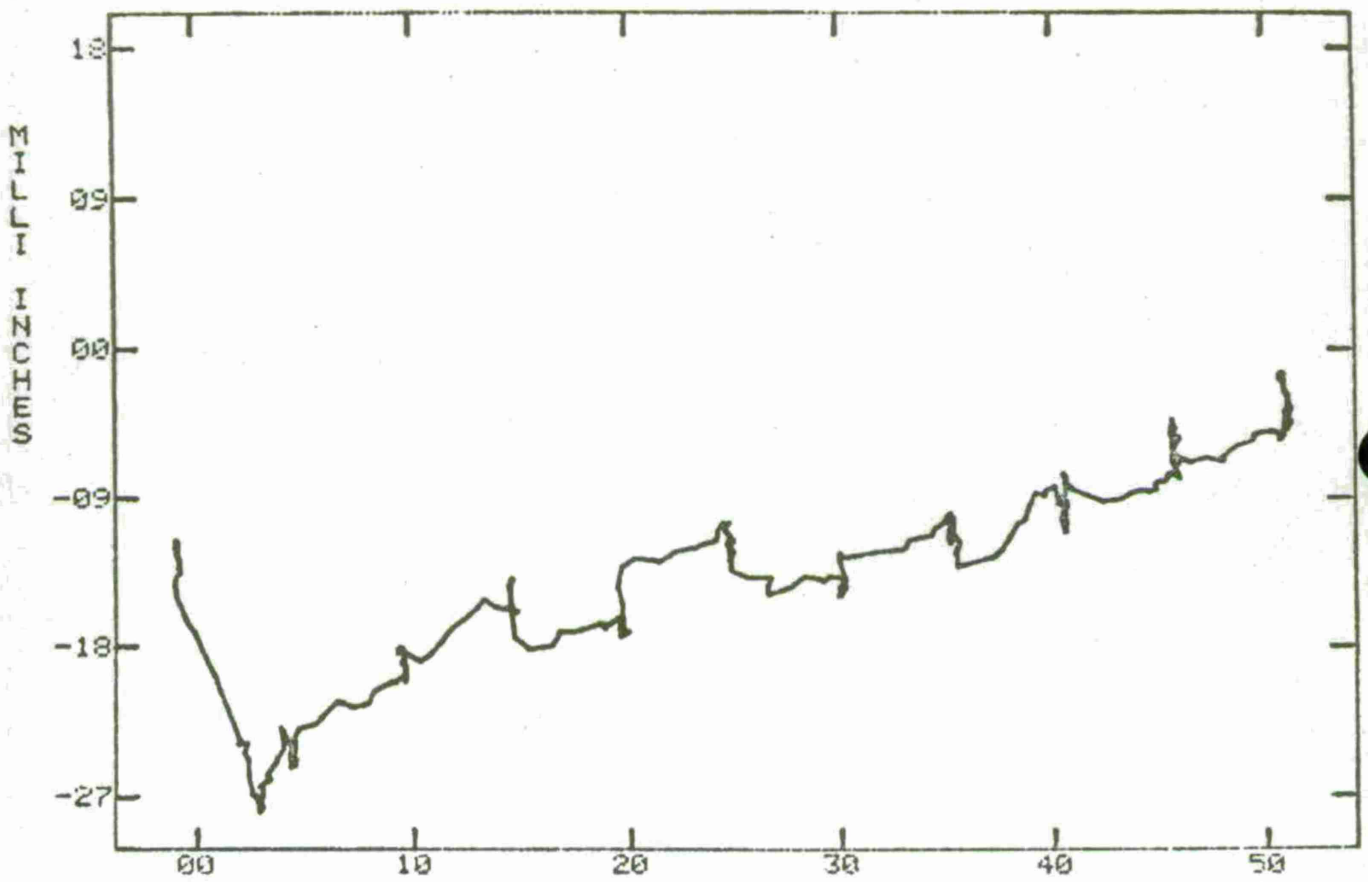
CH 23 LOAD APPLIED - L.H. (CHS 1,3,4,6,7,10,13,15,18,20) X 10
-1 TEST 20 (2JUL75) AH1G BEND TEST



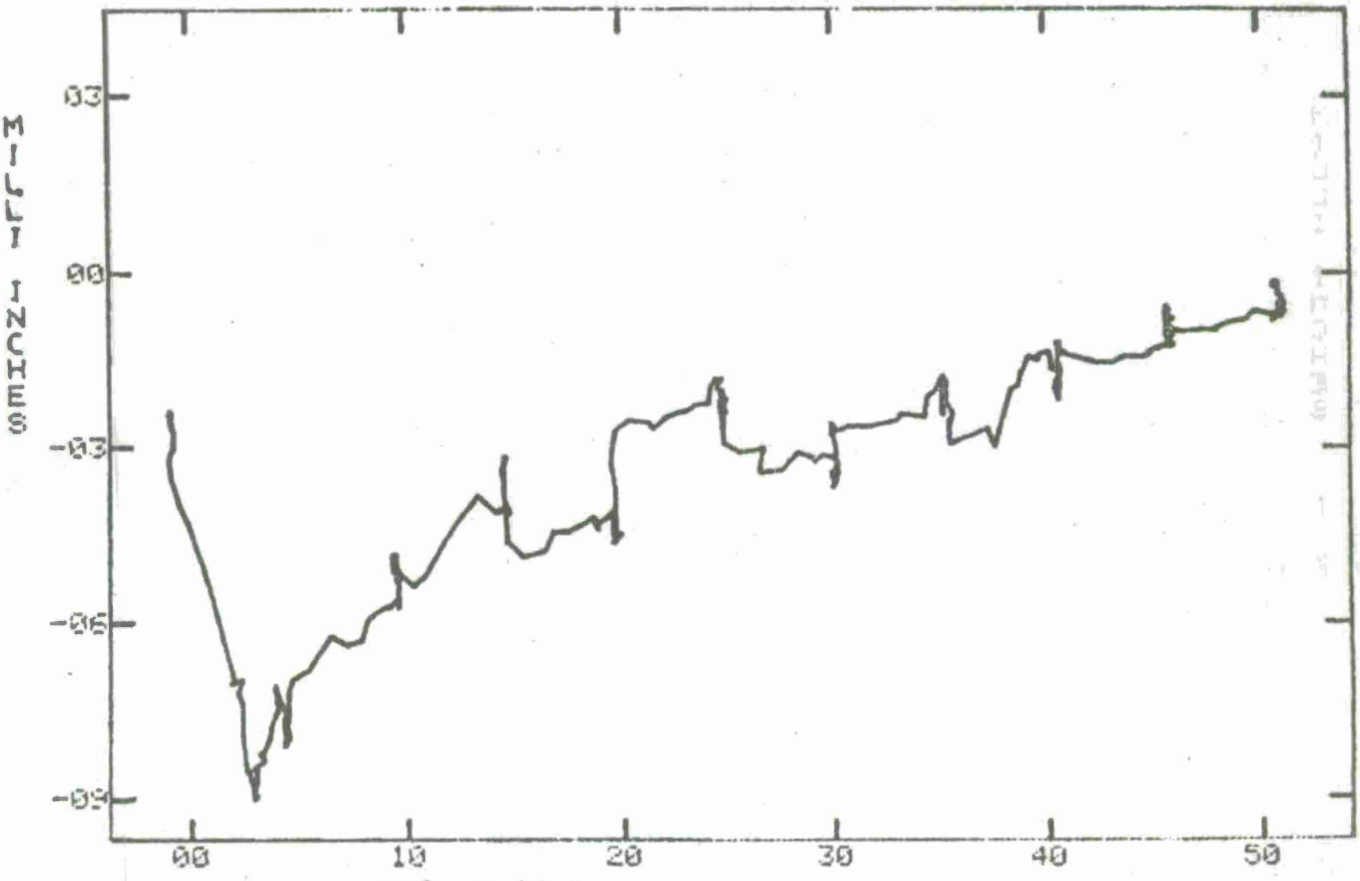
LOAD - R.H. VS DEFLN - ST 93.00 L.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST

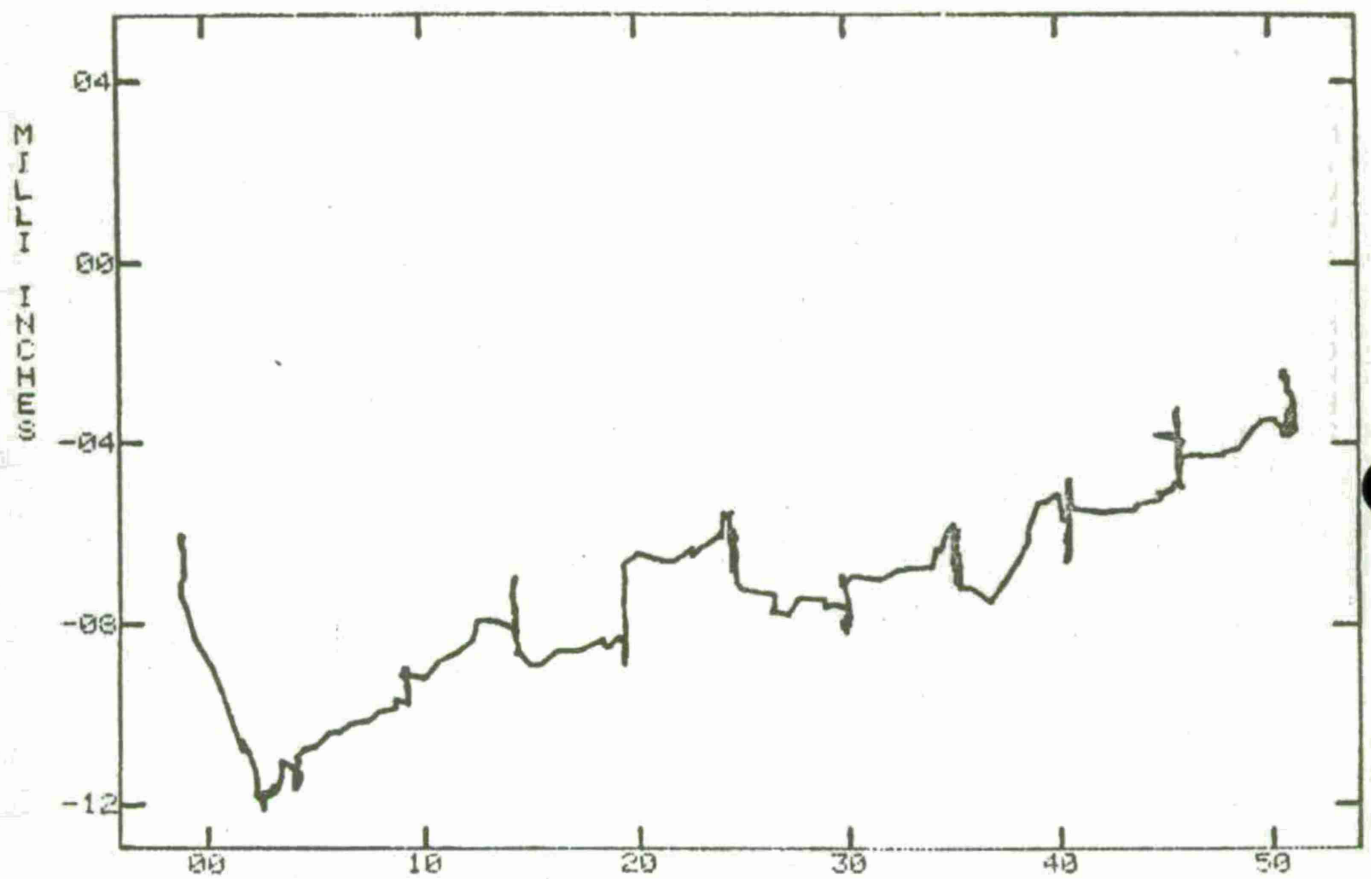


LOAD - P.H. VS DEFLN - ST 138.70 L.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST

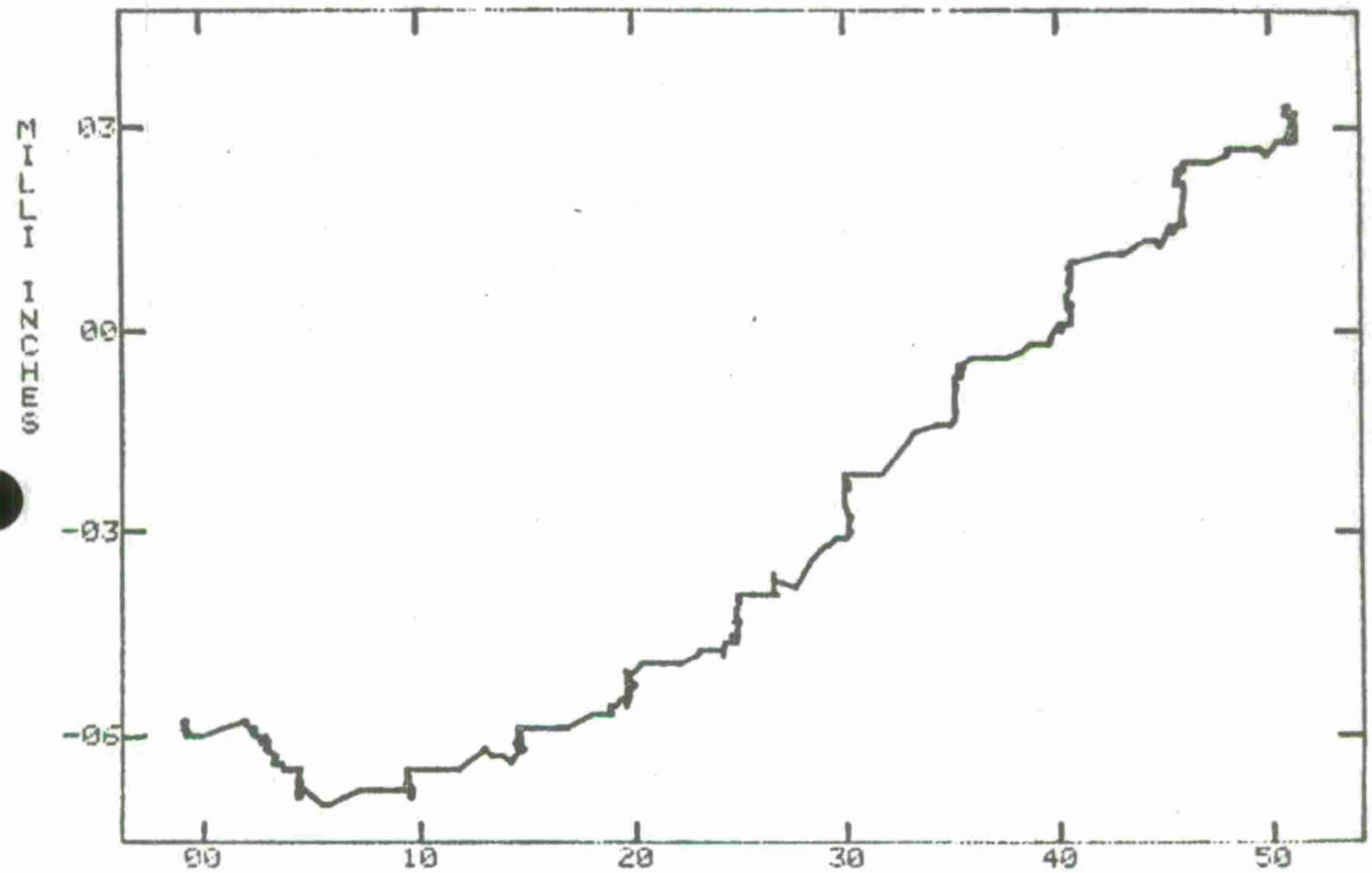


LOAD - R.H. VS DEFLN - ST 148.50 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST

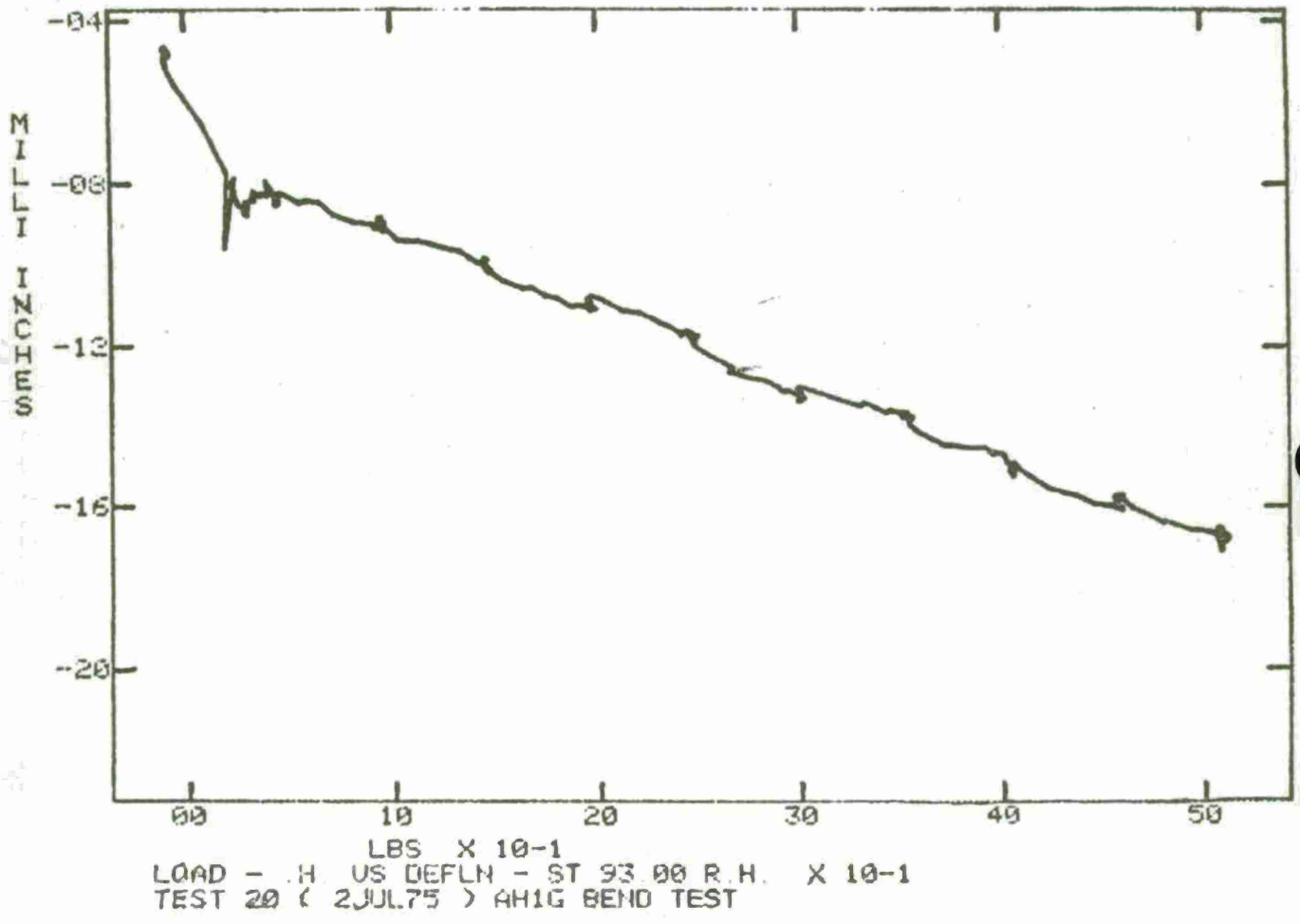

03
00
-03
-06
-09
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 186.25 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



LOAD - R H VS DEFLN - ST 213.90 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



LOAD - R.H. VS DEFLN - ST 300.42 L.H. X 10+1
TEST 20 (2JUL75) AH1G BEND TEST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MILLI INCHES
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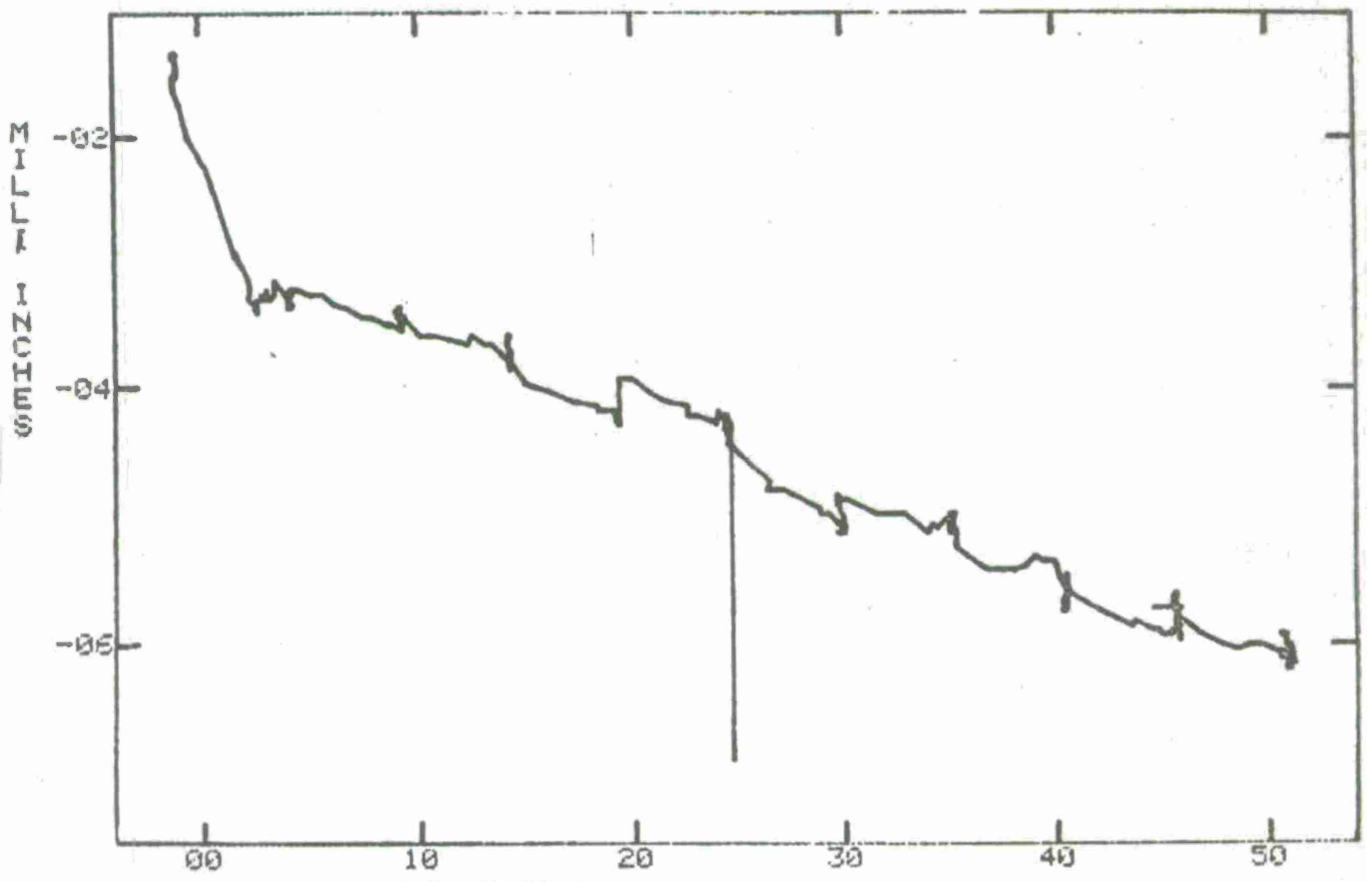
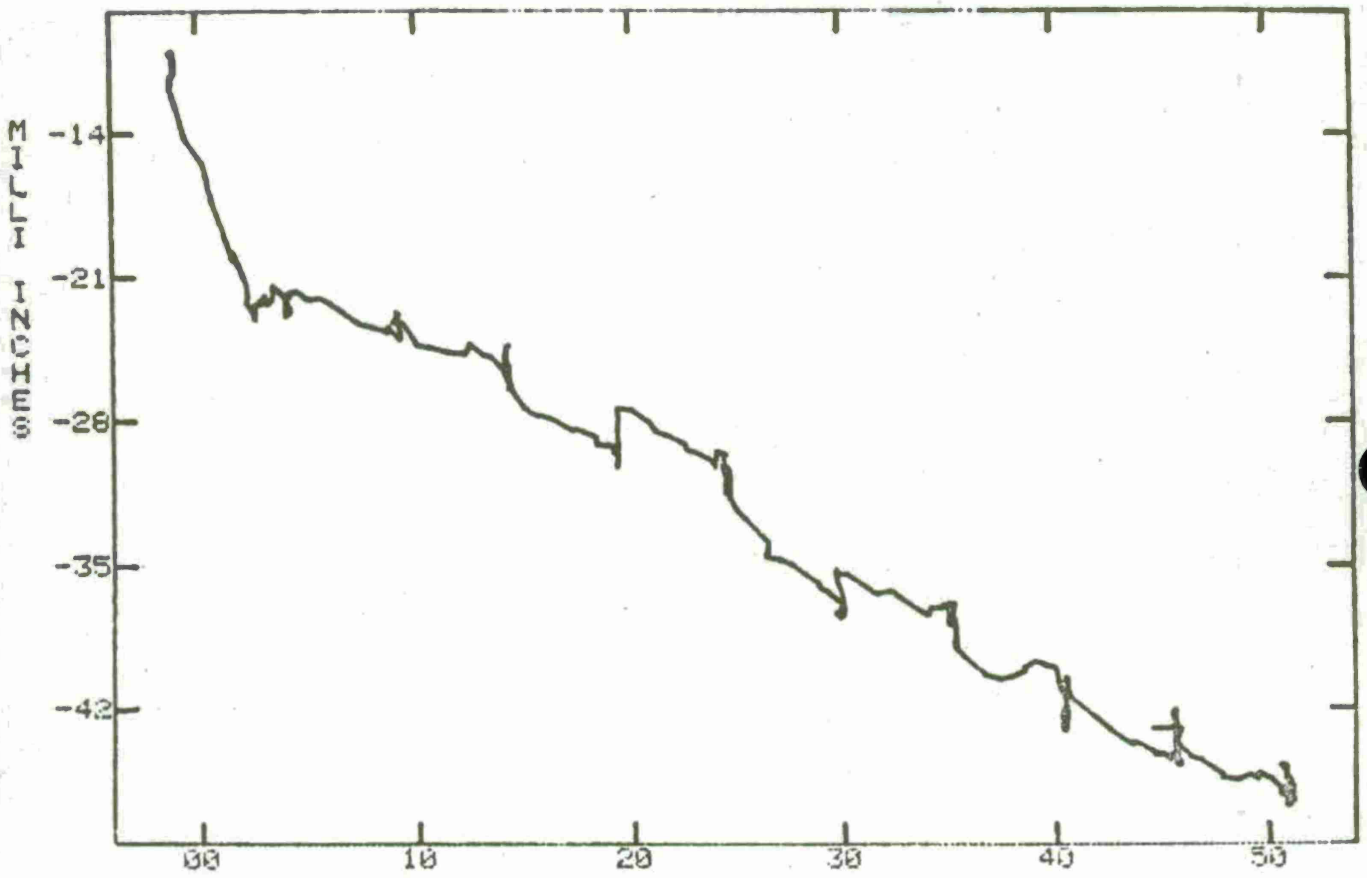
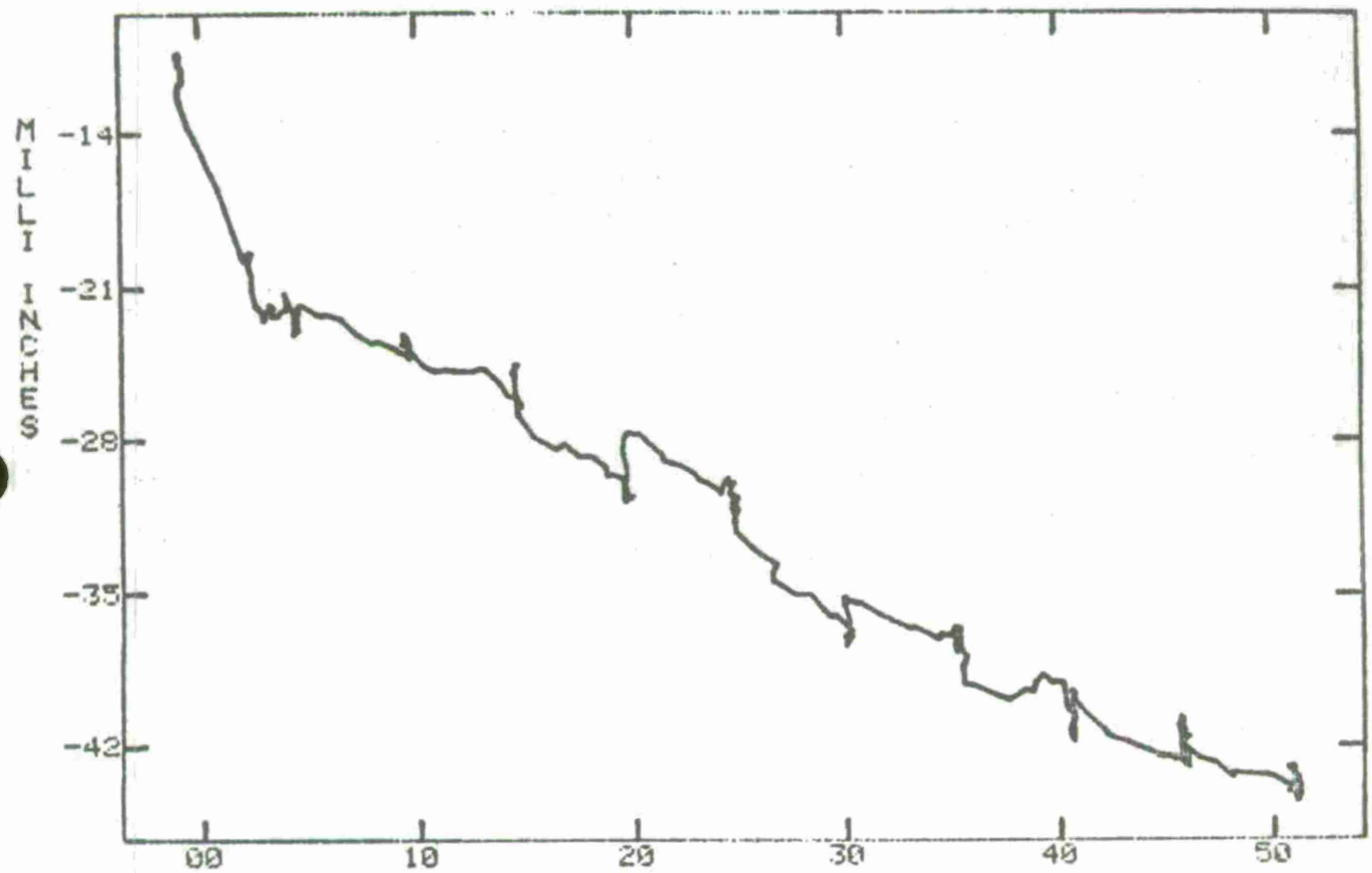
LBS X 10-1
LOAD - .H VS DEFLN - ST 93.00 R.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



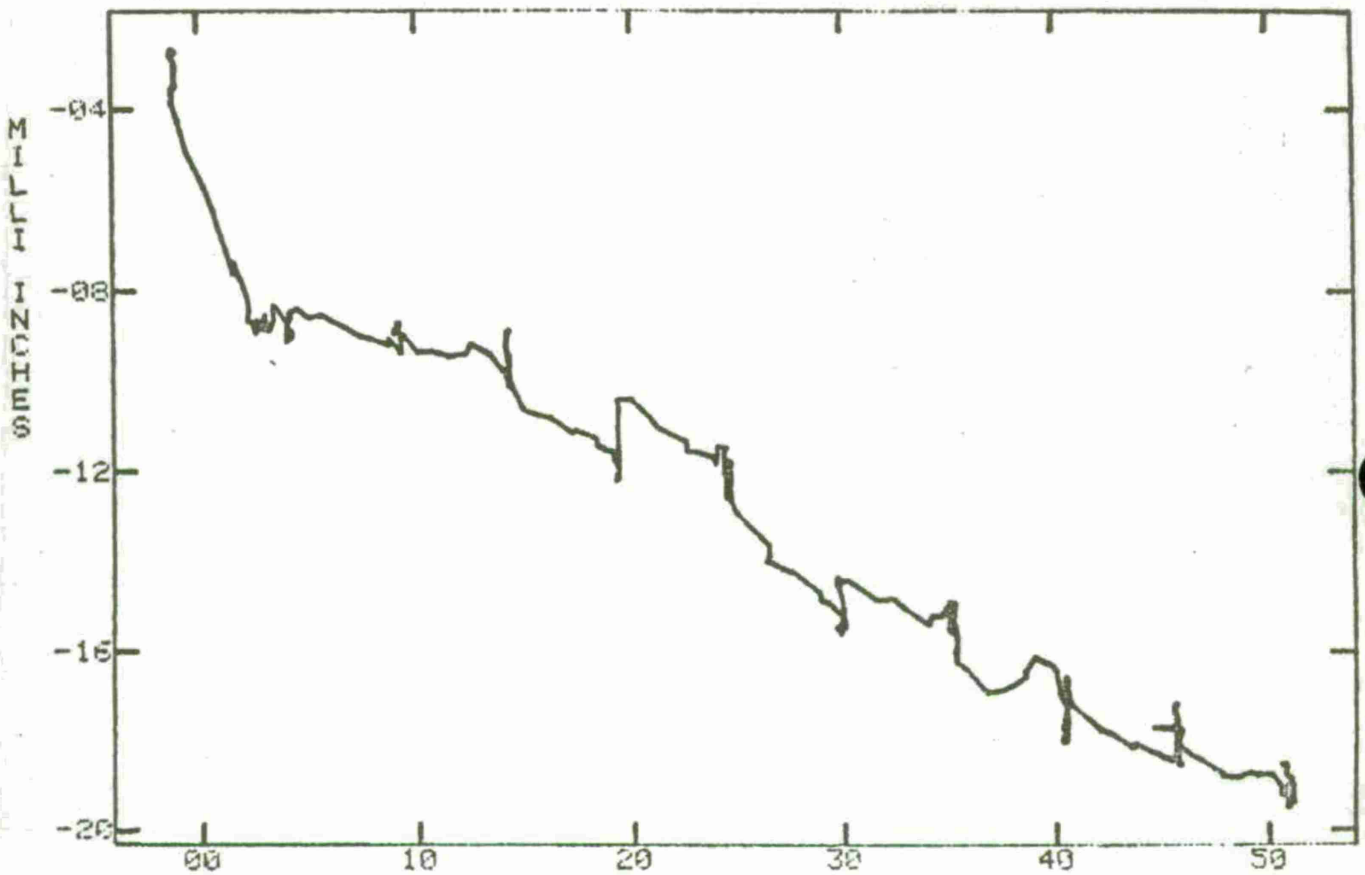
LOAD - R.H. VS DEFLN - ST 138.70 R.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



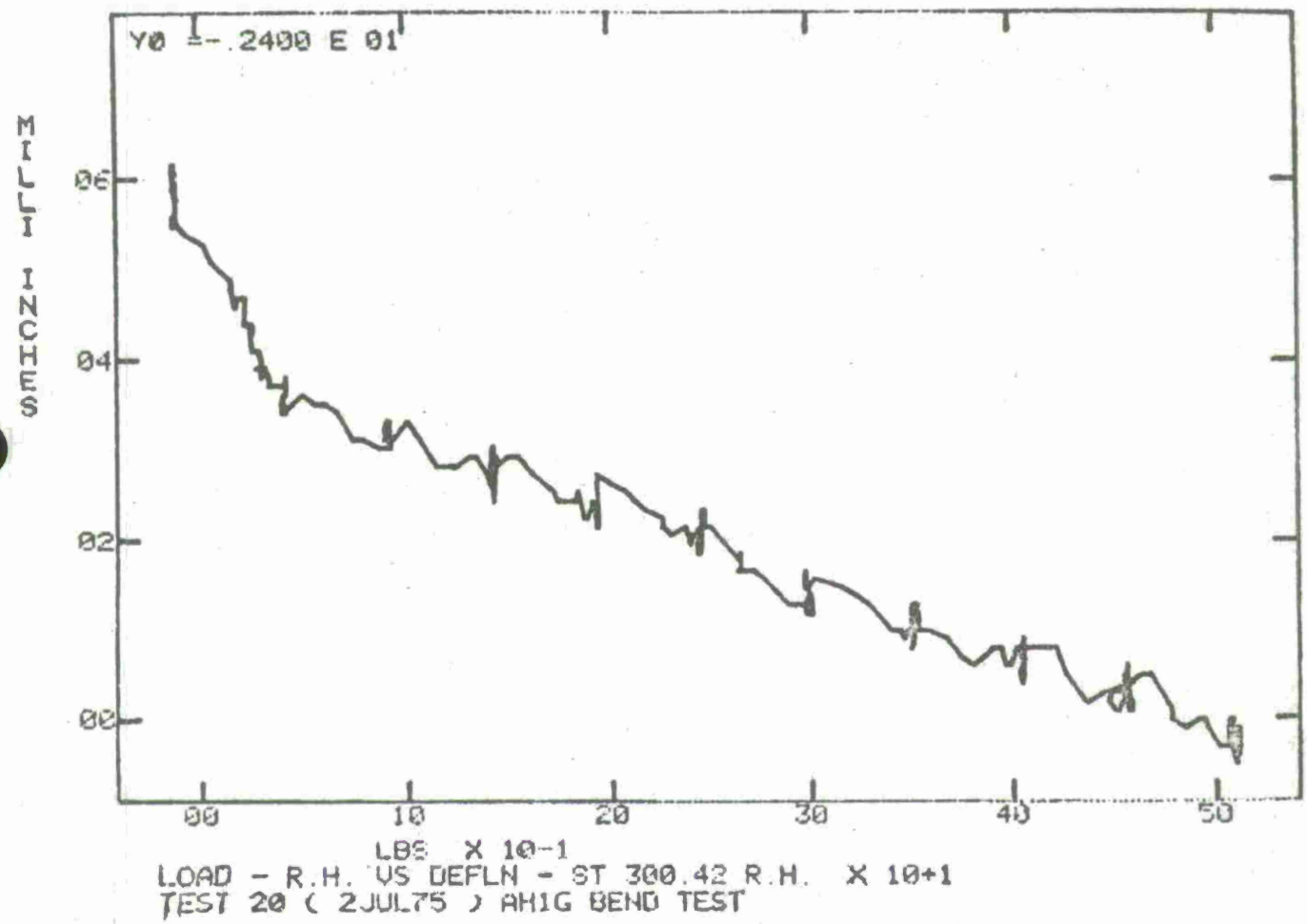
LOAD - R.H. VS DEFLN - ST 148.50 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



LOAD - R.H. VS DEFLN - ST 186.25 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



LOAD - R.H. VS DEFLN - ST 213.90 R.H X 10+0
TEST 20 (2JUL75) AH1G BEND TEST


Y0 =-.2400 E 01
MILLI INCHES
06
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10
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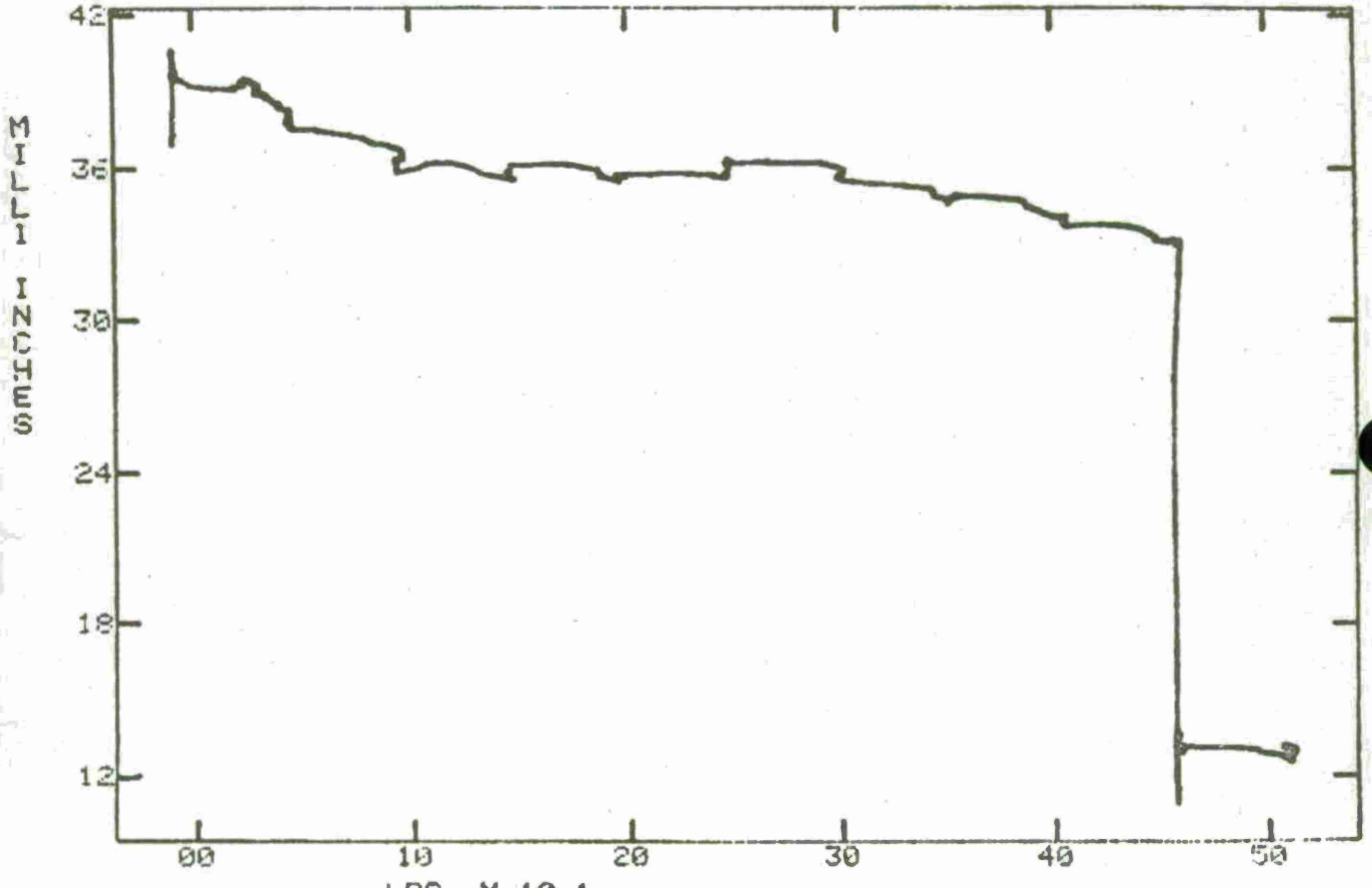
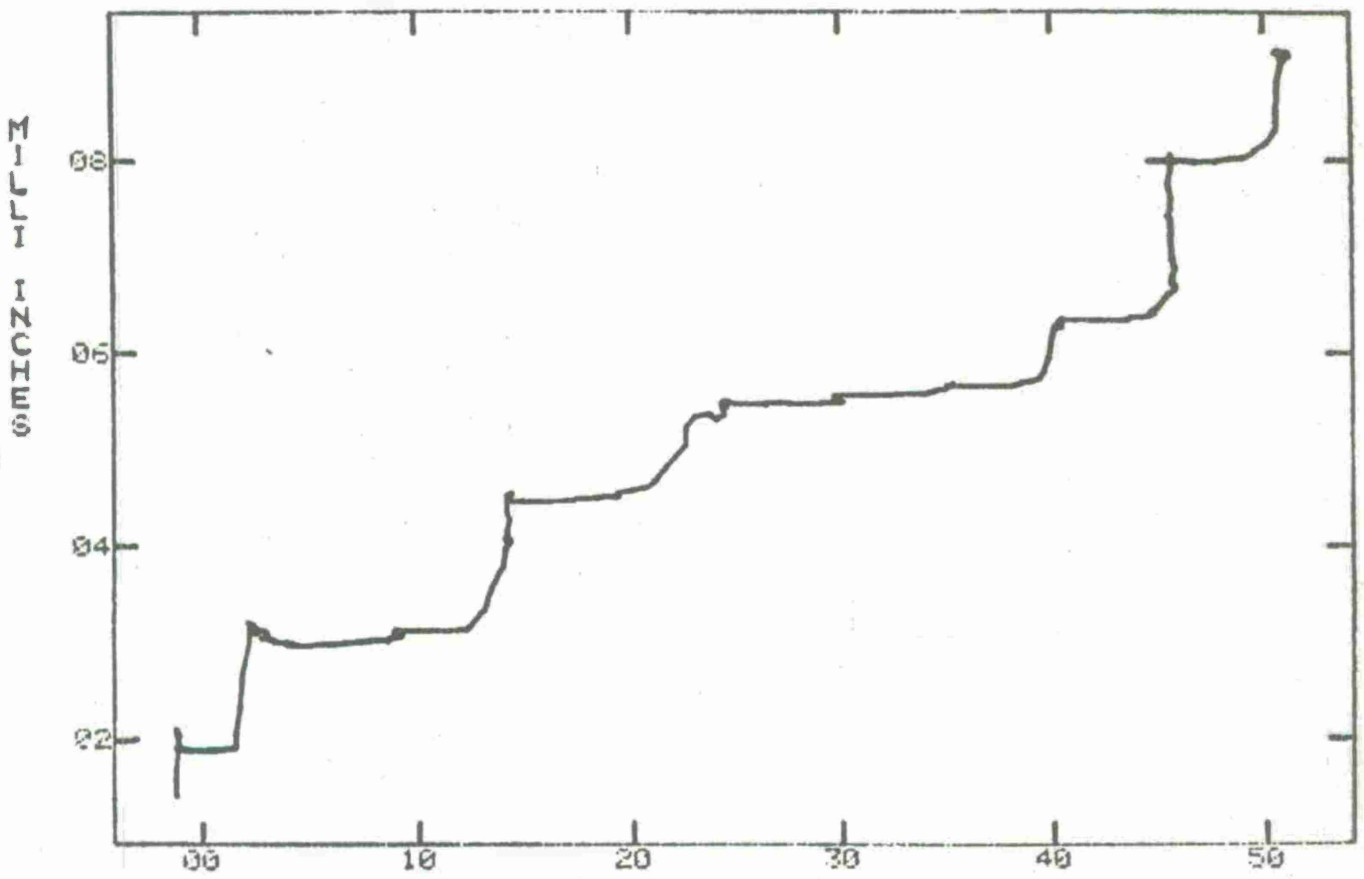
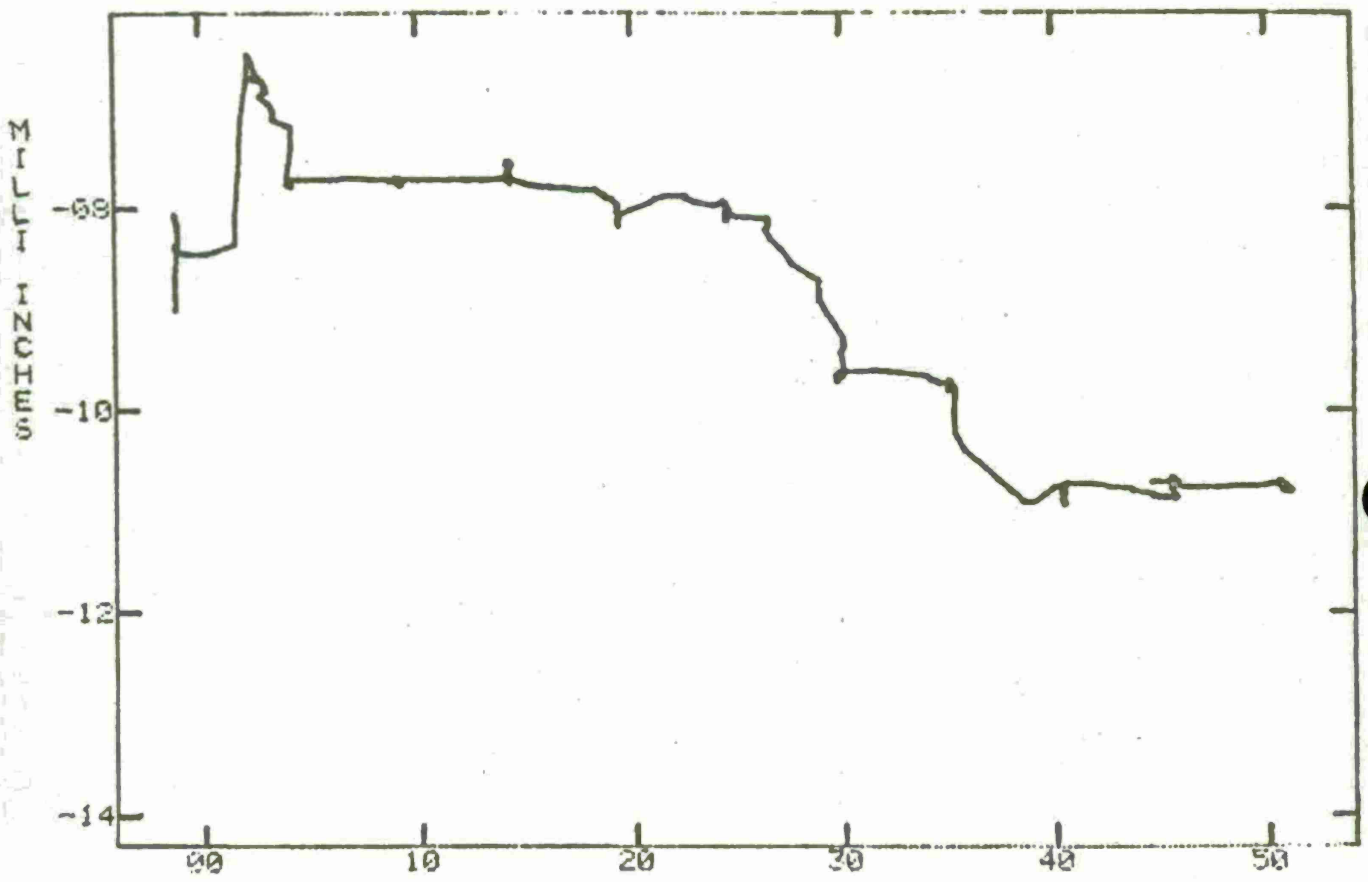
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 300.42 R.H. X 10+1
TEST 20 (2JUL75) AH1G BEND TEST



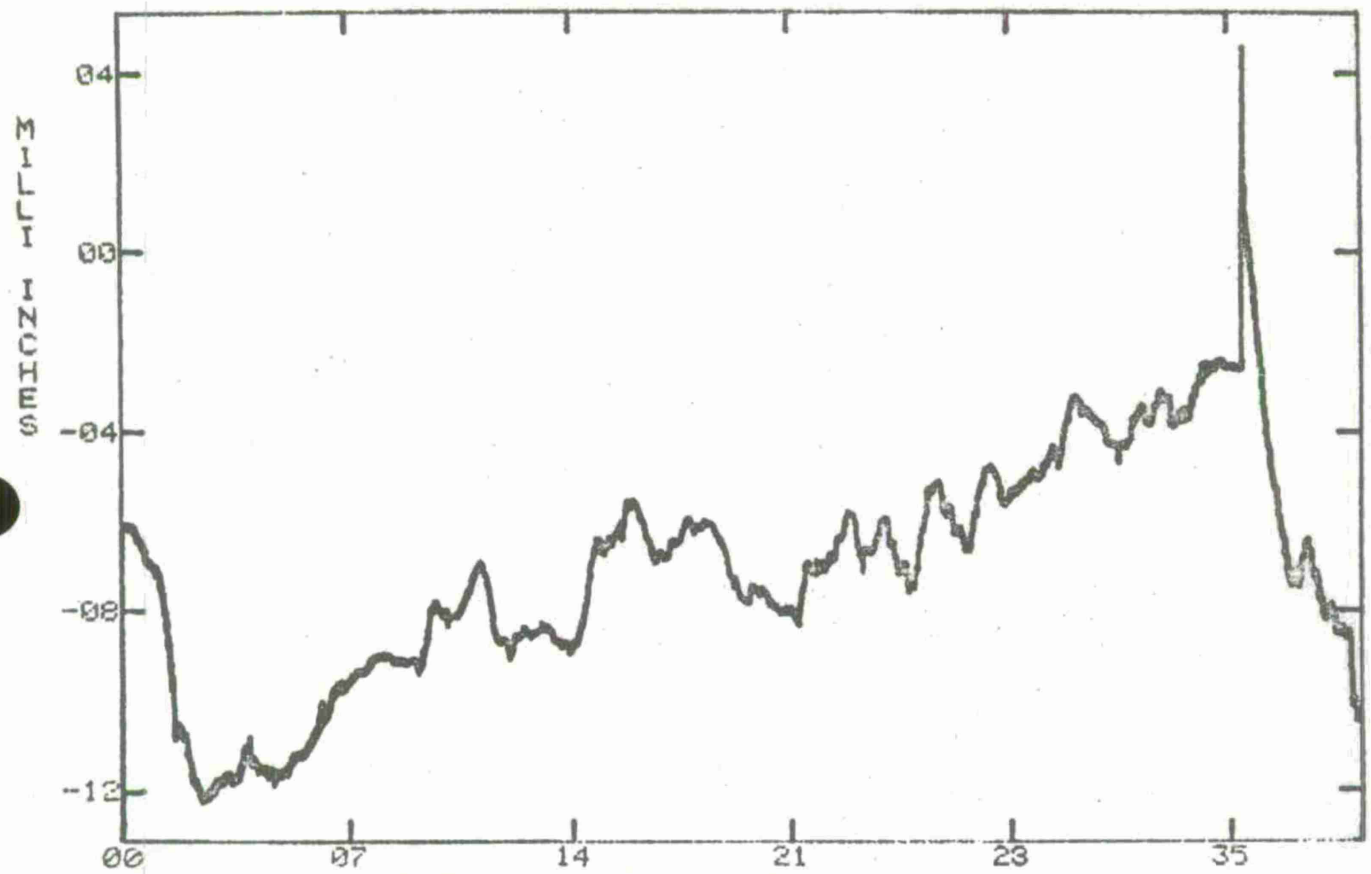
LOAD - R.H. VS BASE ROTATION - UPPER L.H. X 10+2
TEST 20 (2JUL75) AH1G BEND TEST



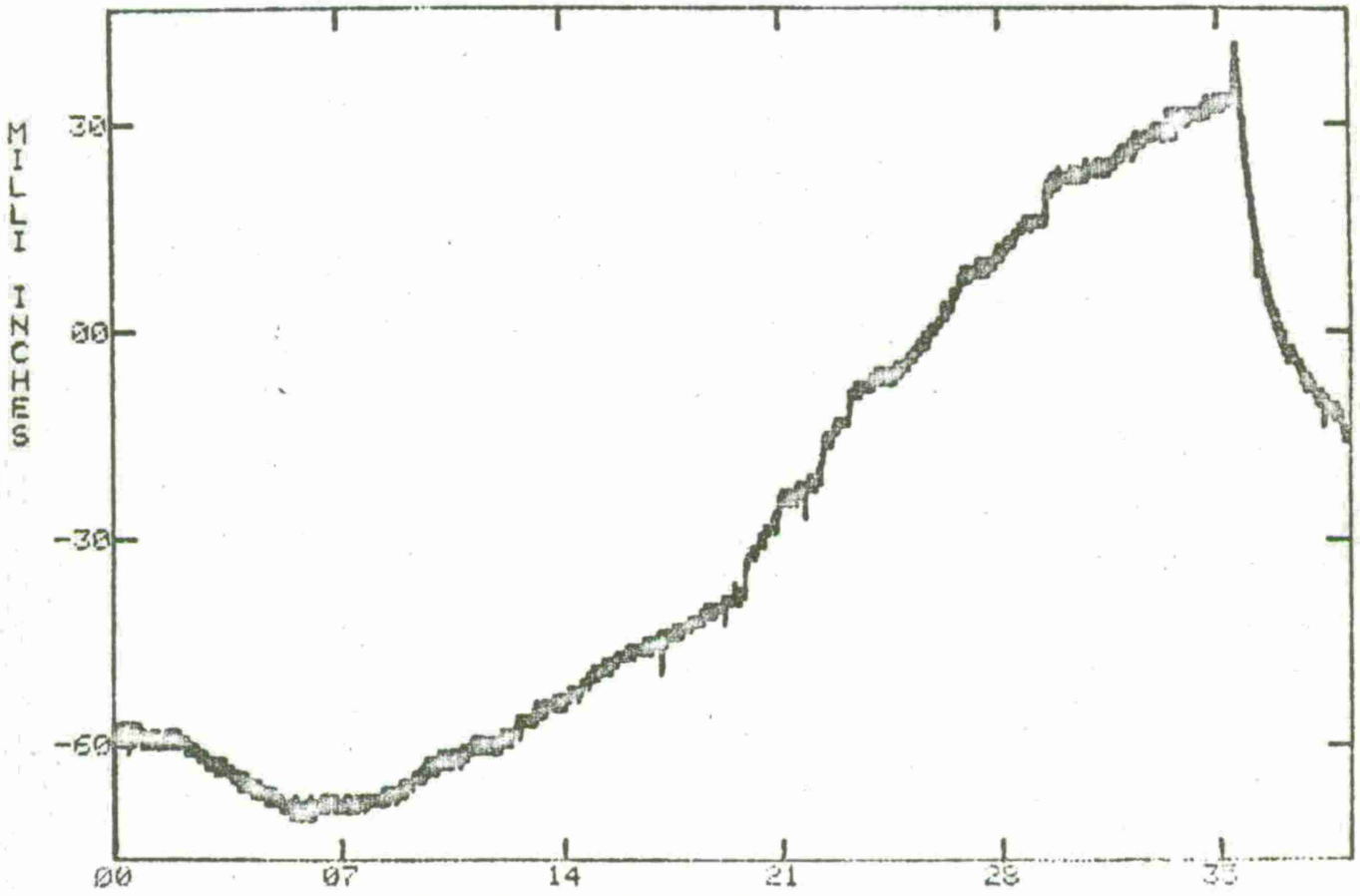
LOAD - R.H. VS BASE ROTATION - LOWER L.H. X 10+1
TEST 20 (2JUL75) AH1G BEND TEST



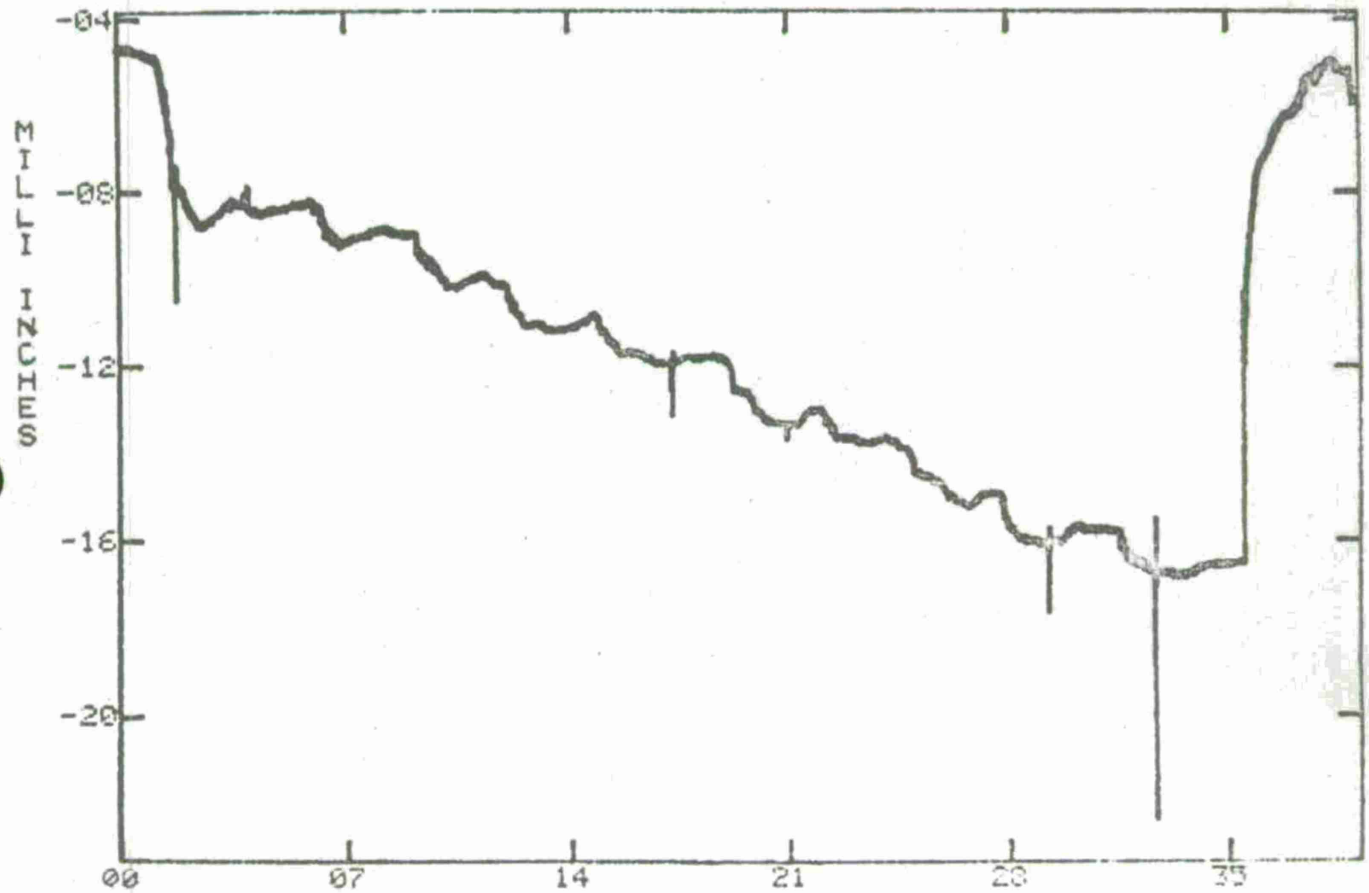
LOAD - R.H. VS BASE ROTATION - LOWER R.H. X 10+1
TEST 20 (2JUL75) AH1G BEND TEST



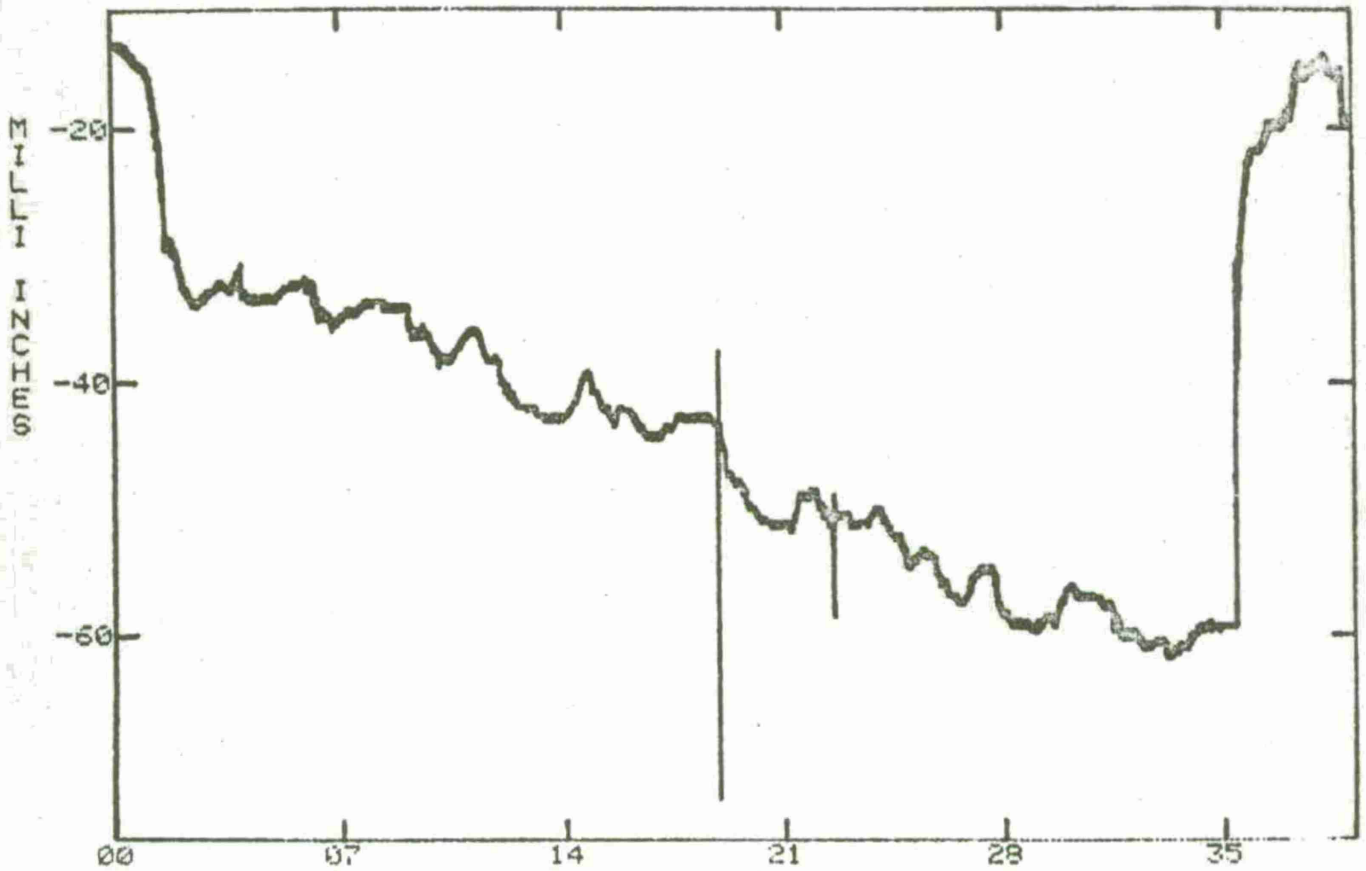
CH 5 TRSN DEFLECTION - ST. 213.90 L.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



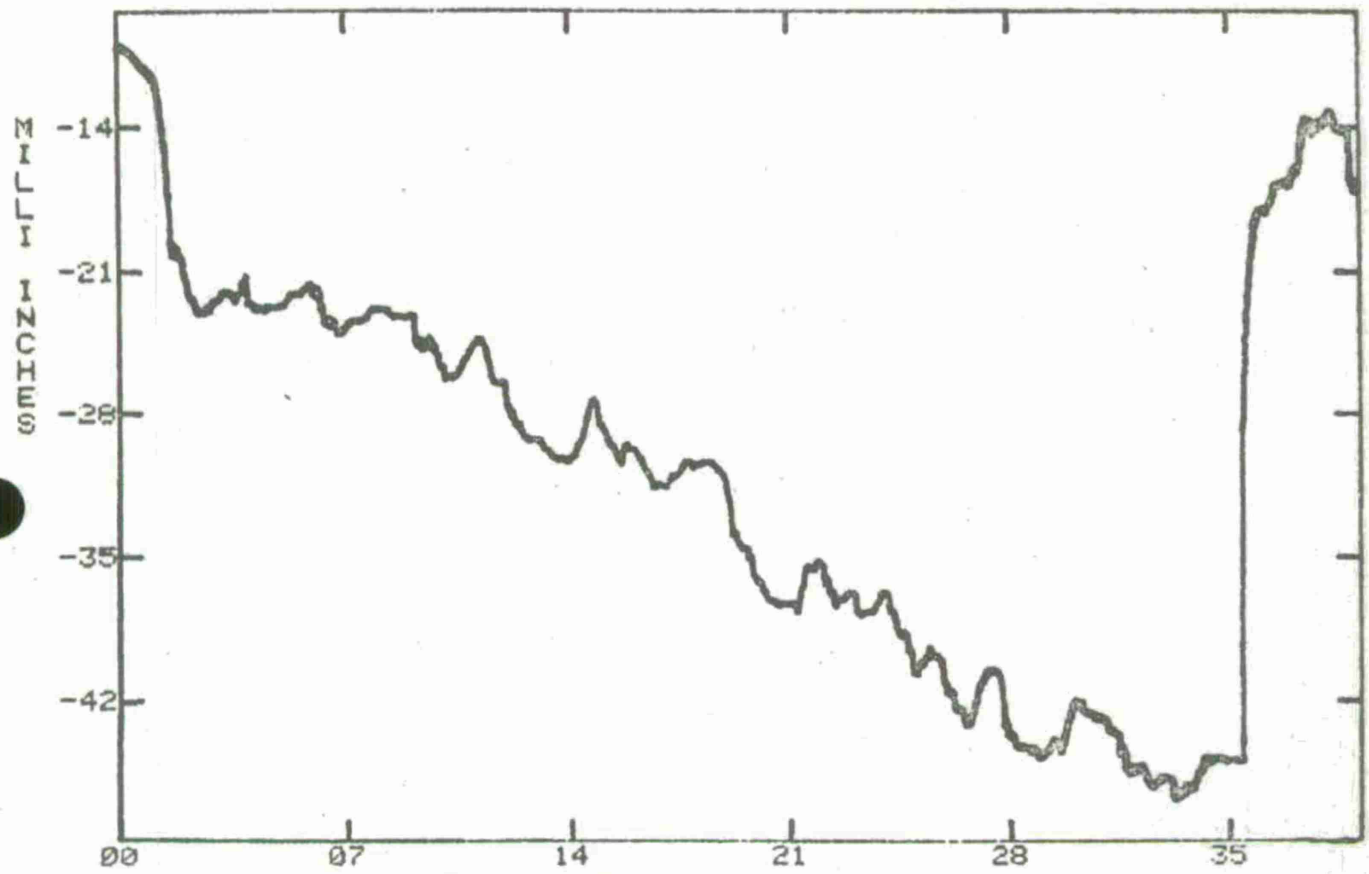
CH 6 TRSN DEFLECTION - ST. 300.42 L.H. X 10+2
TEST 20 (2JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 7 TRSN DEFLECTION - ST. 93.00 R.H. X 10-1
TEST 20 (2JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 8 TRSN DEFLECTION - ST. 136.70 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST


MILLI INCHES
-14
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-28
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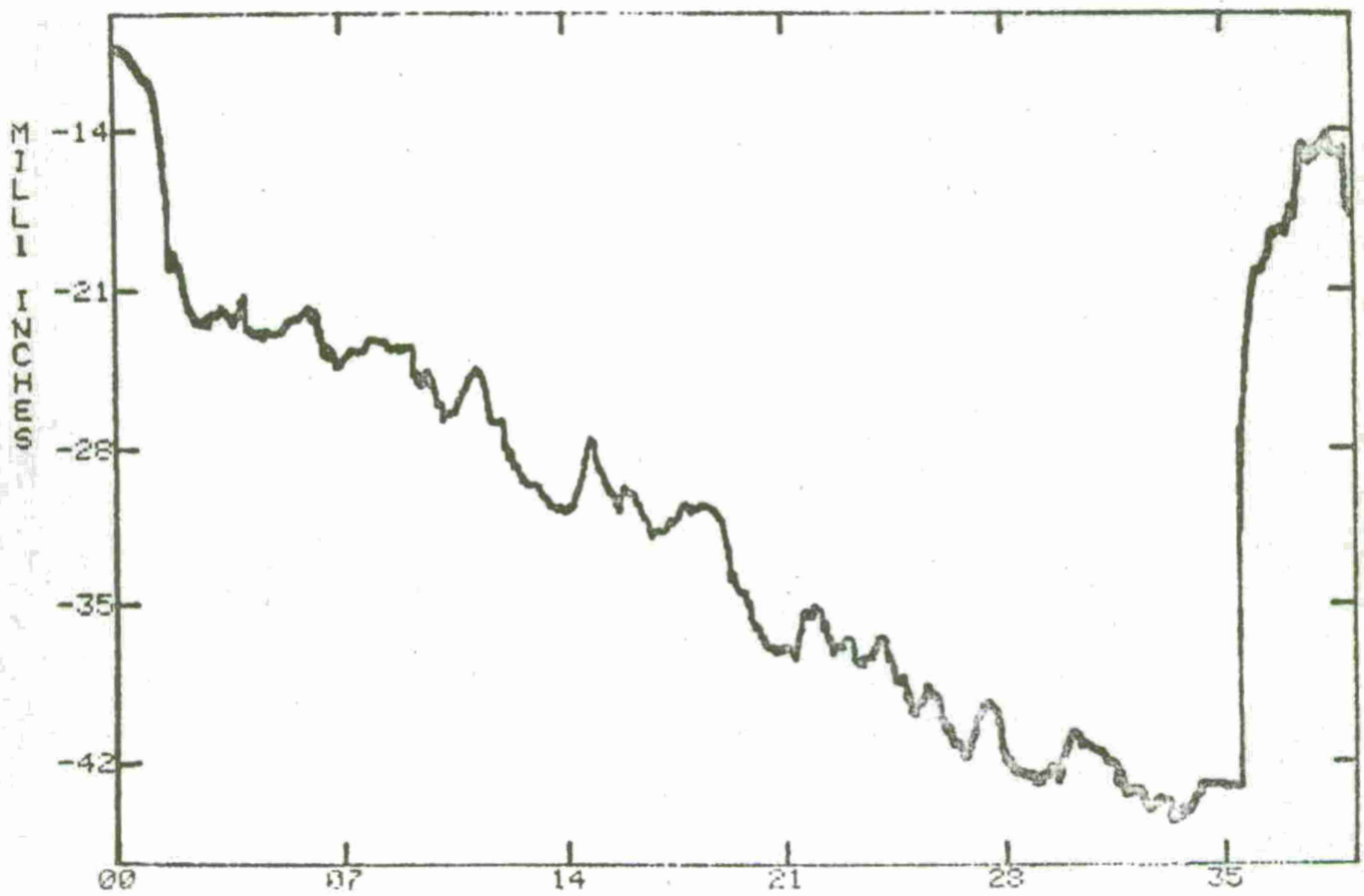
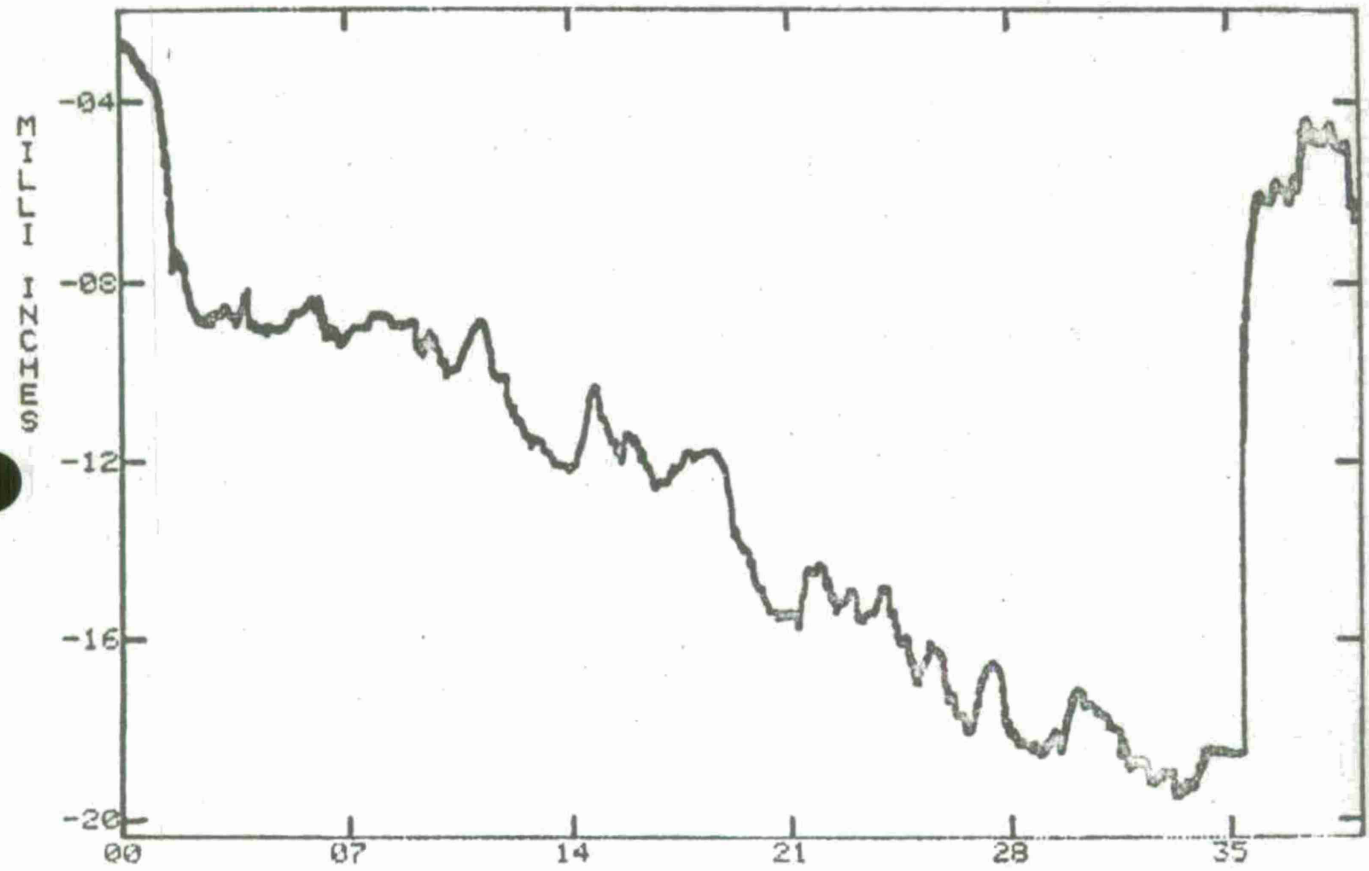
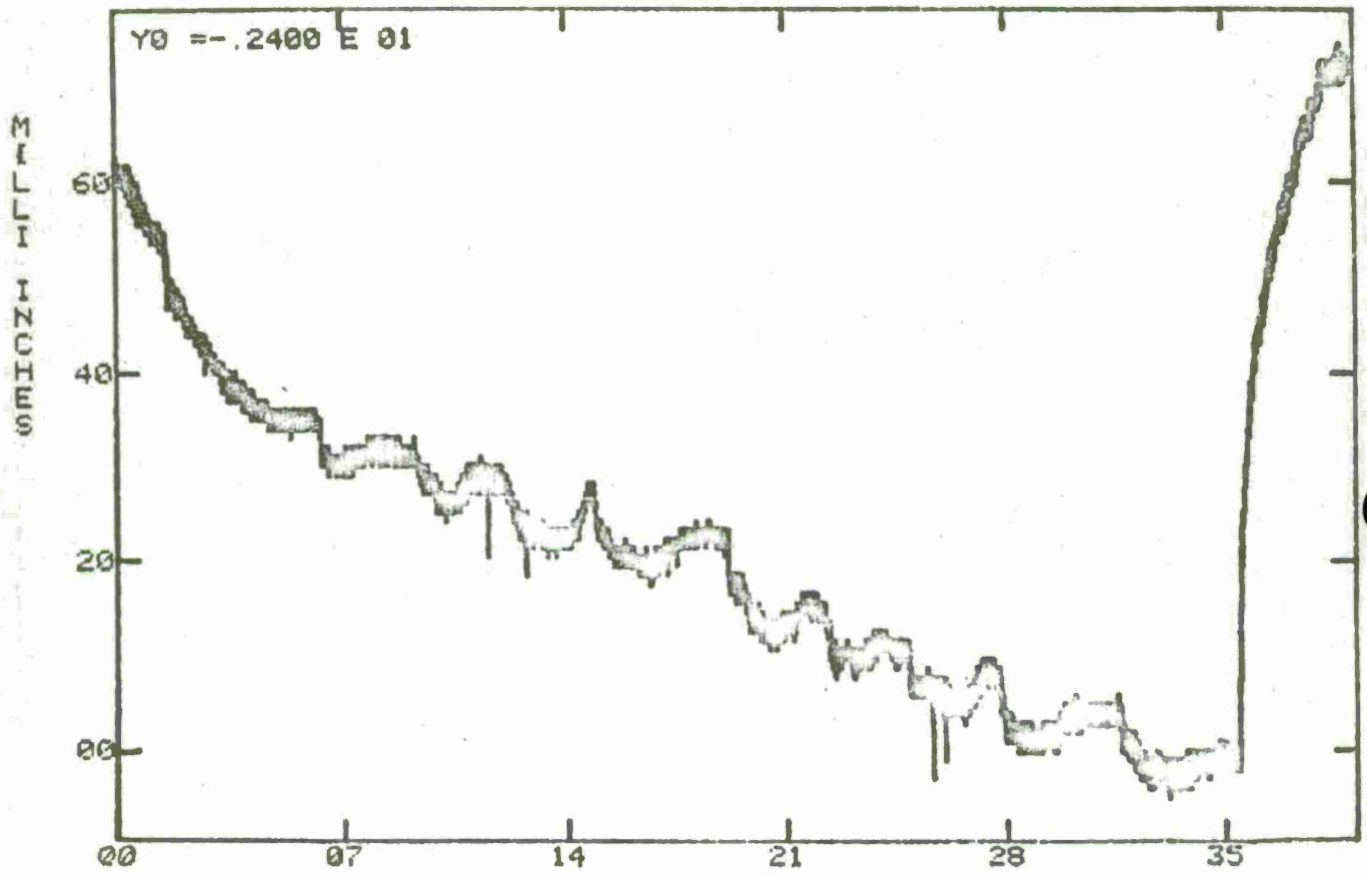
35
TIME IN SECONDS X 10-1
CH 9 TRSN DEFLECTION - ST. 148.50 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



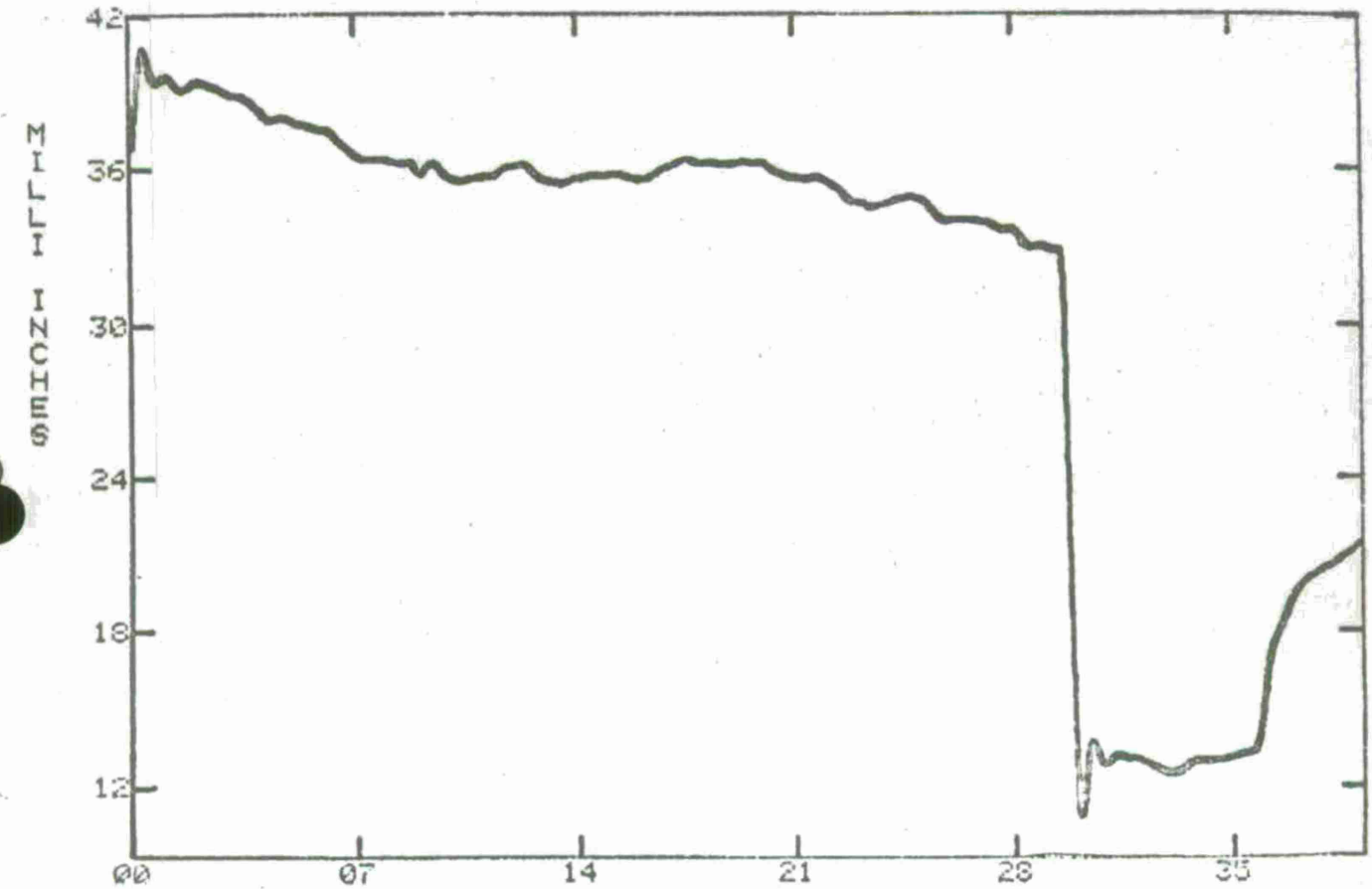
TIME IN SECONDS X 10-1
CH 10 TRSN DEFLECTION - ST 186.25 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



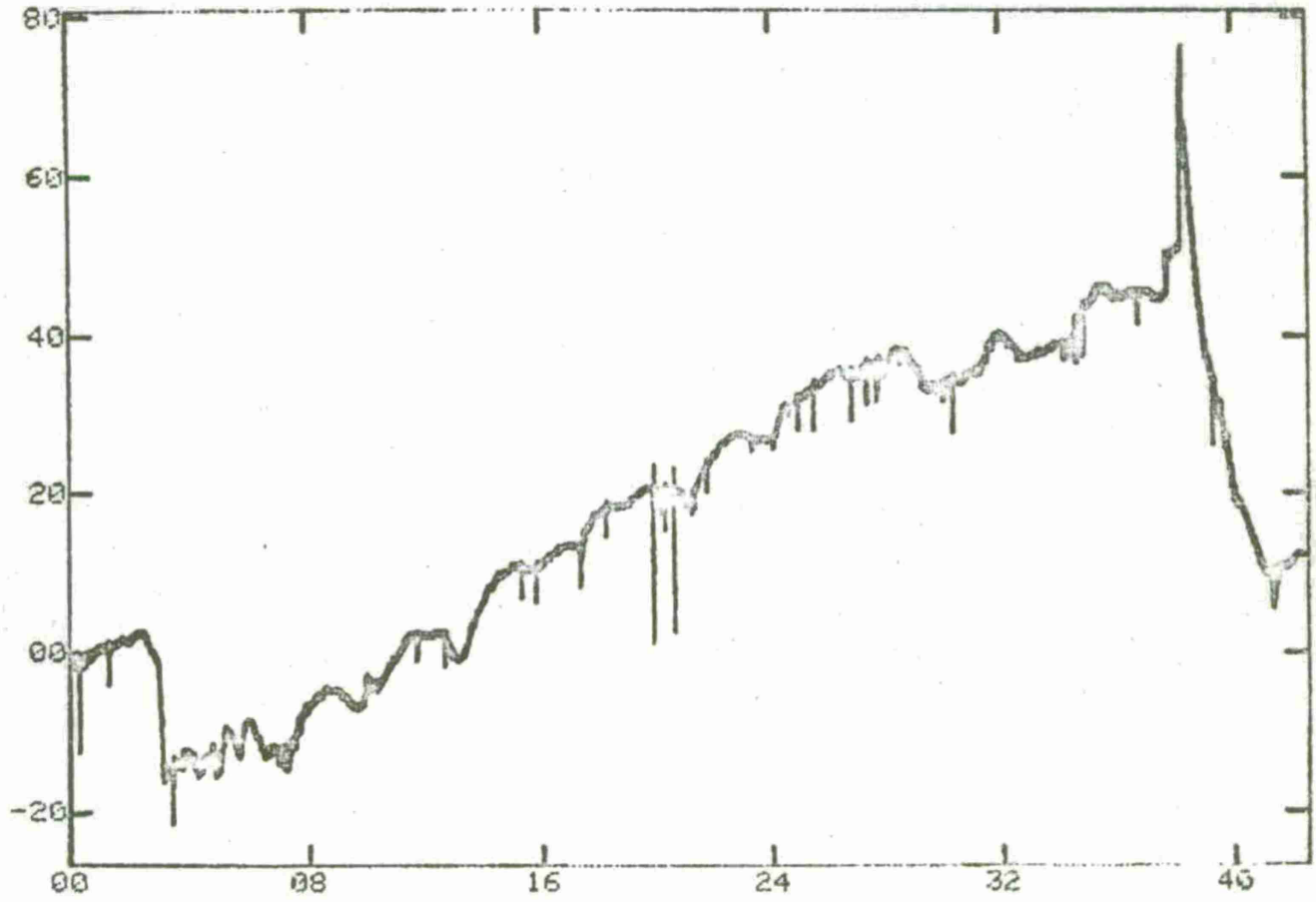
TIME IN SECONDS X 10-1
CH 11 TRSN DEFLECTION - ST. 213.90 R.H. X 10+0
TEST 20 (2JUL75) AH1G BEND TEST



CH 12 TRSN DEFLECTION - ST. 300.42 R.H. X 10+2
TEST 20 (2JUL75) AH1G BEND TEST



CH 13 BASE ROTATION - UPPER L.H. X 10+2
TEST 20 (2JUL75) AH1G BEND TEST


MILLI INCHES
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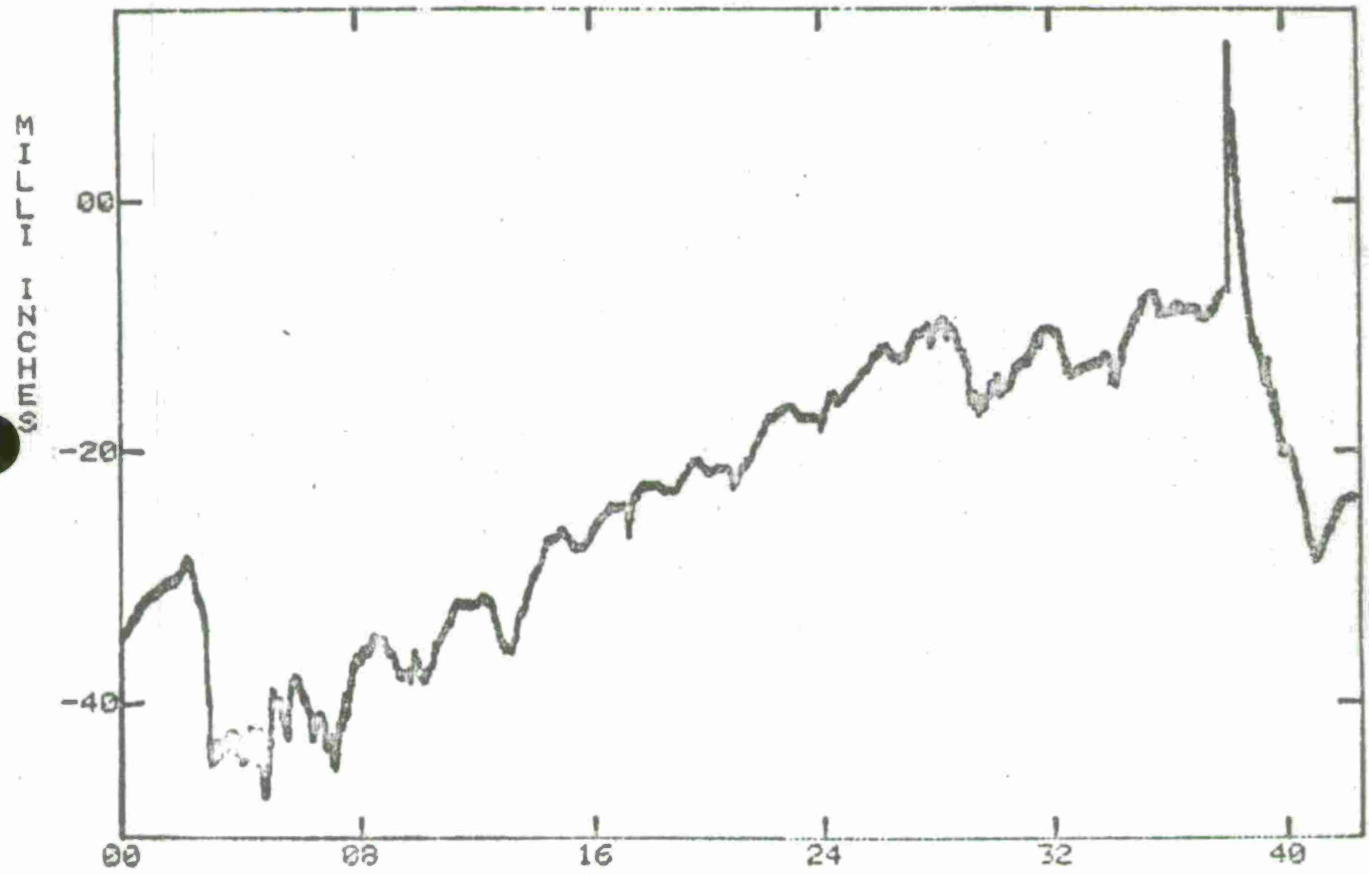
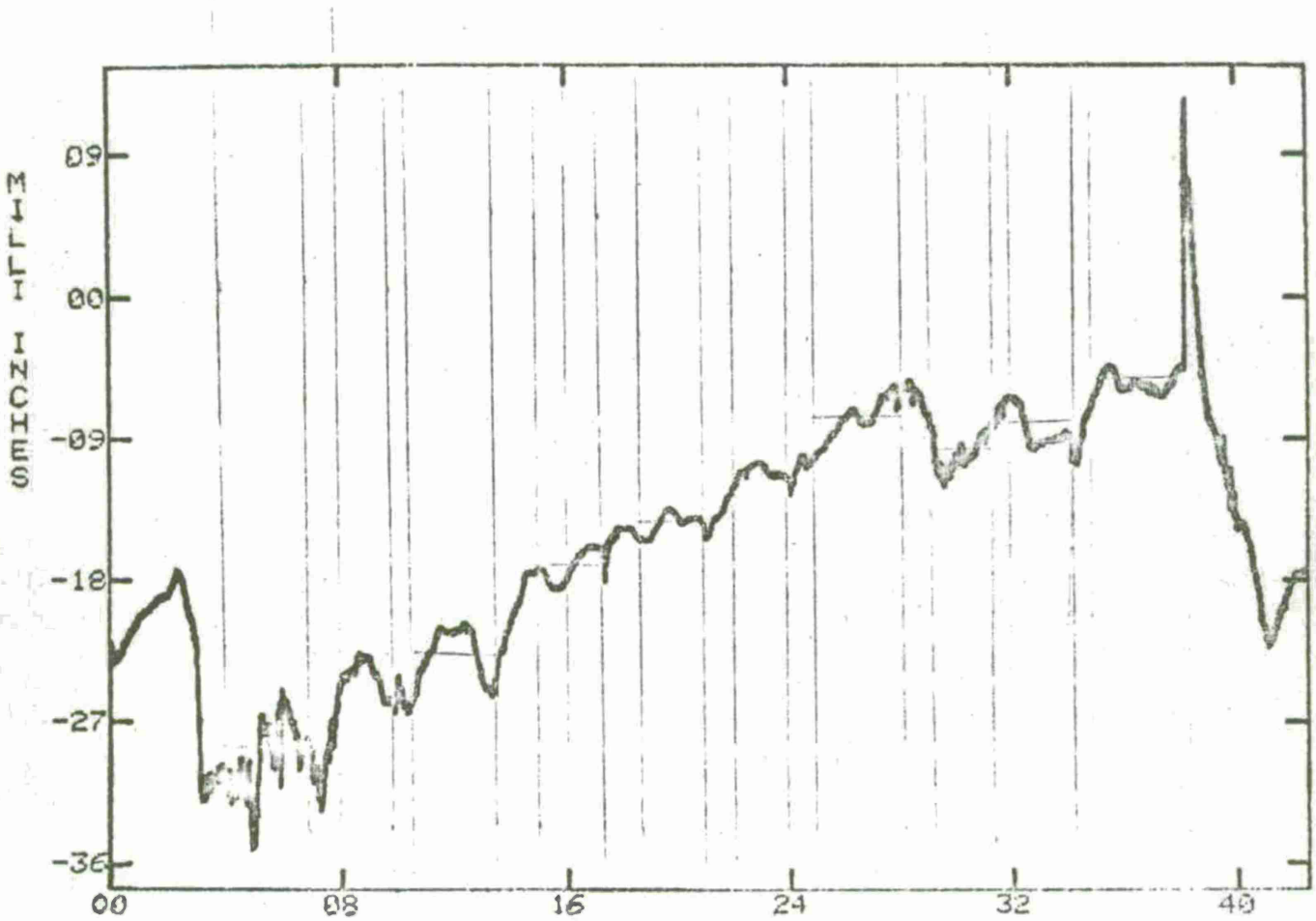
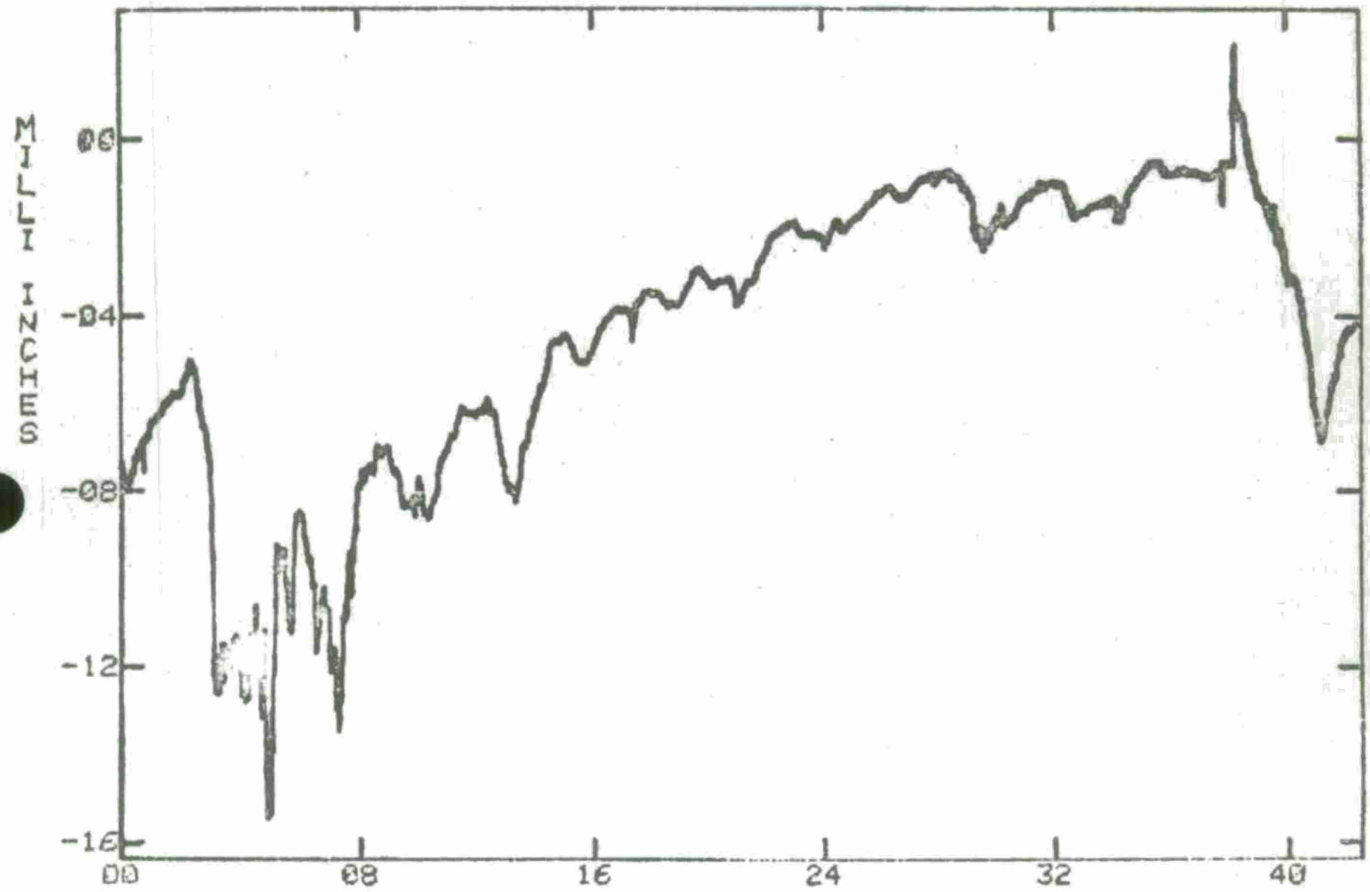
TIME IN SECONDS X 10-1
CH 1 TRSN DEFLECTION - ST 93.00 L H X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



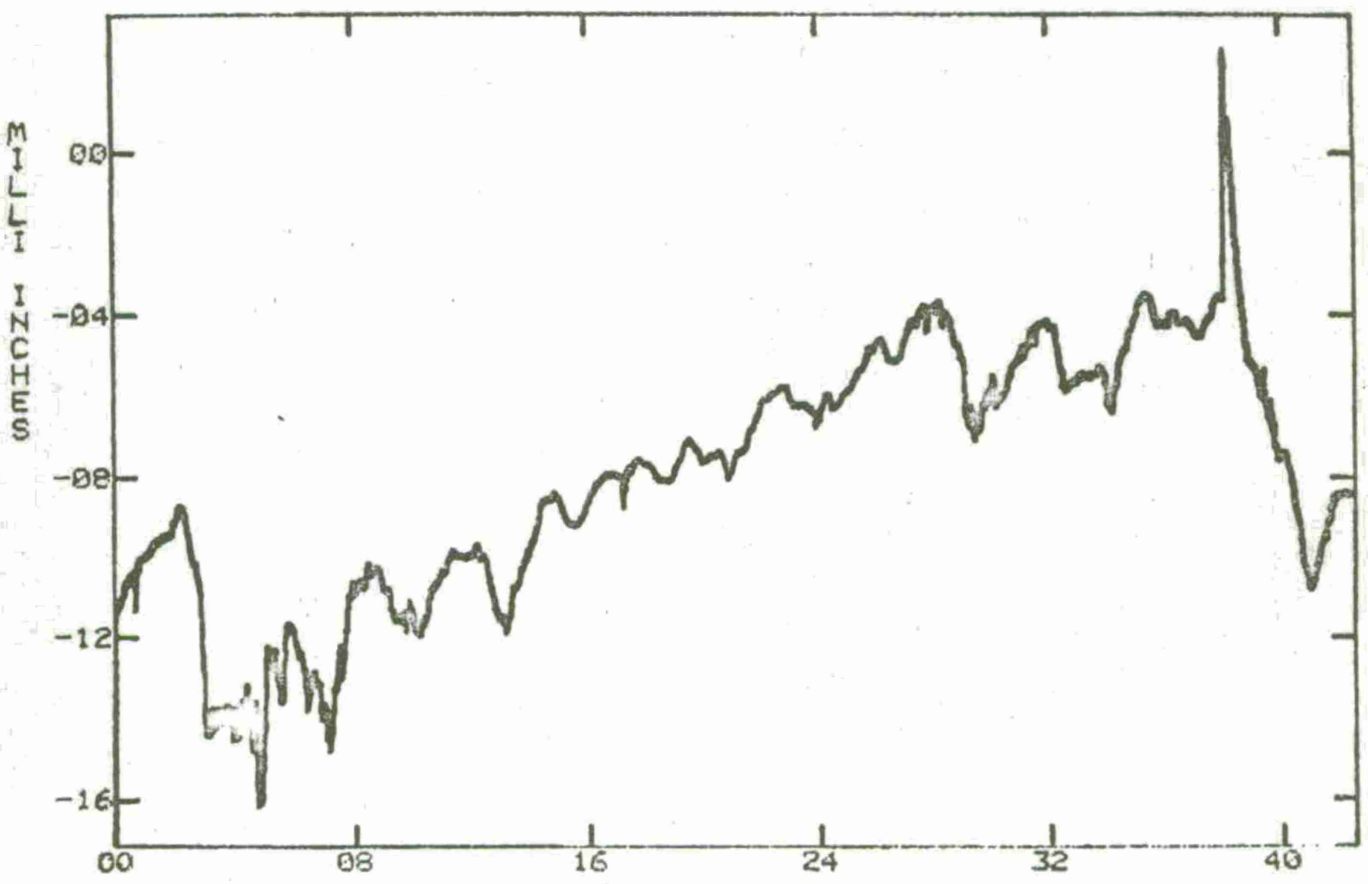
CH 2 TRSN DEFLECTION - ST. 138.70 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



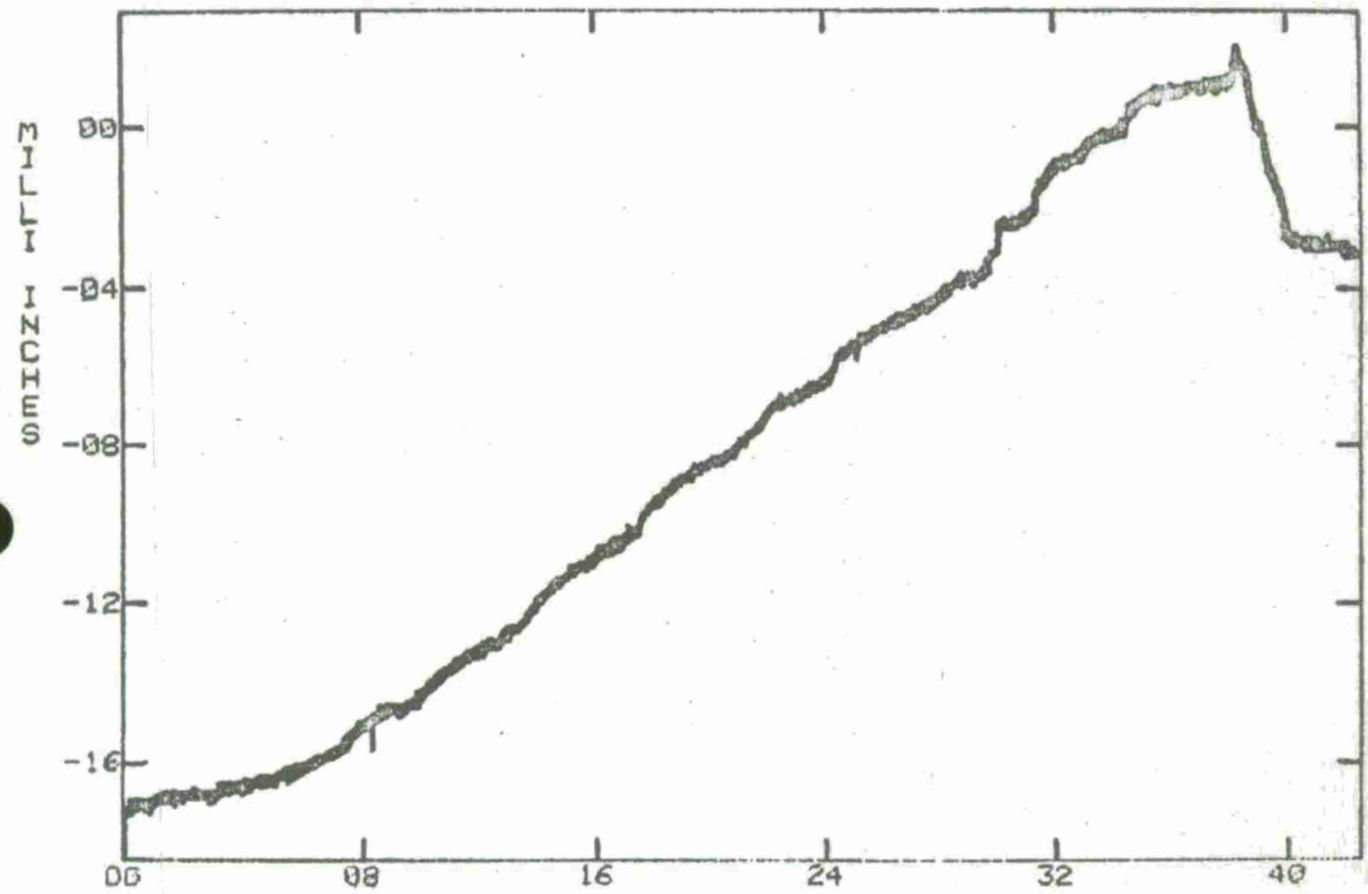
CH 3 TRSN DEFLECTION - ST 148.50 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 4 TRSH DEFLECTION - ST. 186.25 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



CH 5 TRSN DEFLECTION - ST. 213.90 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST


MILLI INCHES
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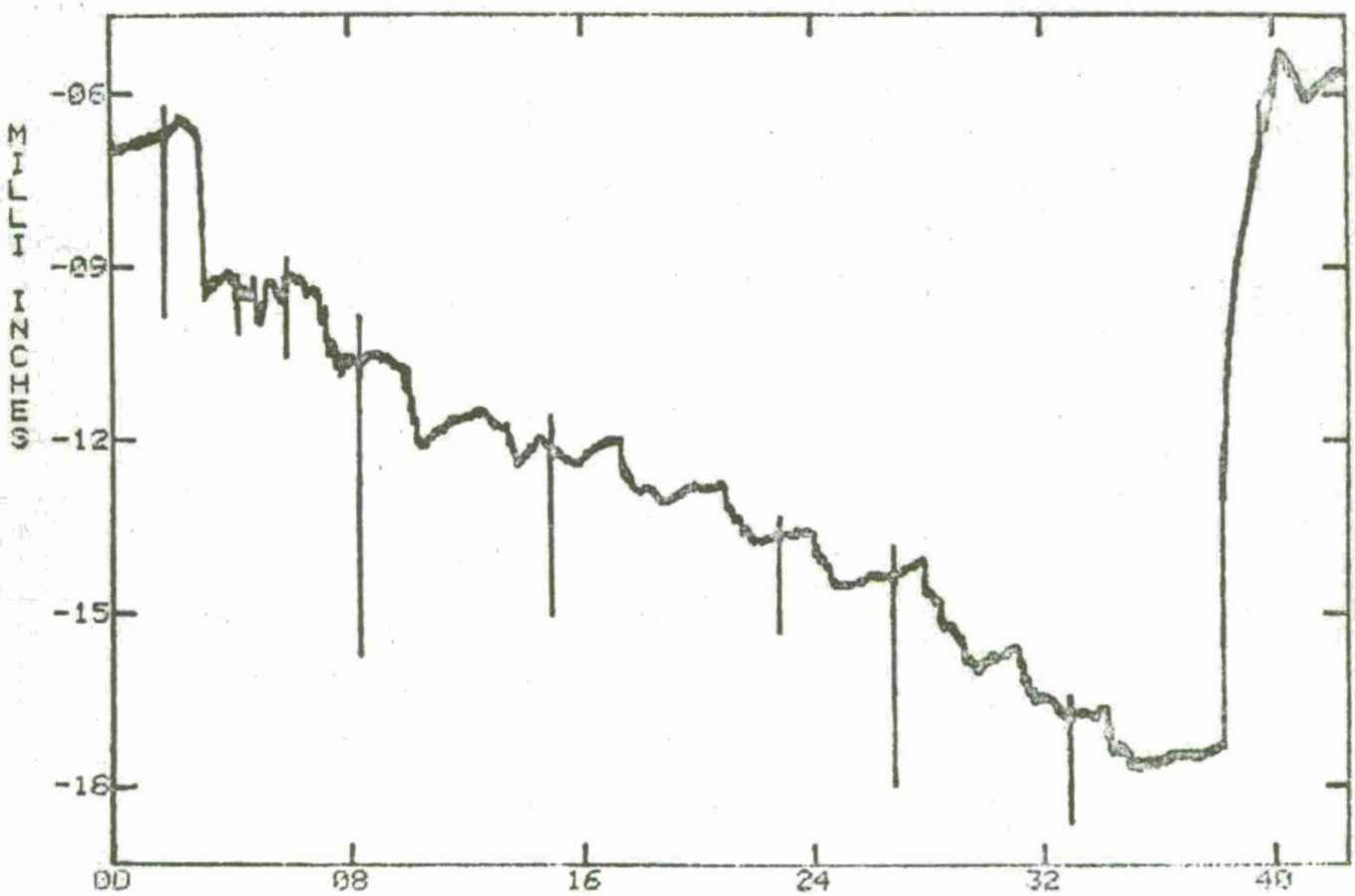
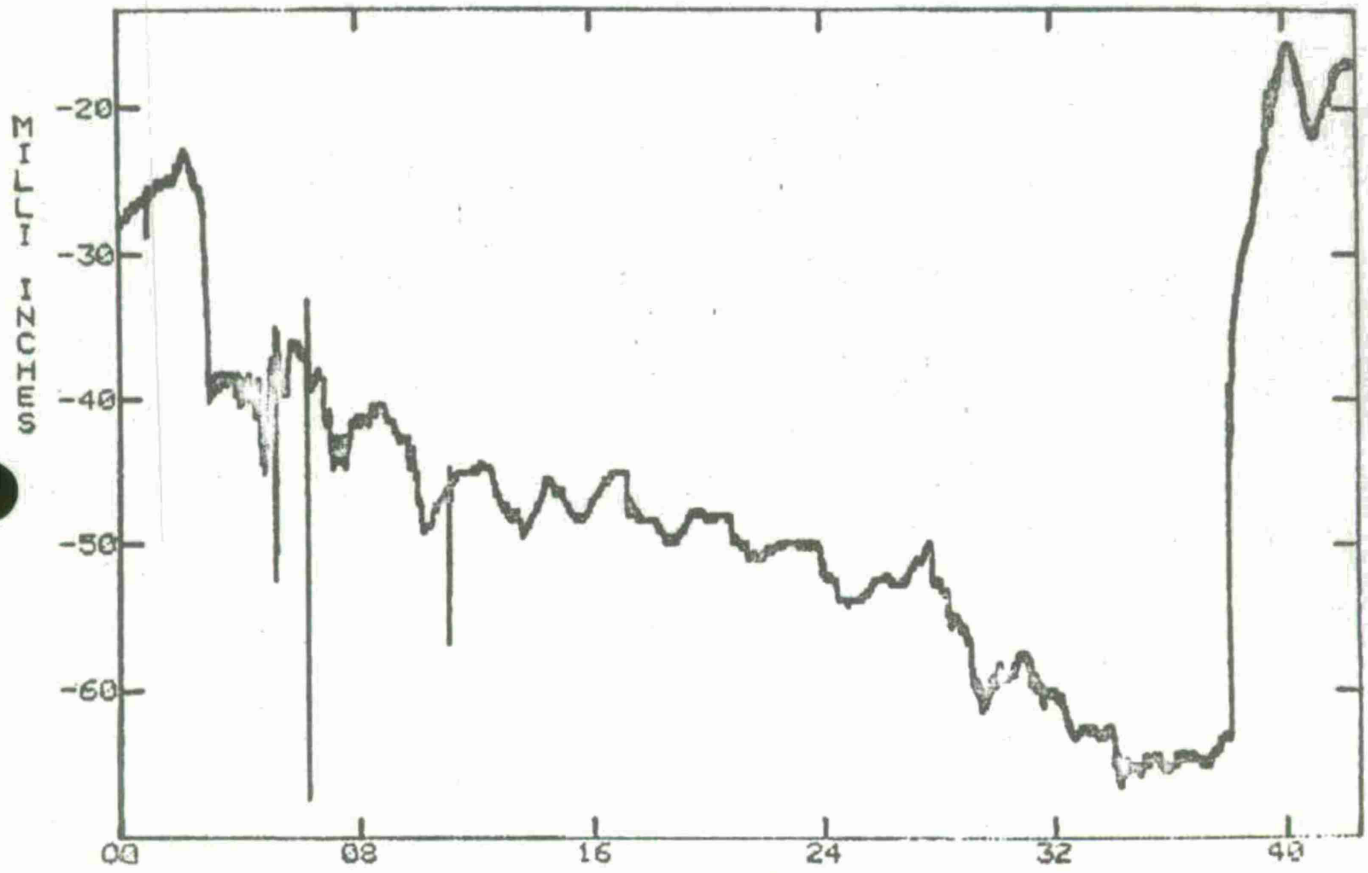
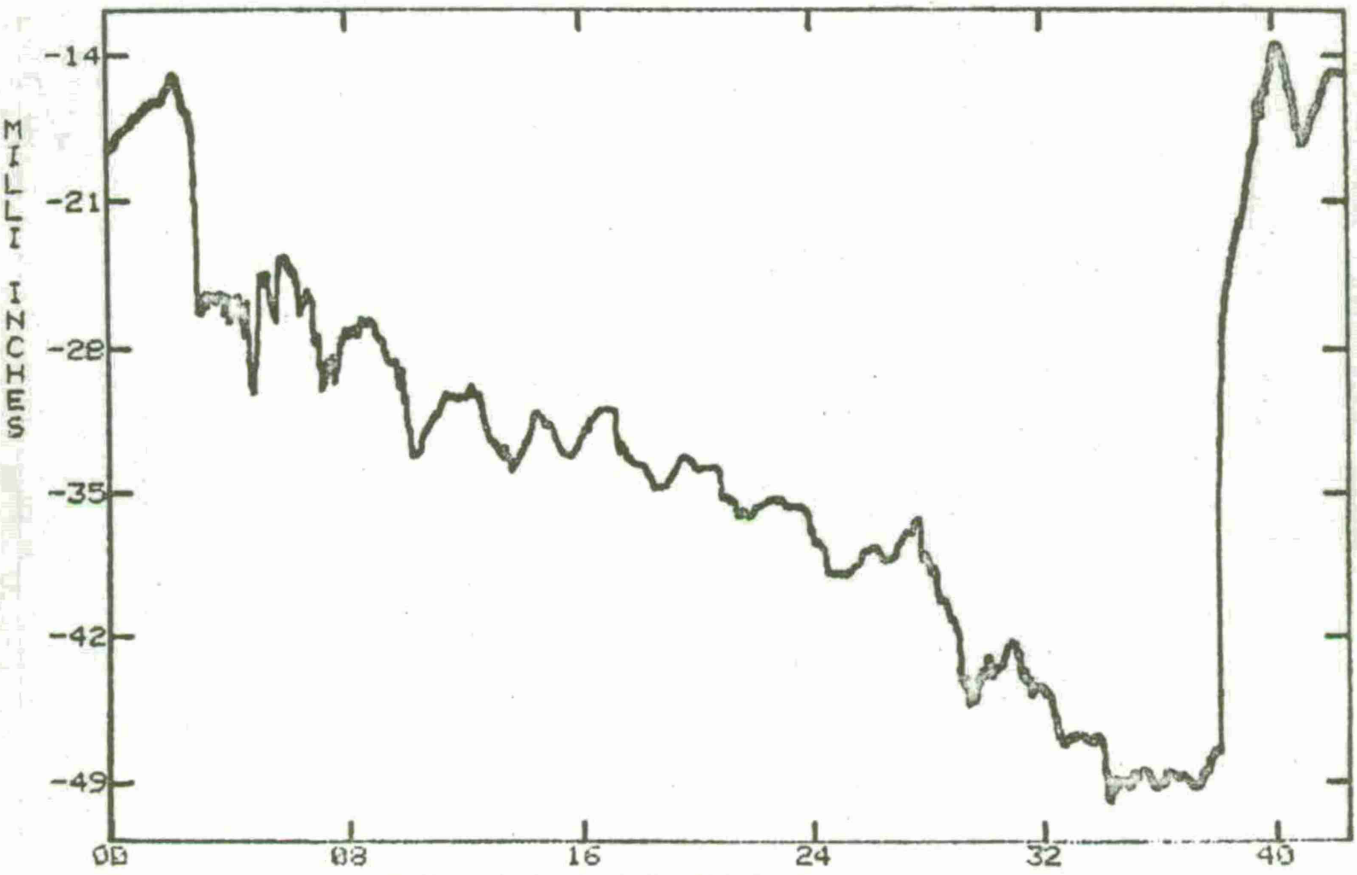
TIME IN SECONDS X 10-1
CH 6 TRSN DEFLECTION - ST. 300.42 L.H. X 10+1
TEST 21 (2JUL75) AH1G BEND TEST



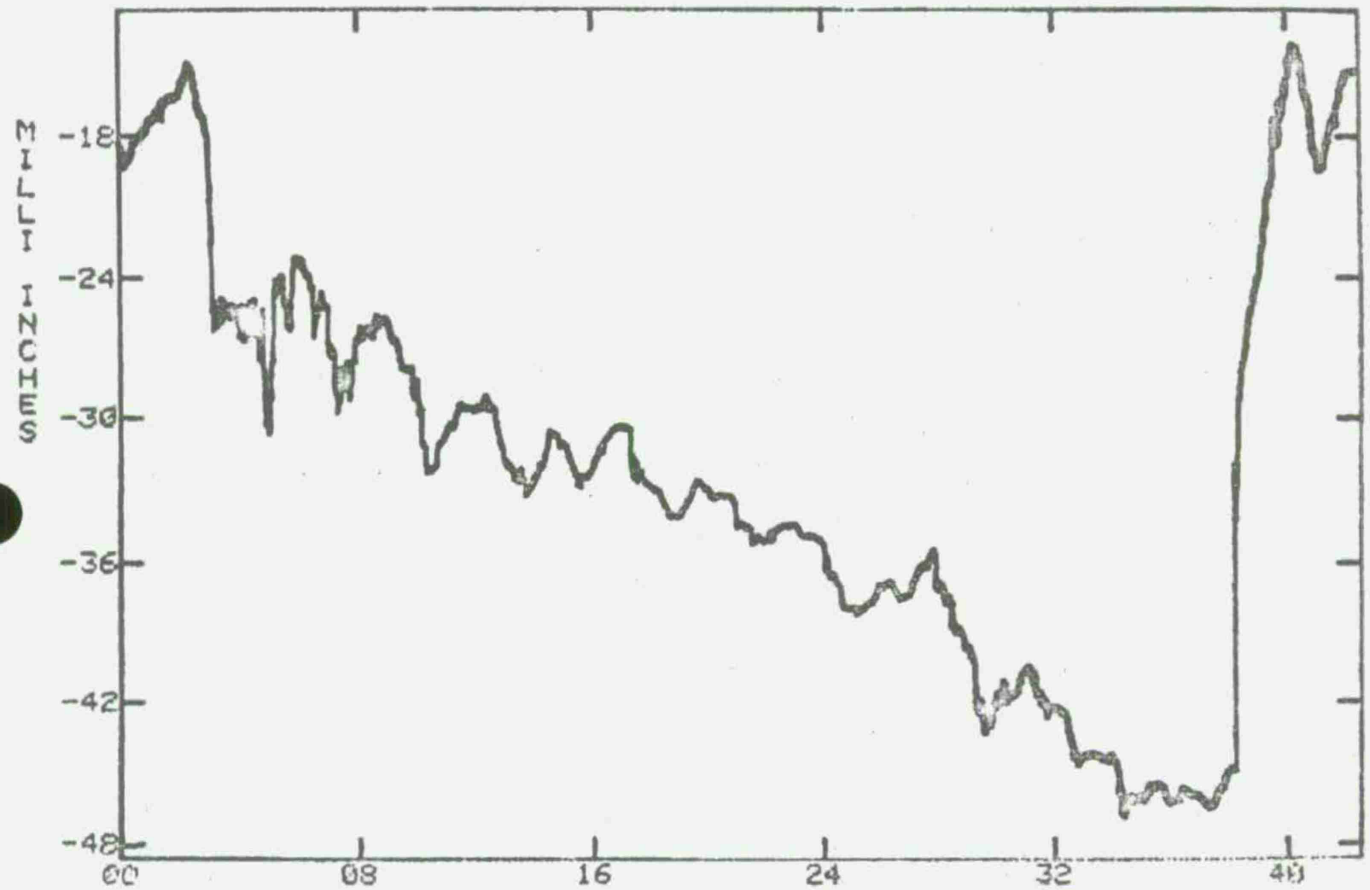
CH 7 TRSN DEFLECTION - ST. 93.00 R.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



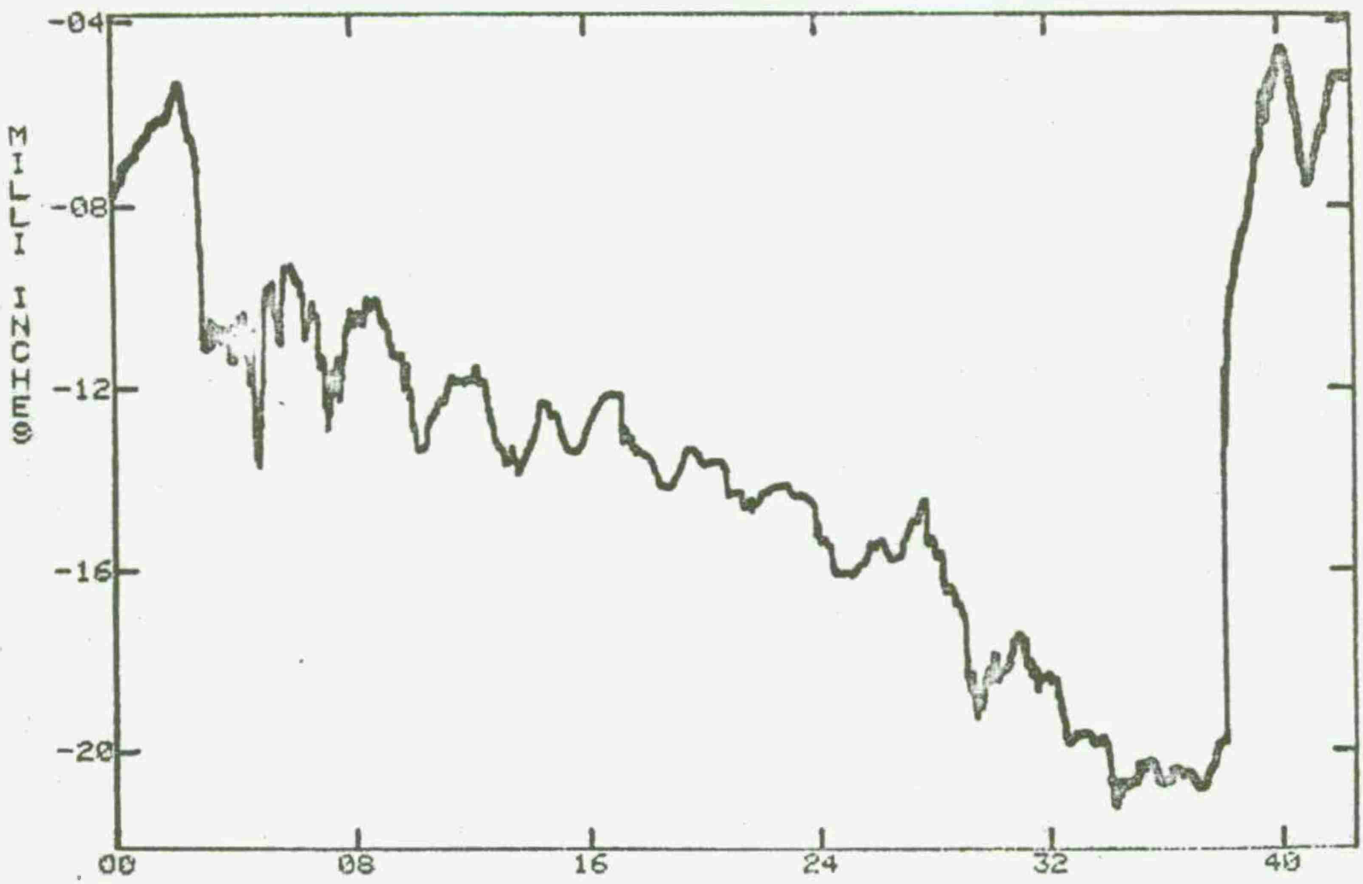
CH 8 . TRSN DEFLECTION - ST. 138.70 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 9 TRSN DEFLECTION - ST. 148.50 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



TIME IN SECONDS X 10-1
CH 10 TRSN DEFLECTION - ST 186.25 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST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MILLI INCHES
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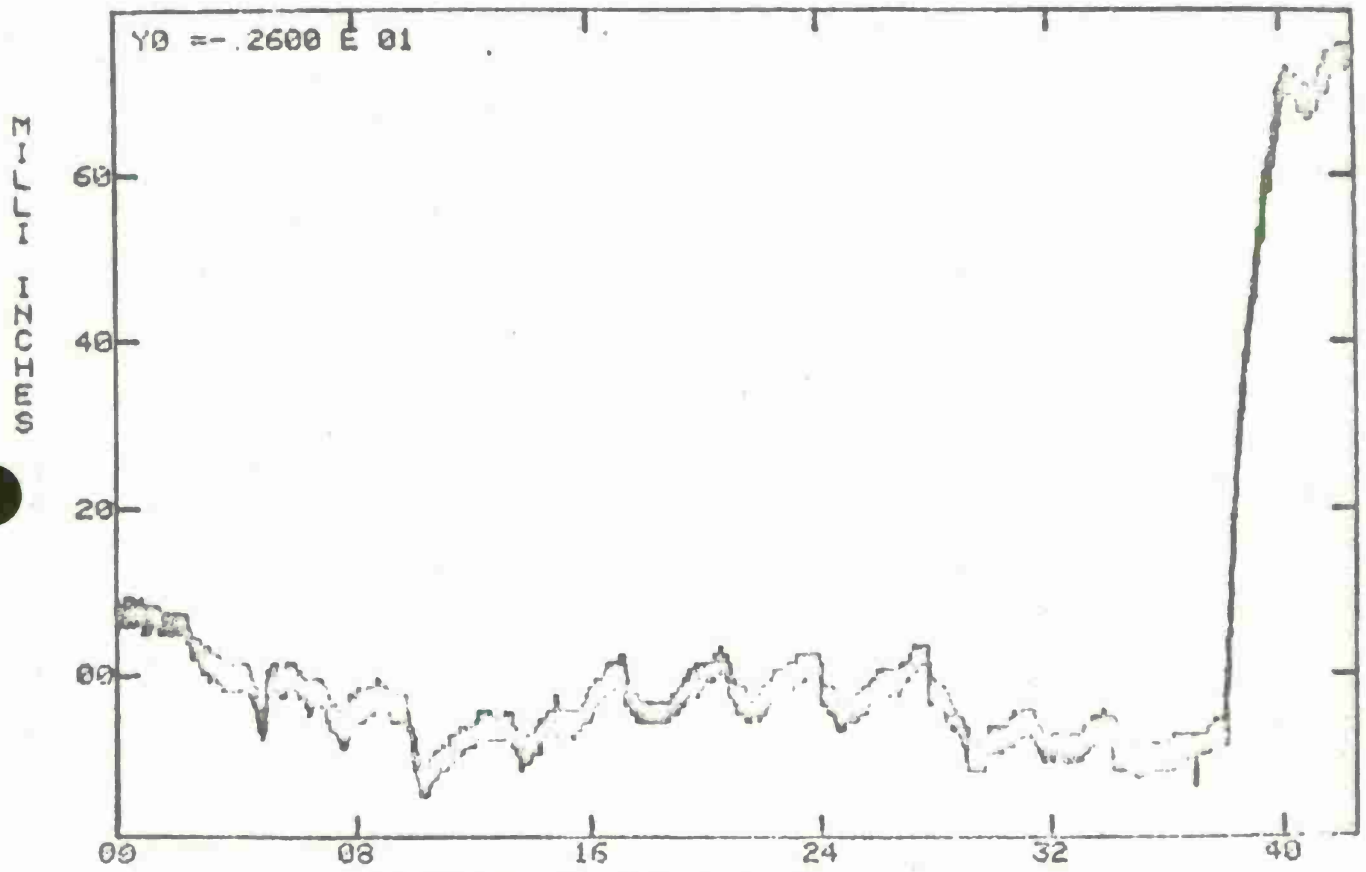
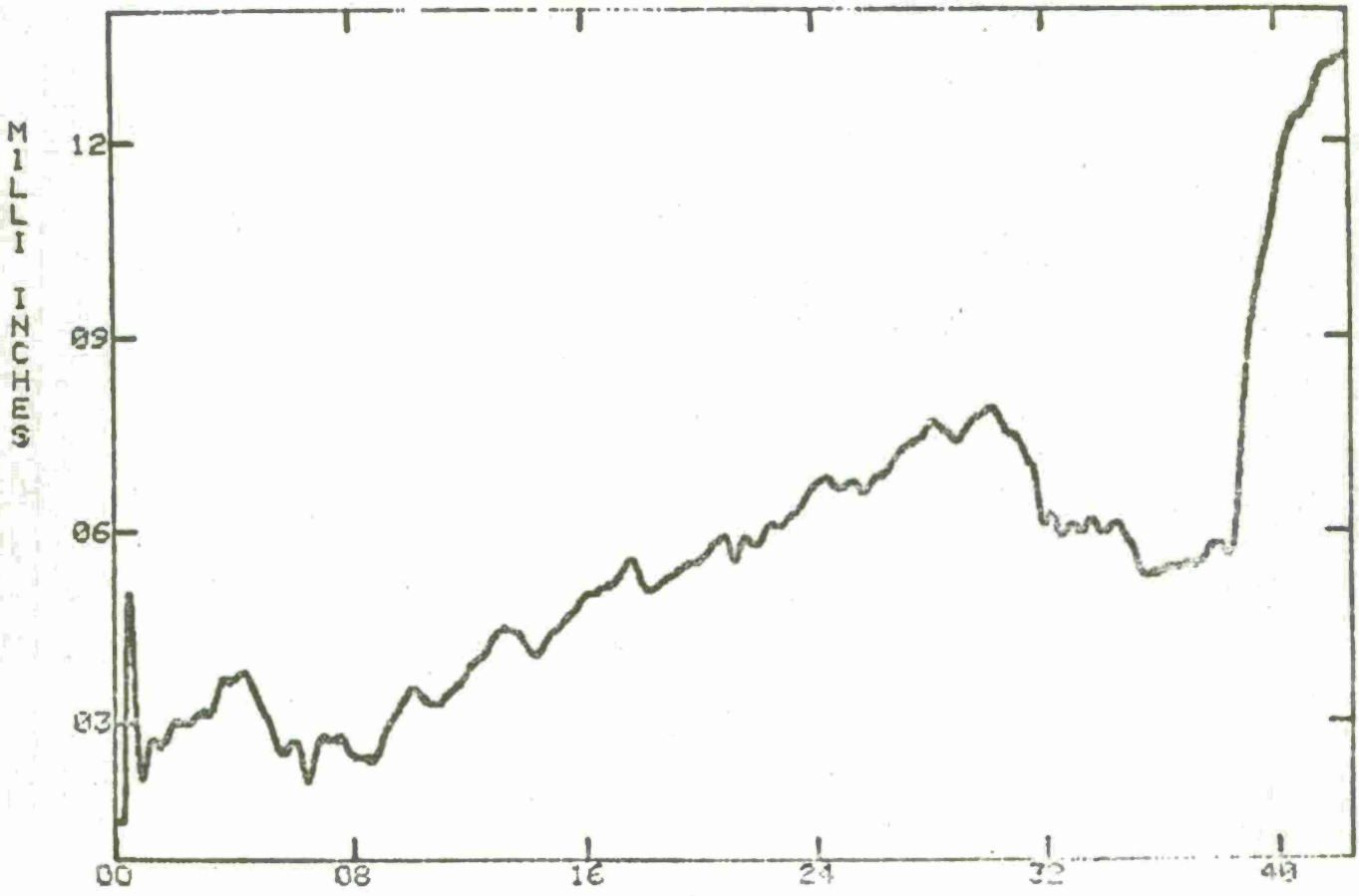
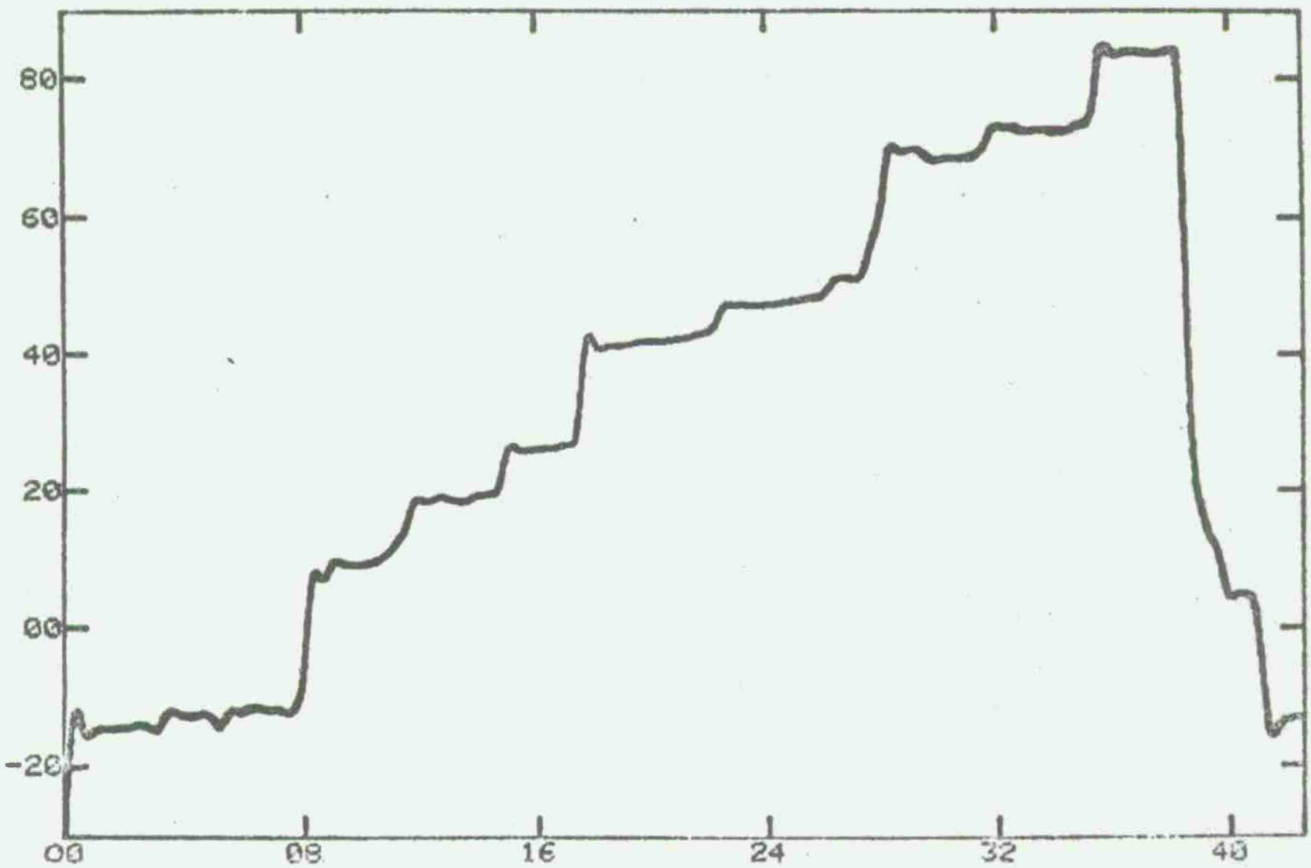
TIME IN SECONDS X 10-1
CH 11 TRSN DEFLECTION - ST 213.90 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



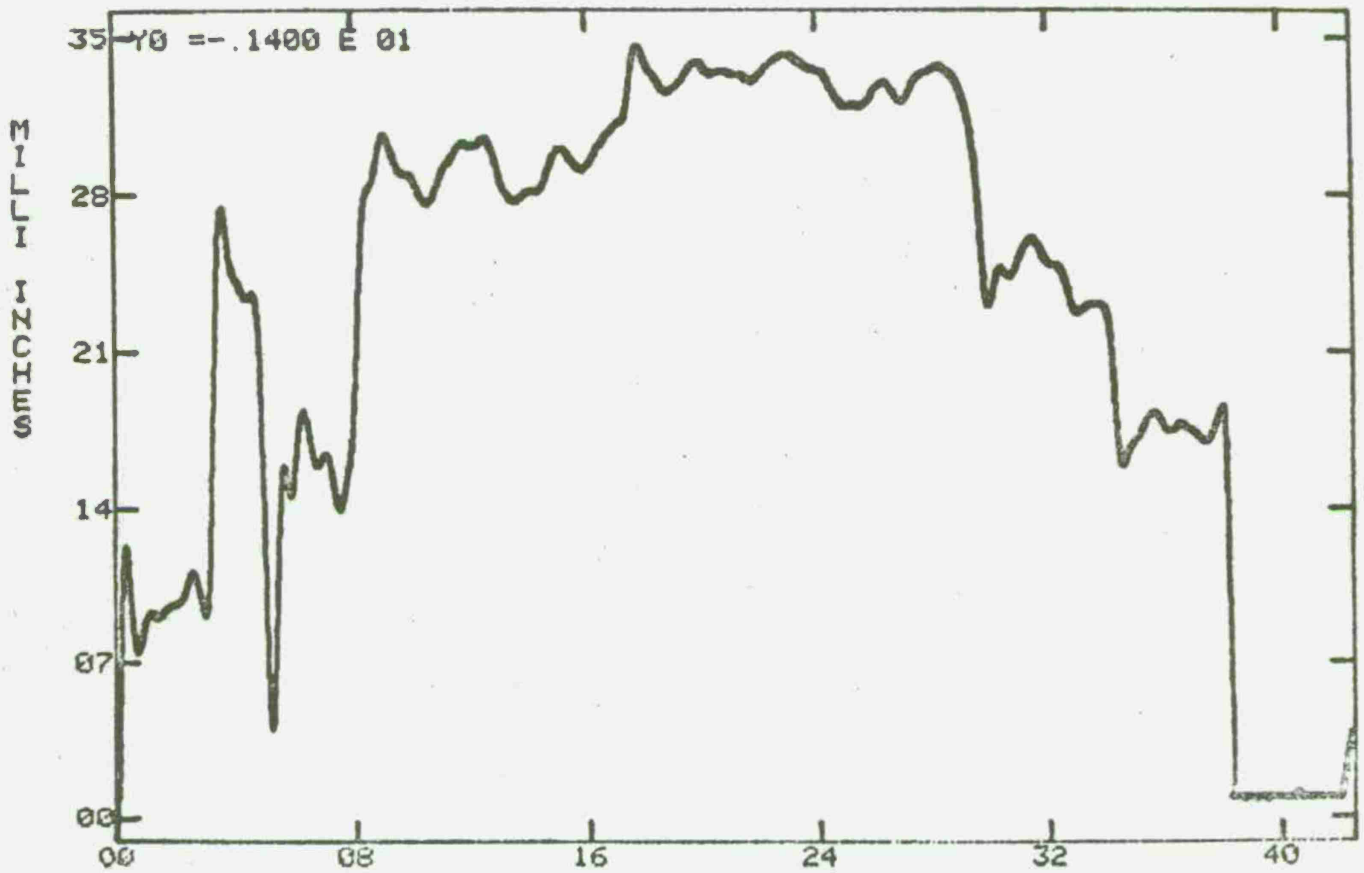
CH 12 TRSN DEFLECTION - ST. 300.42 R.H. X 10+2
TEST 21 (2JUL75) AH1G BEND TEST.



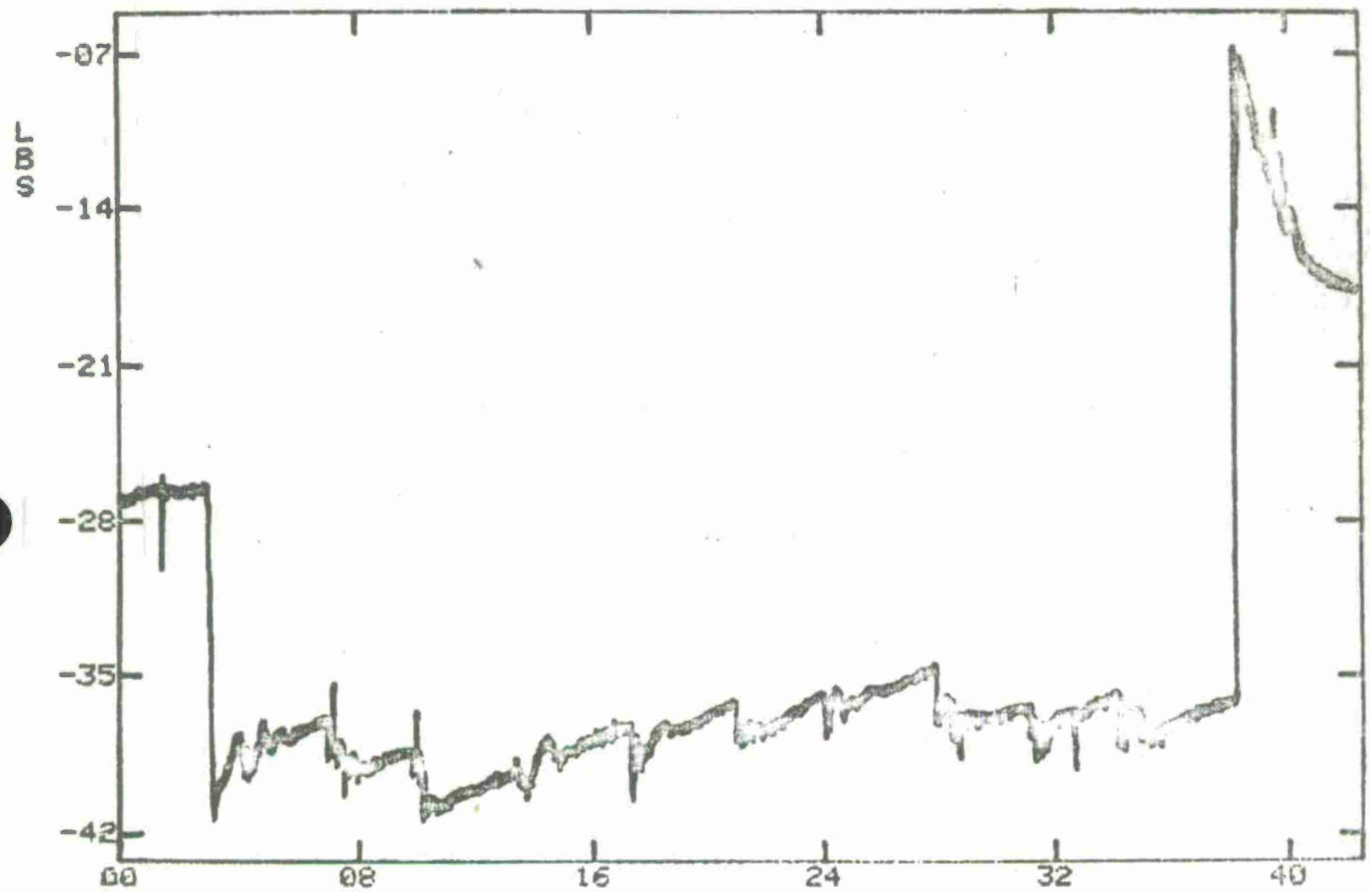
TIME IN SECONDS X 10-1
CH 13 BASE ROTATION - UPPER L.H. X 10+2
TEST 21 (2JUL75) AH1G BEND TEST



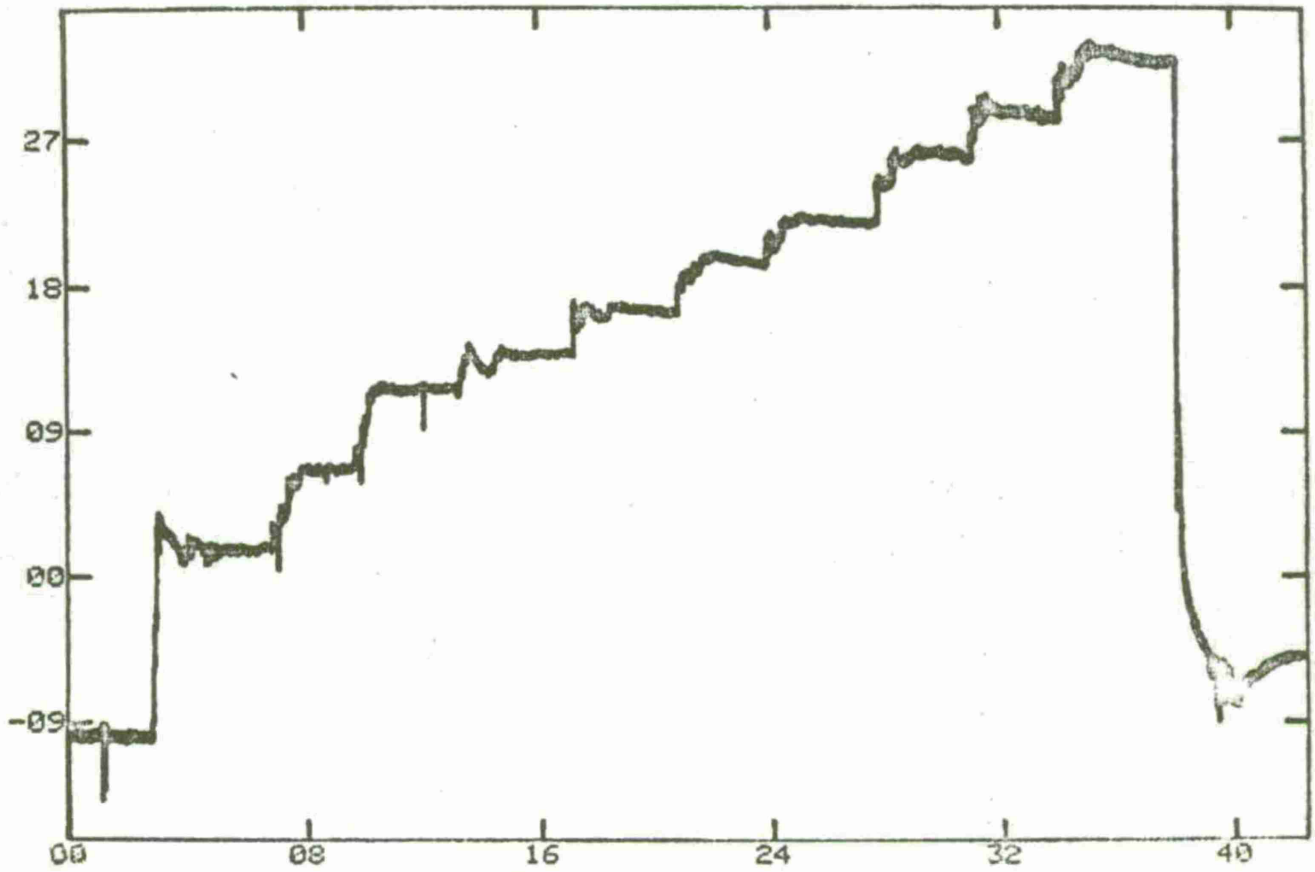
CH 14 BASE ROTATION - LOWER L.H. X 10+2
TEST 21 (2JUL75) AH1G BEND TEST



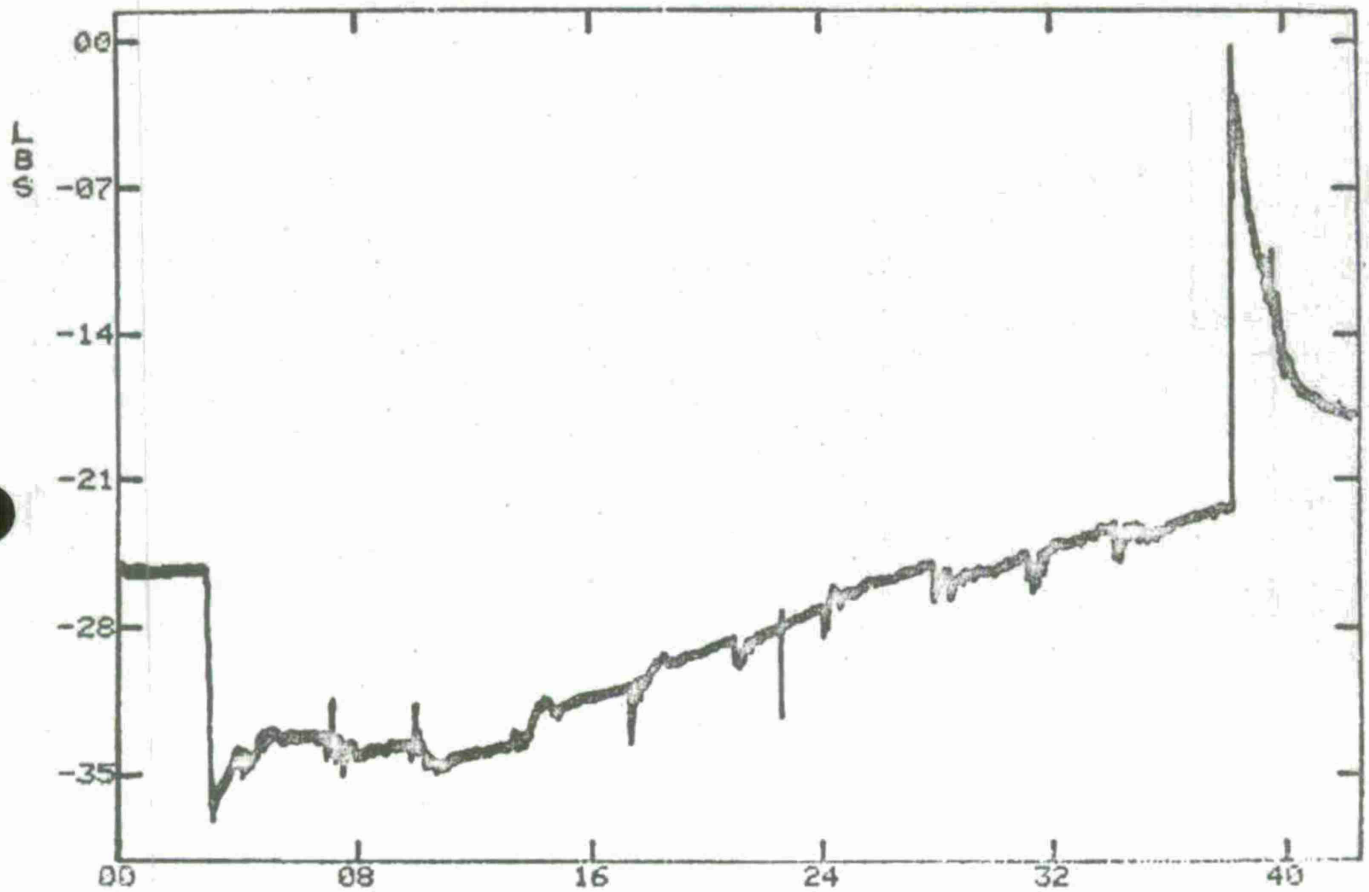
CH 17 BASE ROTATION - LOWER R.H. X 10+2
TEST 21 (2JUL75) AH1G BEND TEST



CH 18 LOAD - UPPER L.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



CH 19 LOAD - LOWER L.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST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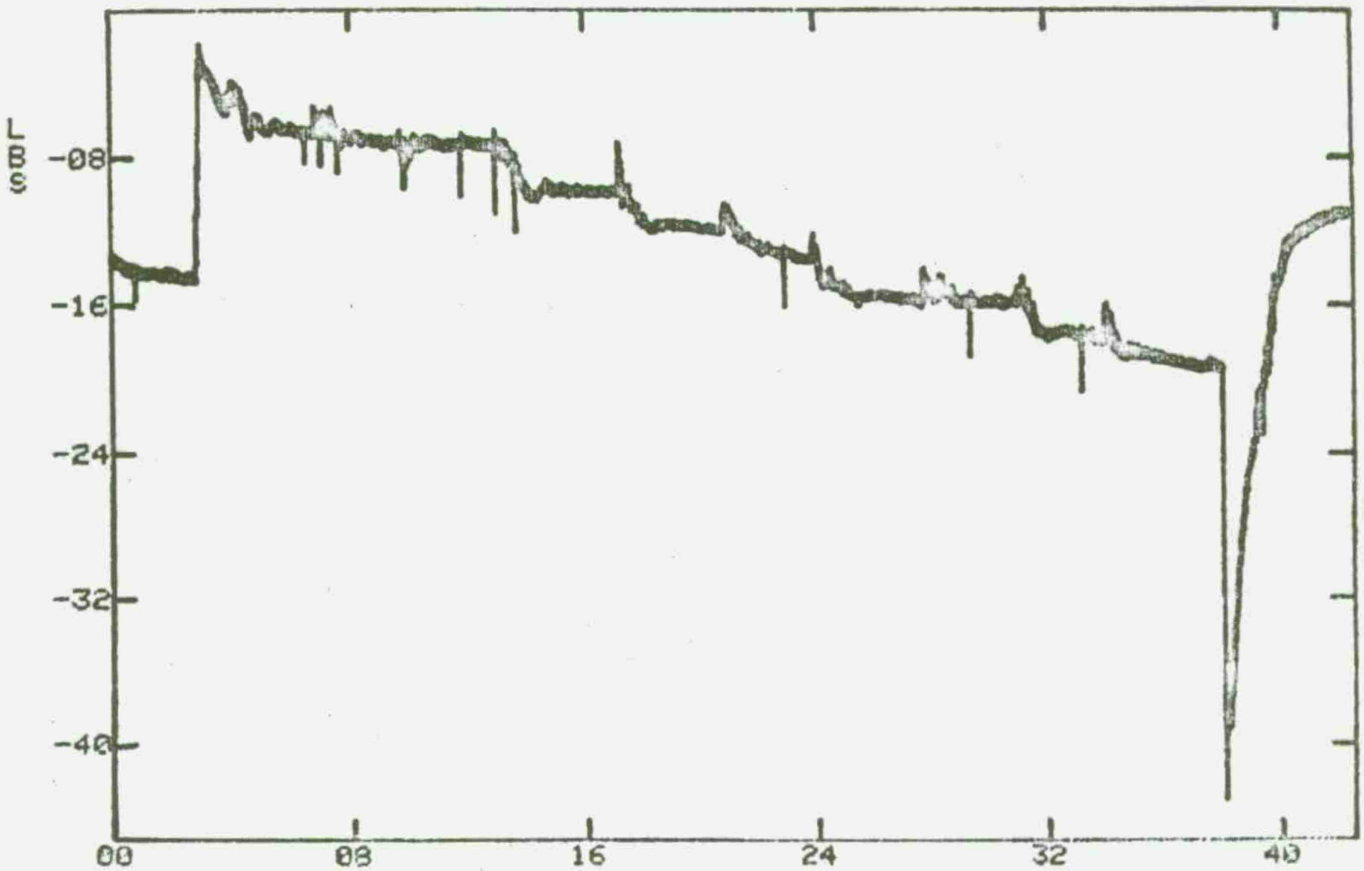
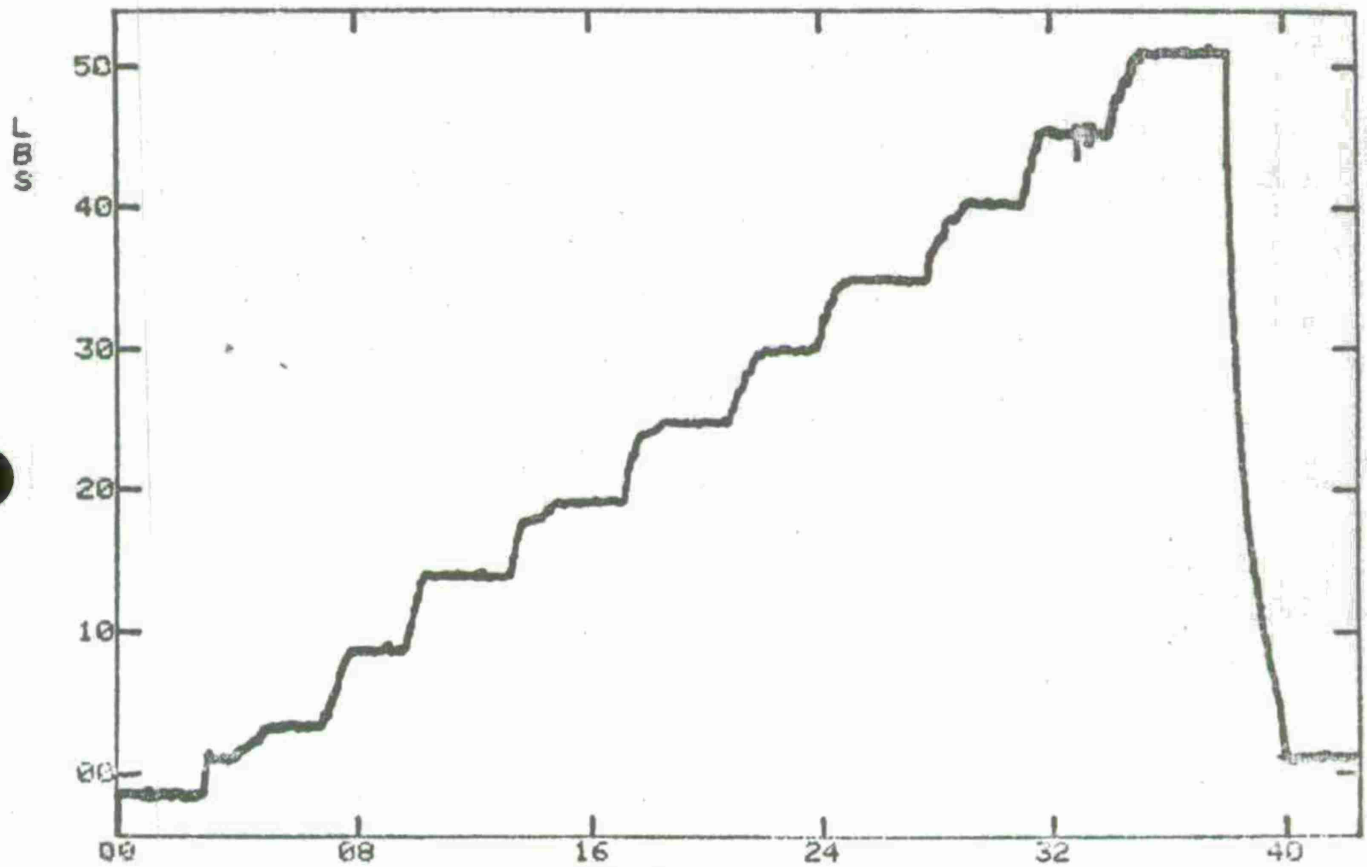
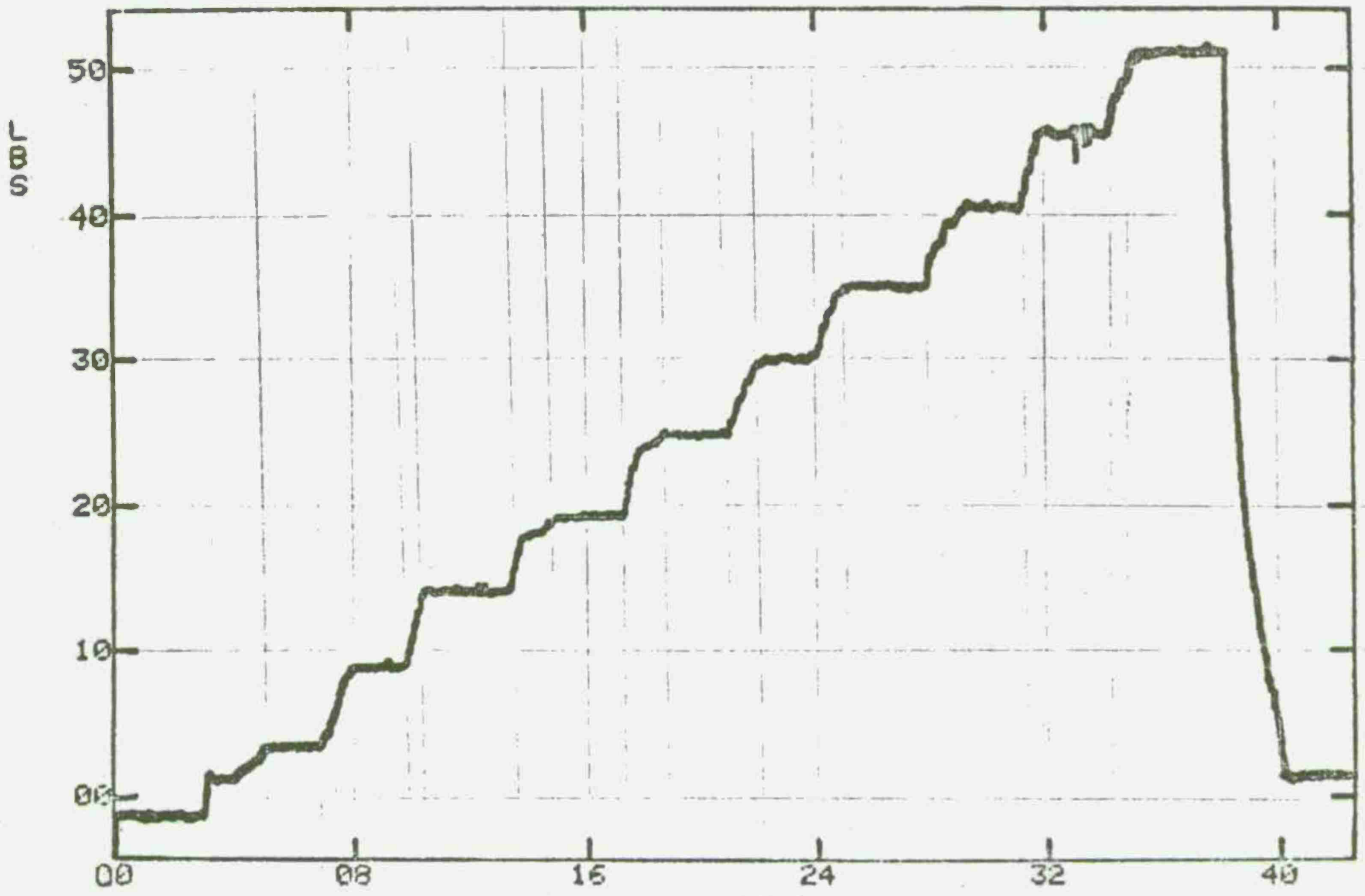
TIME IN SECONDS X 10-1
CH 20 LOAD - UPPER R.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



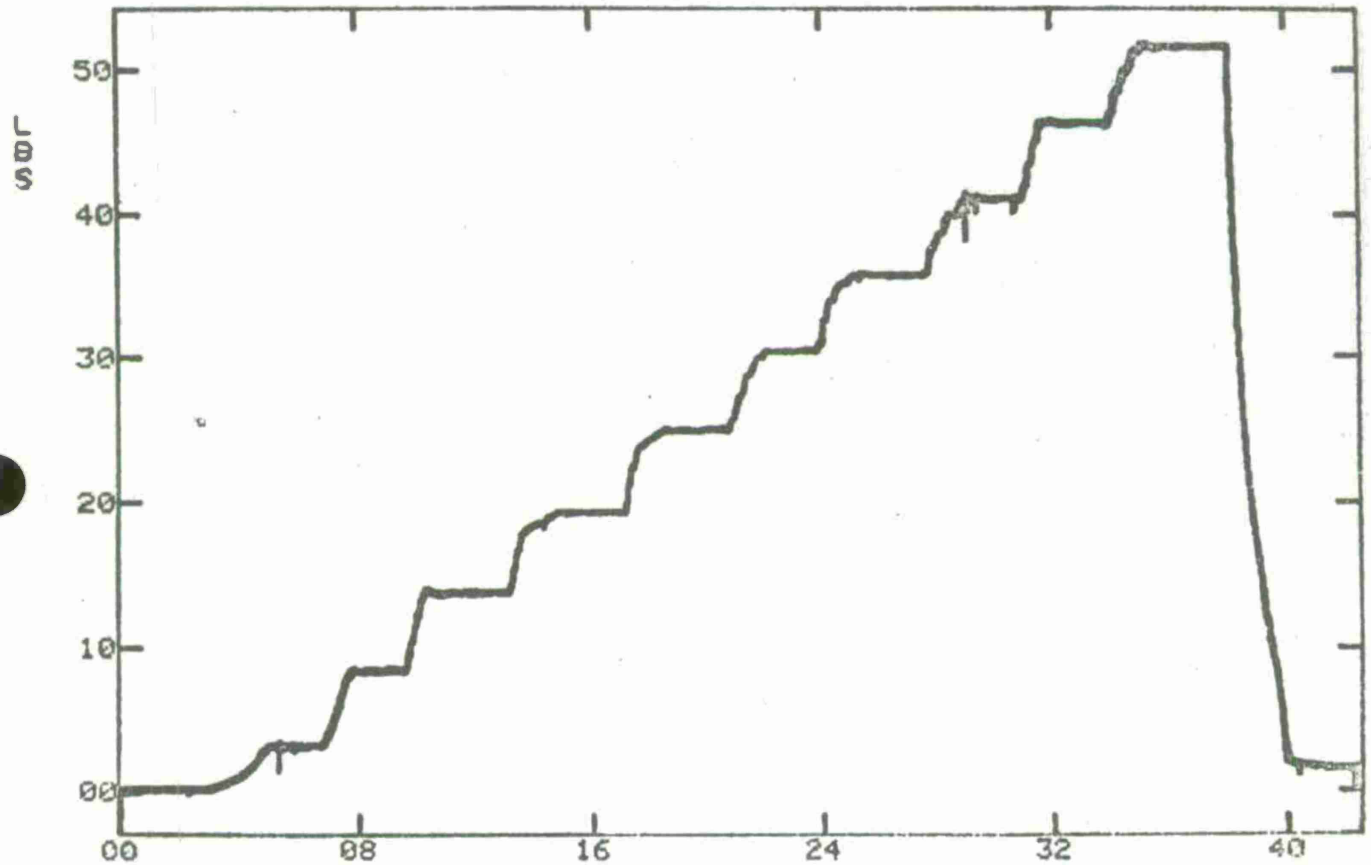
CH 21 LOAD - LOWER R.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



CH 22 LOAD APPLIED - R.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



CH 22 LOAD APPLIED - R.H. (CHS 1,3,4,6,7,10.13,15,18.20) X 10 -/
TEST 21 (2JUL75) AH1G BEND TEST


50
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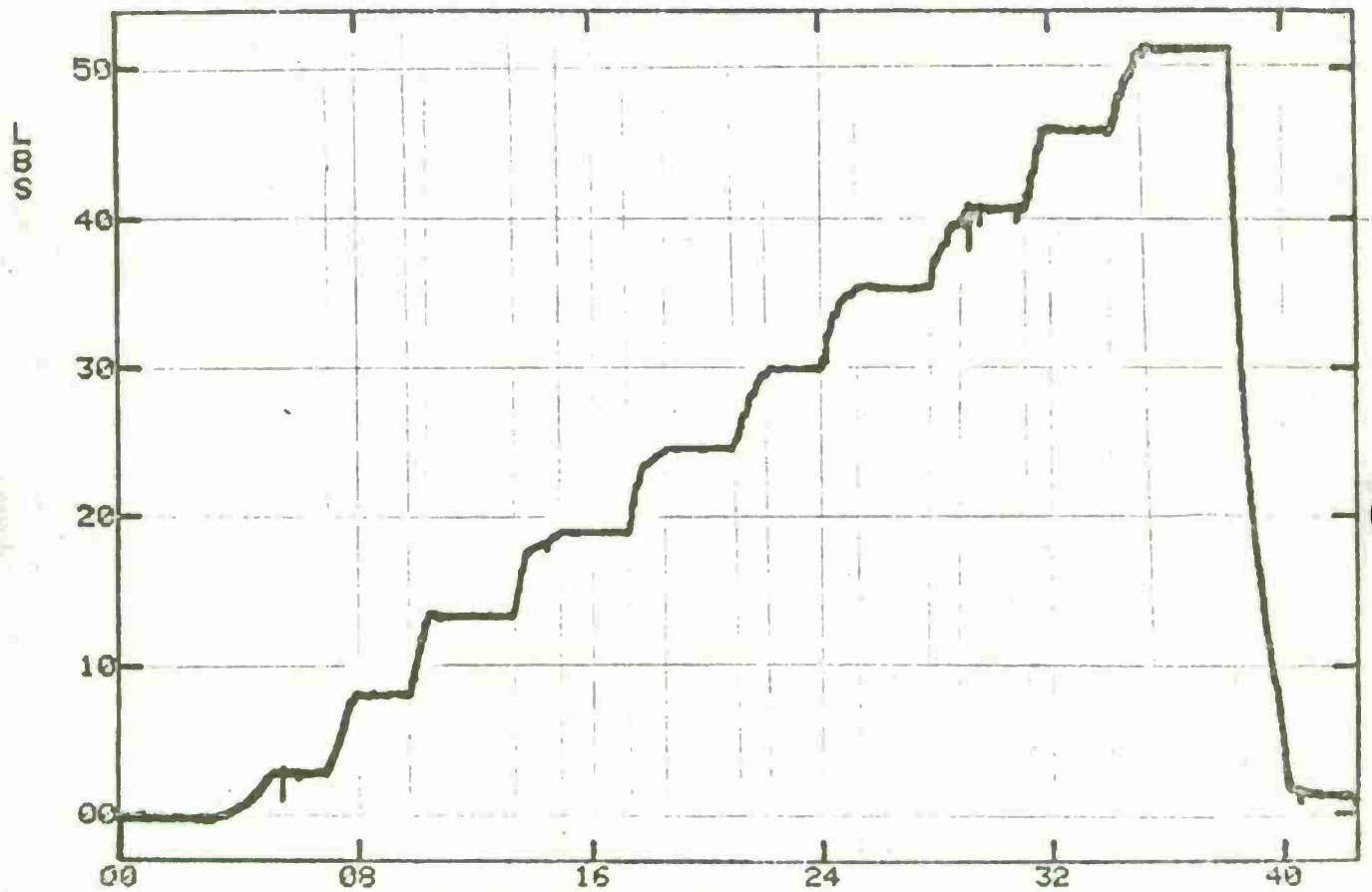
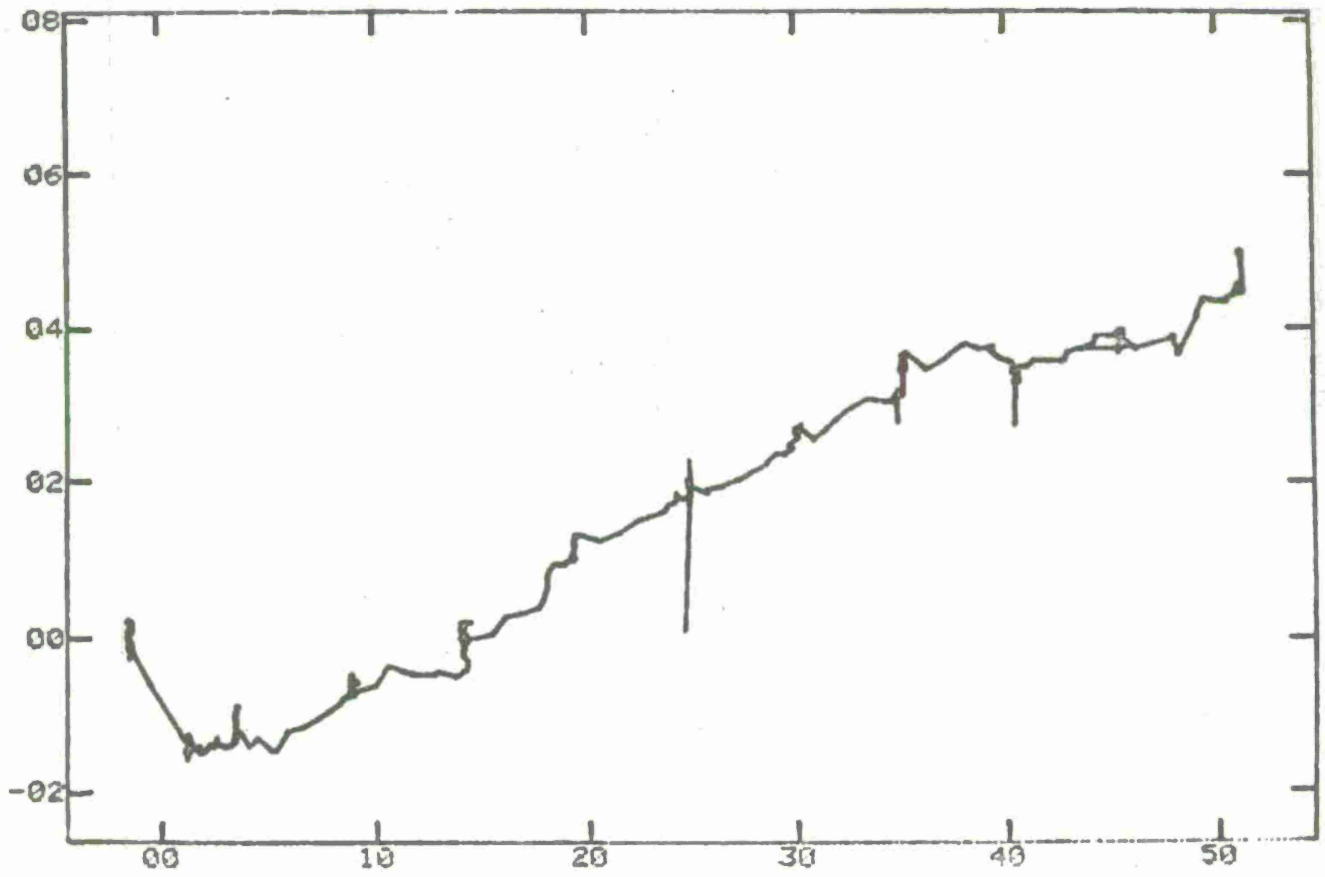
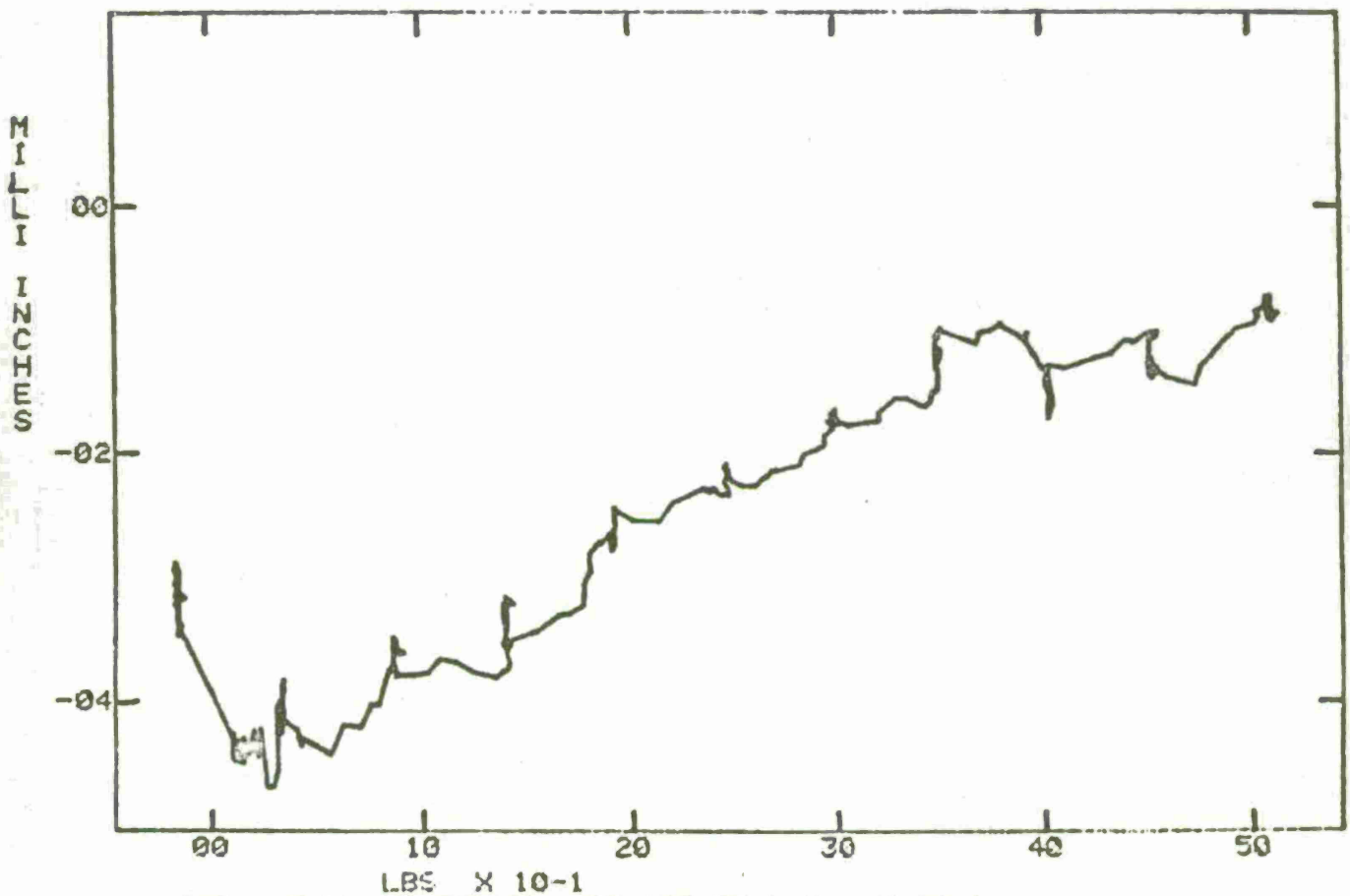
TIME IN SECONDS X 10-1
CH 23 LOAD APPLIED - L.H. (CH 2,5,8,9,11,12,14,17,19,21) X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



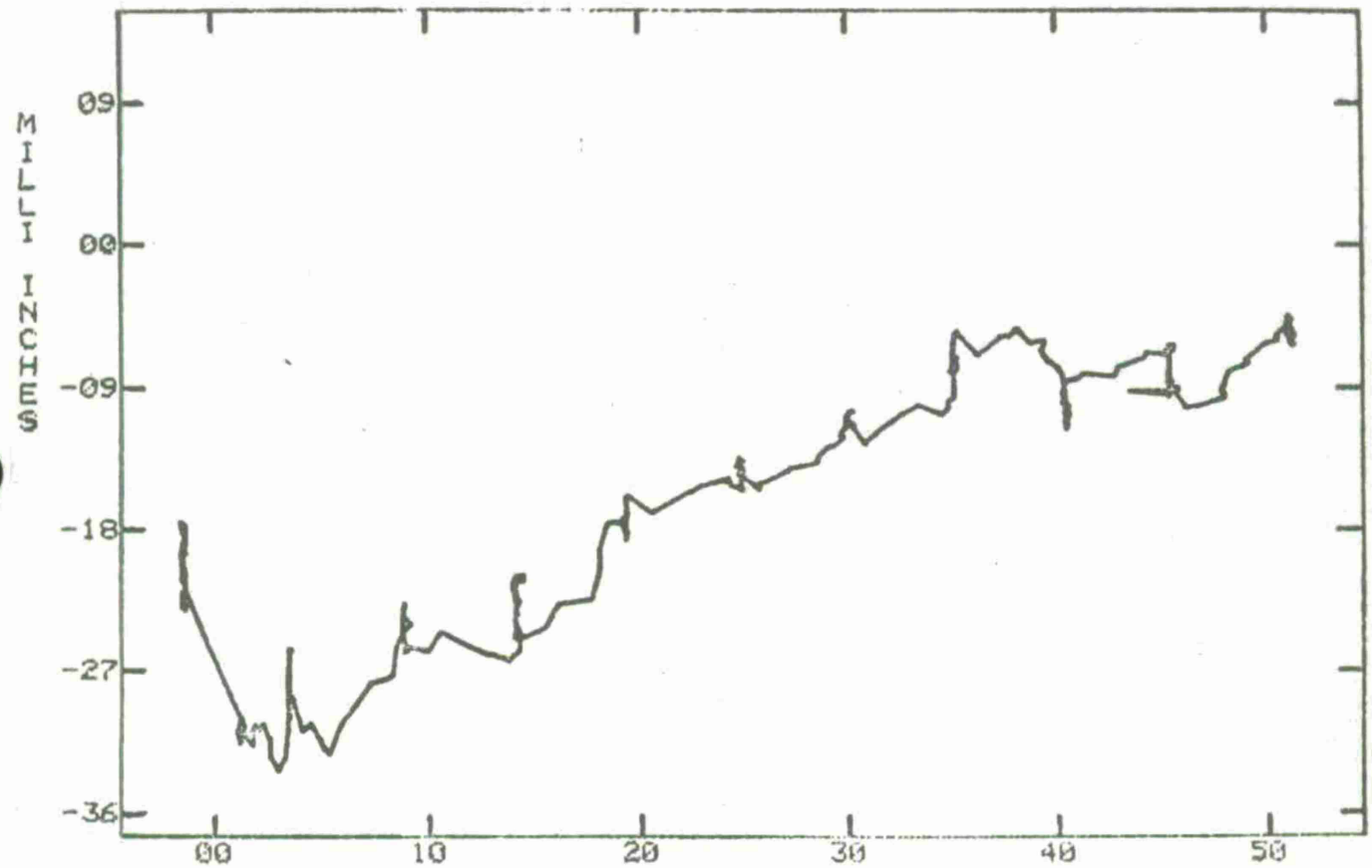
CH 23 LOAD APPLIED - L.H. (CHS 1,3,4,6,7,10,13,15,18,20) X 10
TEST 21 (2JUL75) AH1G BEND TEST



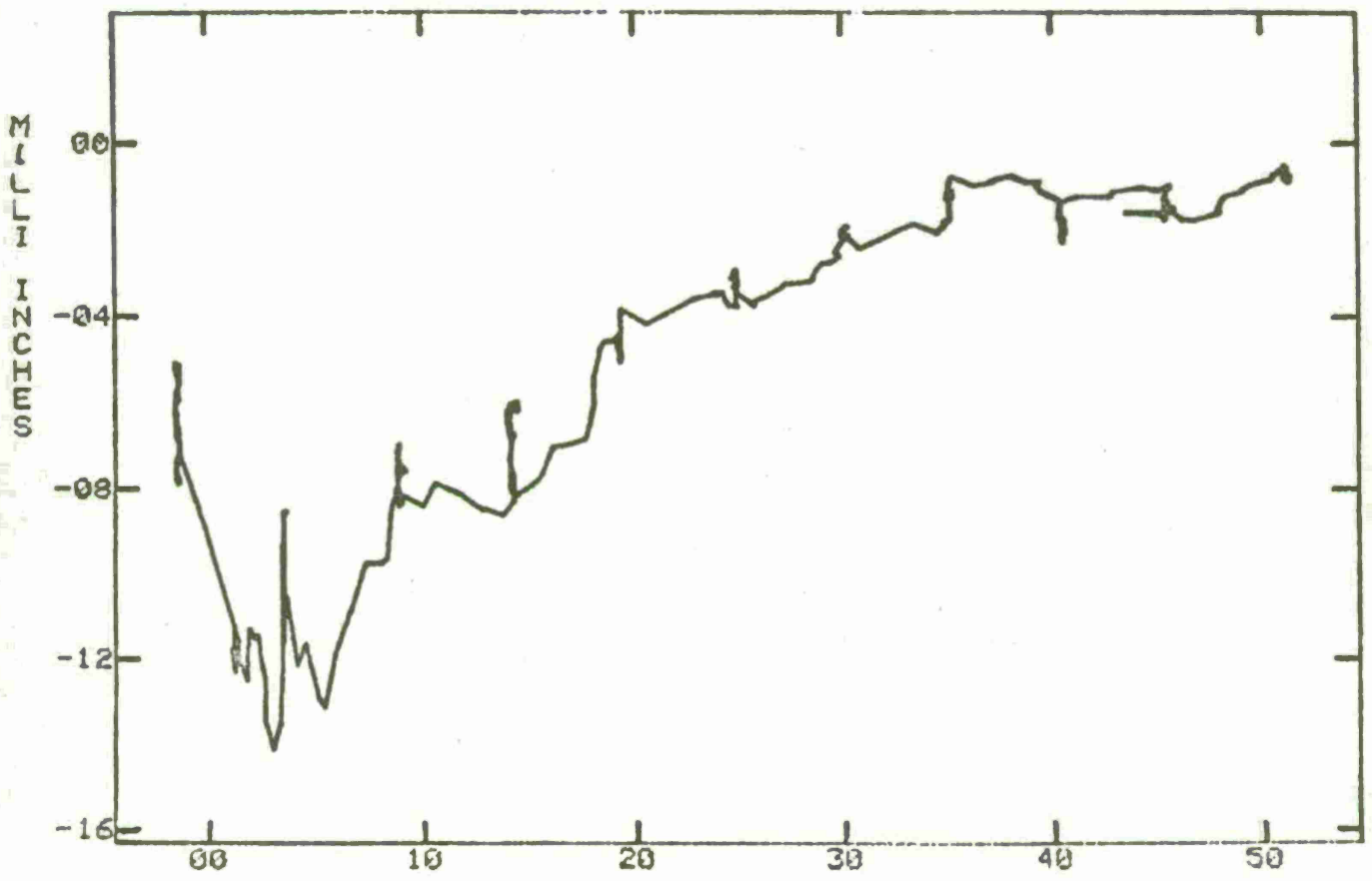
LOAD - R.H. VS DEFLN - ST 93.00 L.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



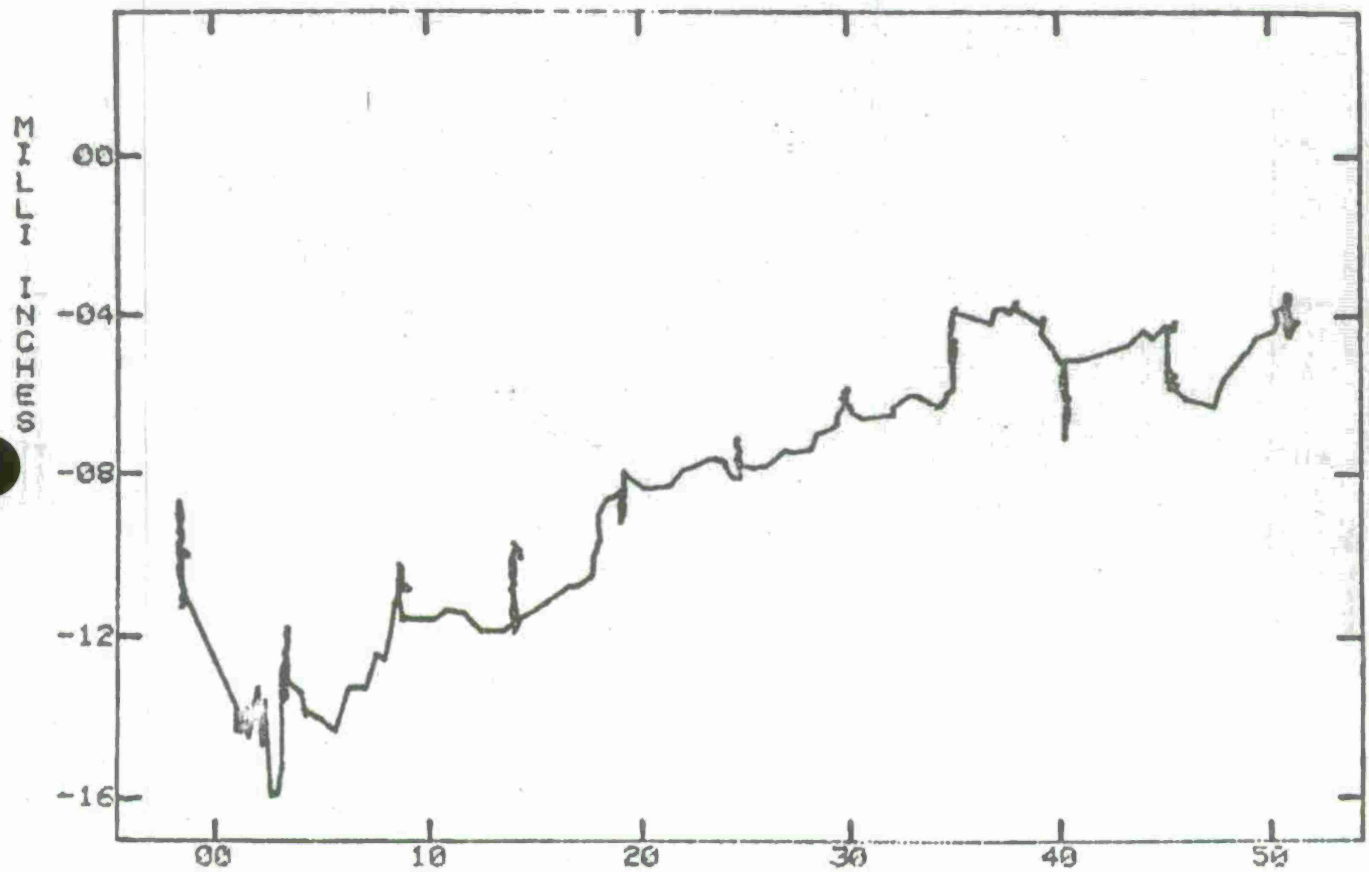
LOAD - R.H. VS DEFLN - ST 138.70 L.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST

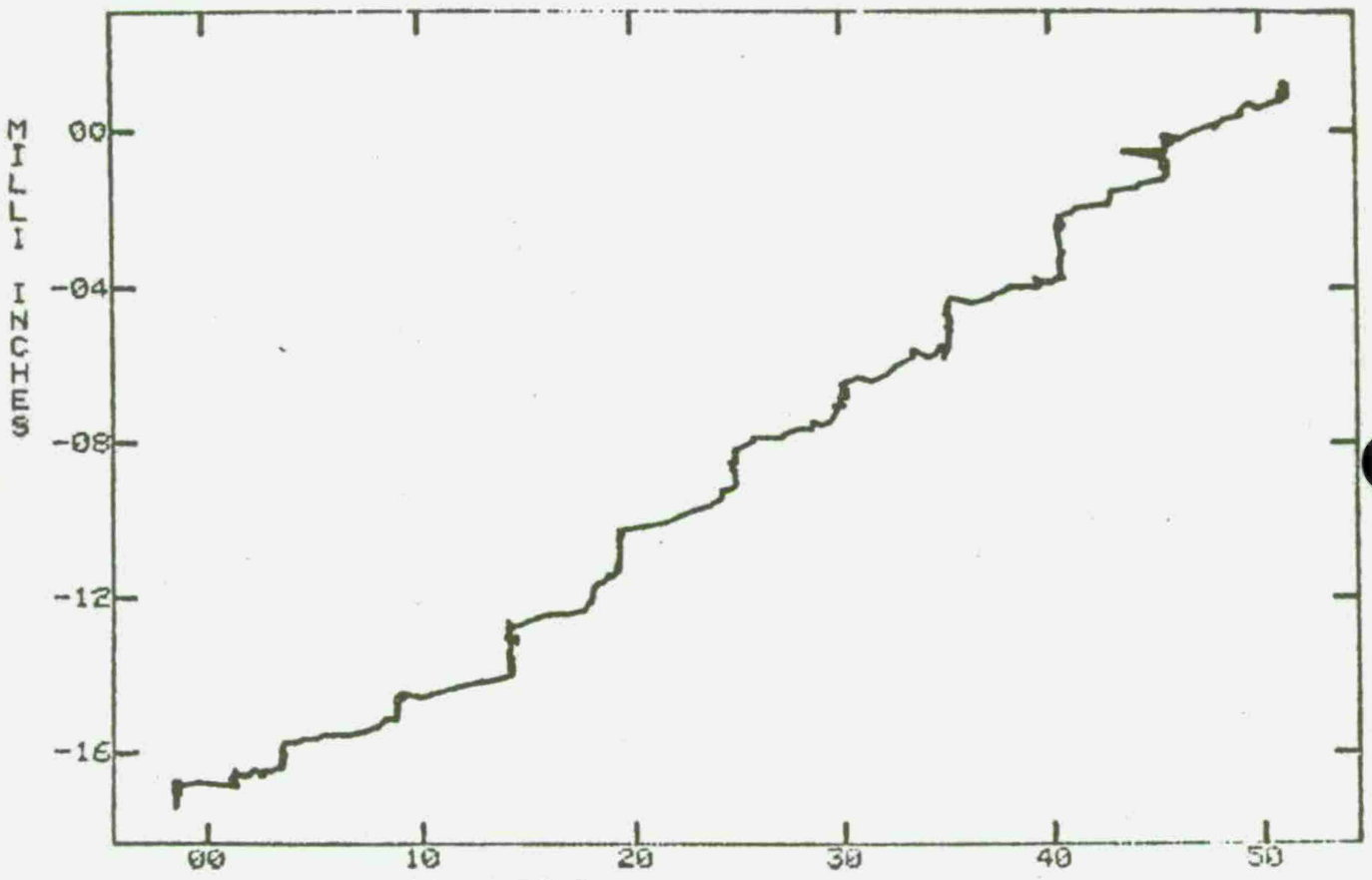


LOAD - R.H. US DEFLN - ST 148.50 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST

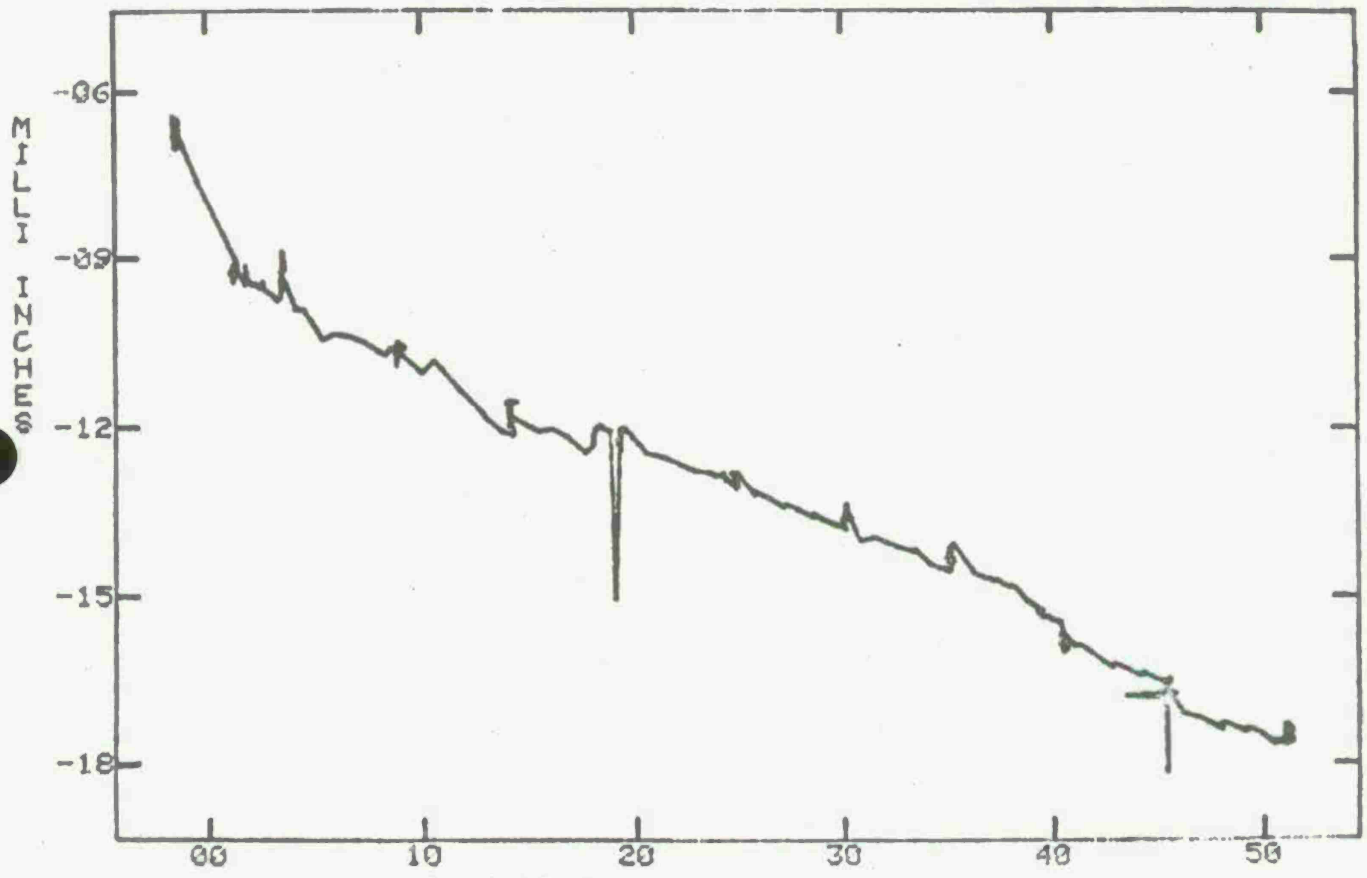


LOAD - R.H. VS DEFLN - ST 186.25 L H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST

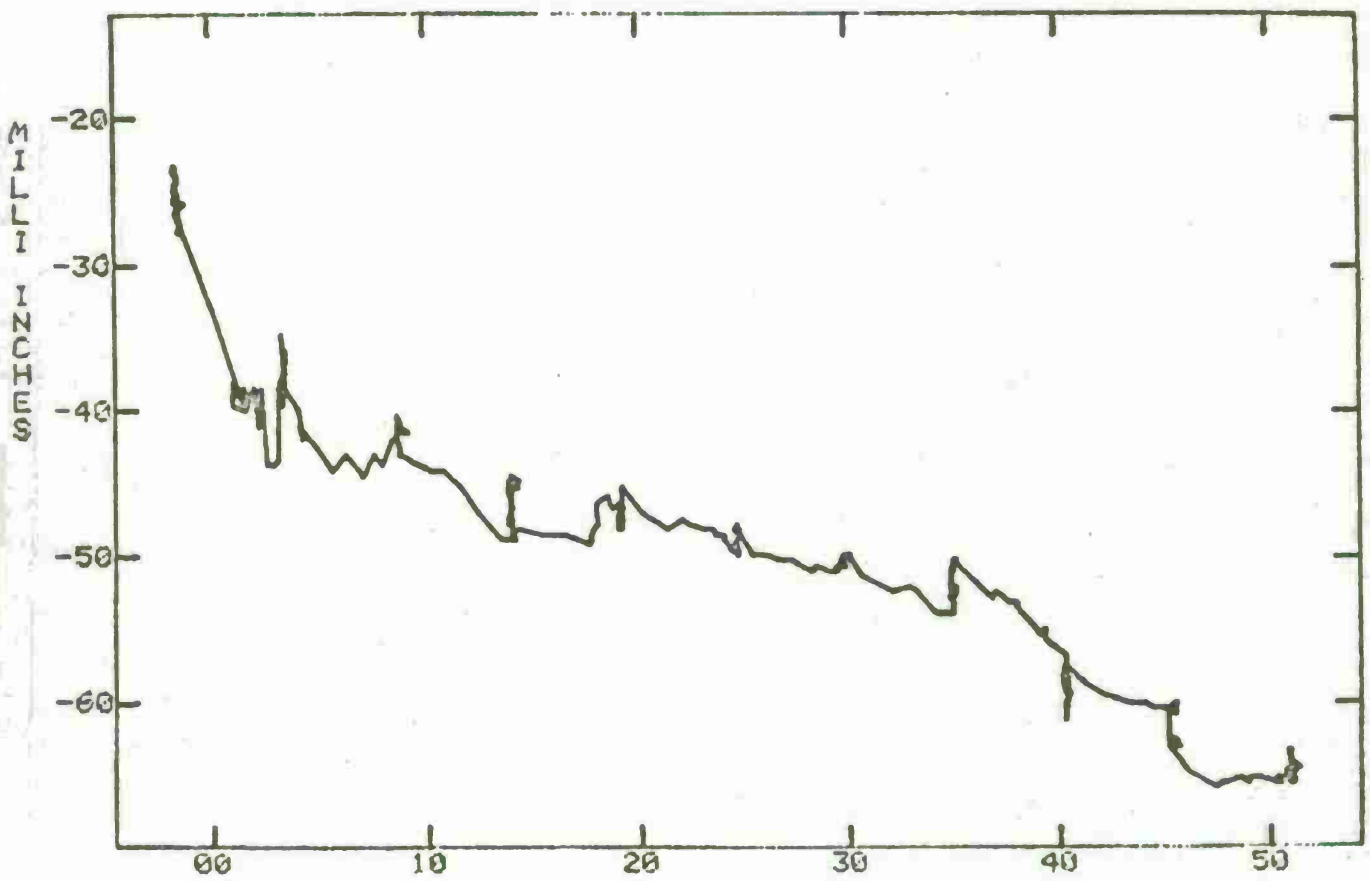

MILLI INCHES
00
-04
-08
-12
-16
00
10
20
30
40
50
LBS X 10-1
LOAD - R.H. VS DEFLN - ST 213.90 L.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



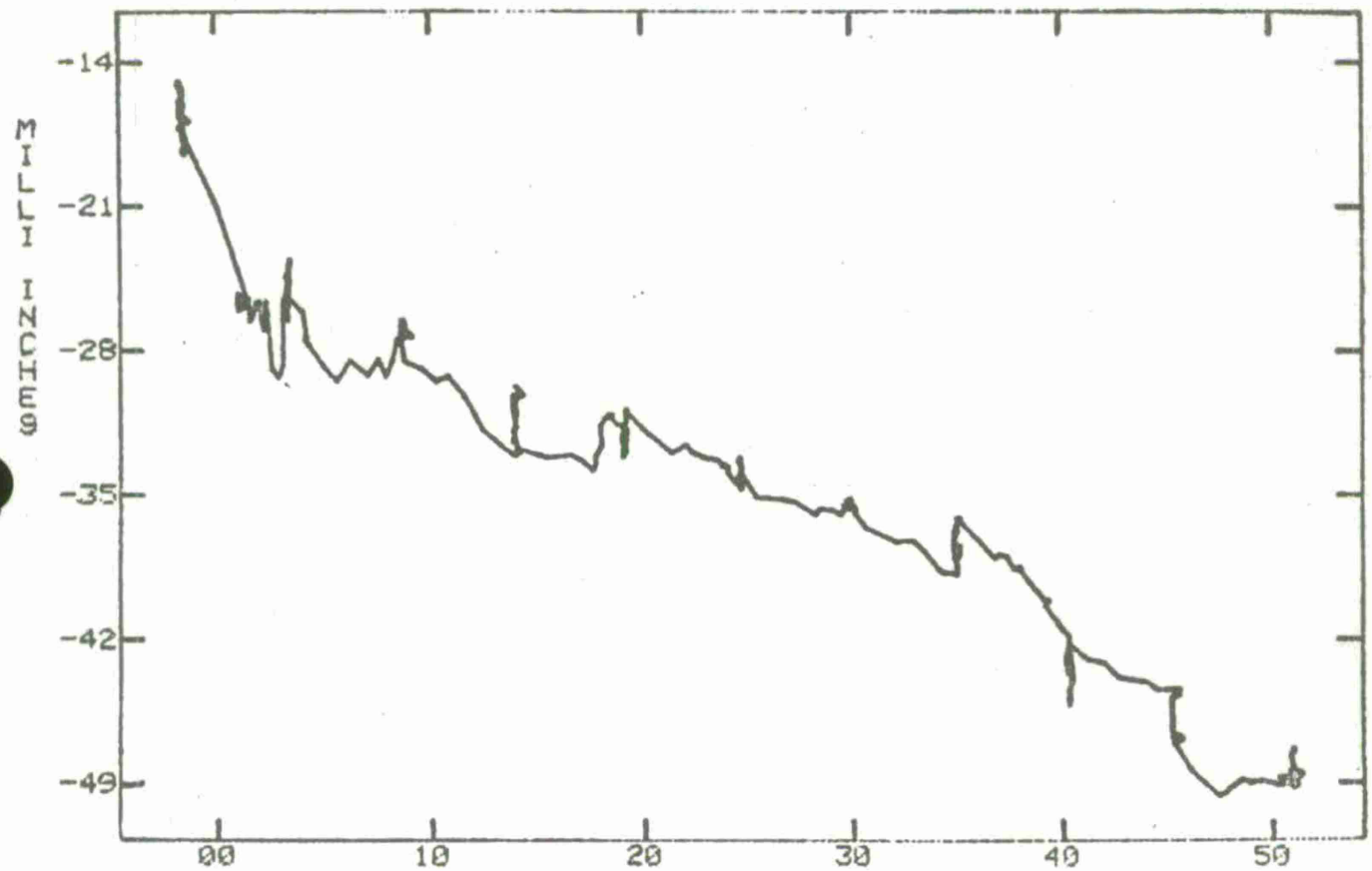
LOAD - R.H. VS DEFLN - ST 300.42 L.H. X 10+1
TEST 21 (2JUL75) AH1G BEND TEST



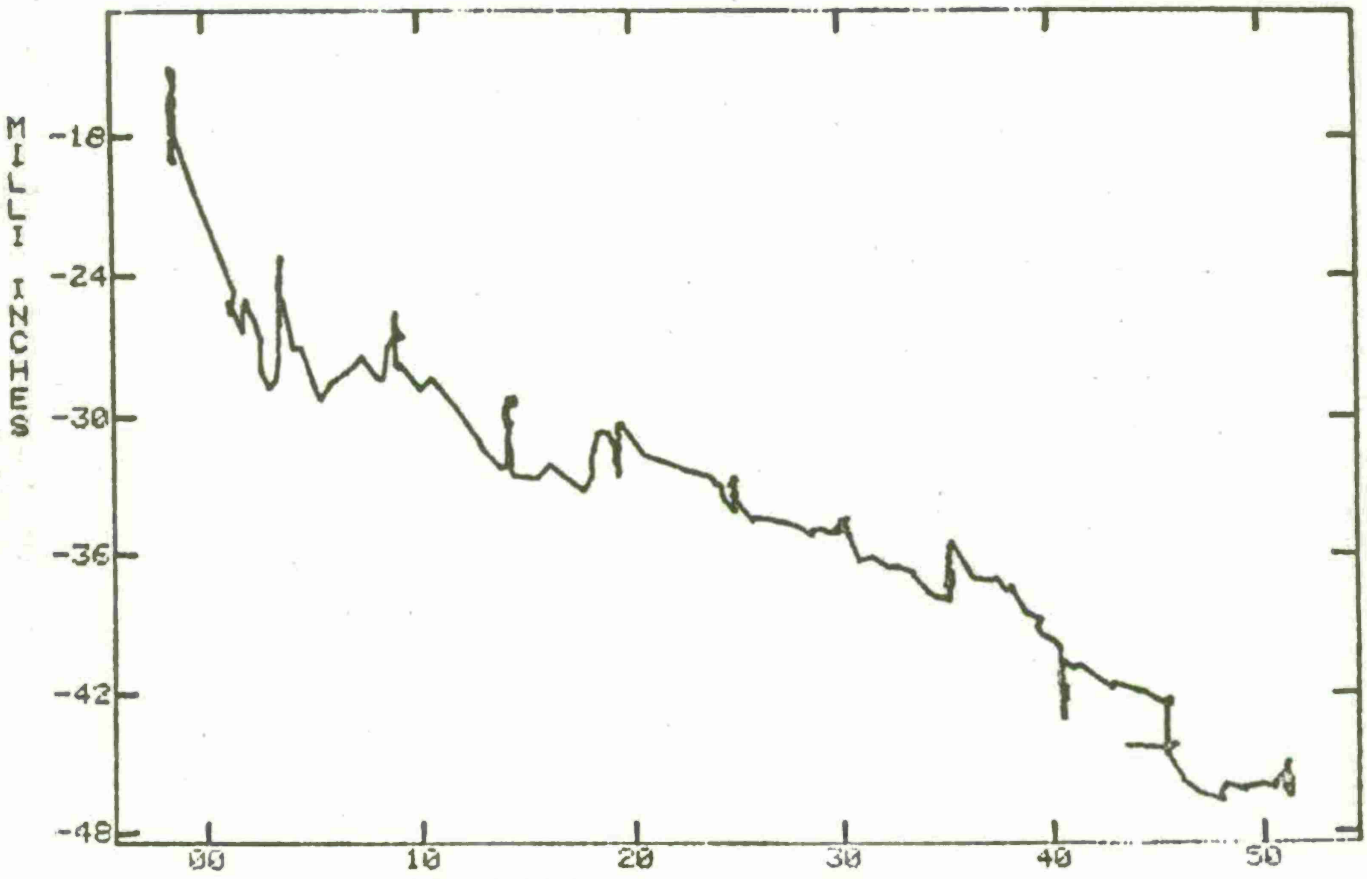
LOAD - R.H. VS DEFLN - ST 93.00 R.H. X 10-1
TEST 21 (2JUL75) AH1G BEND TEST



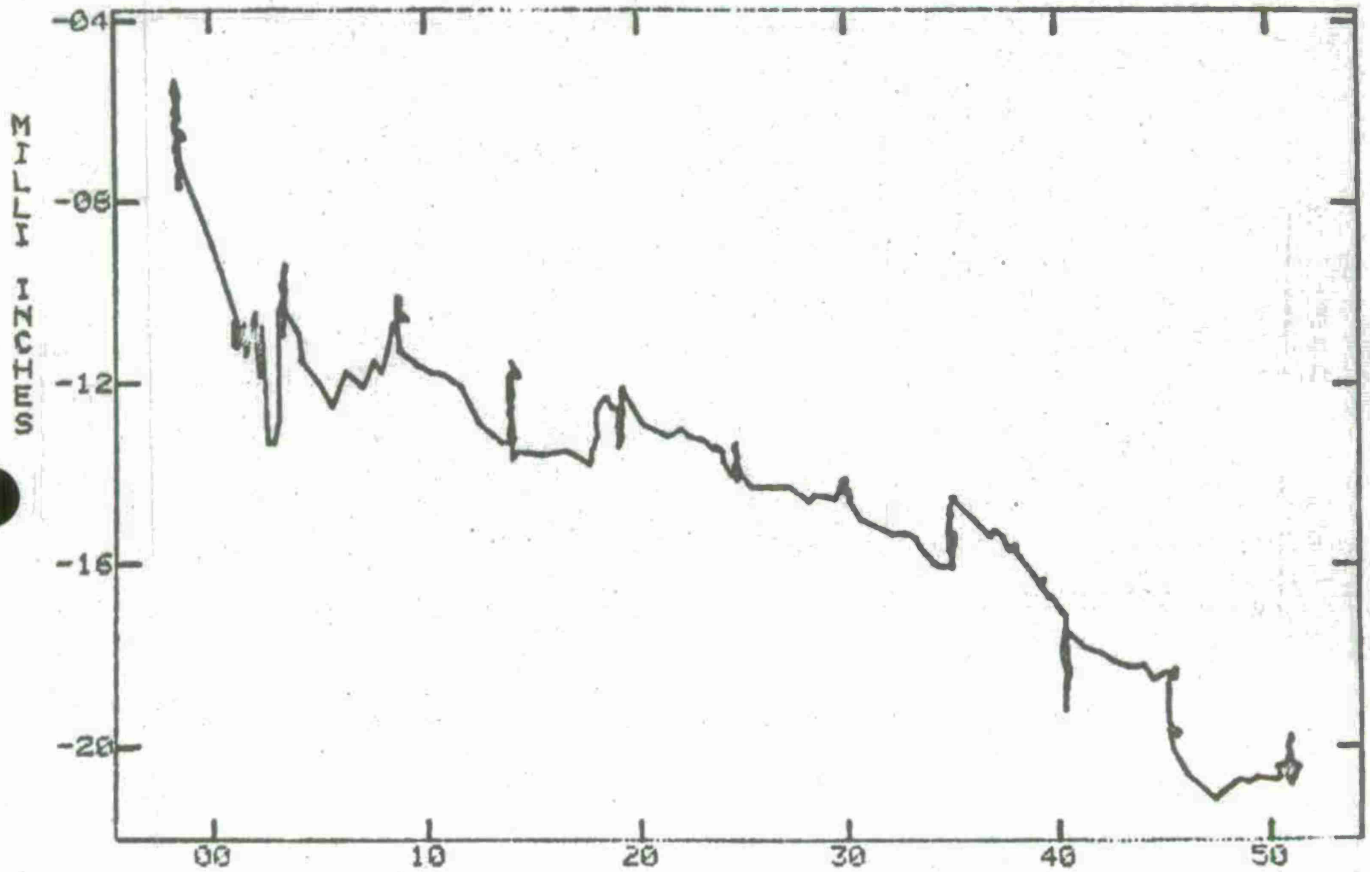
LOAD - R.H. VS DEFLN - ST 138.70 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



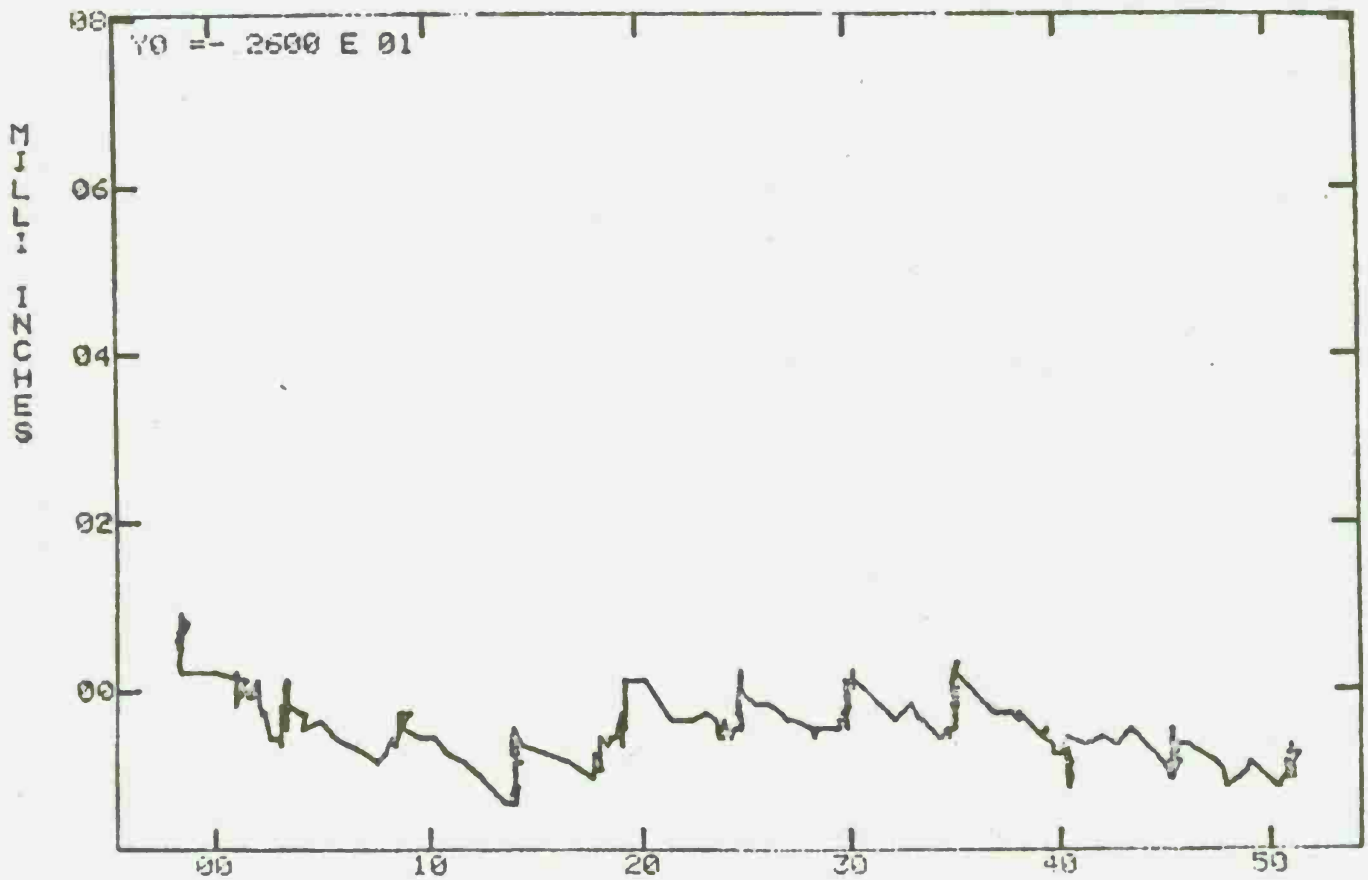
LOAD - R.H. VS DEFLN - ST 148.50 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



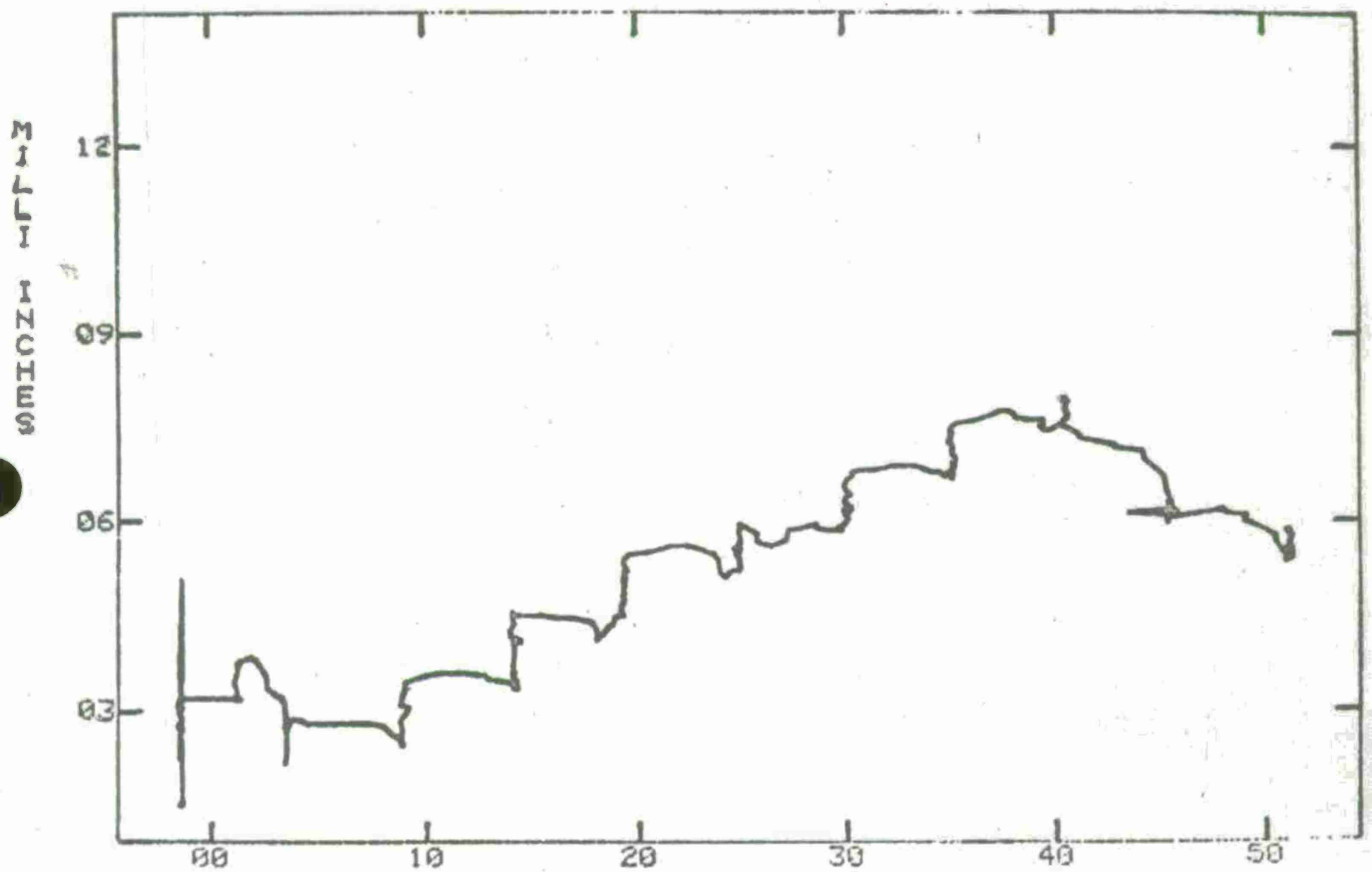
LOAD - R.H. VS DEFLN - ST 186.25 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



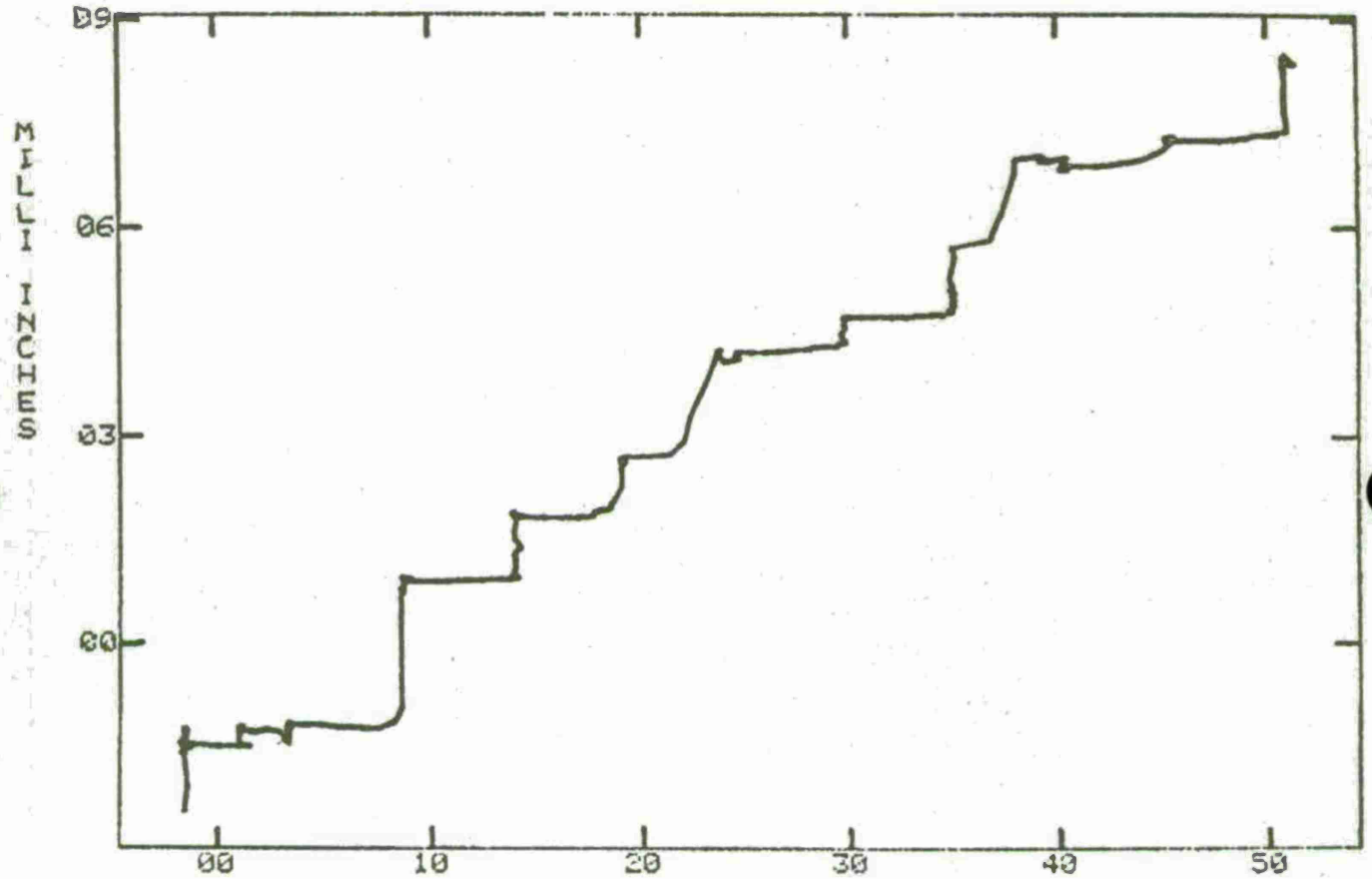
LOAD - R.H. VS DEFLN - ST 213.90 R.H. X 10+0
TEST 21 (2JUL75) AH1G BEND TEST



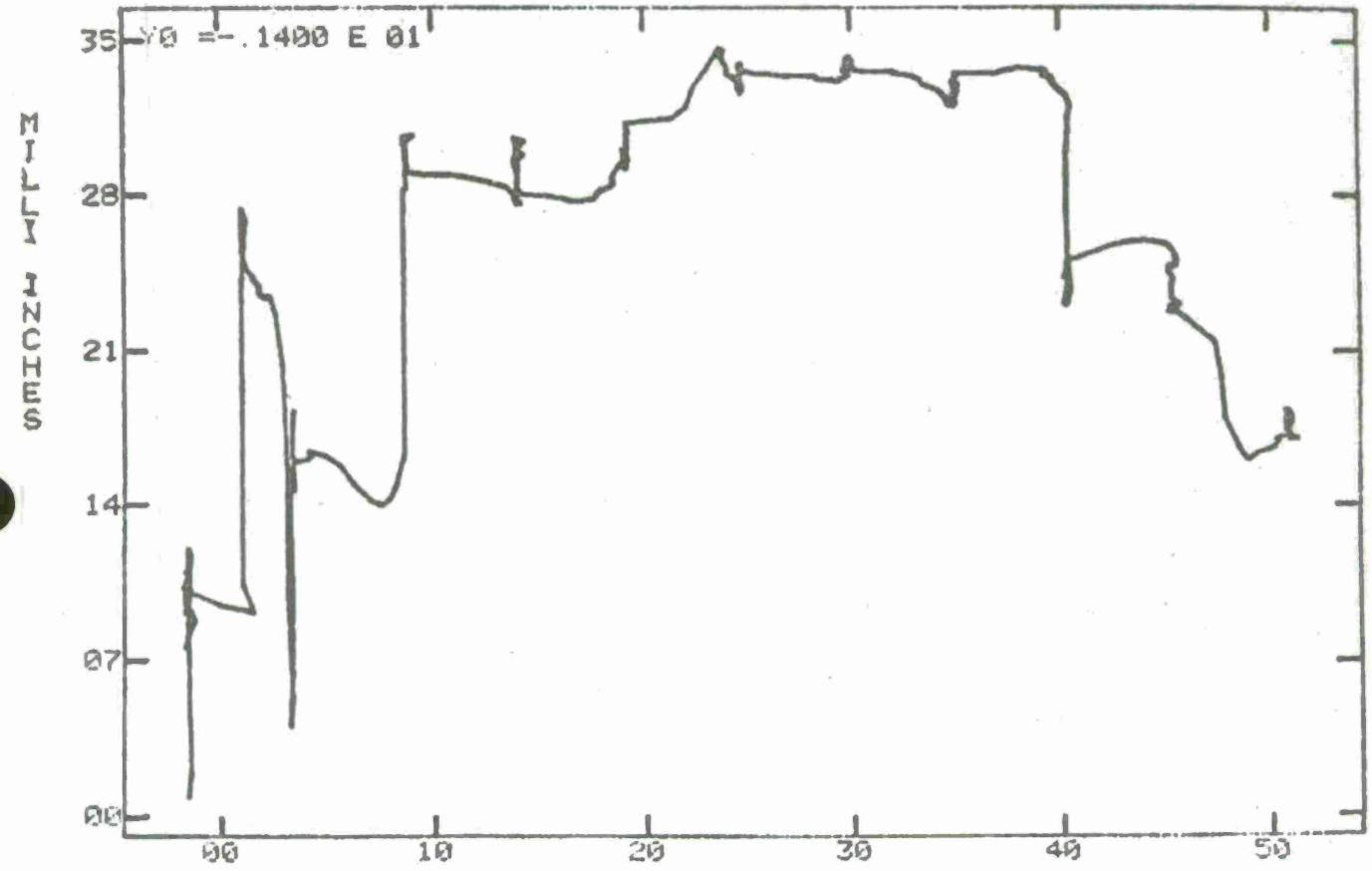
LOAD - R.H. VS DEFLN - ST 300.42 R.H X 10+1
TEST 21 (2JUL75) AH1G BEND TEST



LOAD - R.H. VS BASE ROTATION - UPPER L.H. X 10+2
TEST 21 (2JUL75) AH1G BEND TEST



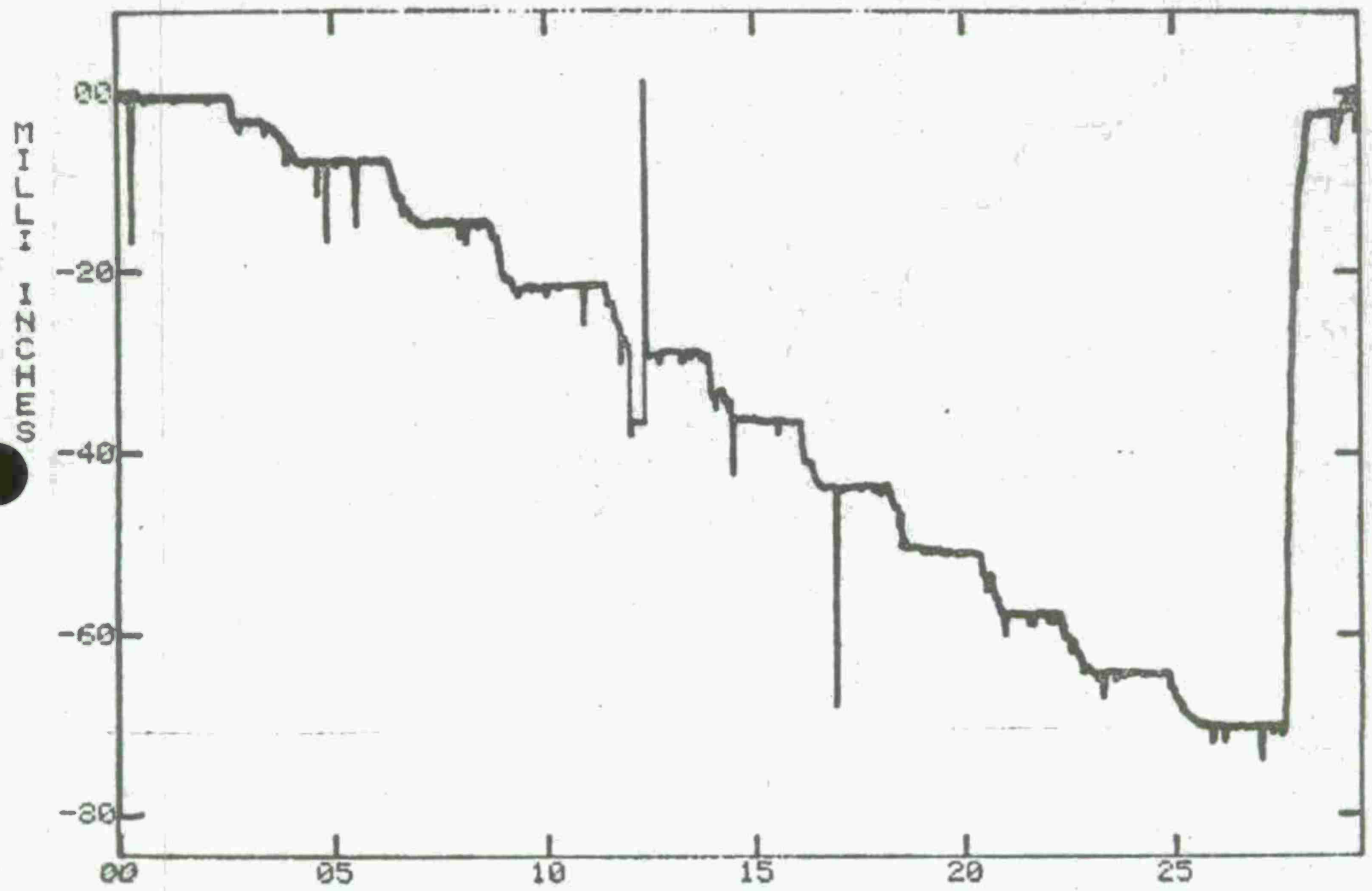
LOAD - R.H. VS BASE ROTATION - LOWER L.H. X 10+1
TEST 21 (2JUL75) AH1G BEND TEST



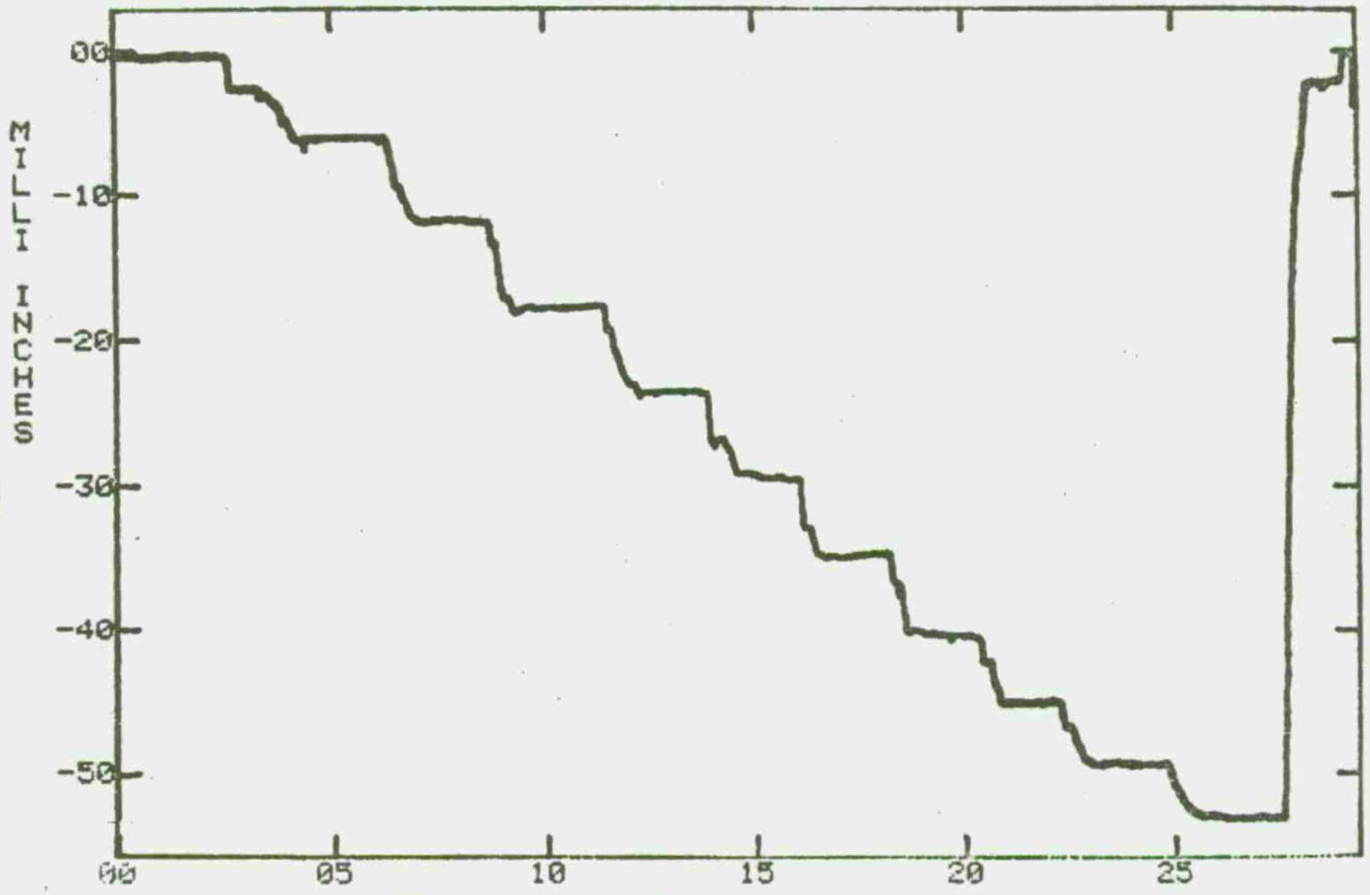
LOAD - R.H. VS BASE ROTATION - LOWER R H X 10+2
TEST 21 (2JUL75) AH1G BEND TEST

APPENDIX F

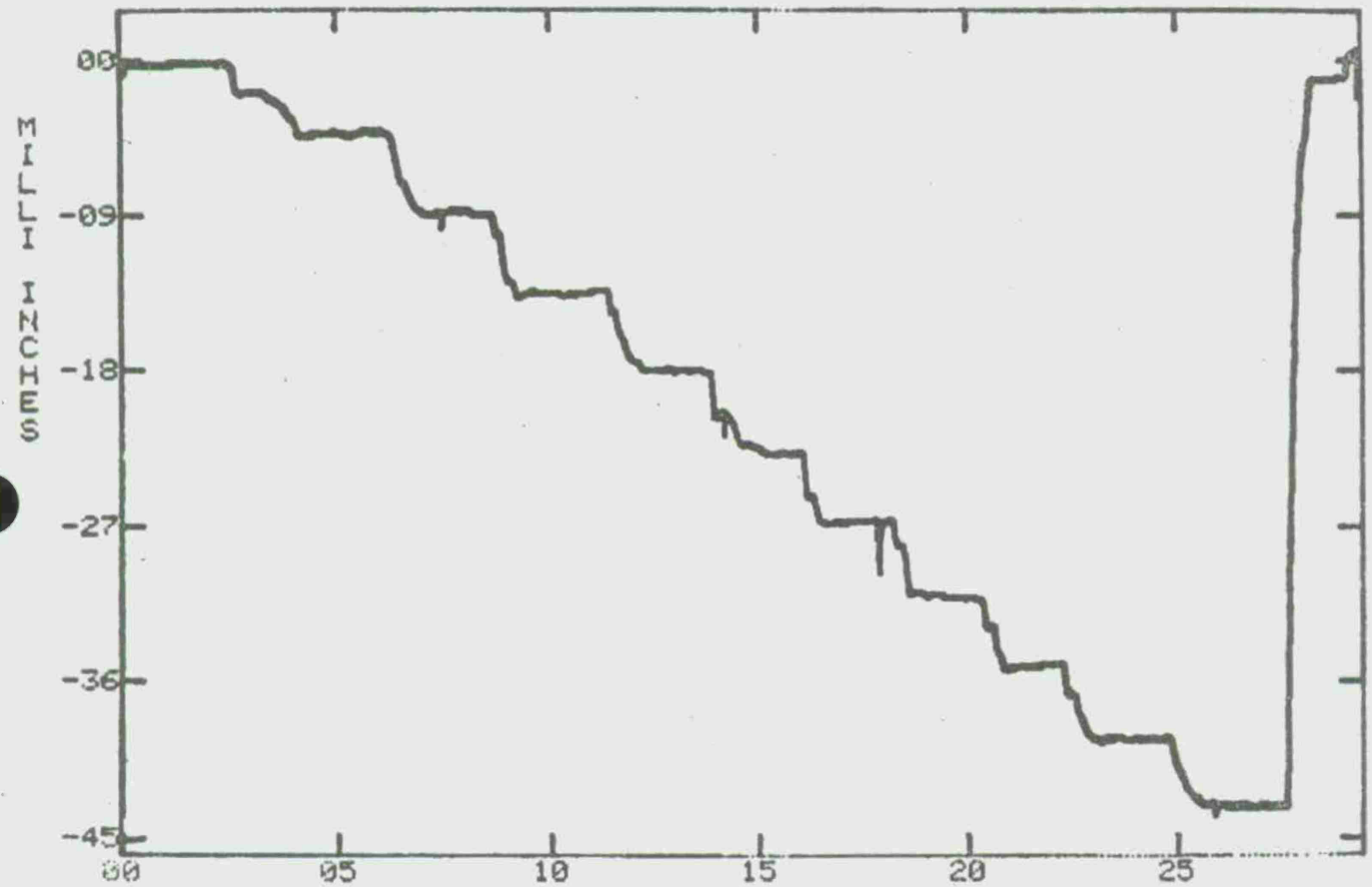
Data Sheets for Lateral Loading Tests



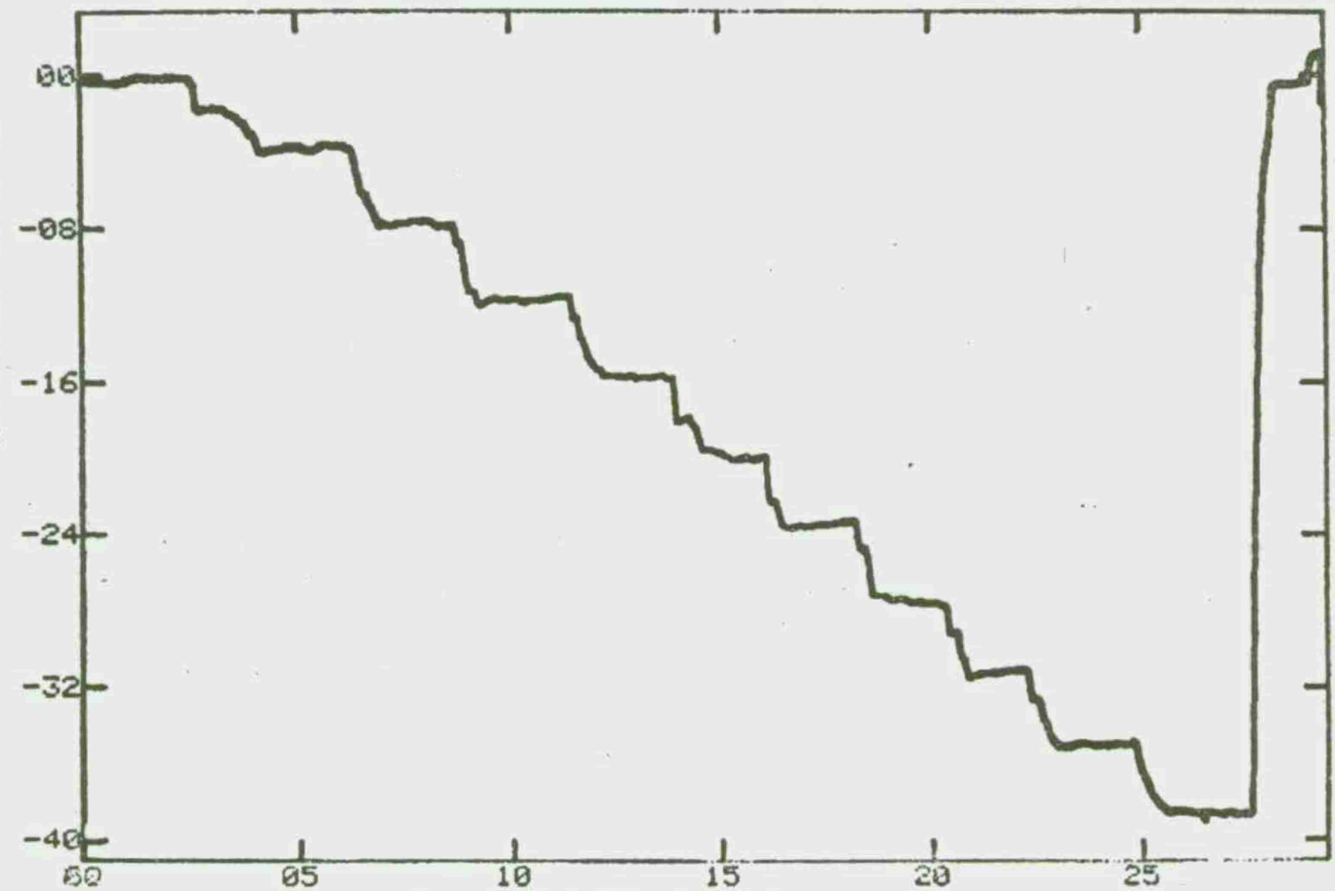
CH 1 LATERAL DEFLECTION ST 61.25 - WL 44.50 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



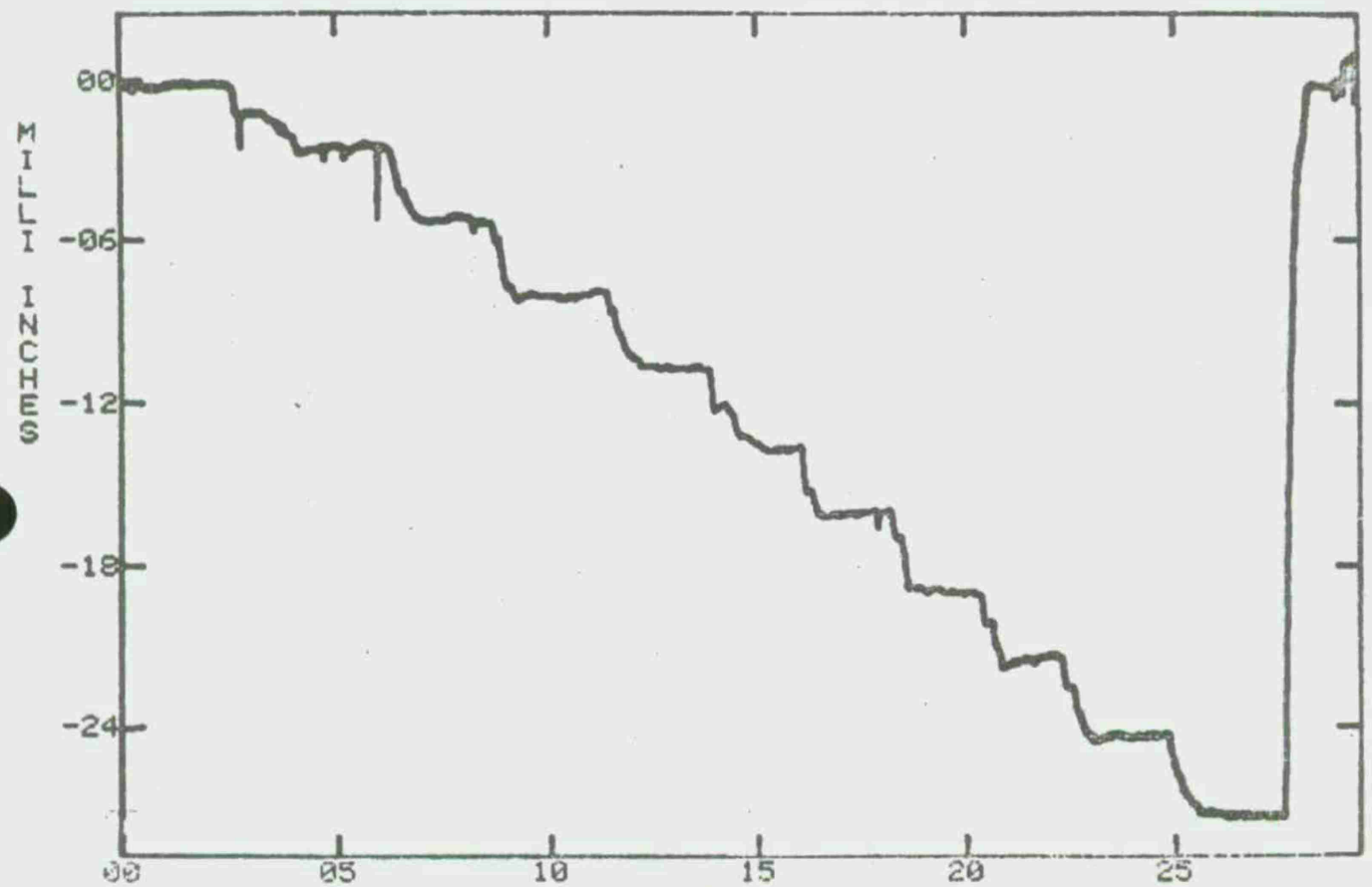
CH 2 LATERAL DEFLECTION ST 93.00 - WL 44.50 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



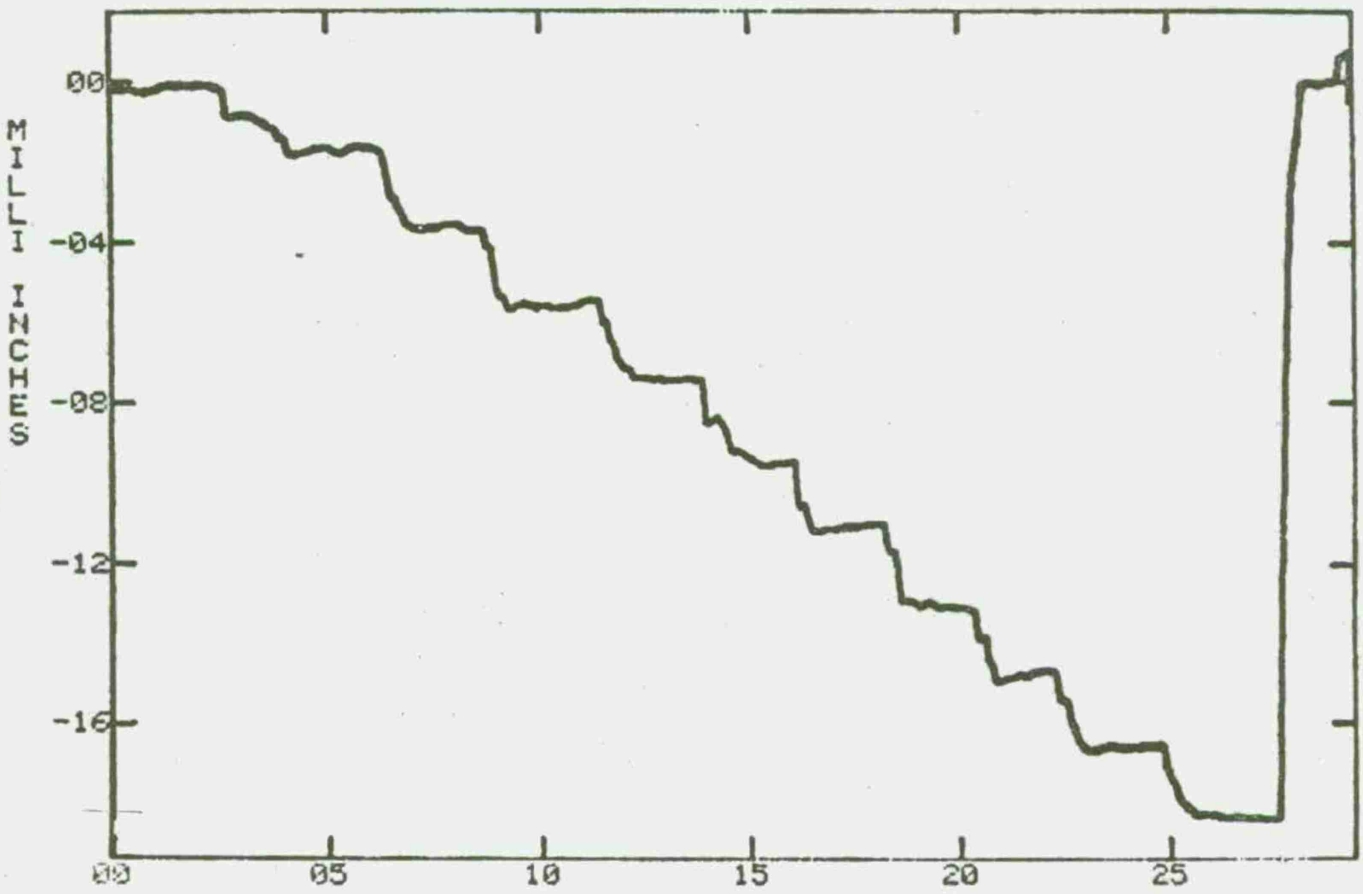
CH 3 LATERAL DEFLECTION ST 138.70 - WL 44.50 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



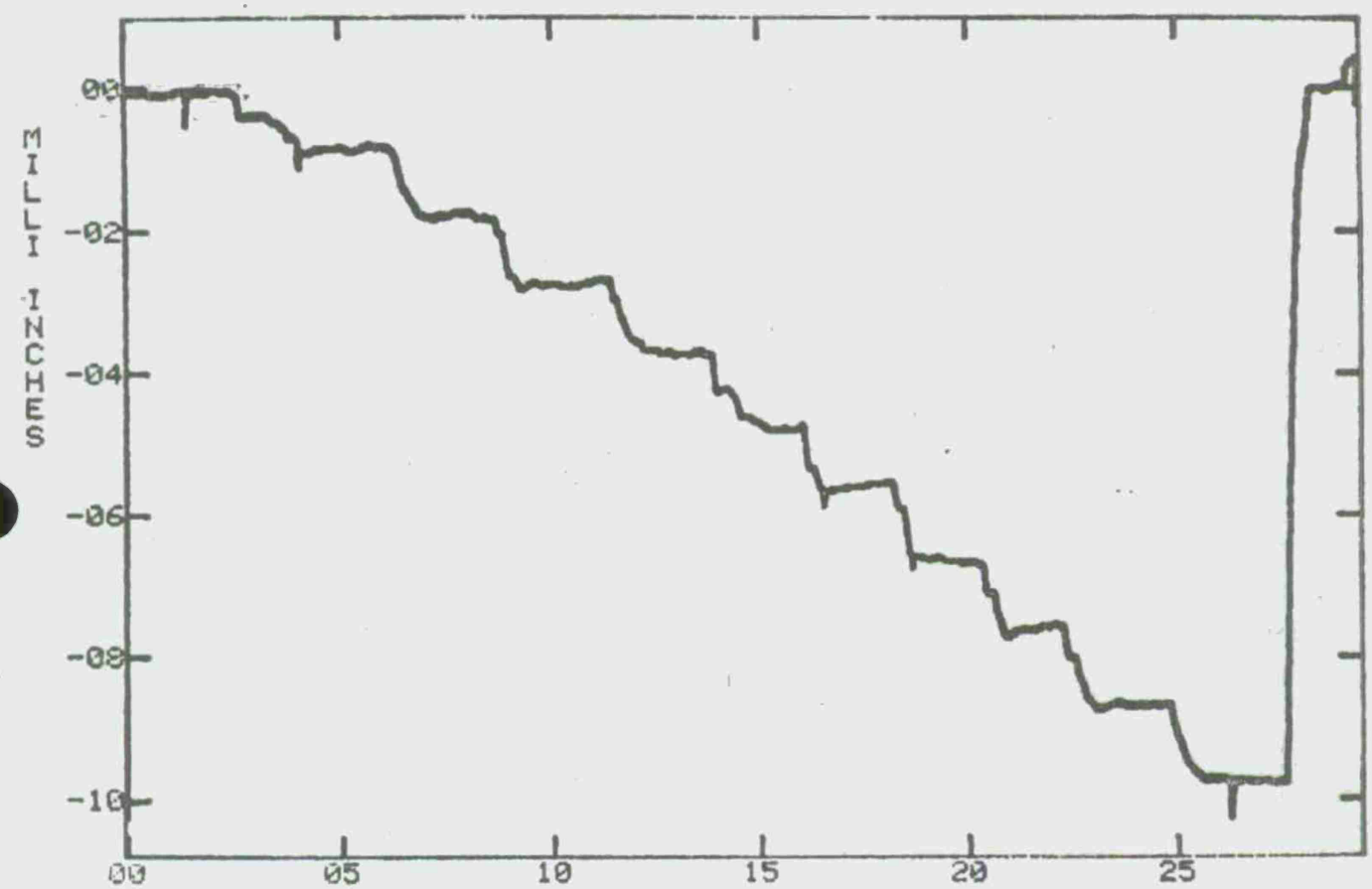
CH 4 LATERAL DEFLECTION ST 148.50 - WL 35.97 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



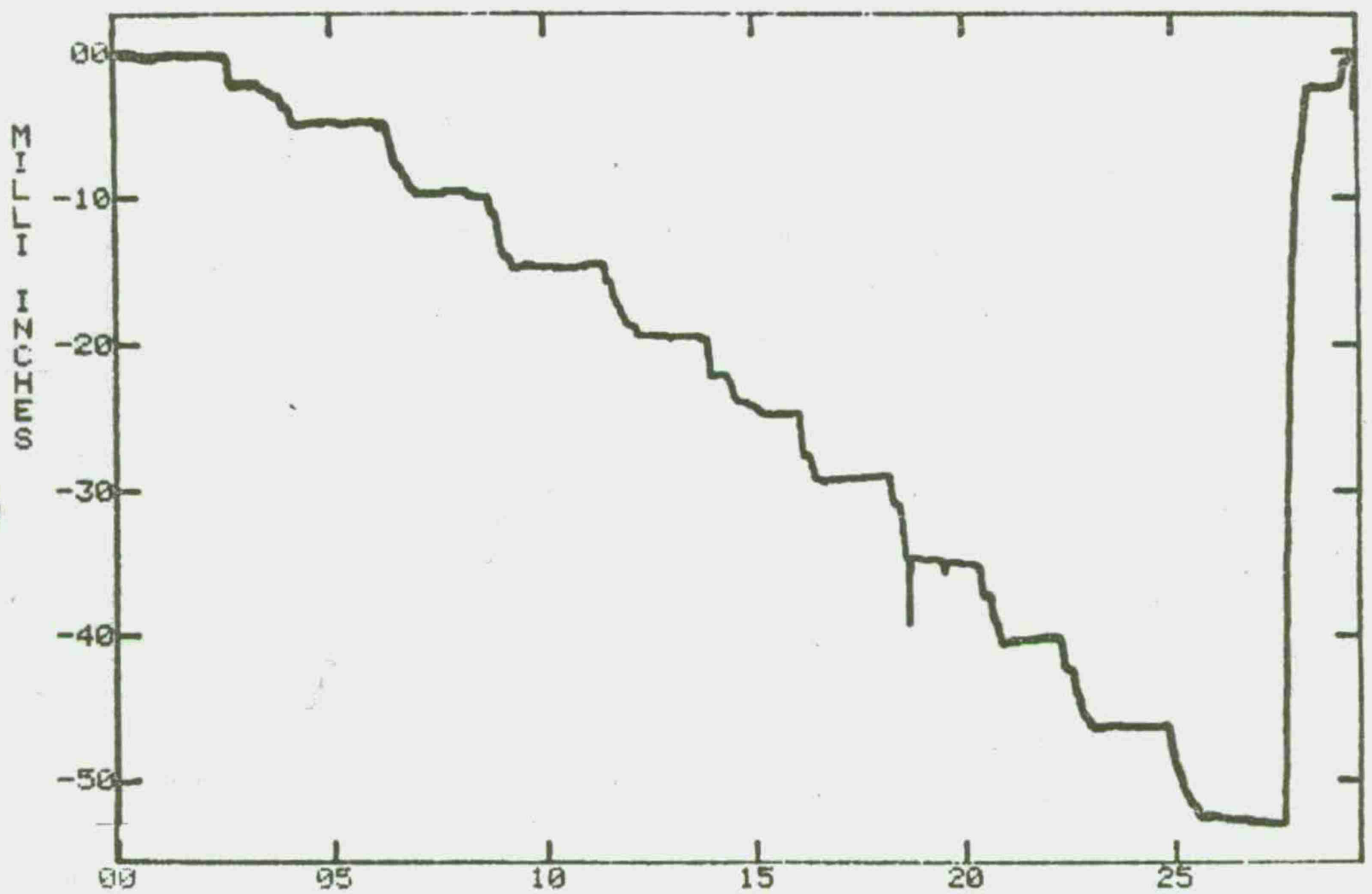
CH 5 LATERAL DEFLECTION ST 186.25 - WL 35.97 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



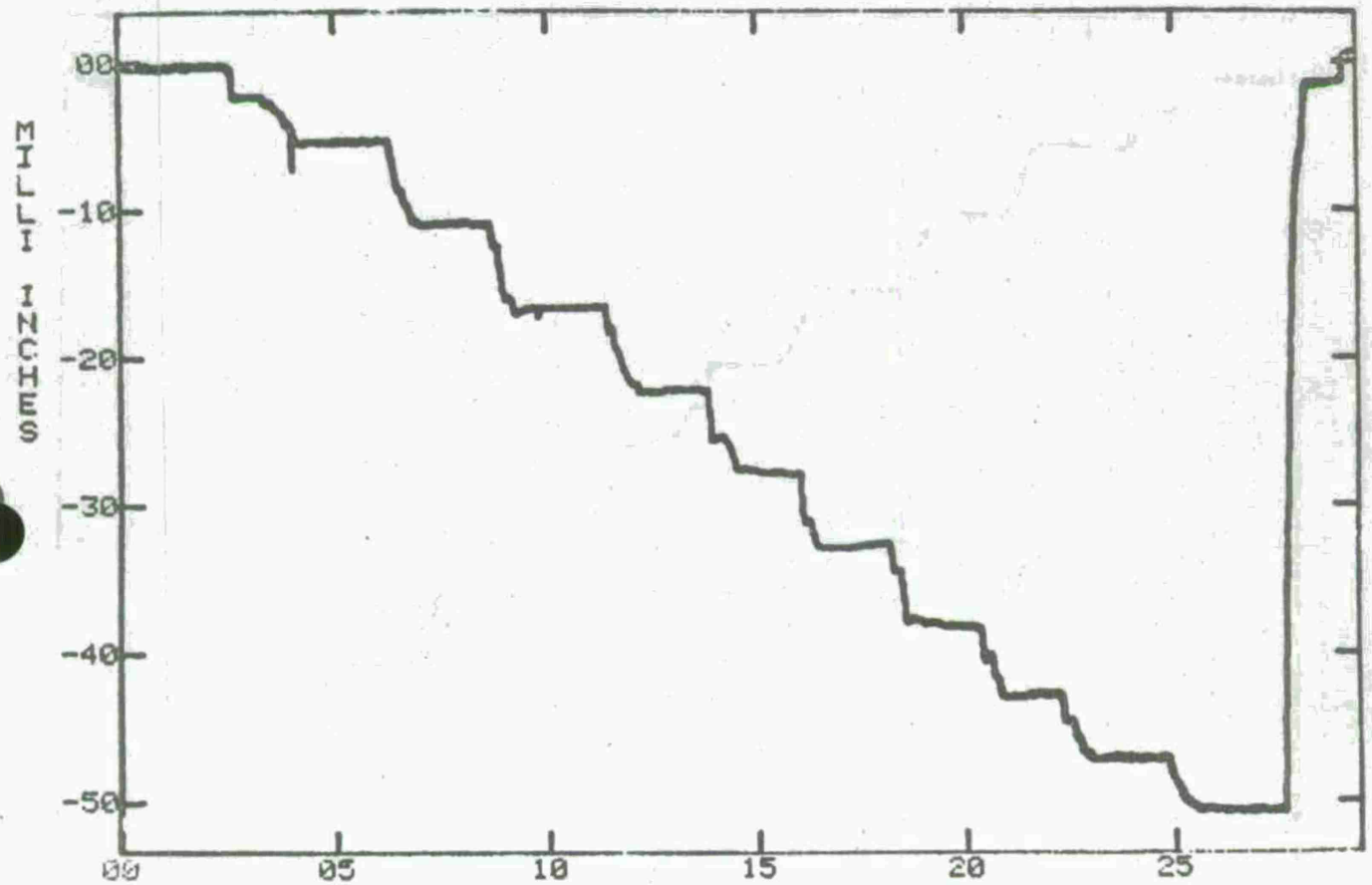
CH 6 LATERAL DEFLECTION ST 213.94 - WL 35.97 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



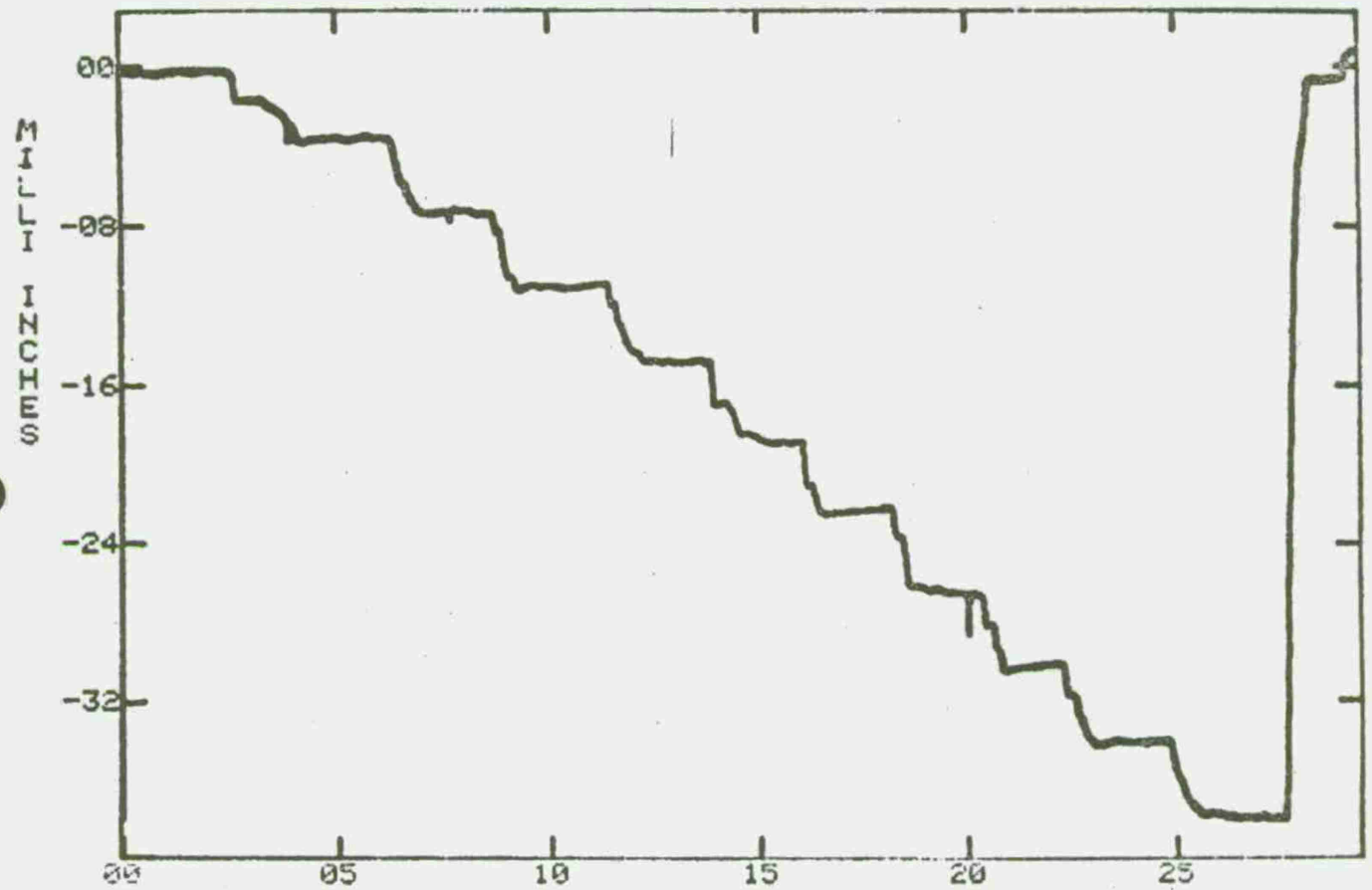
CH 7 LATERAL DEFLECTION ST 250.00 - WL 35.97 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



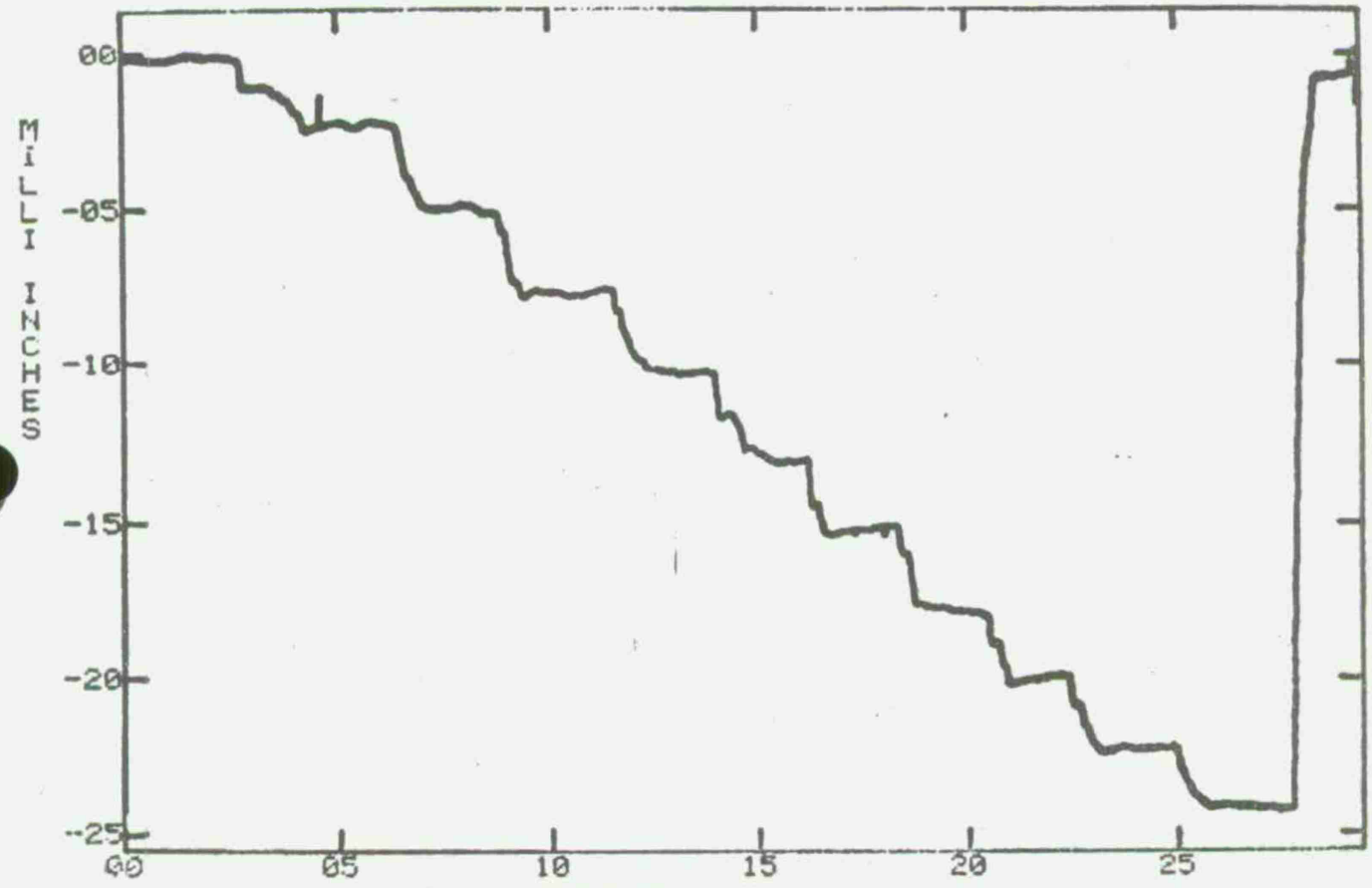
CH 8 LATERAL DEFLECTION ST 270.00 - WL 35.97 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



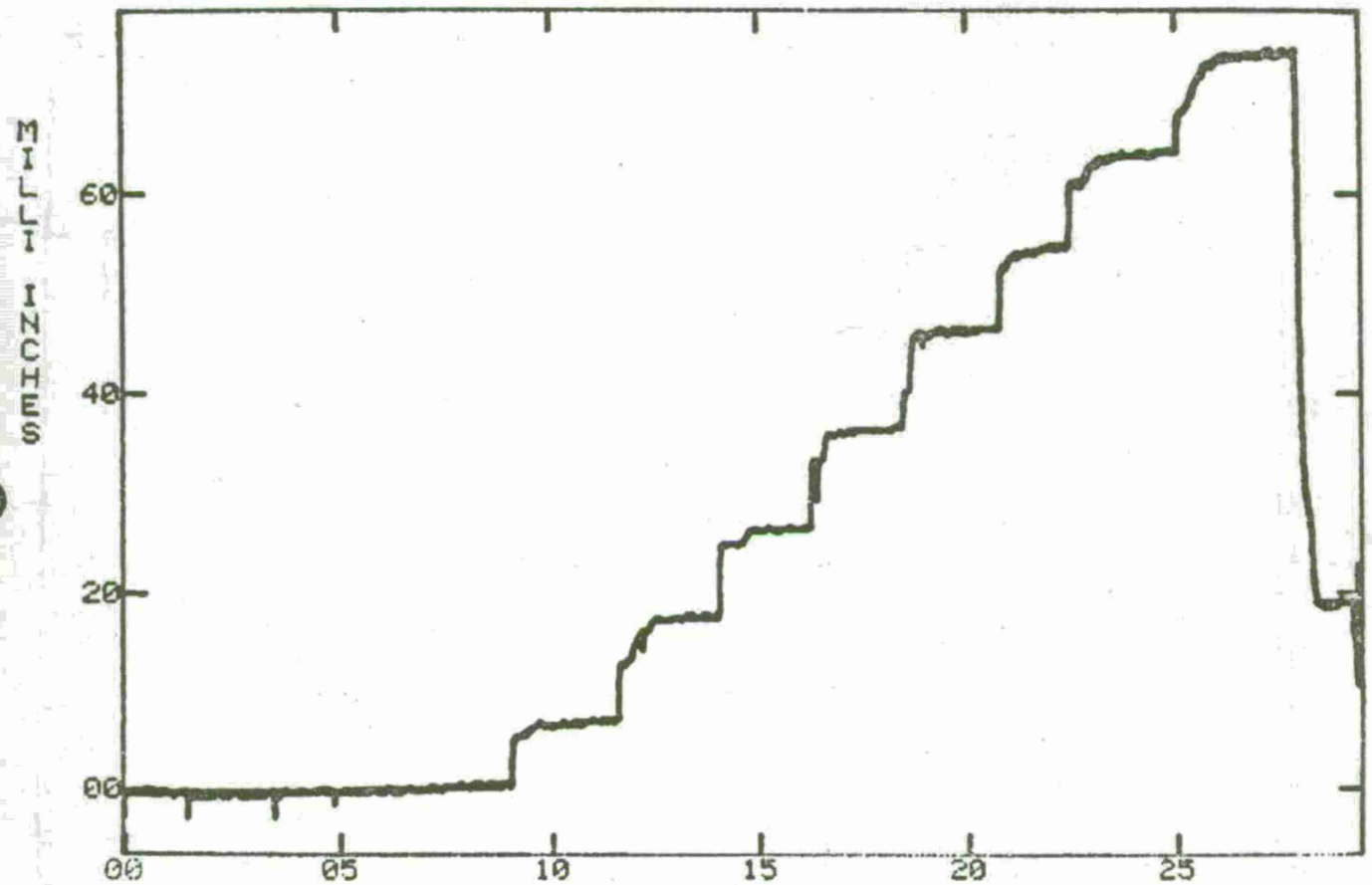
CH 9 LATERAL DEFLECTION ST 96.00 - WL 62.17 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



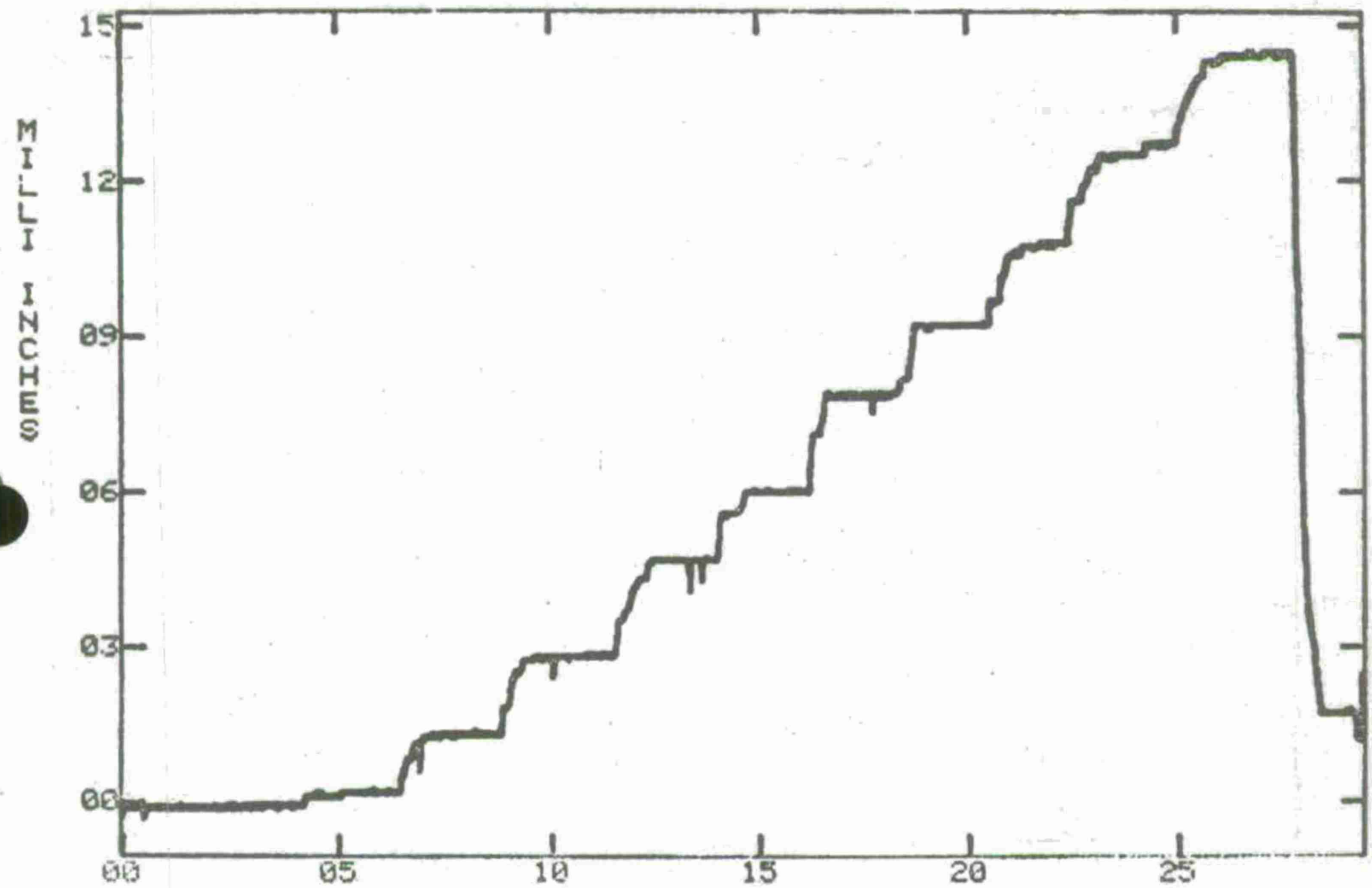
CH 10 LATERAL DEFLECTION ST 148.50 - WL 63.49 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



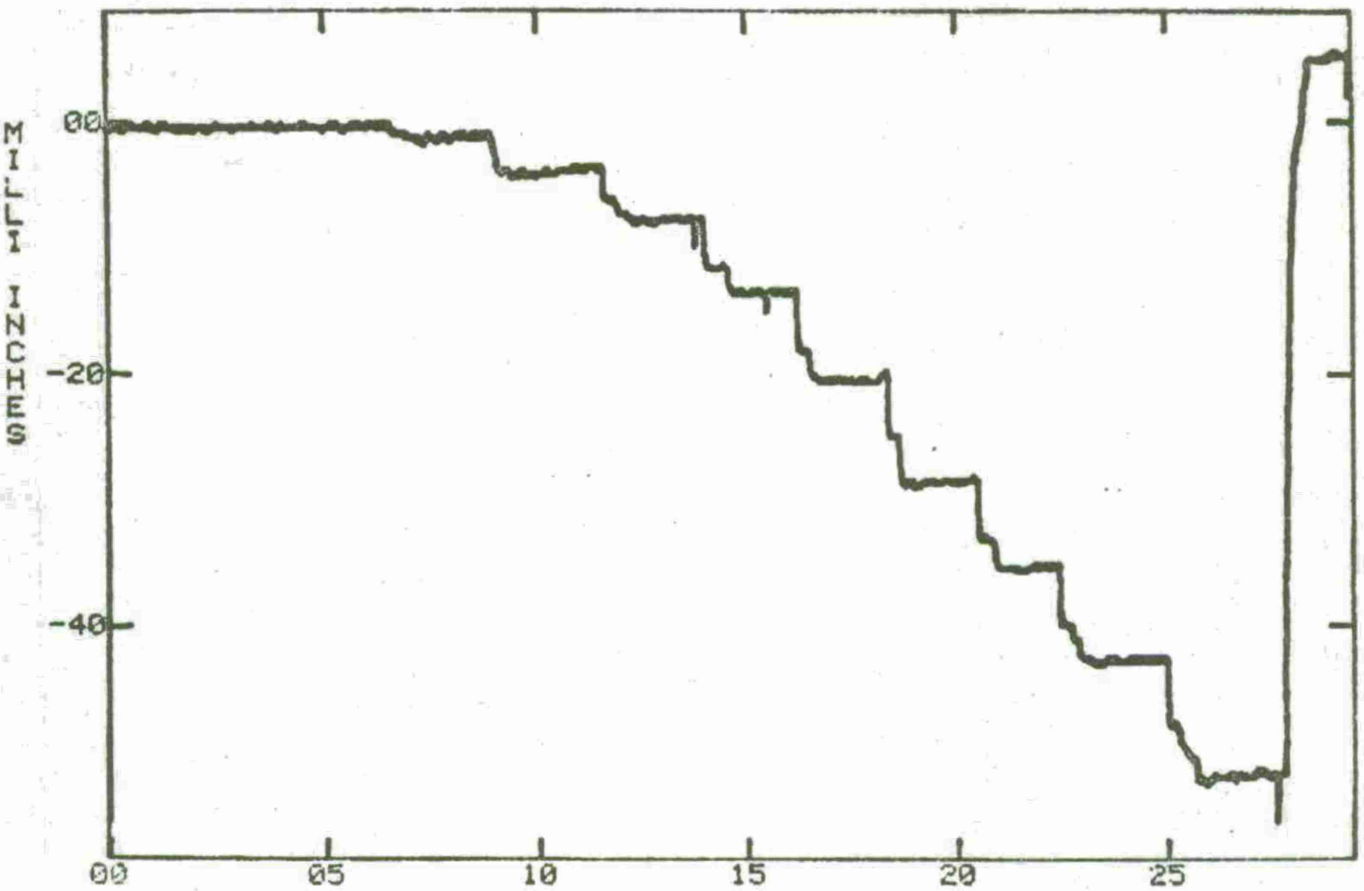
TIME IN SECONDS X 10-1
CH 11 LATERAL DEFLECTION ST 213.94 - WL 65.00 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



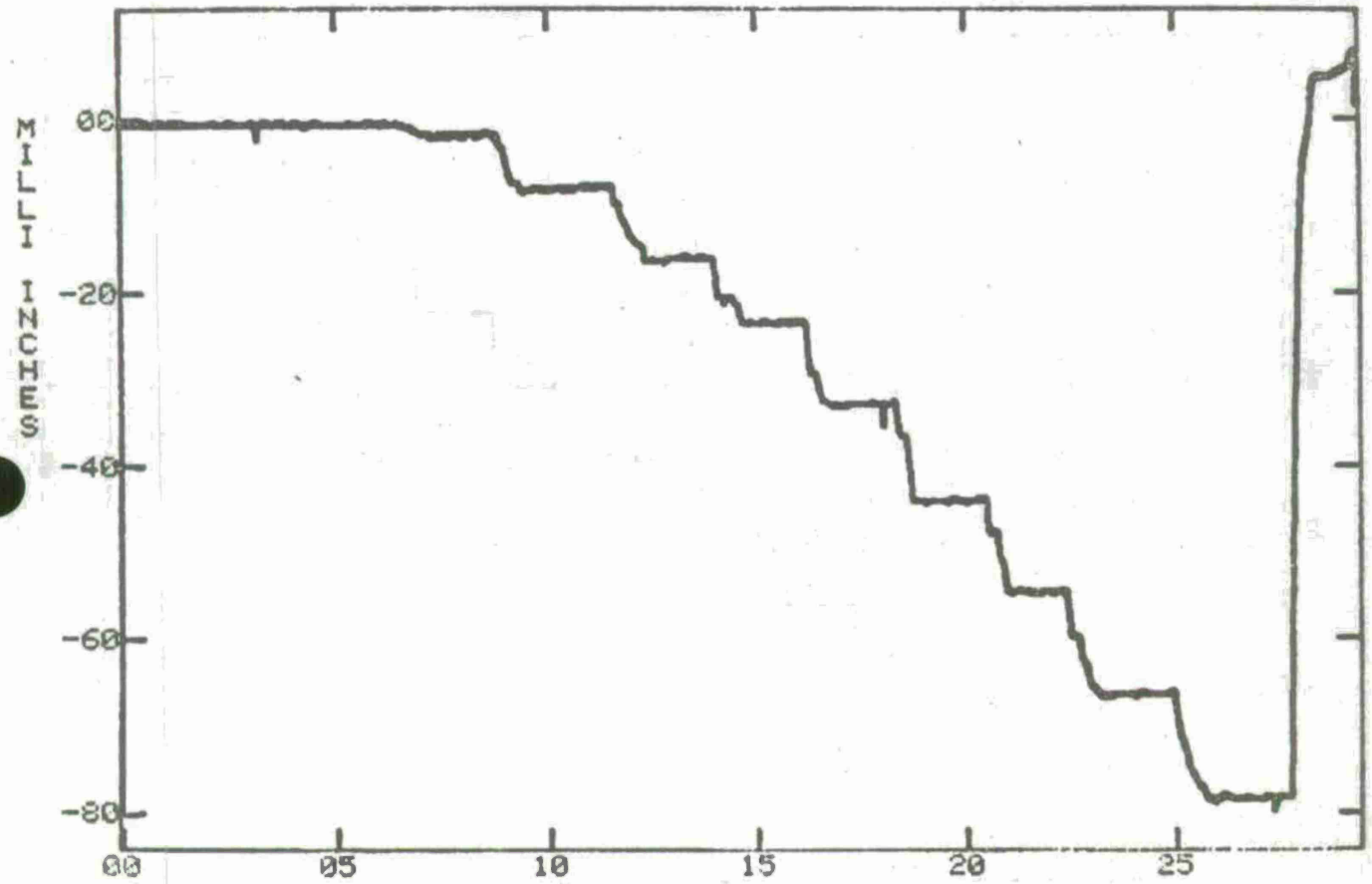
TIME IN SECONDS X 10-1
CH 12 BASE ROTATION TOP LEFT HAND X 10+1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



CH 13 BASE ROTATION BOTTOM LEFT HAND X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



CH 14 BASE ROTATION TOP RIGHT HAND X 10+1
TEST 36 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
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-20
-40
-60
-80
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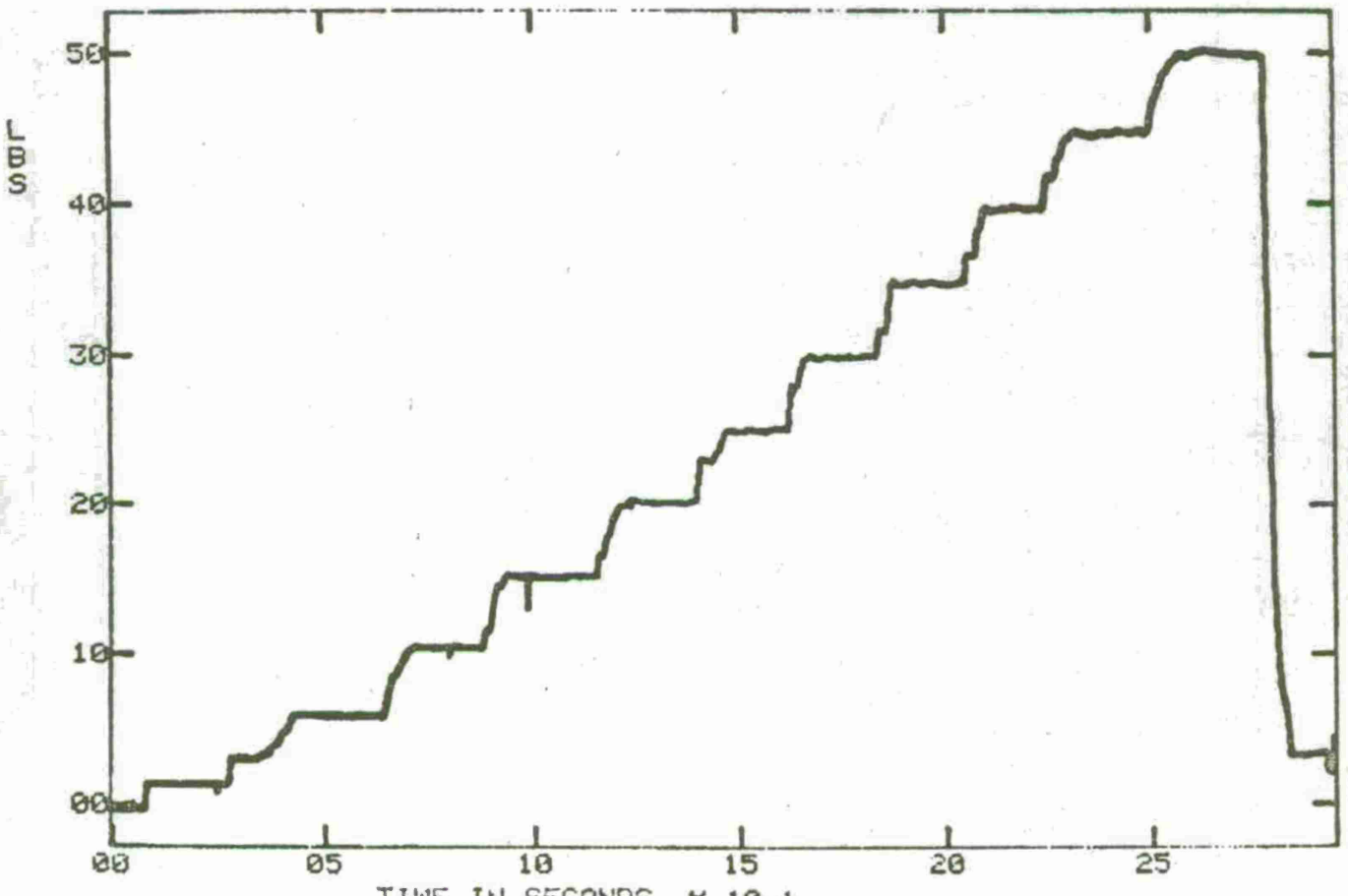
15
20
25
TIME IN SECONDS X 10-1
CH 15 BASE ROTATION BOTTOM RIGHT HAND X 10+1
TEST 36 (2 SEPT 75) AH1G BEND TESTS


LBS
50
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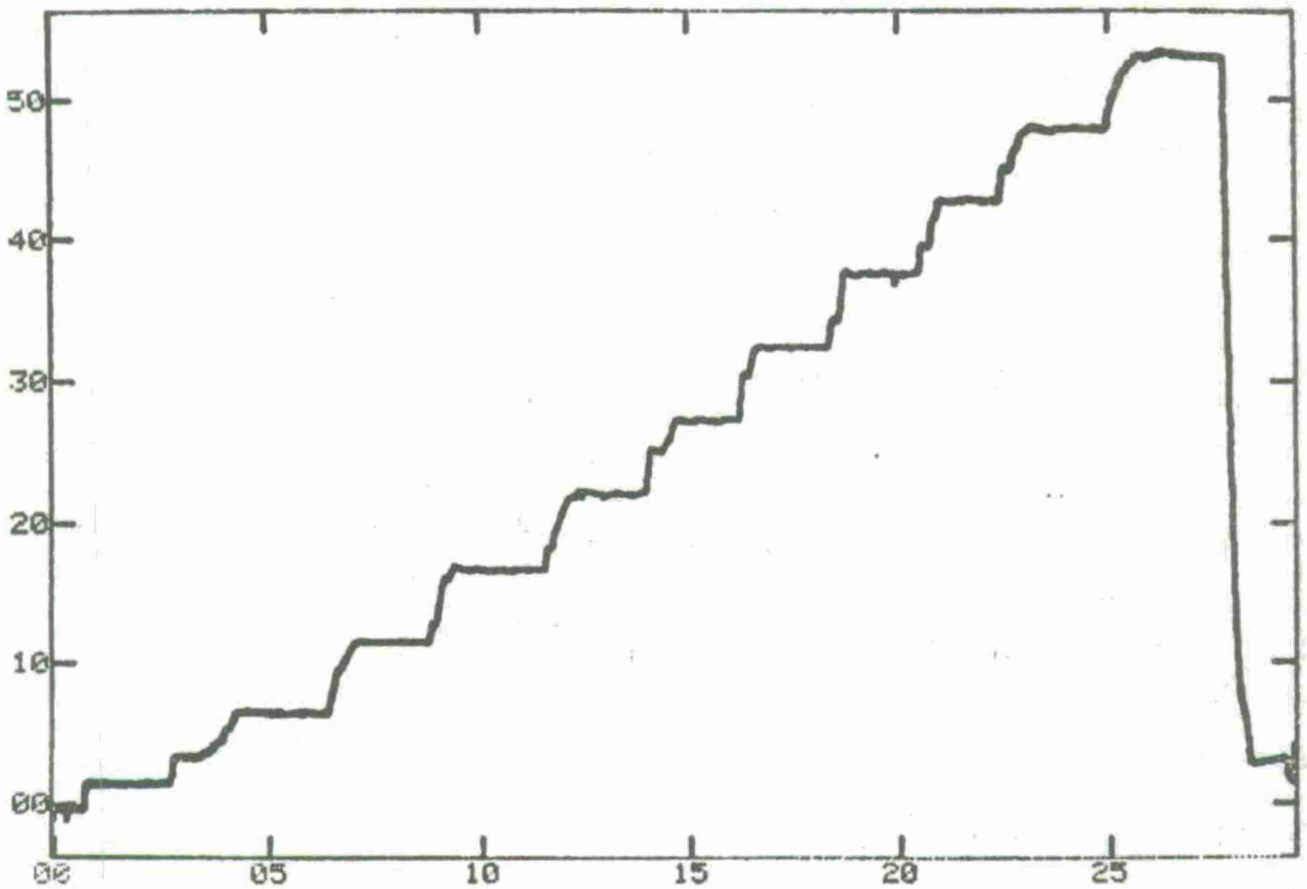
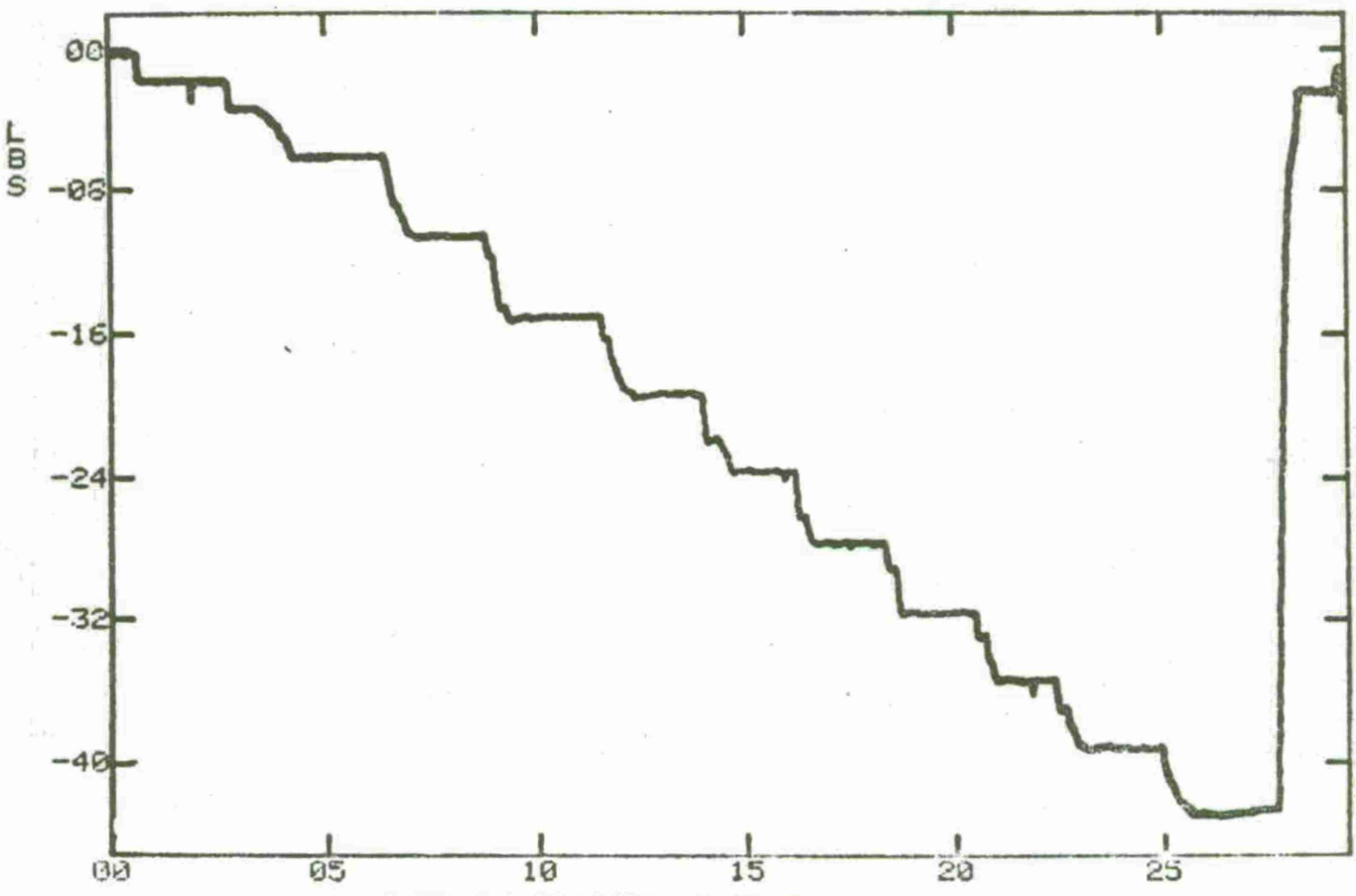
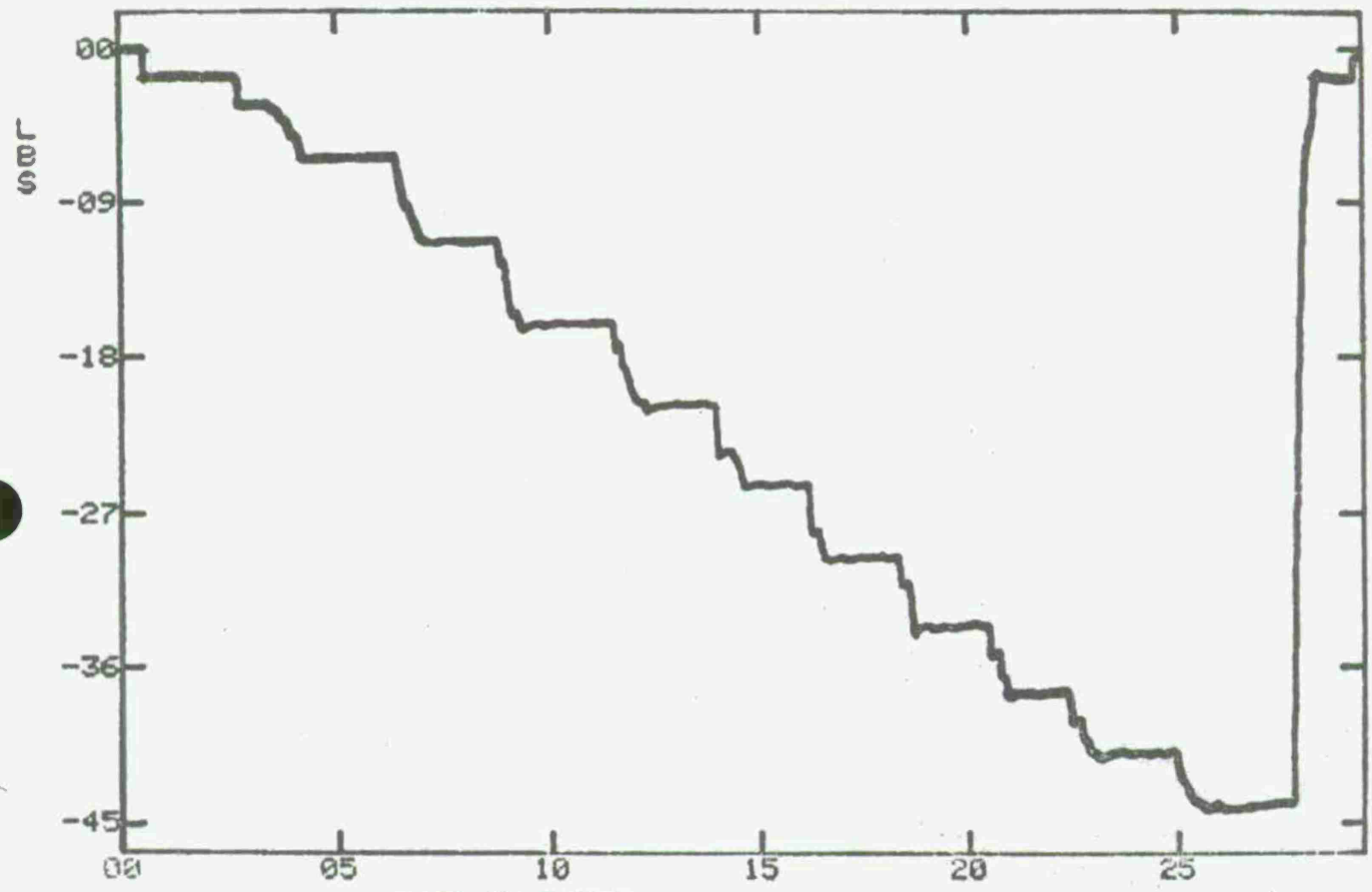
20
25
TIME IN SECONDS X 10-1
CH 17 BASE LOAD TOP LEFT HAND X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

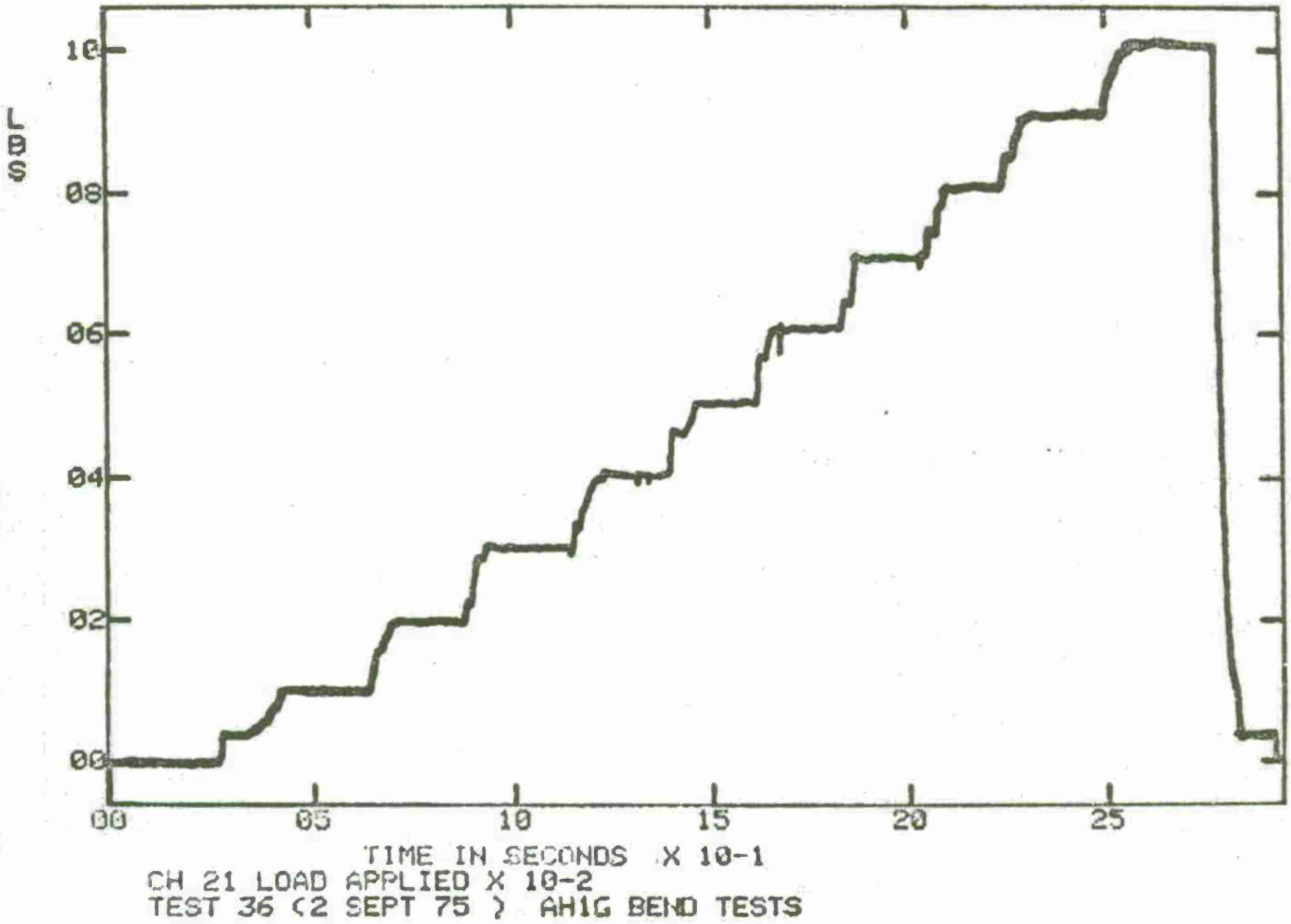


CH 18 BASE LOAD BOTTOM LEFT HAND X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

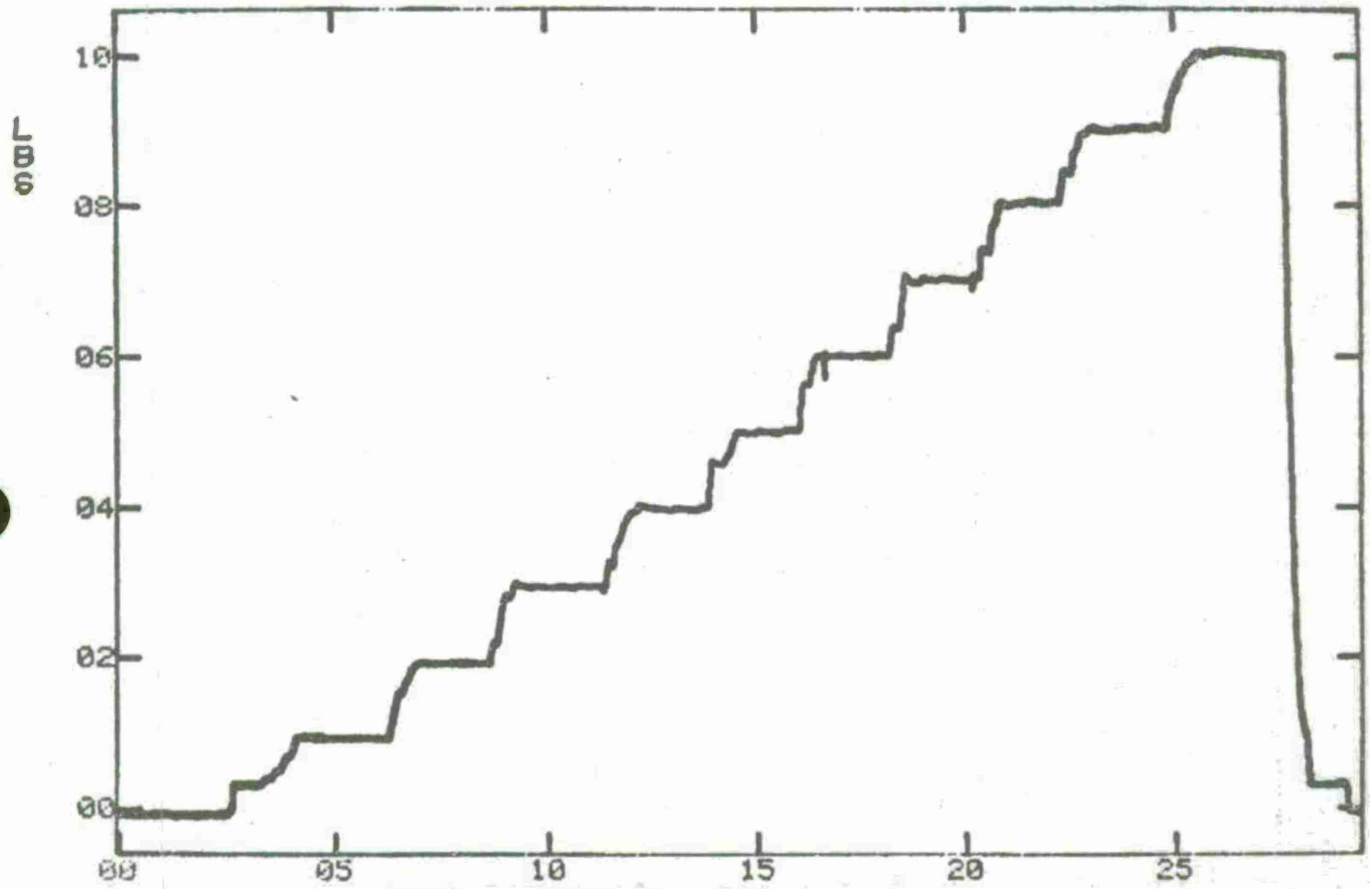


CH 19 BASE LOAD TOP RIGHT HAND X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

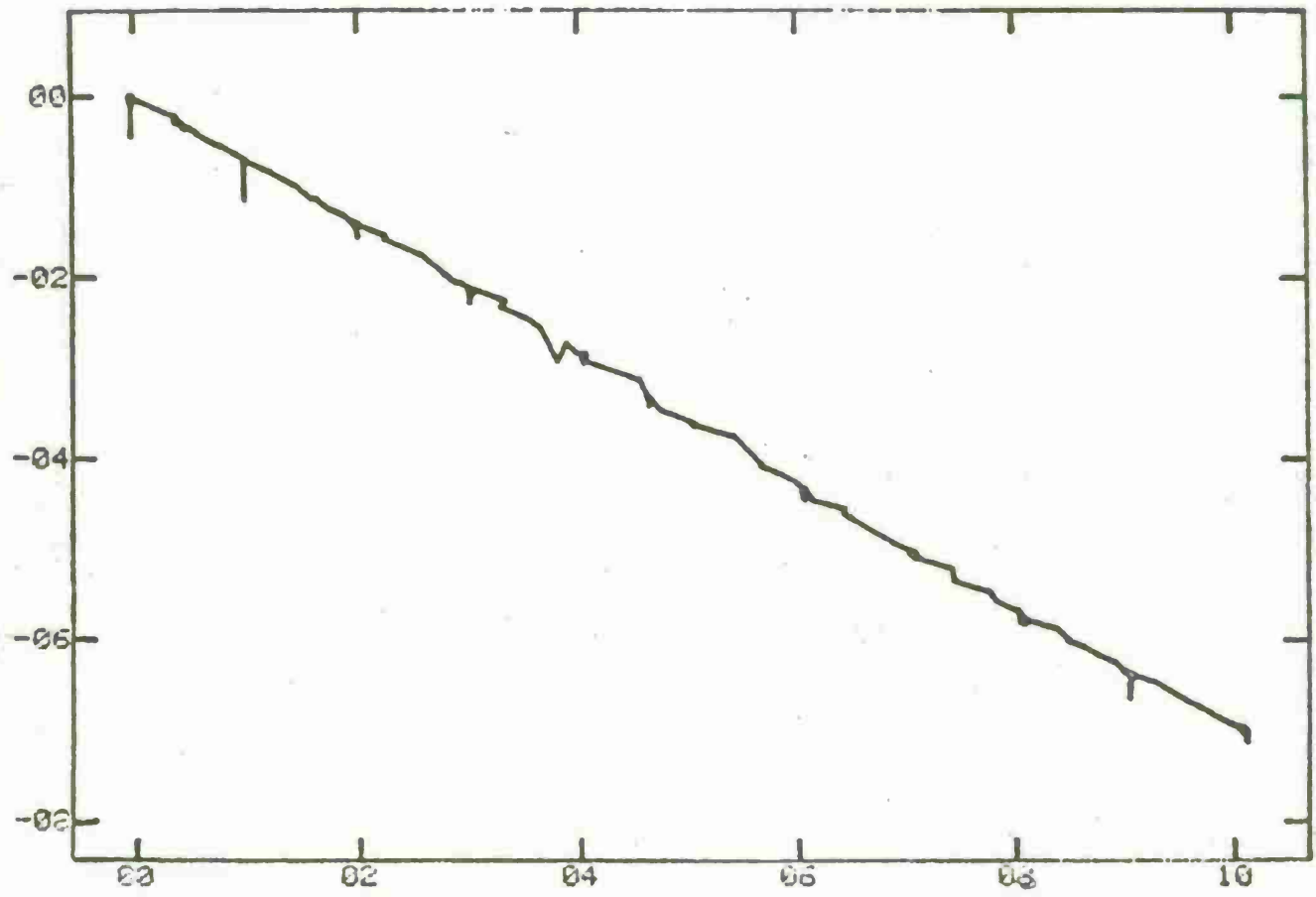

00
-09
-18
-27
-36
-45
00
05
10
15
20
25
TIME IN SECONDS X 10-1
CH 20 BASE LOAD BOTTOM RIGHT HAND X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS



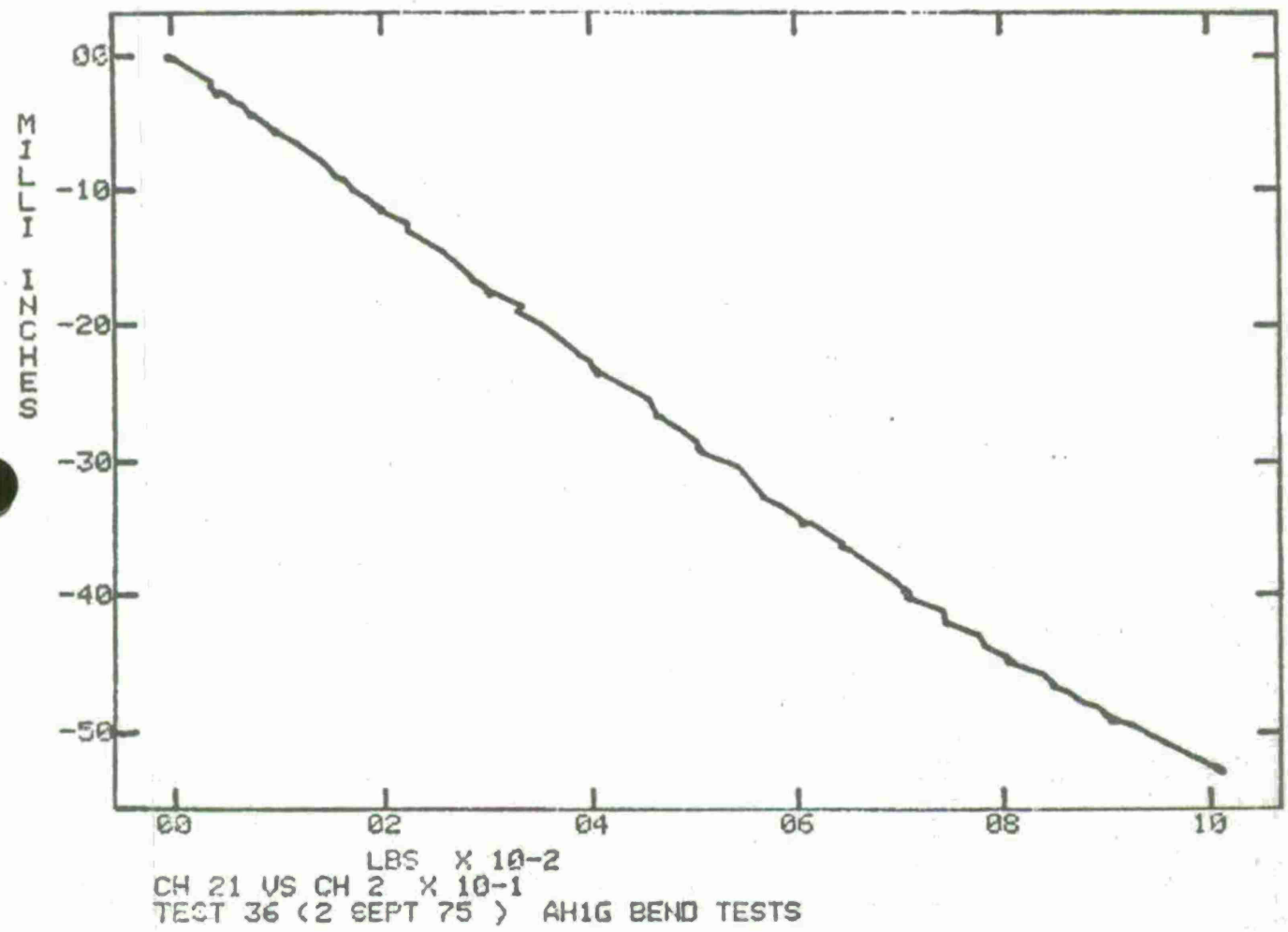
CH 21 LOAD APPLIED X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

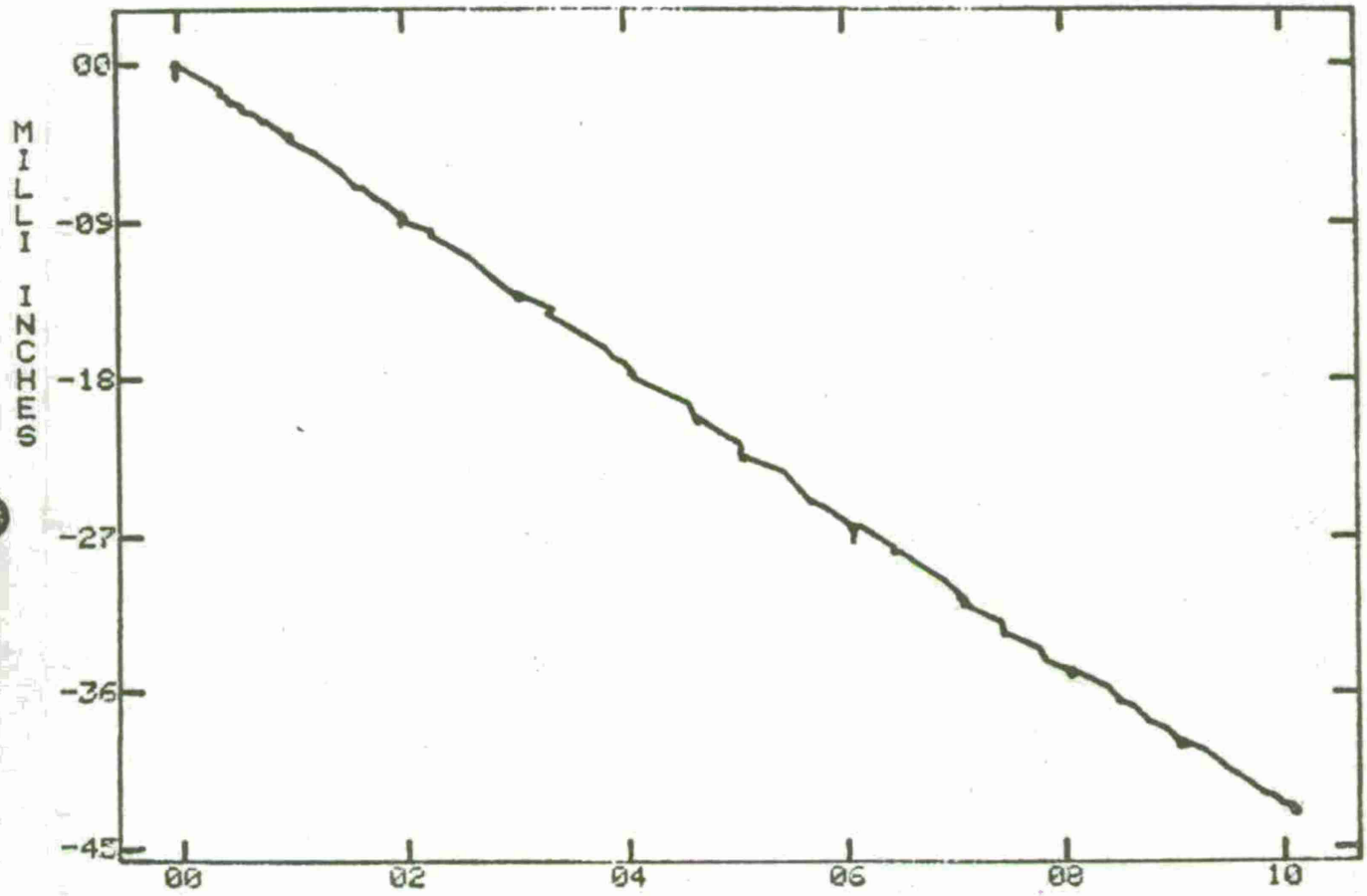


CH 21 LOAD APPLIED X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

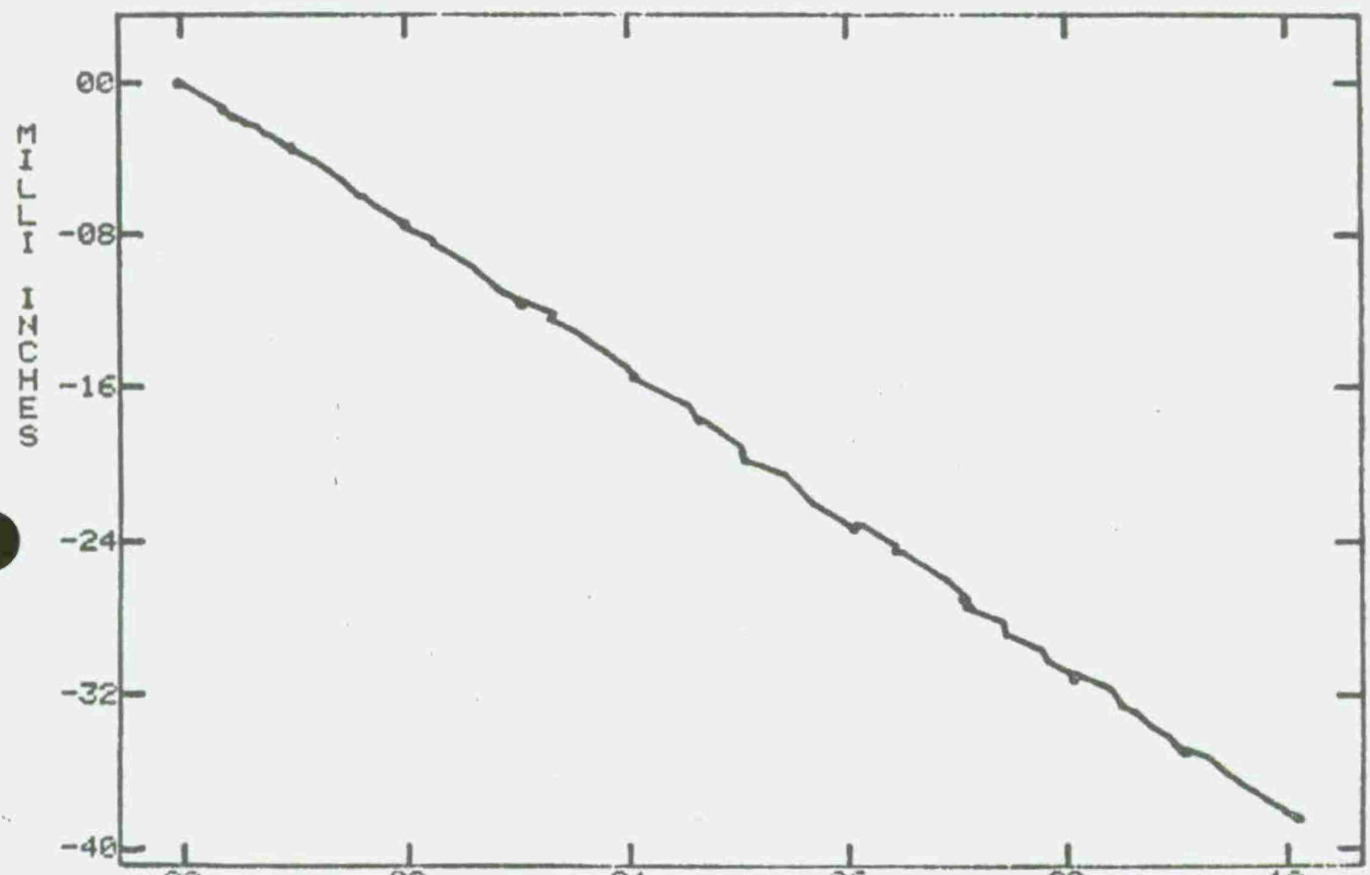


CH 21 VS CH 1 X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS

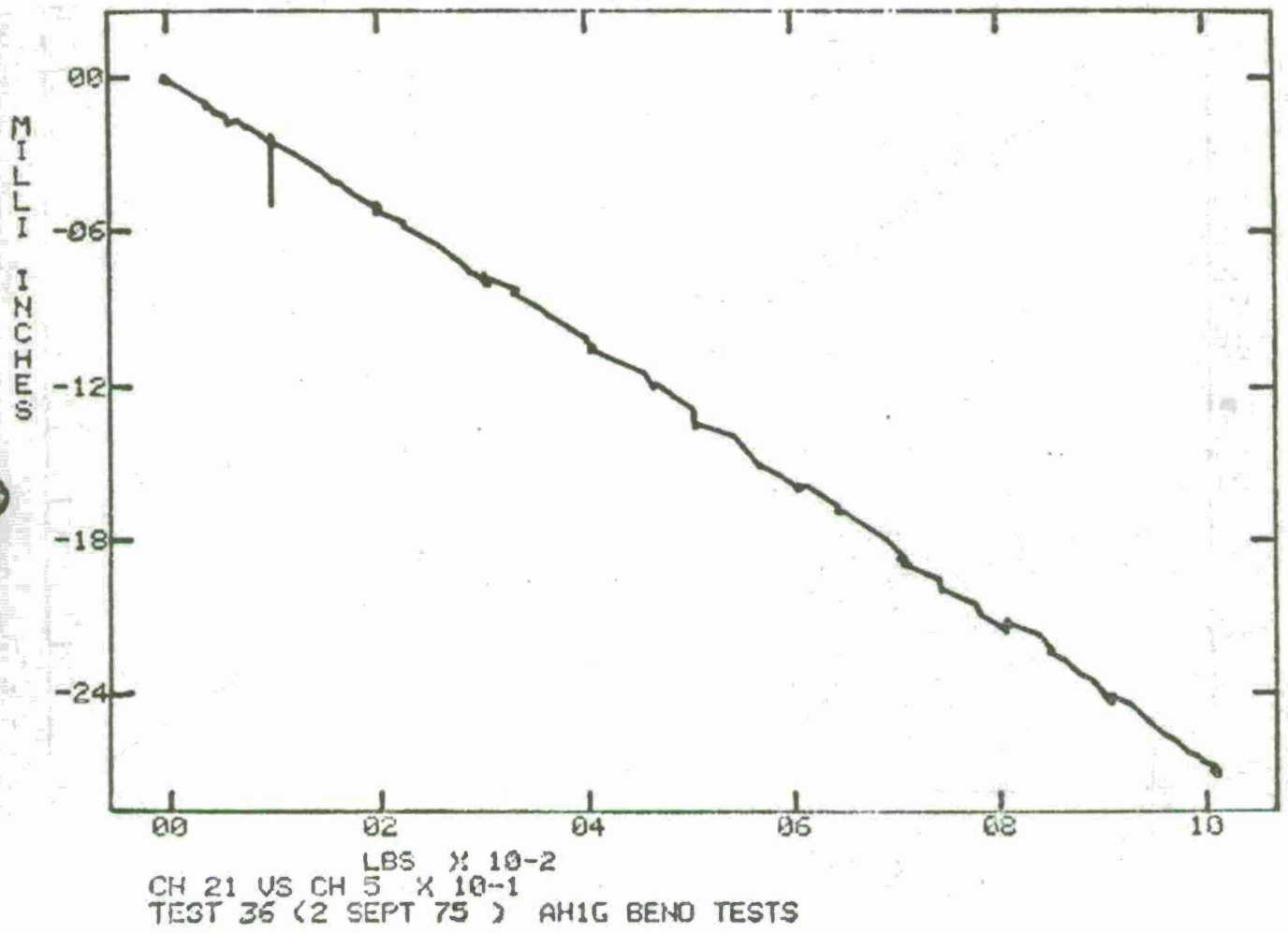

00
-10
-20
-30
-40
-50
MILLI INCHES
00
02
04
06
08
10
LBS X 10-2
CH 21 VS CH 2 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



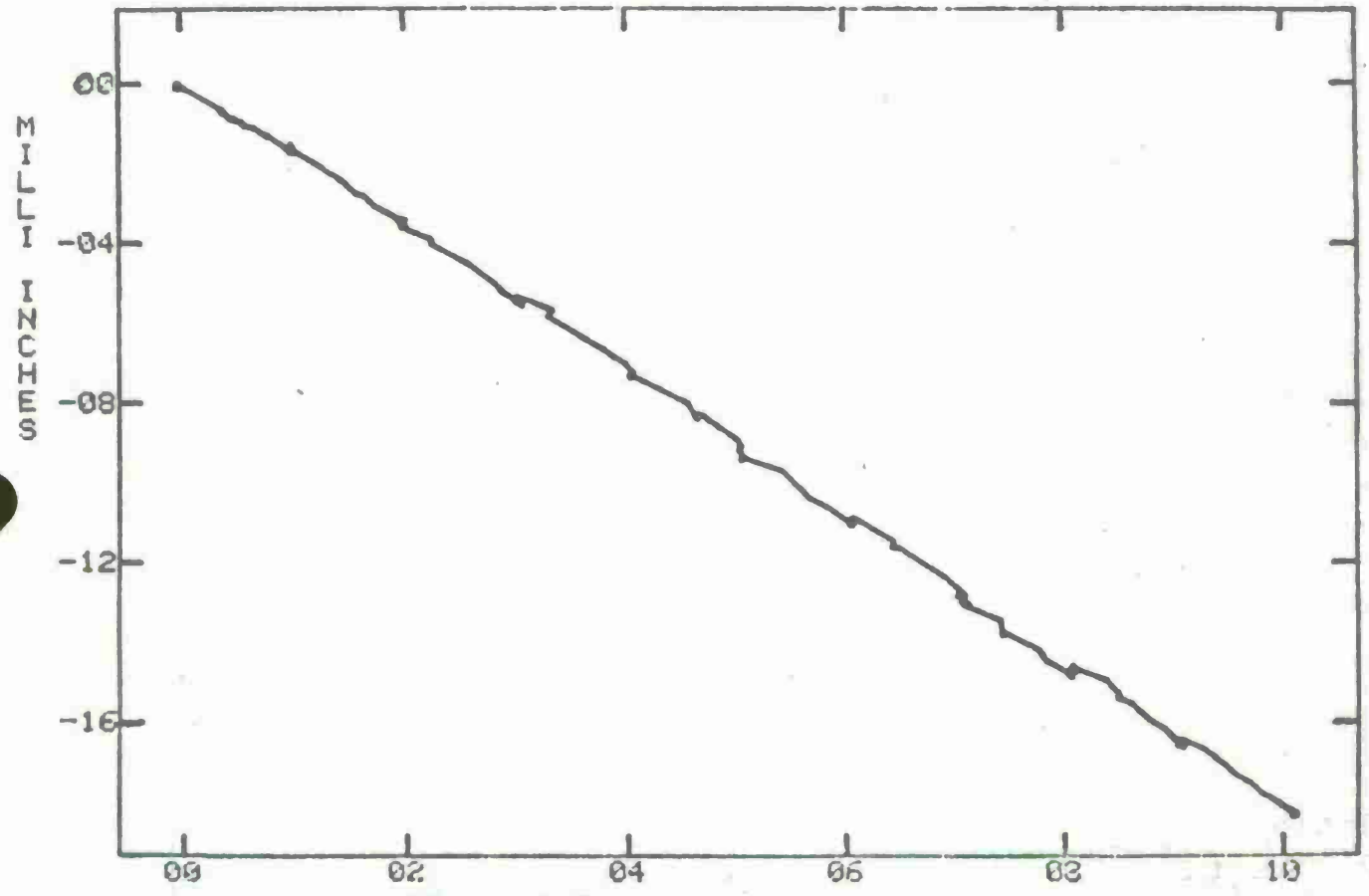
CH 21 VS CH 3 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



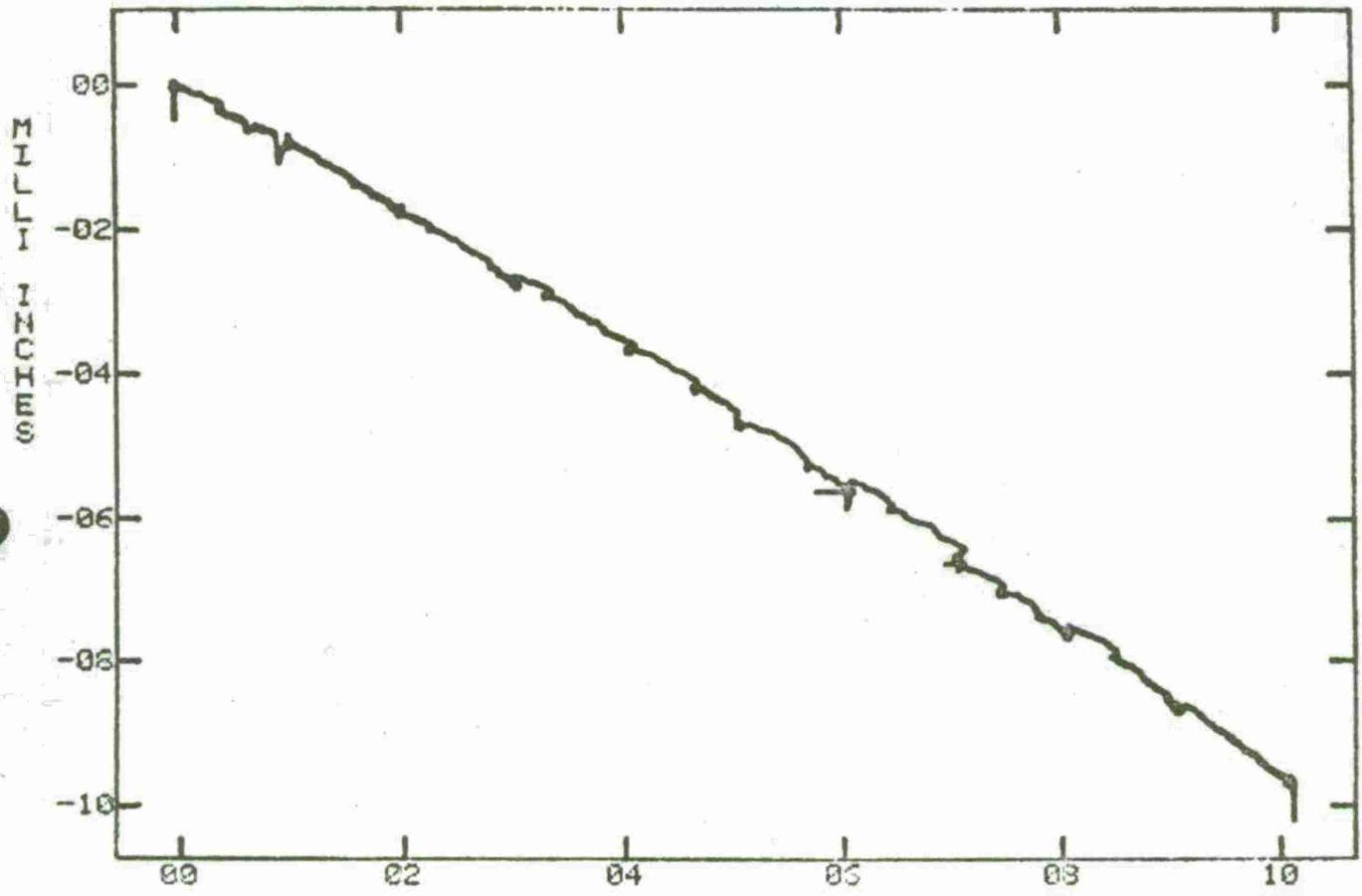
CH 21 VS CH 4 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



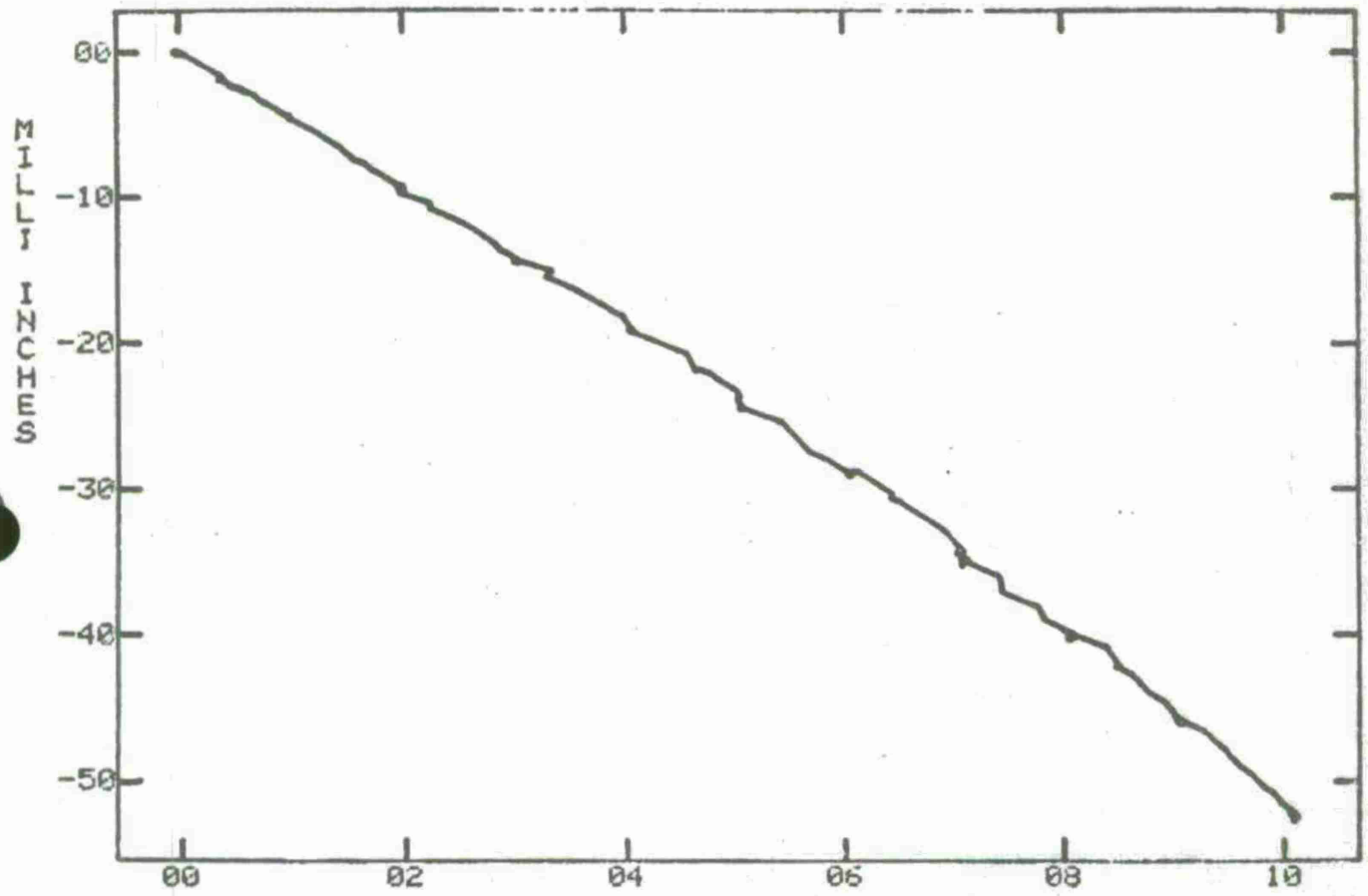
CH 21 VS CH 5 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



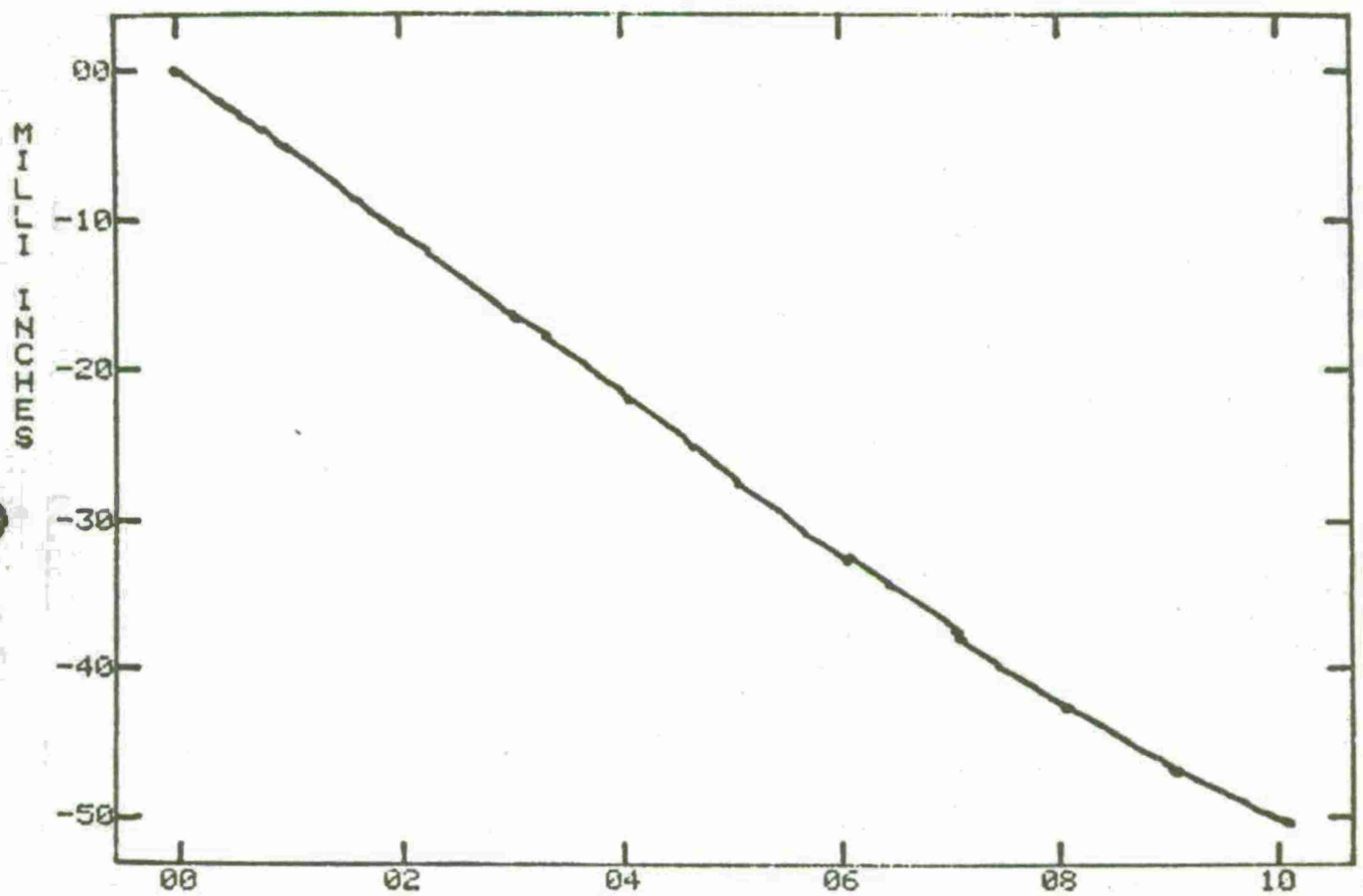
CH 21 VS CH 6 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



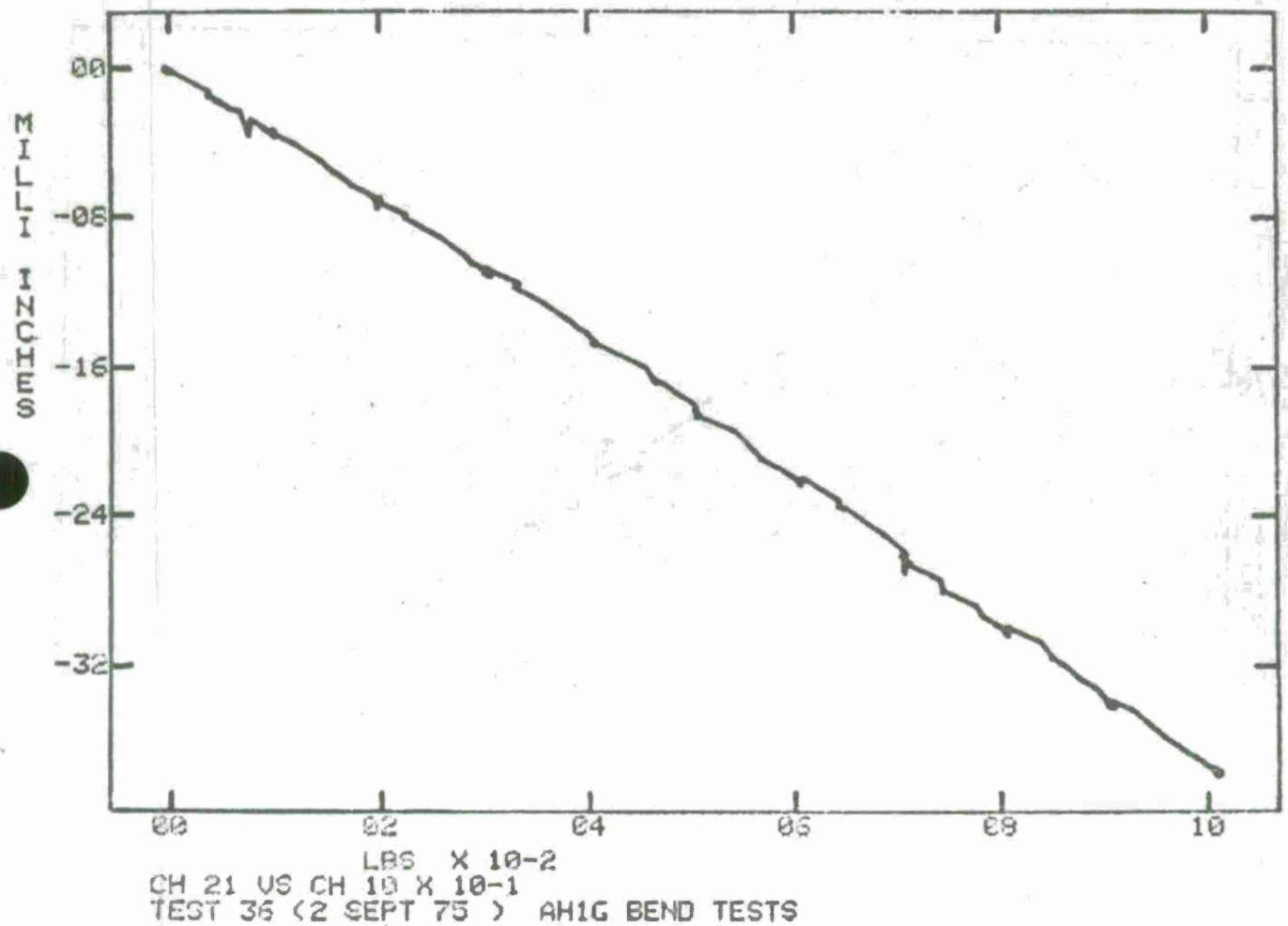
CH 21 VS CH 7 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



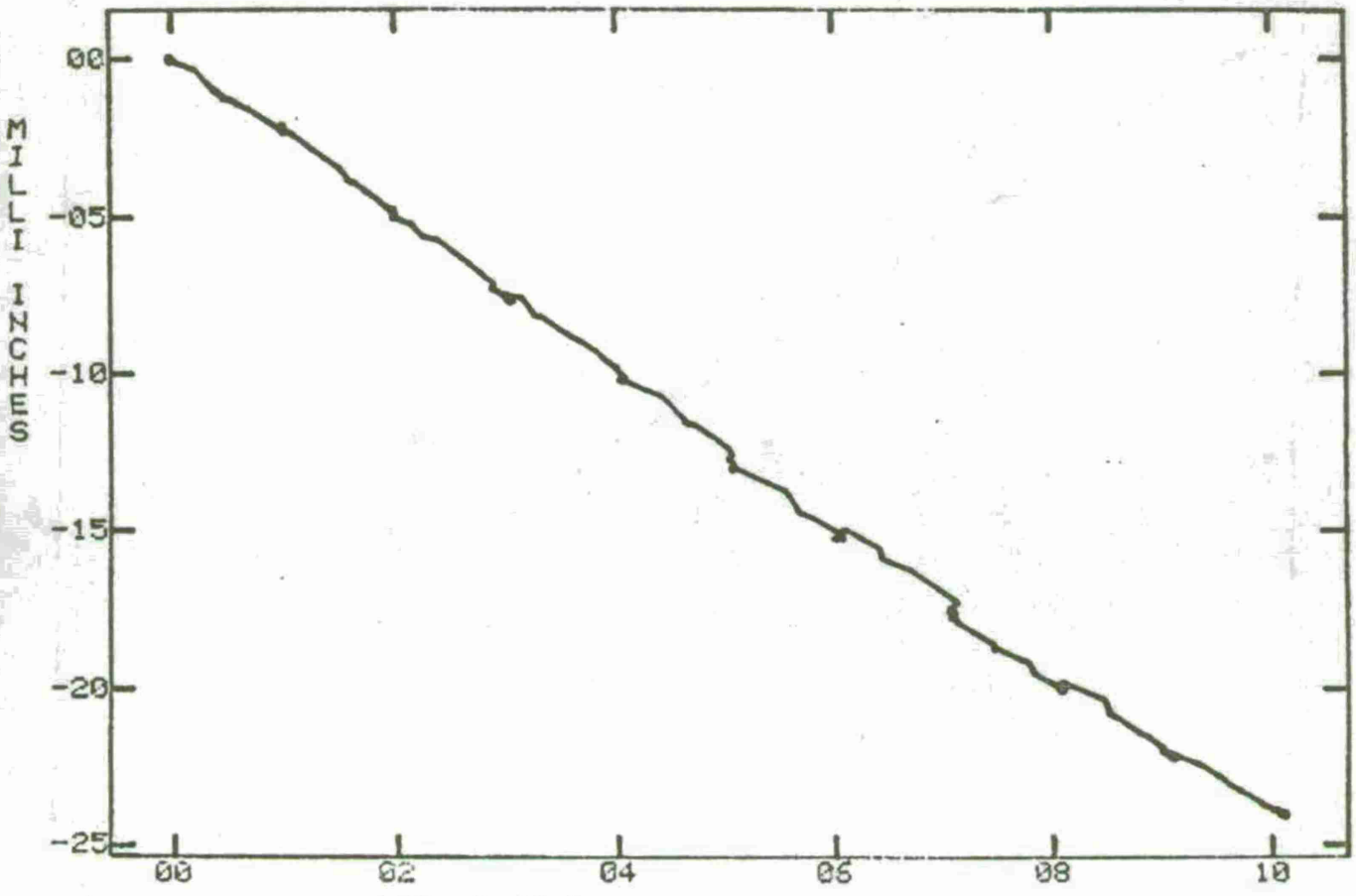
CH 21 VS CH 8 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



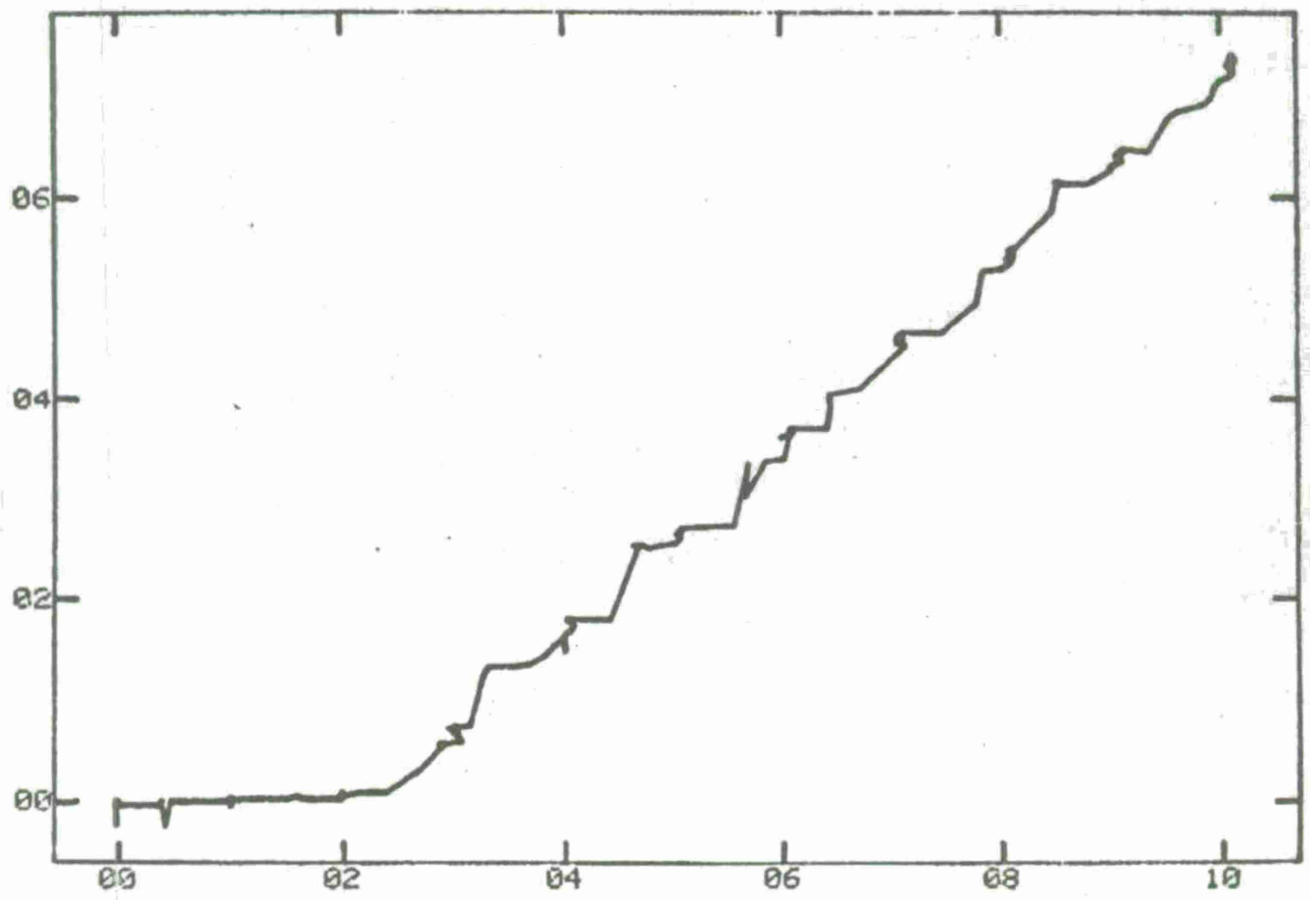
CH 21 VS CH 9 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



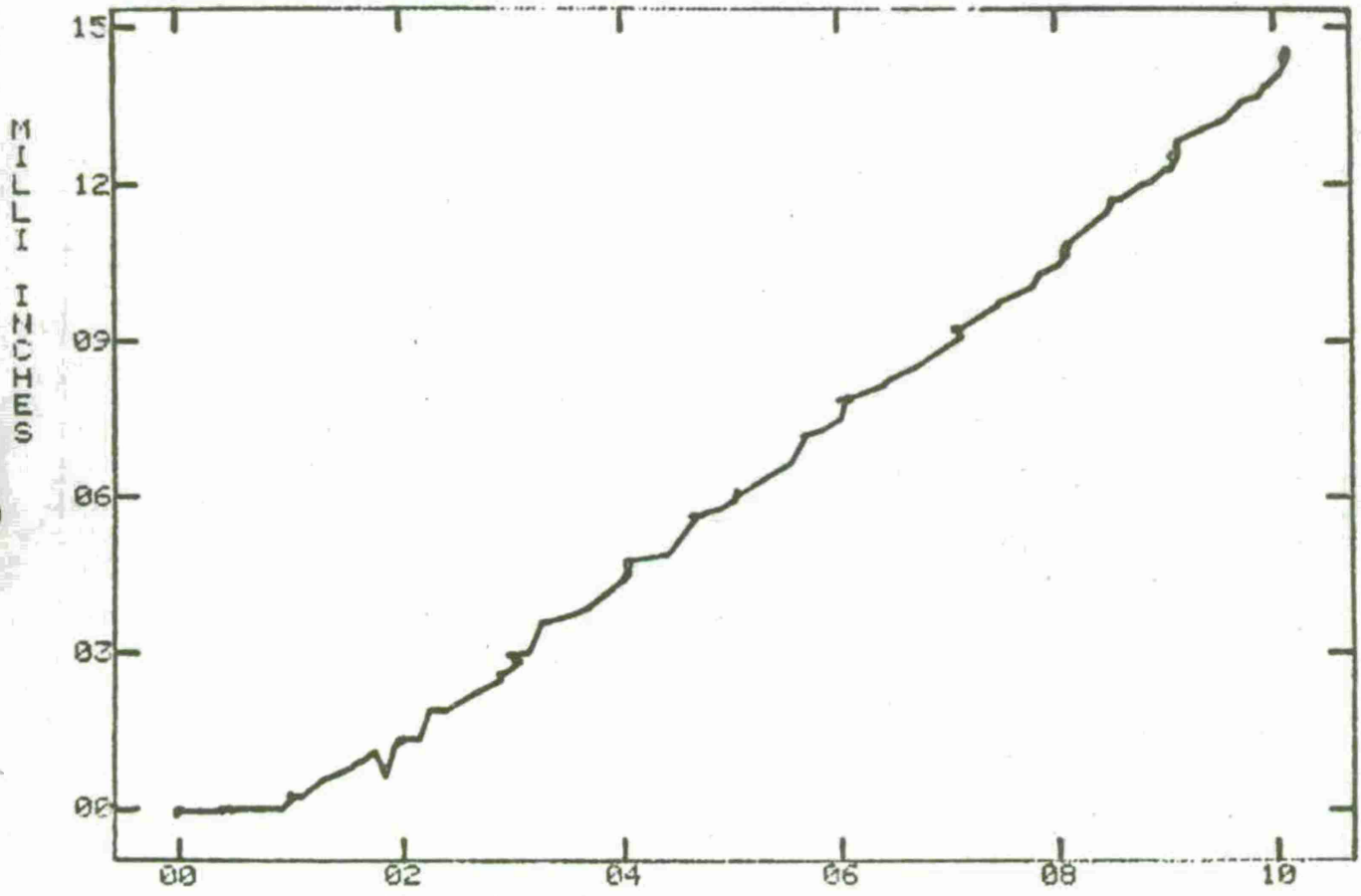
CH 21 VS CH 10 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



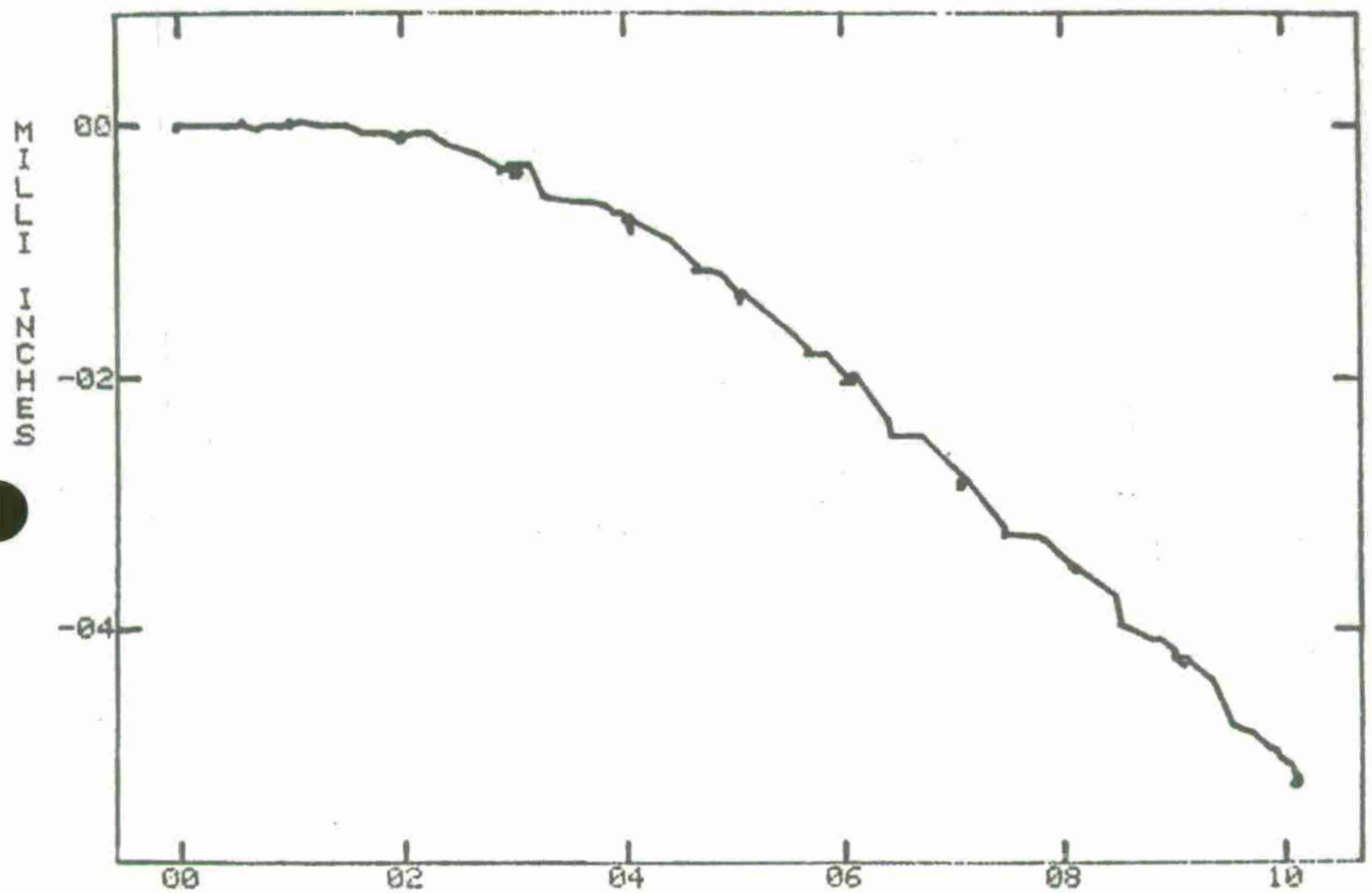
CH 21 VS CH 11 X 10-1
TEST 36 (2 SEPT 75) AH1G BEND TESTS



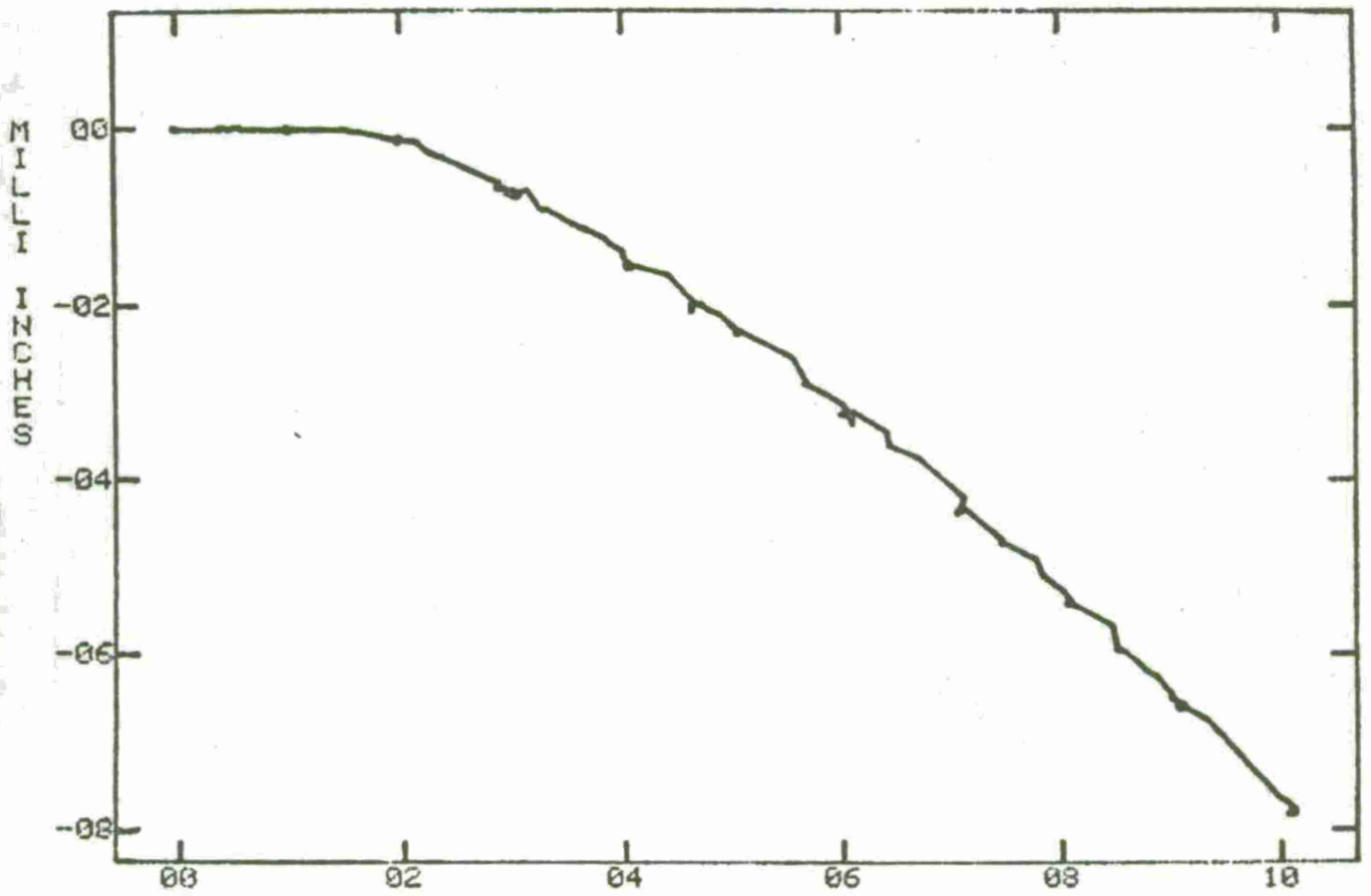
CH 21 VS CH 12 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 13 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 14 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
00
-02
-04
-06
-08
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02
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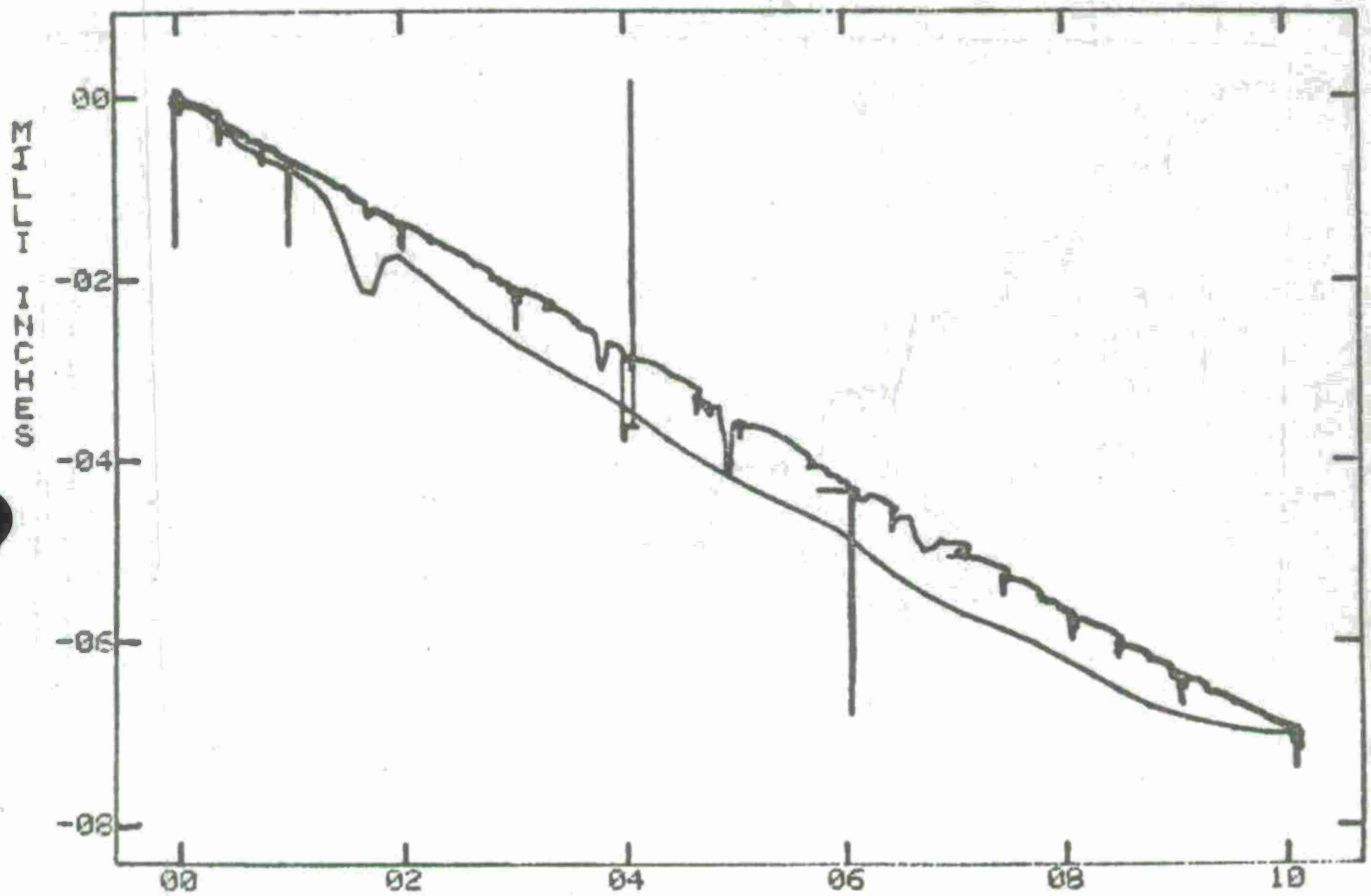
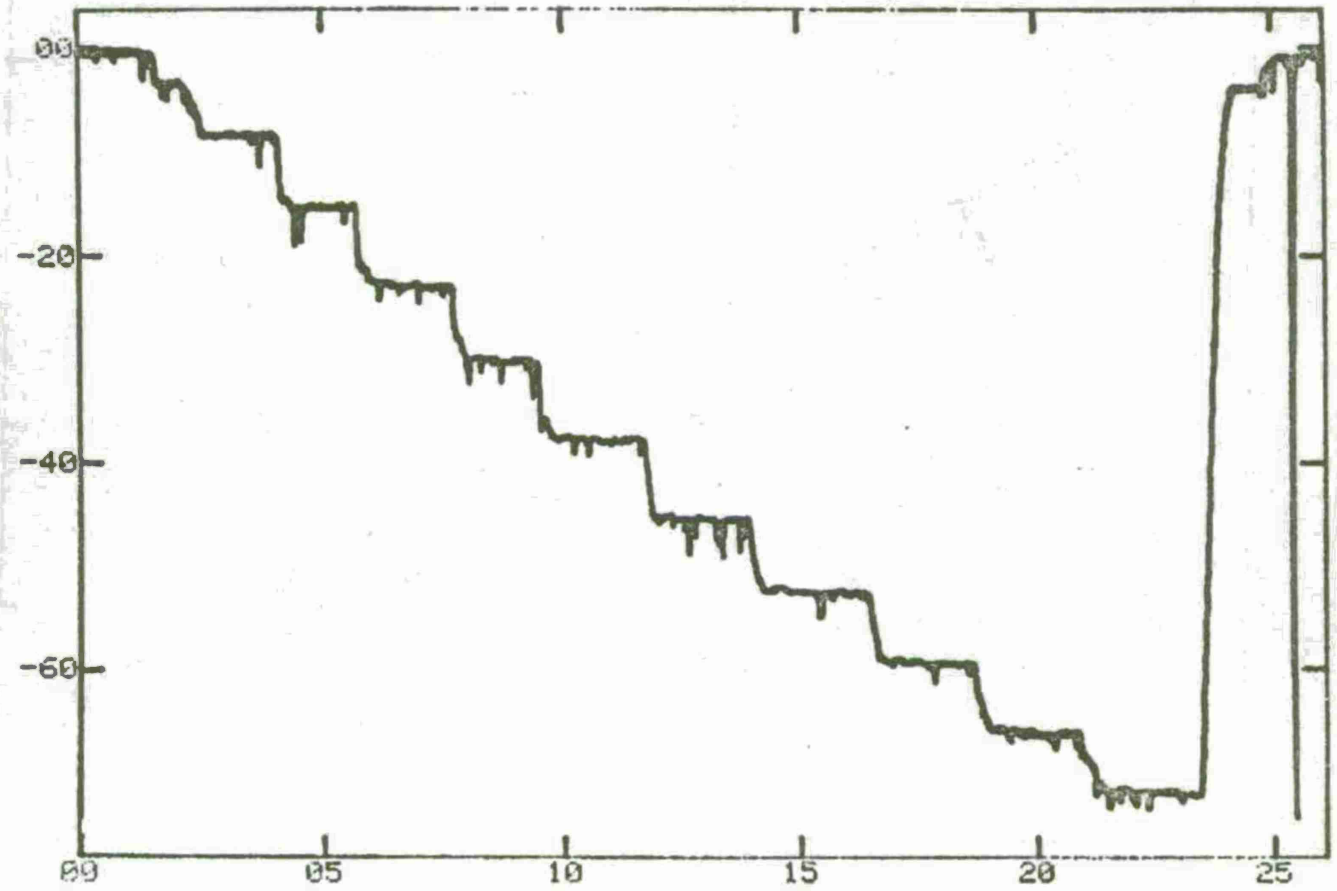
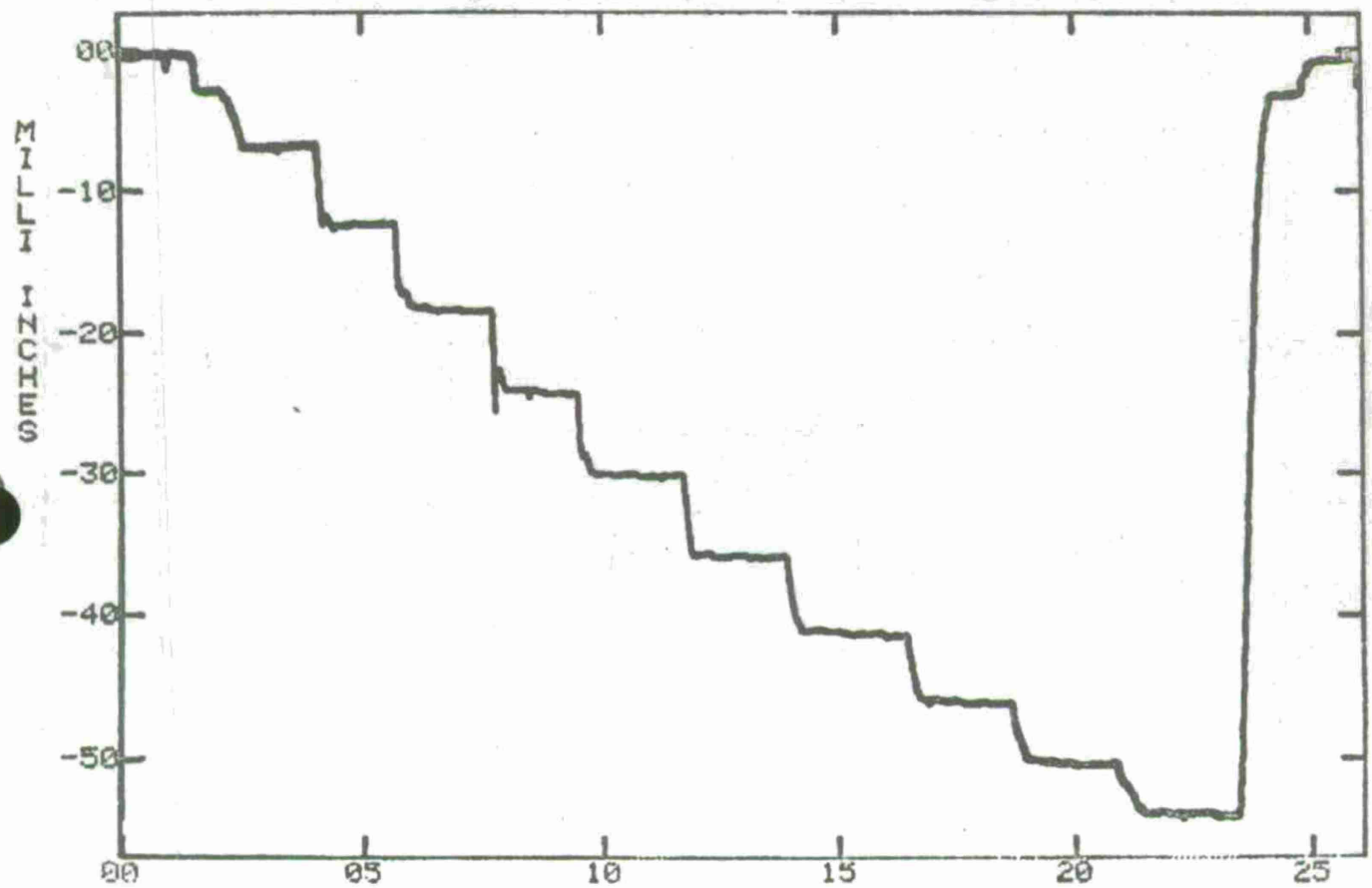
10
LBS X 10-2
CH 21 VS CH 15 X 10+0
TEST 36 (2 SEPT 75) AH1G BEND TESTS



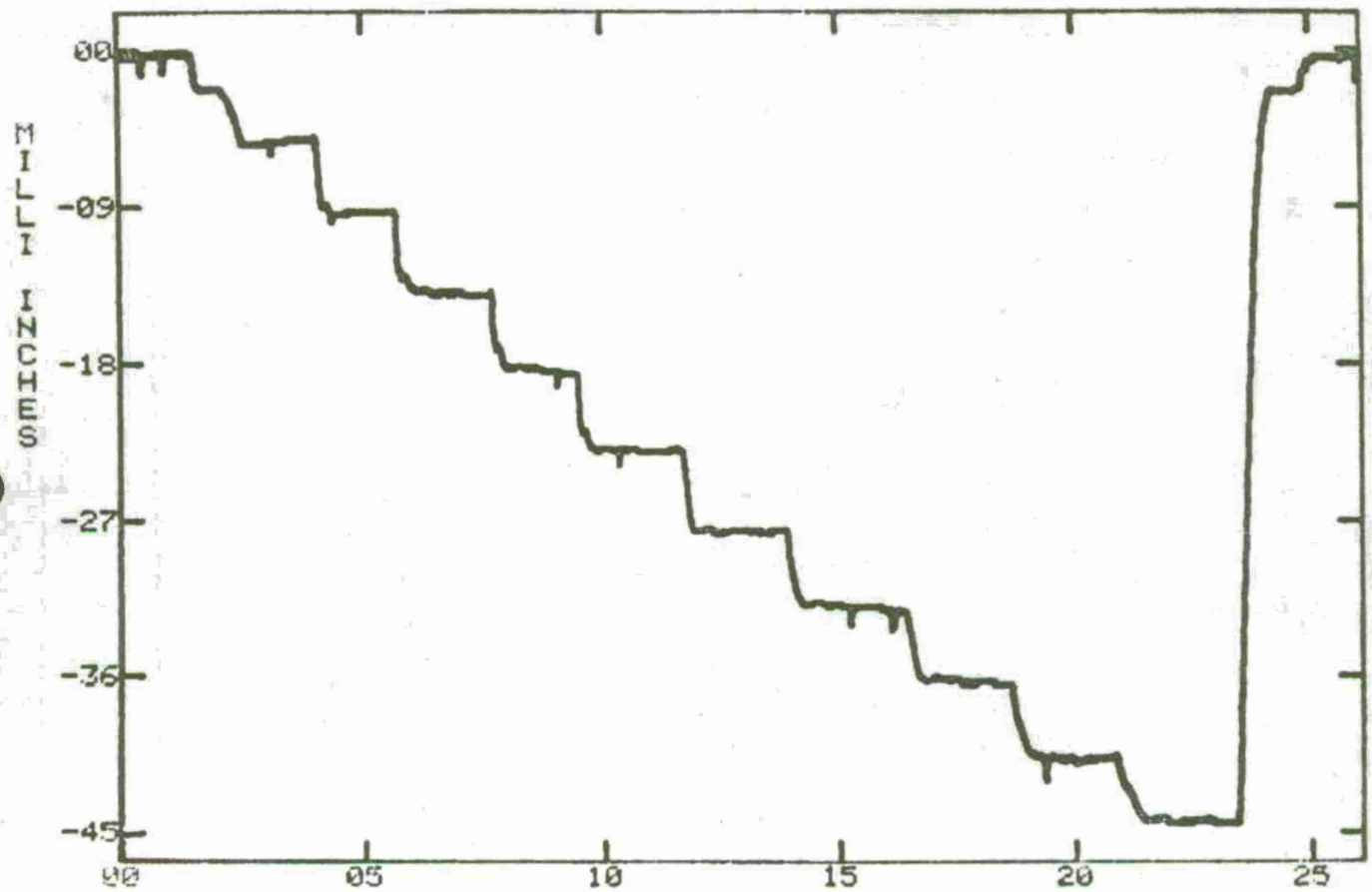
CH 21 LOAD APPLIED X 10-2
TEST 36 (2 SEPT 75) AH1G BEND TESTS



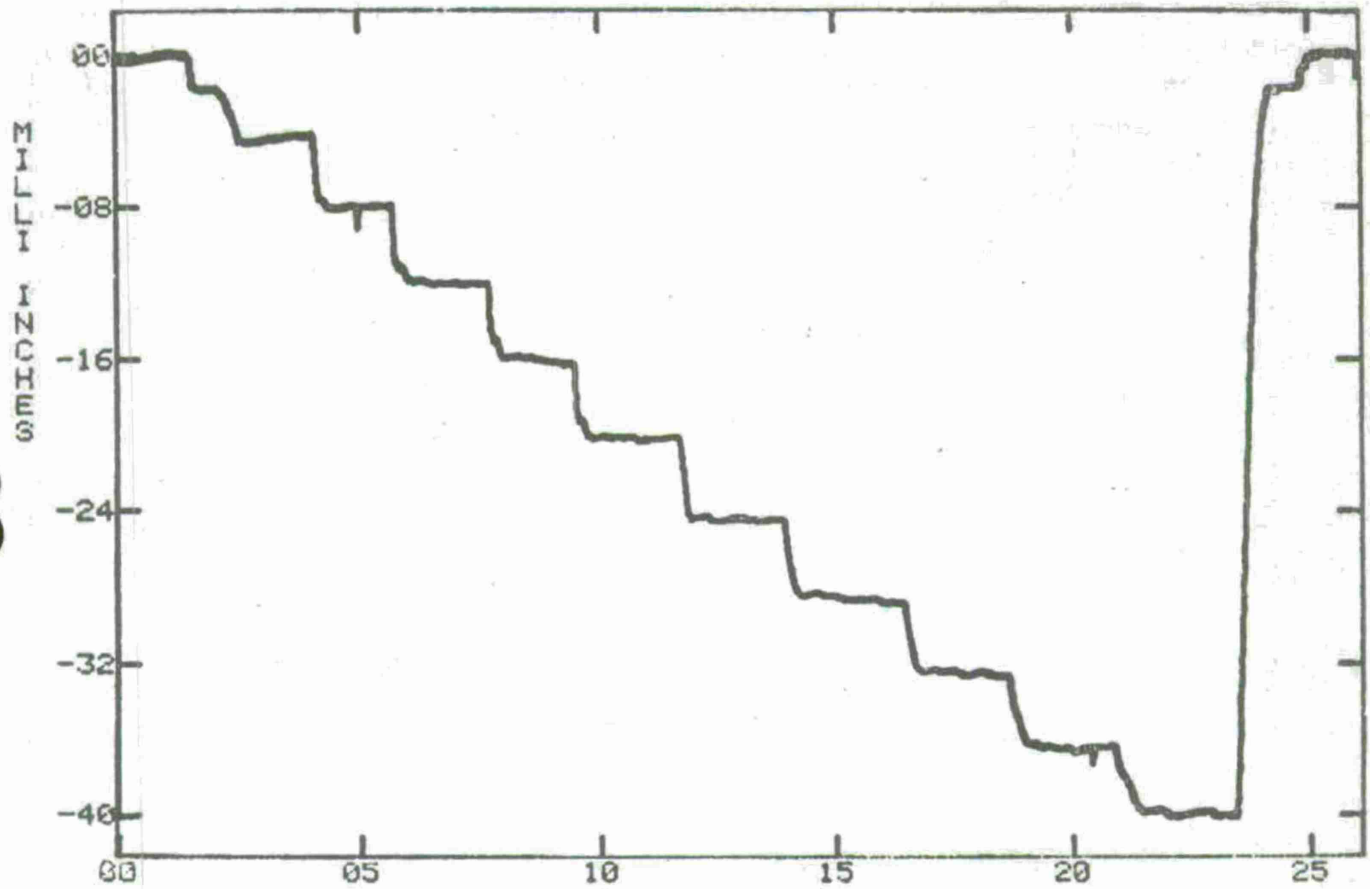
CH 1 LATERAL DEFLECTION ST 61.25 - WL 44.50 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



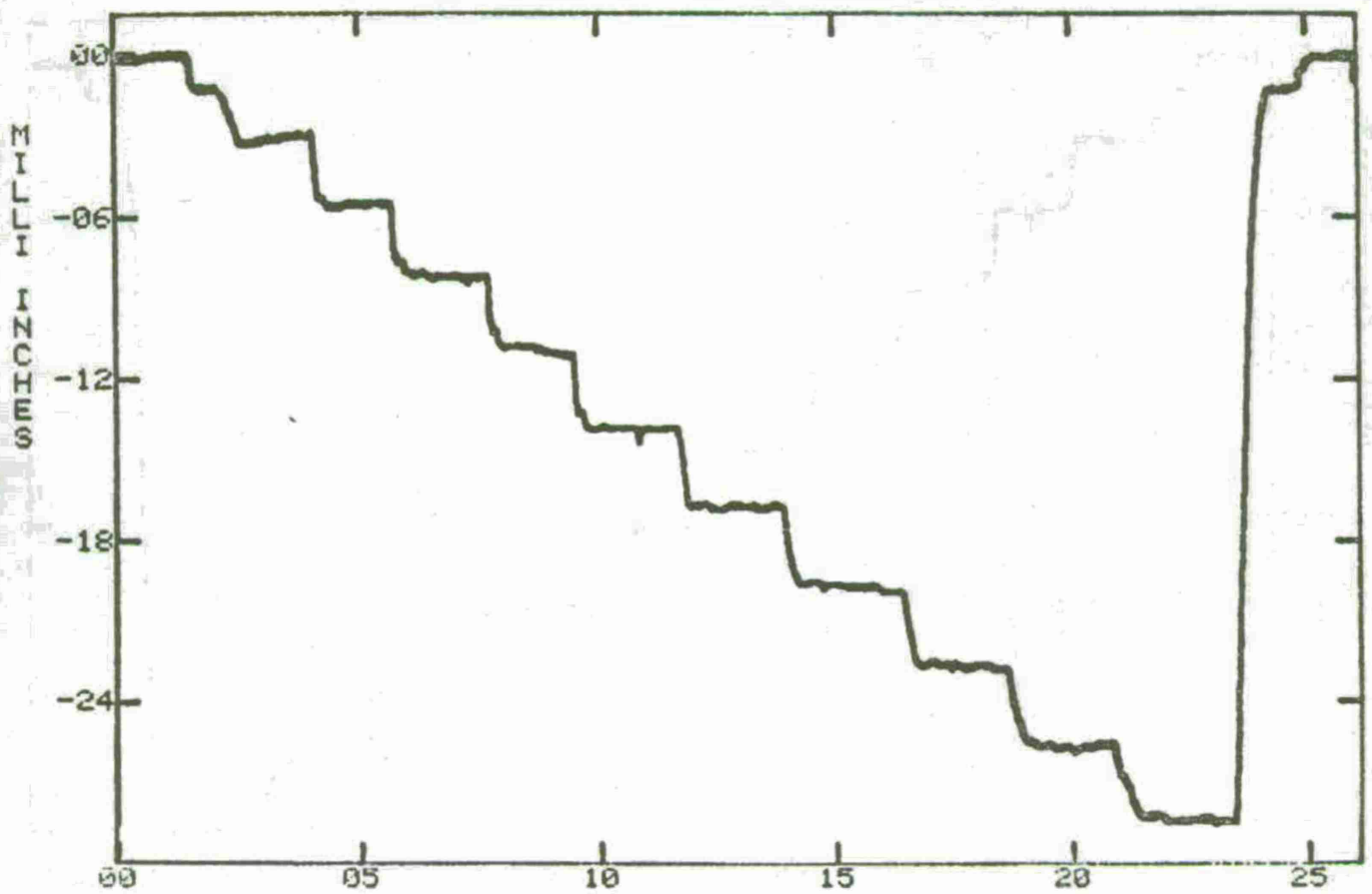
CH 2 LATERAL DEFLECTION ST 93.00 - WL 44.50 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



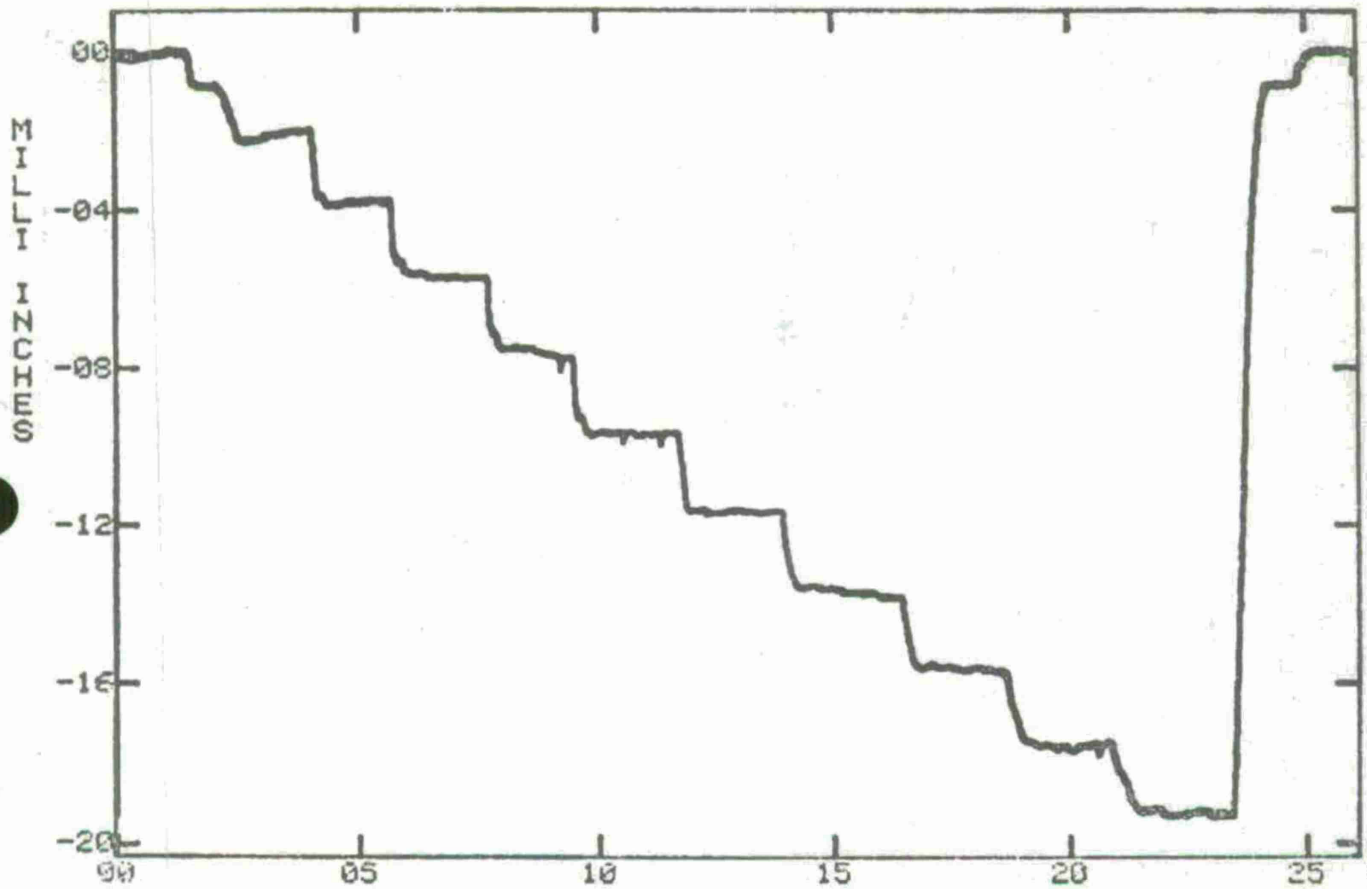
CH 3 LATERAL DEFLECTION ST 133.70 - WL 44.50 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



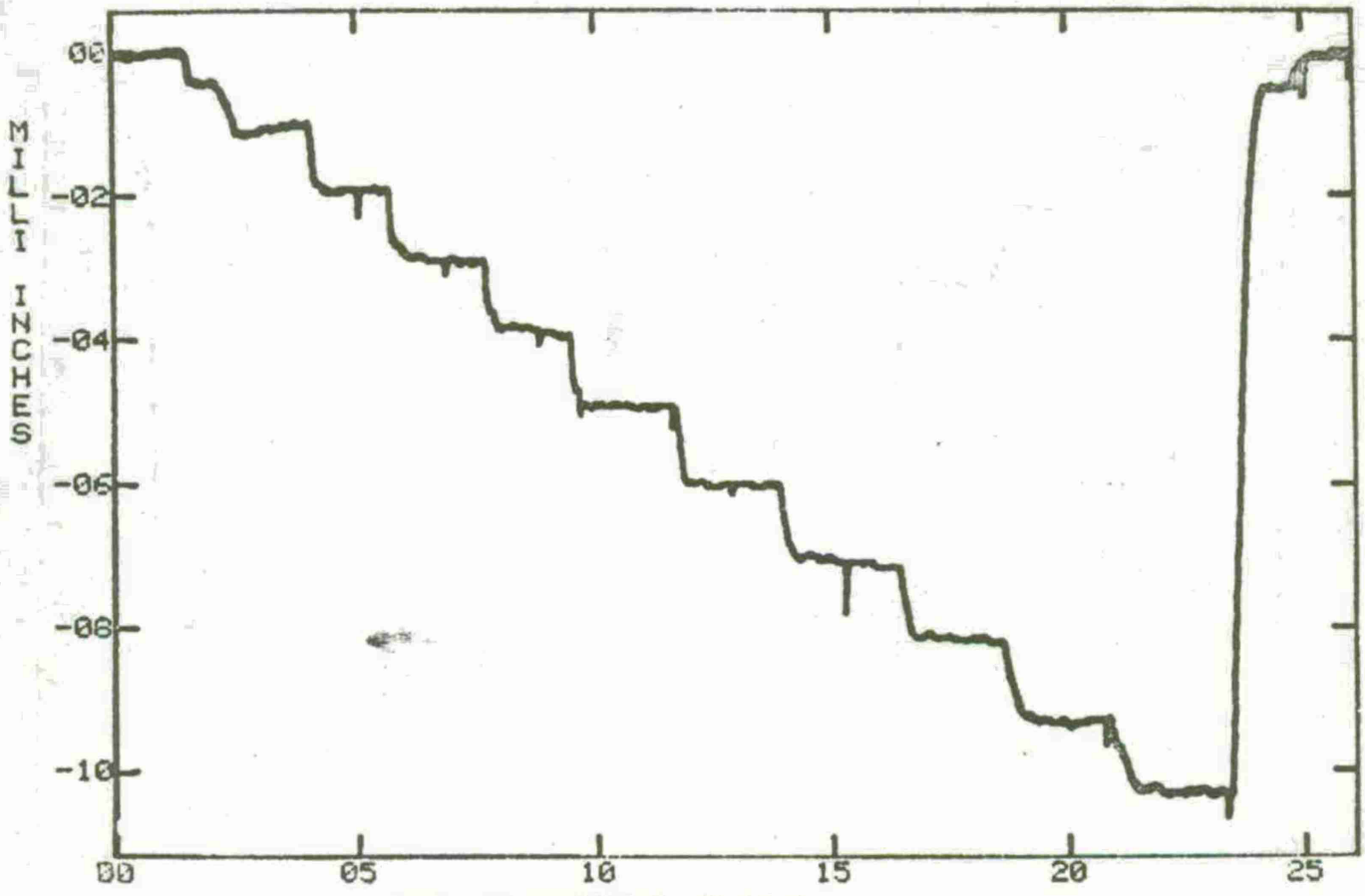
CH 4 LATERAL DEFLECTION ST 148.50 - WL 35.97 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



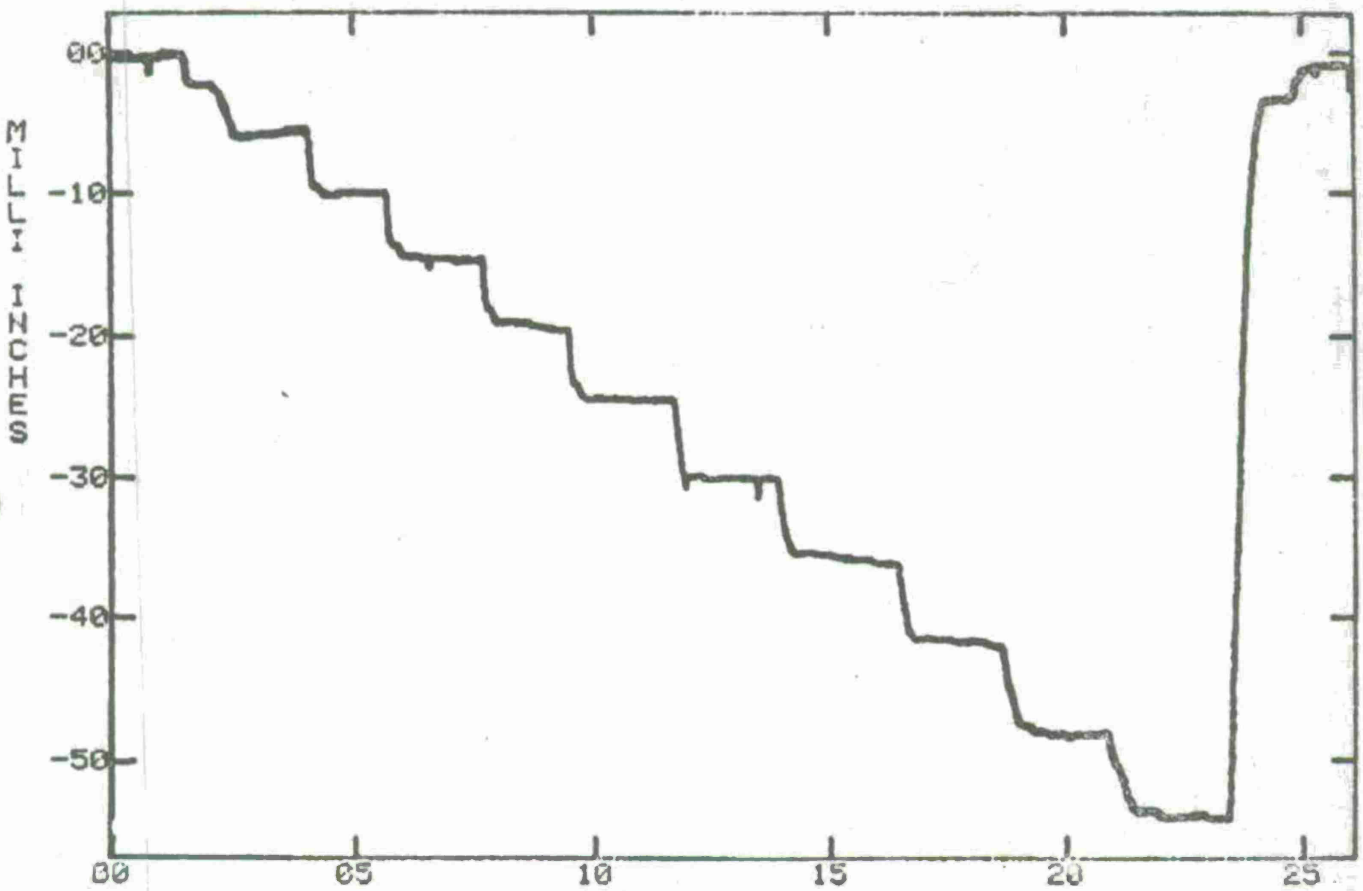
CH 5 LATERAL DEFLECTION ST 186.25 - WL 35.97 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



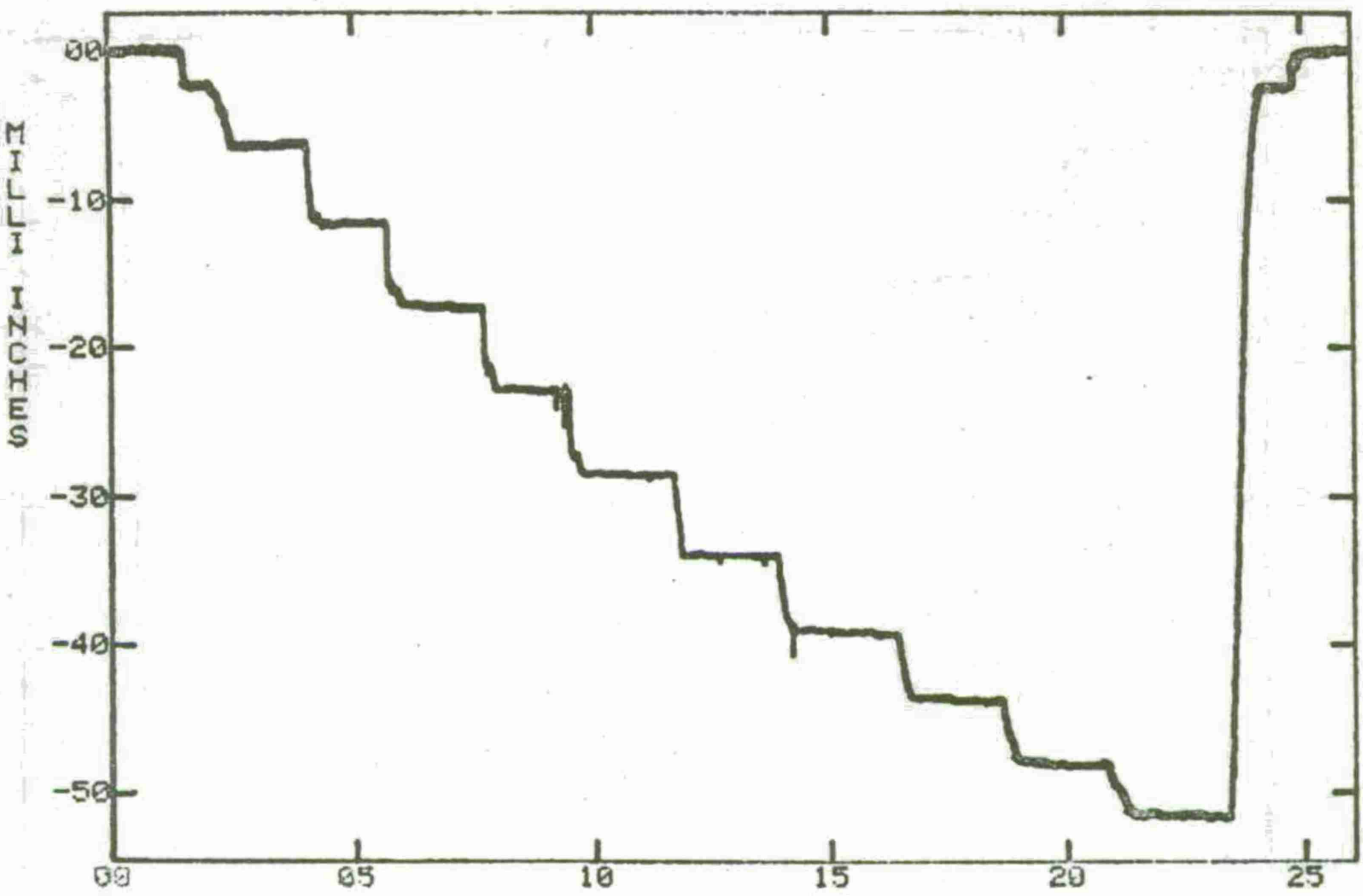
CH 6 LATERAL DEFLECTION ST 213.94 - WL 35.97 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



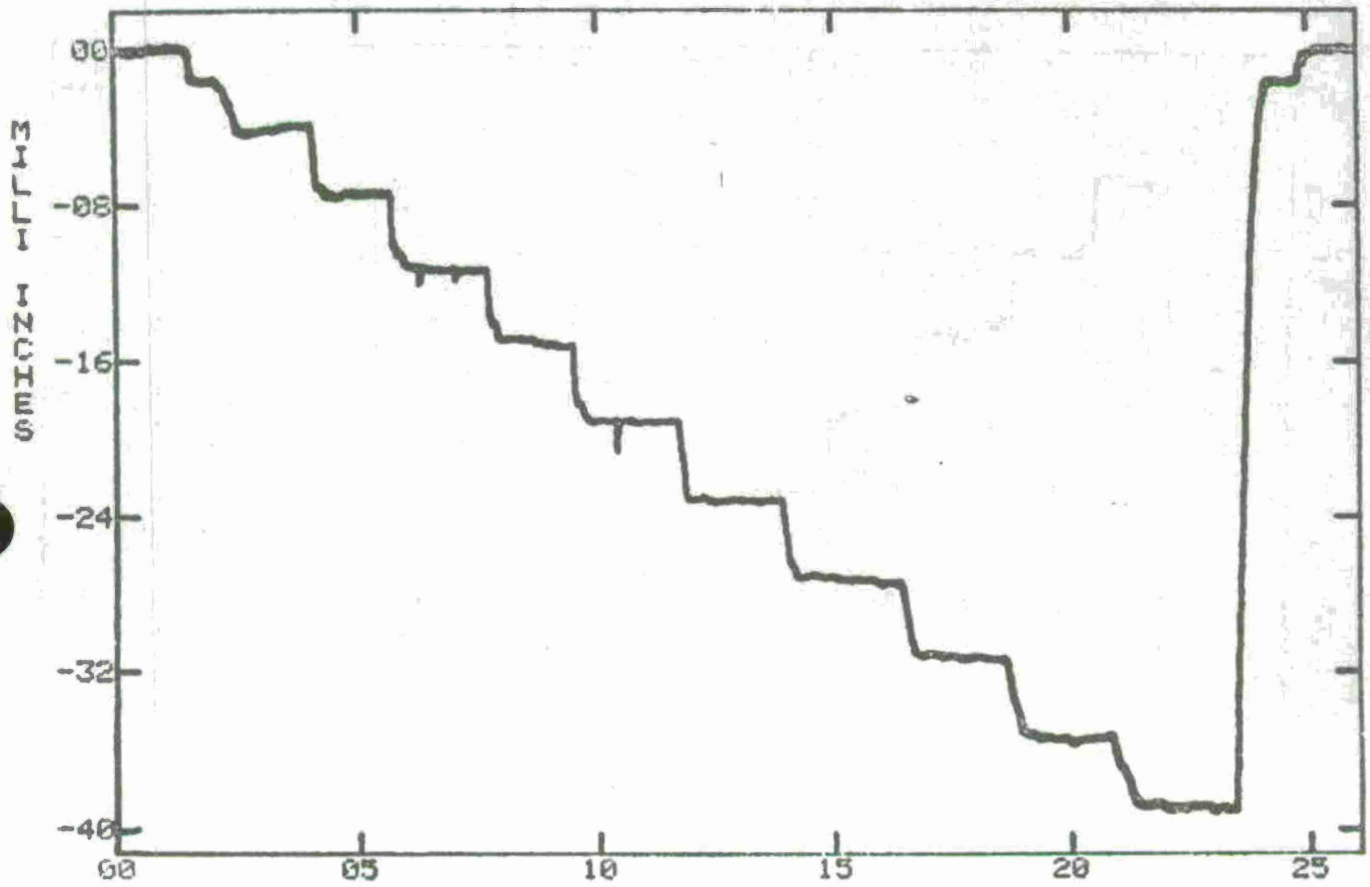
CH 7 LATERAL DEFLECTION ST 250.00 - WL 35.97 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



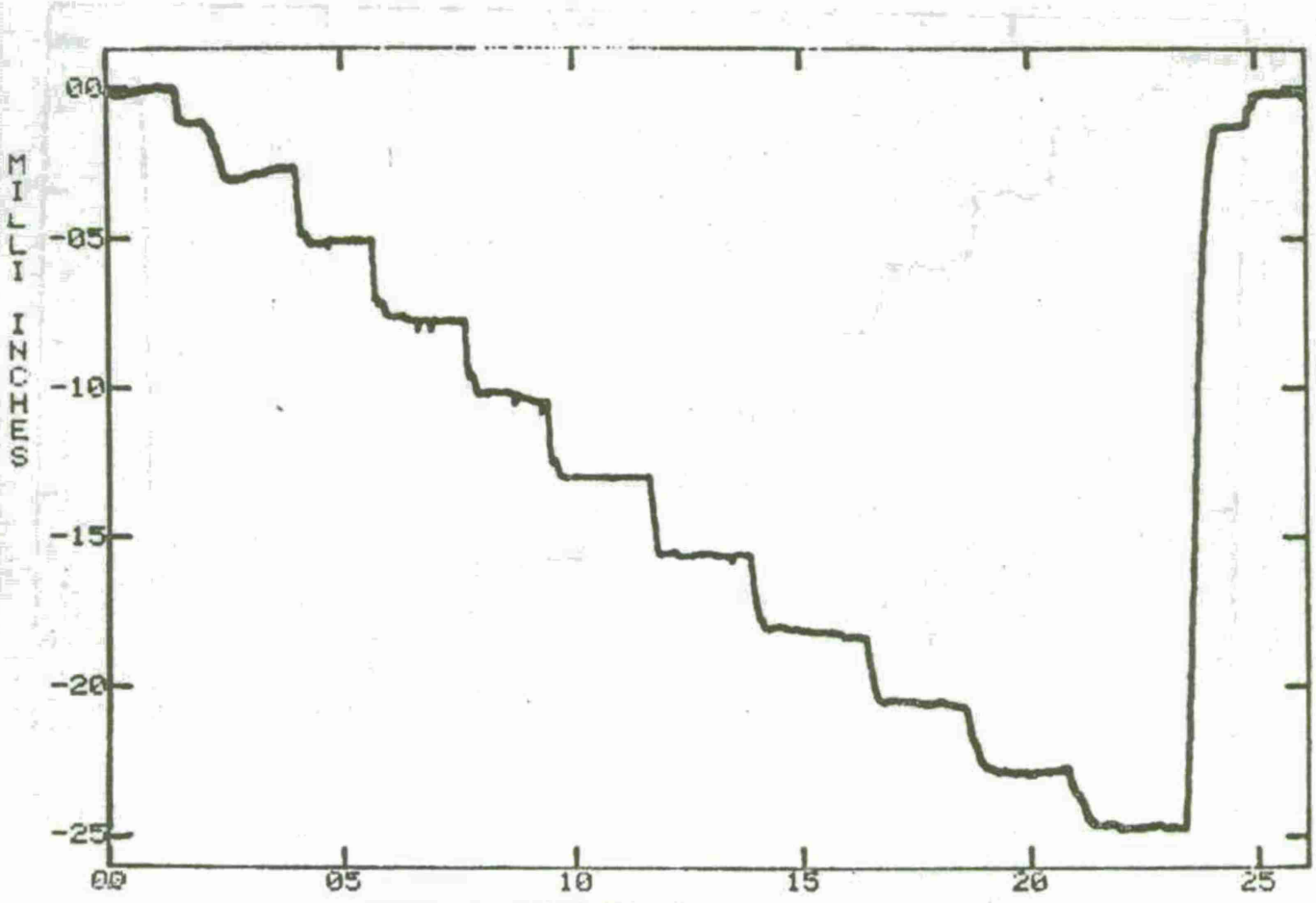
CH 8 LATERAL DEFLECTION ST 270.00 - WL 35.97 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



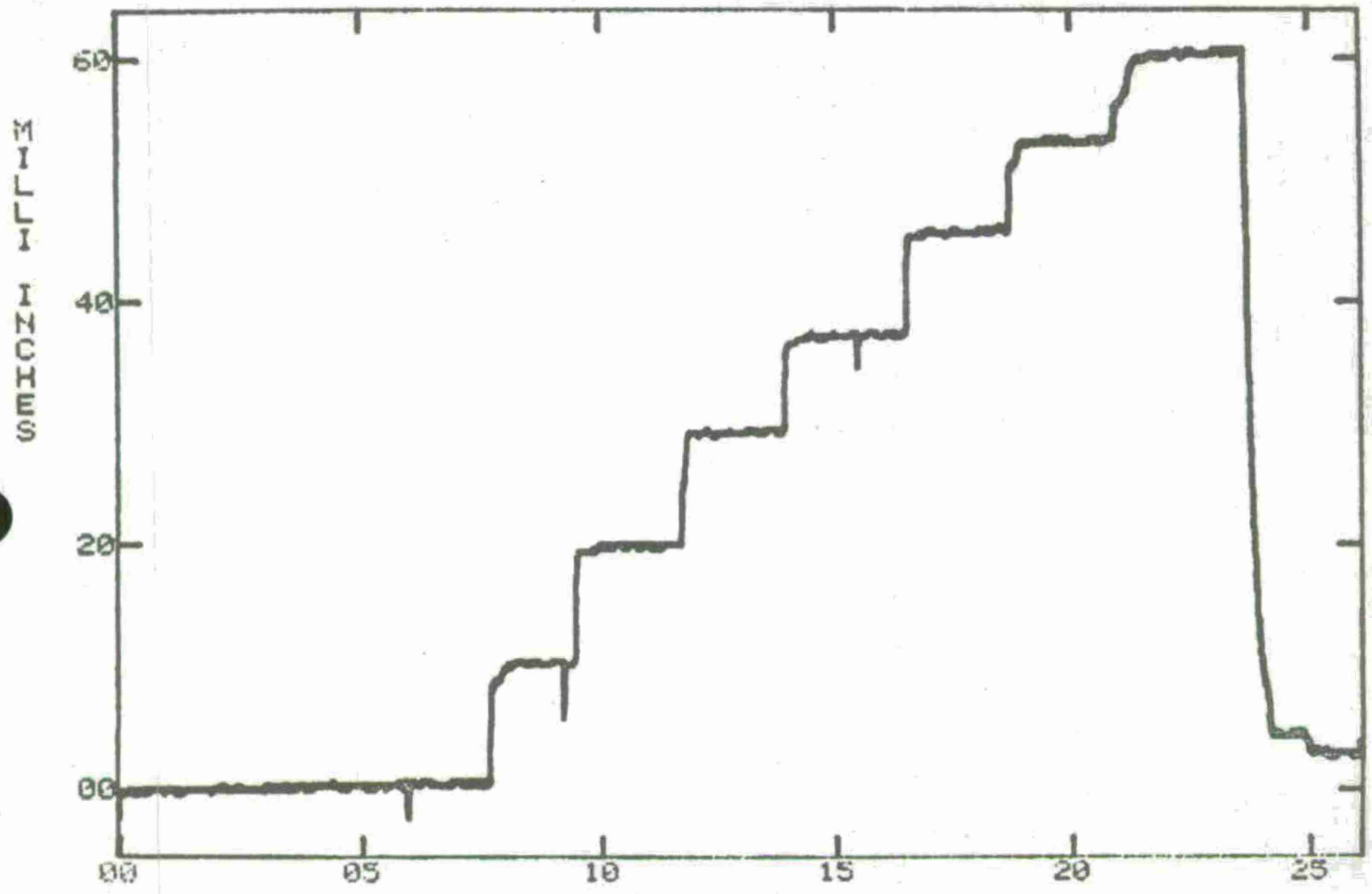
CH 9 LATERAL DEFLECTION ST 96.00 - WL 62.17 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



CH 10 LATERAL DEFLECTION ST 148.50 - WL 63.49 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 11 LATERAL DEFLECTION ST 213.94 - WL 65.00 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
60
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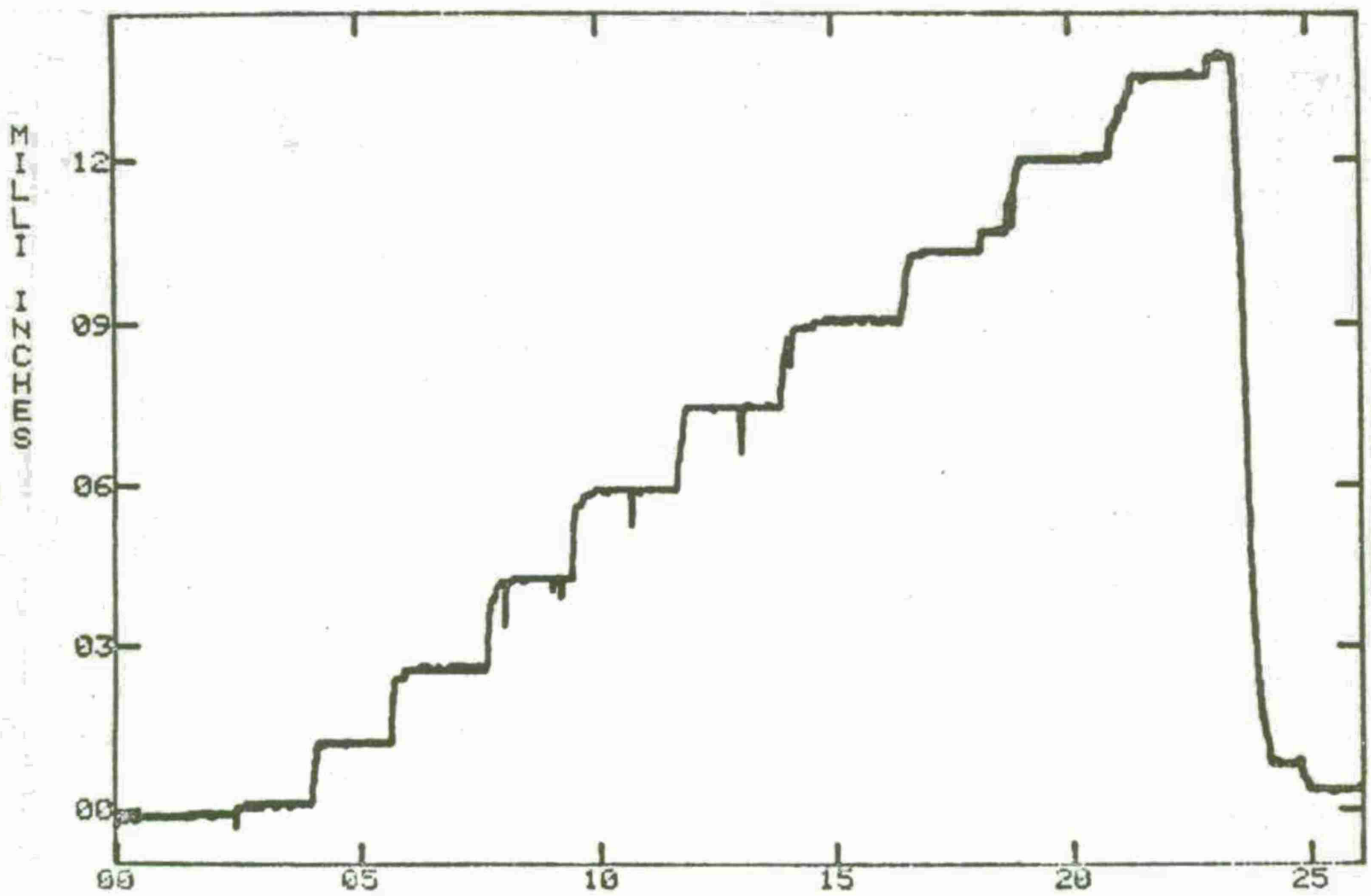
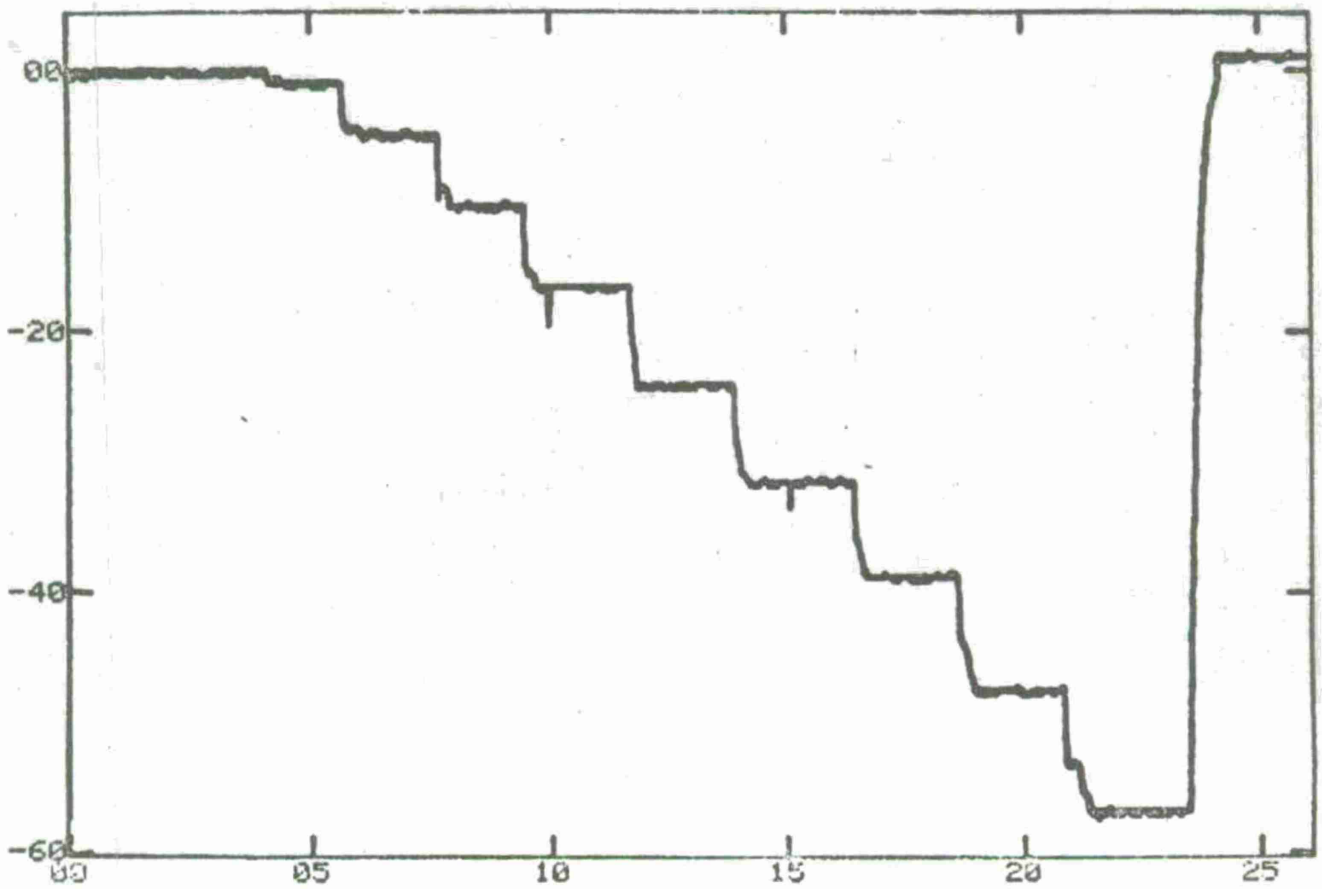
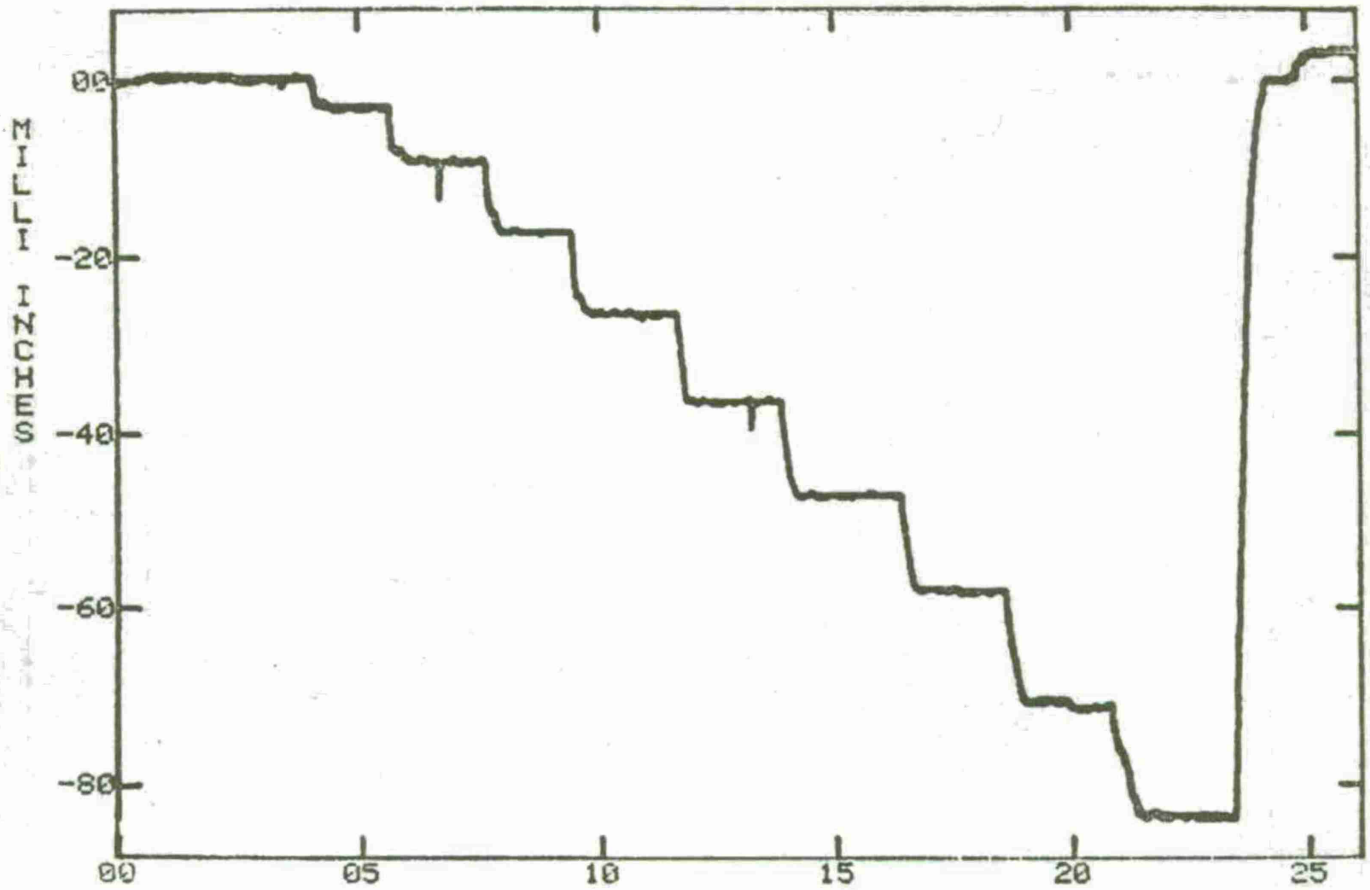
25
TIME IN SECONDS X 10-1
CH 12 BASE ROTATION TOP LEFT HAND X 10+1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



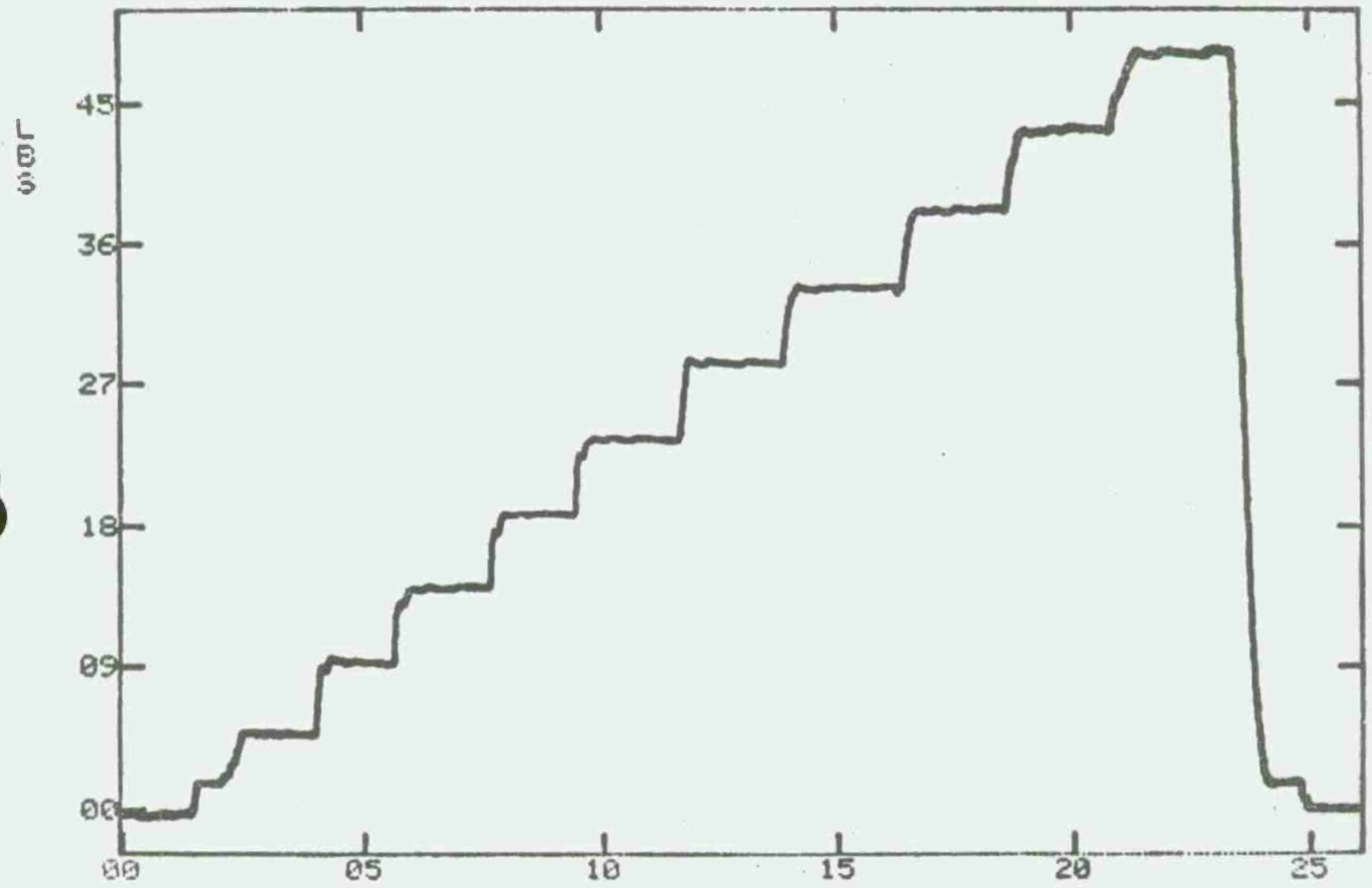
CH 13 BASE ROTATION BOTTOM LEFT HAND X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



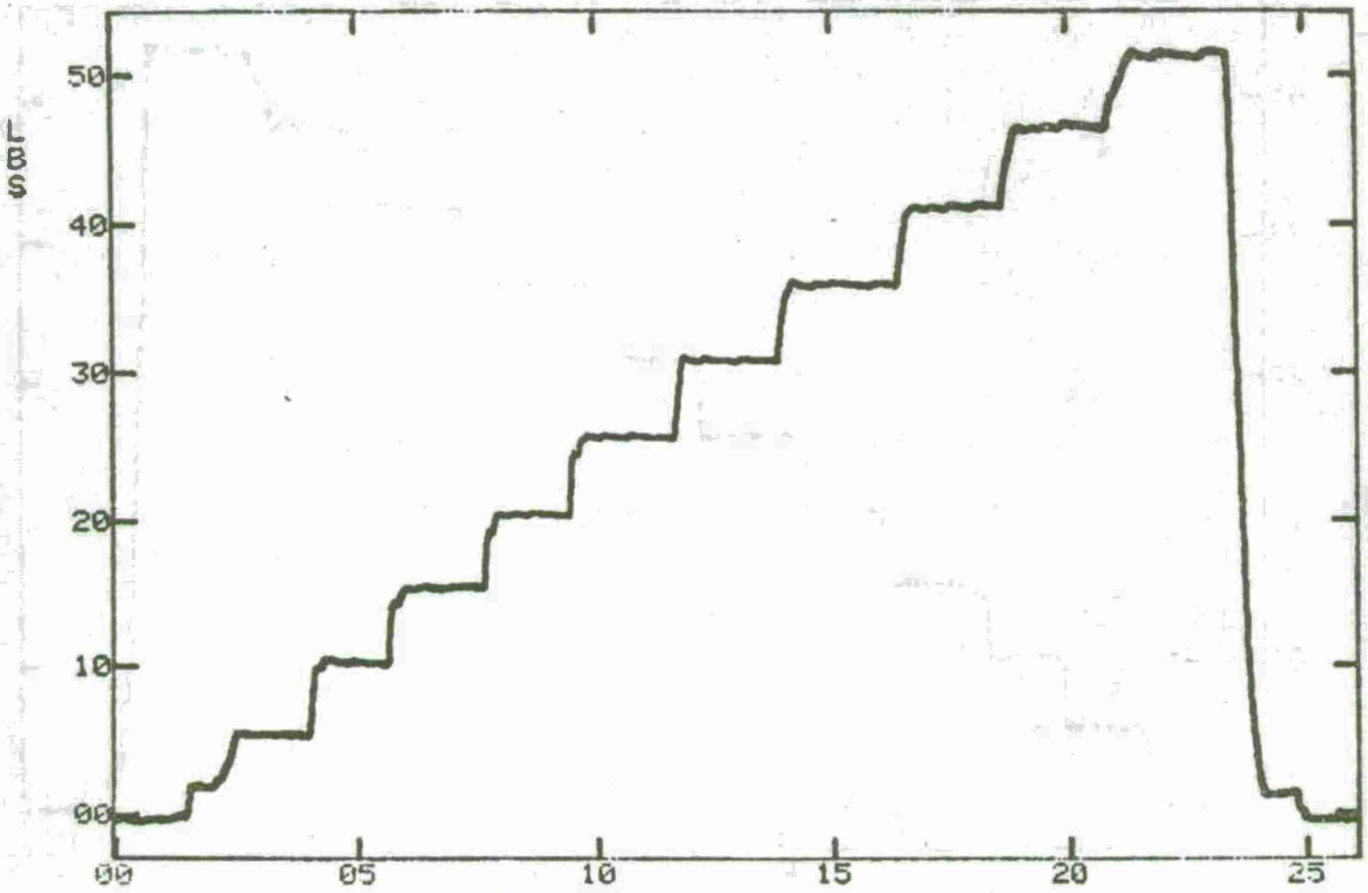
CH 14 BASE ROTATION TOP RIGHT HAND X 10+1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



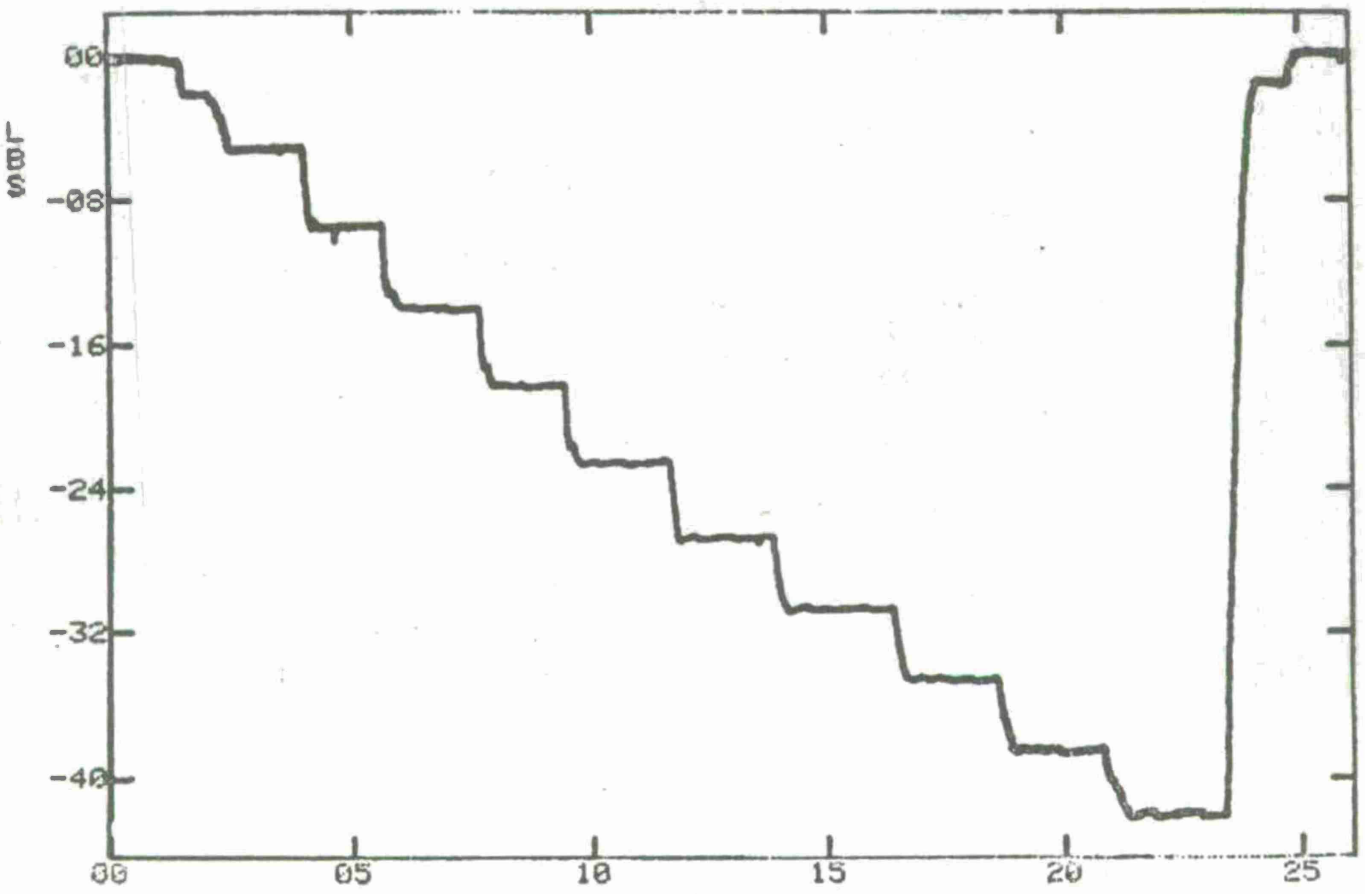
CH 15 BASE ROTATION BOTTOM RIGHT HAND X 10+1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 17 BASE LOAD TOP LEFT HAND X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS



CH 18 BASE LOAD BOTTOM LEFT HAND X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS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-32
-40
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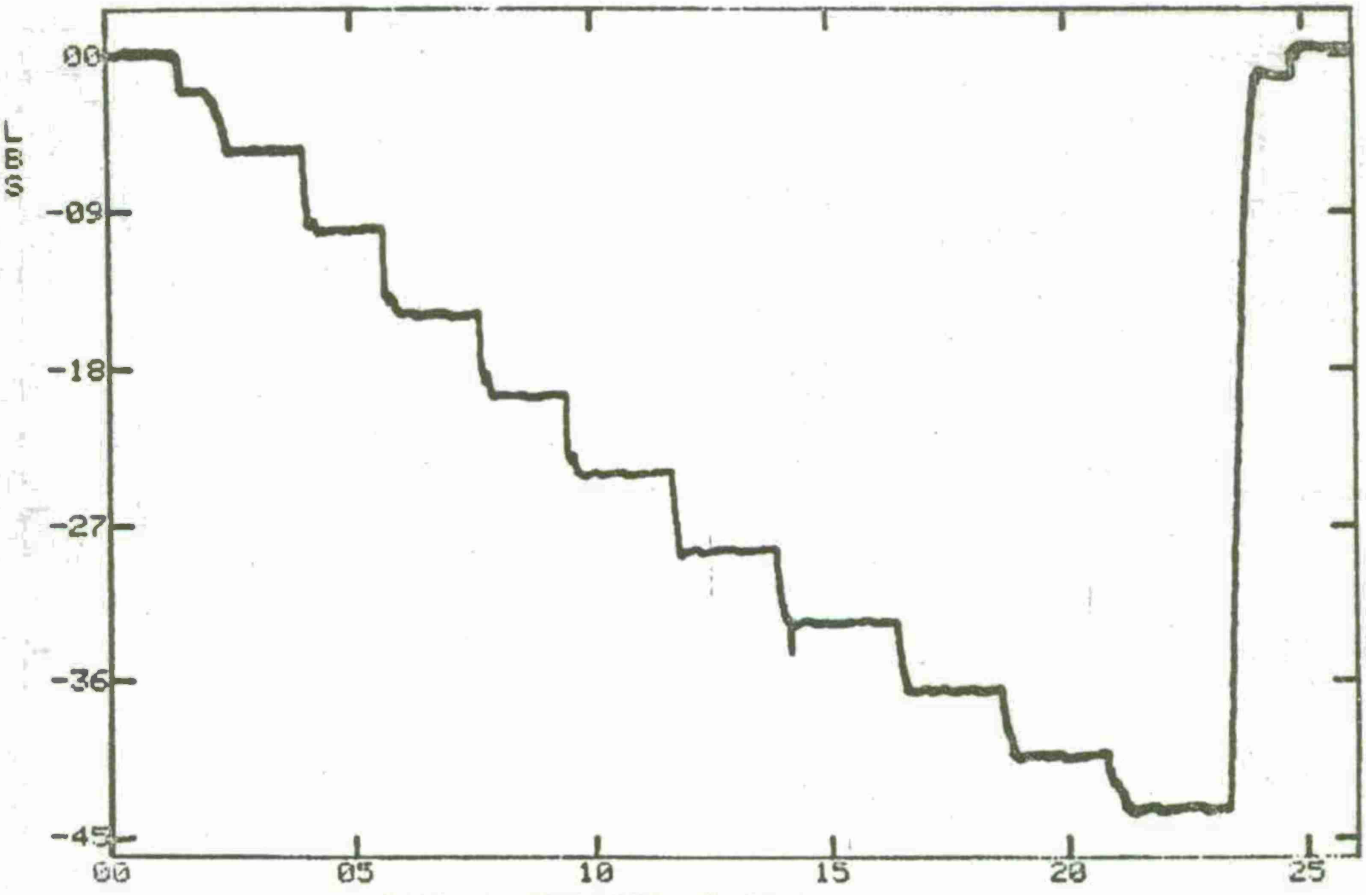
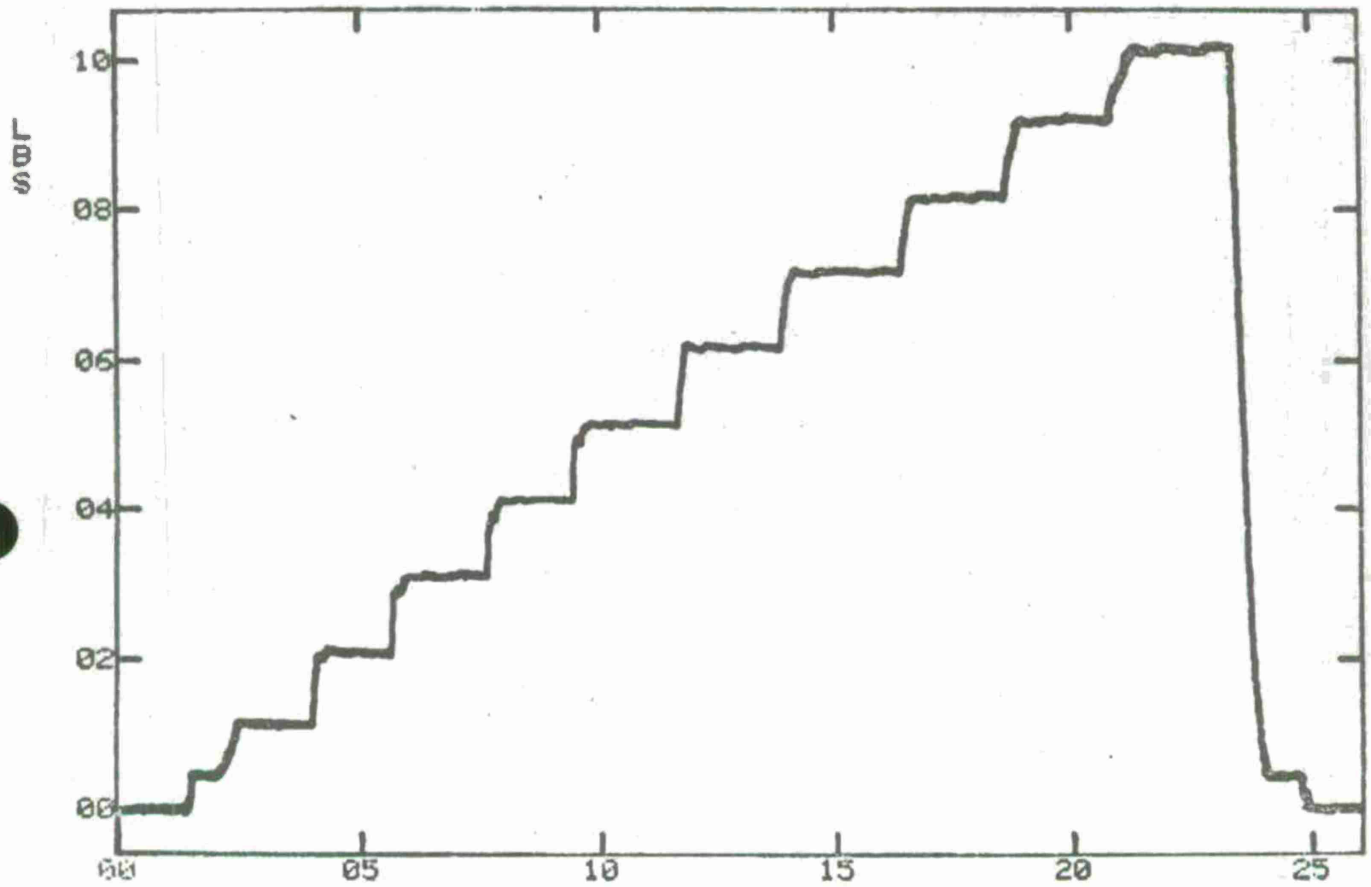
TIME IN SECONDS X 10-1
CH 19 BASE LOAD TOP RIGHT HAND X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 20 BASE LOAD BOTTOM RIGHT HAND X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS


10
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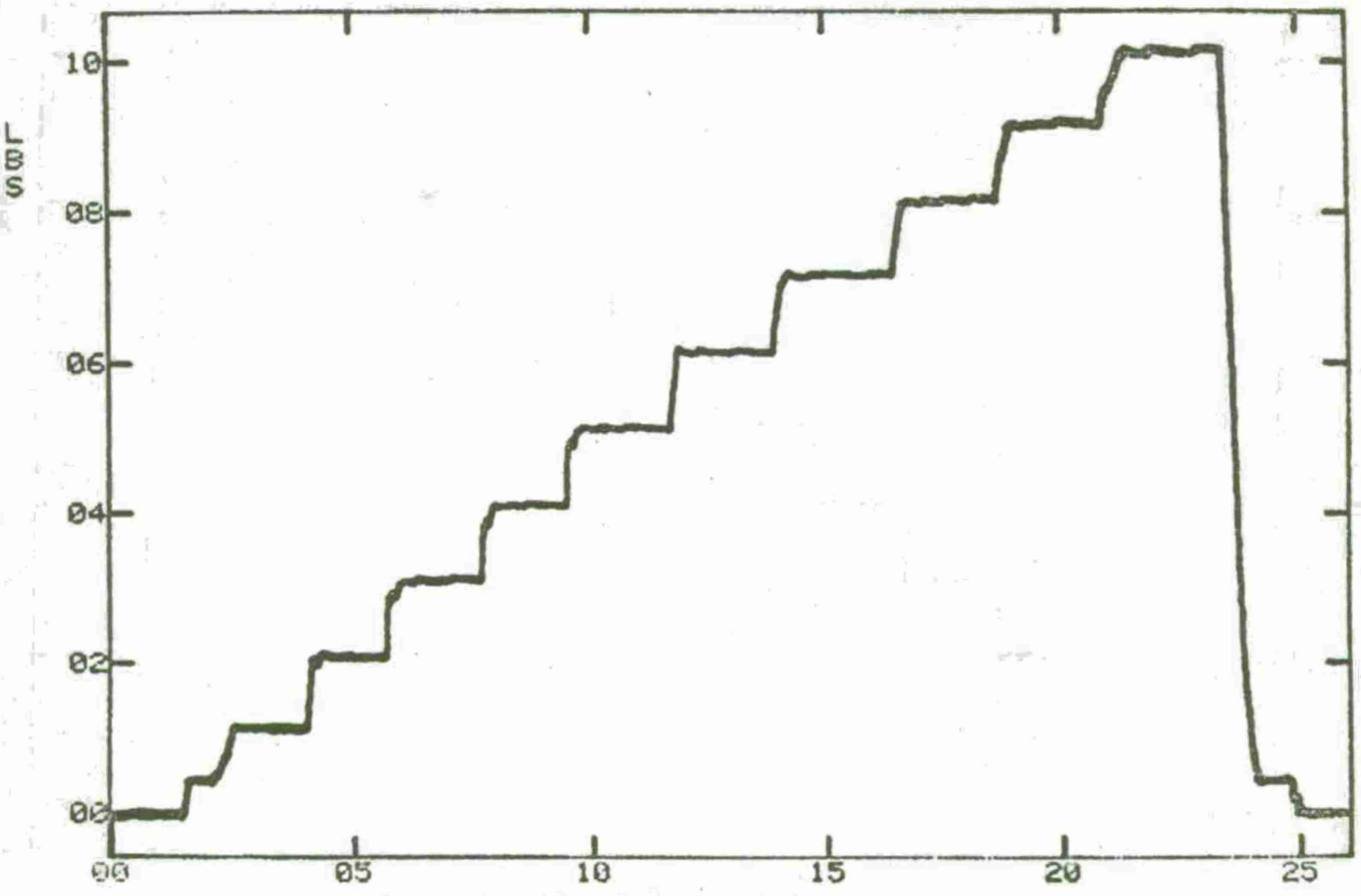
25
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS


10
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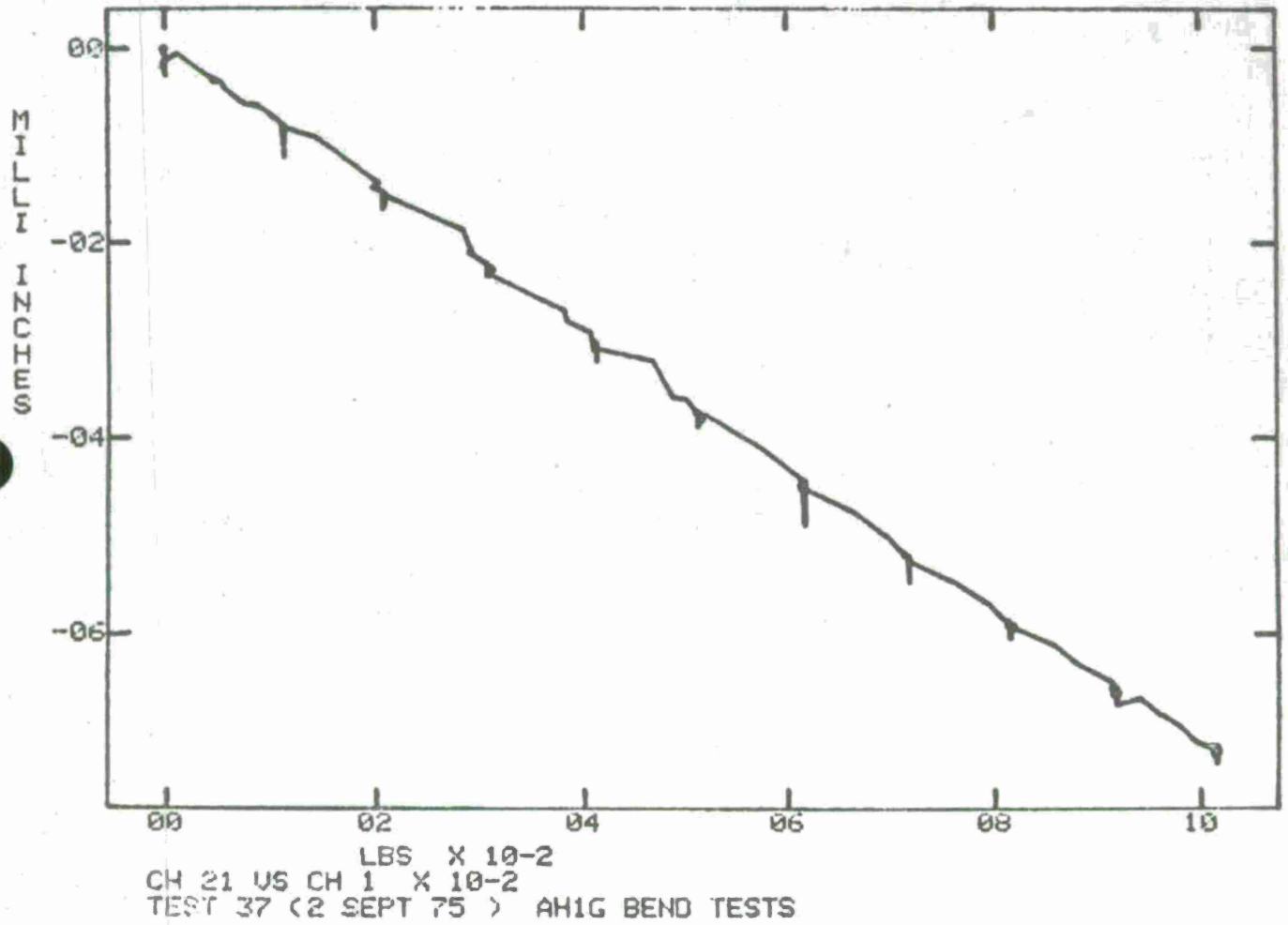
20
25
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS


00
-02
-04
-06
MILLI INCHES
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02
04
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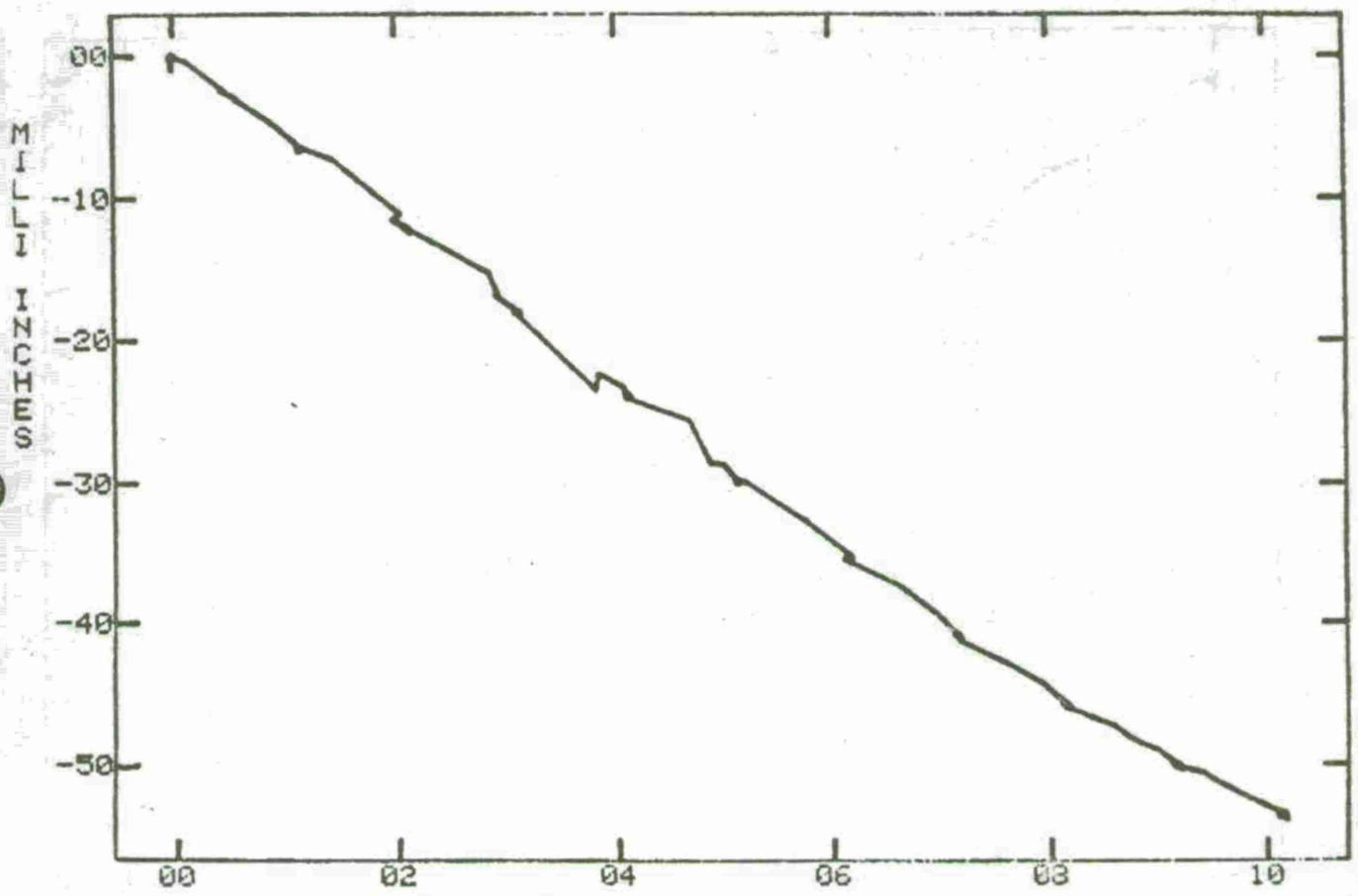
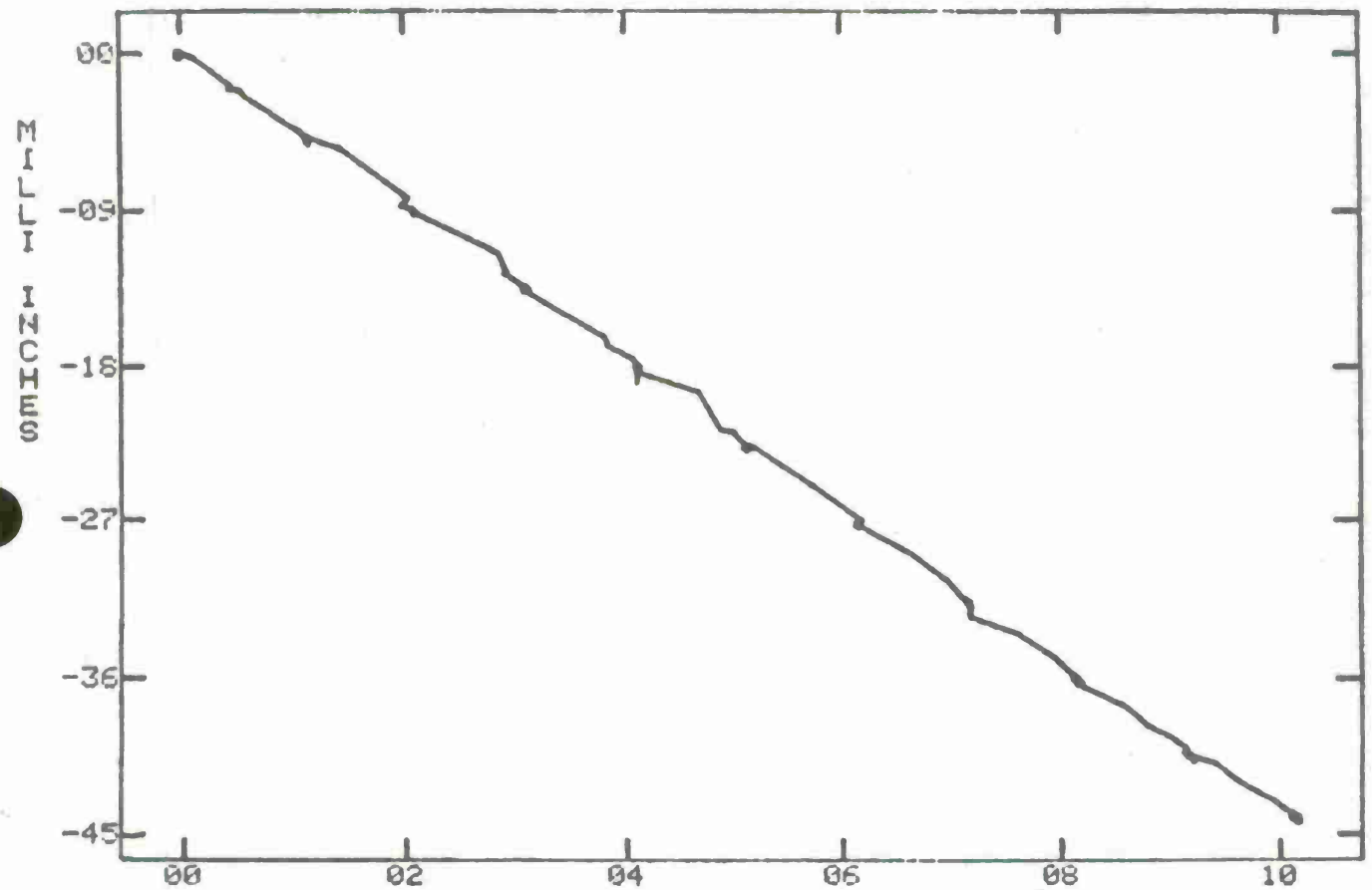
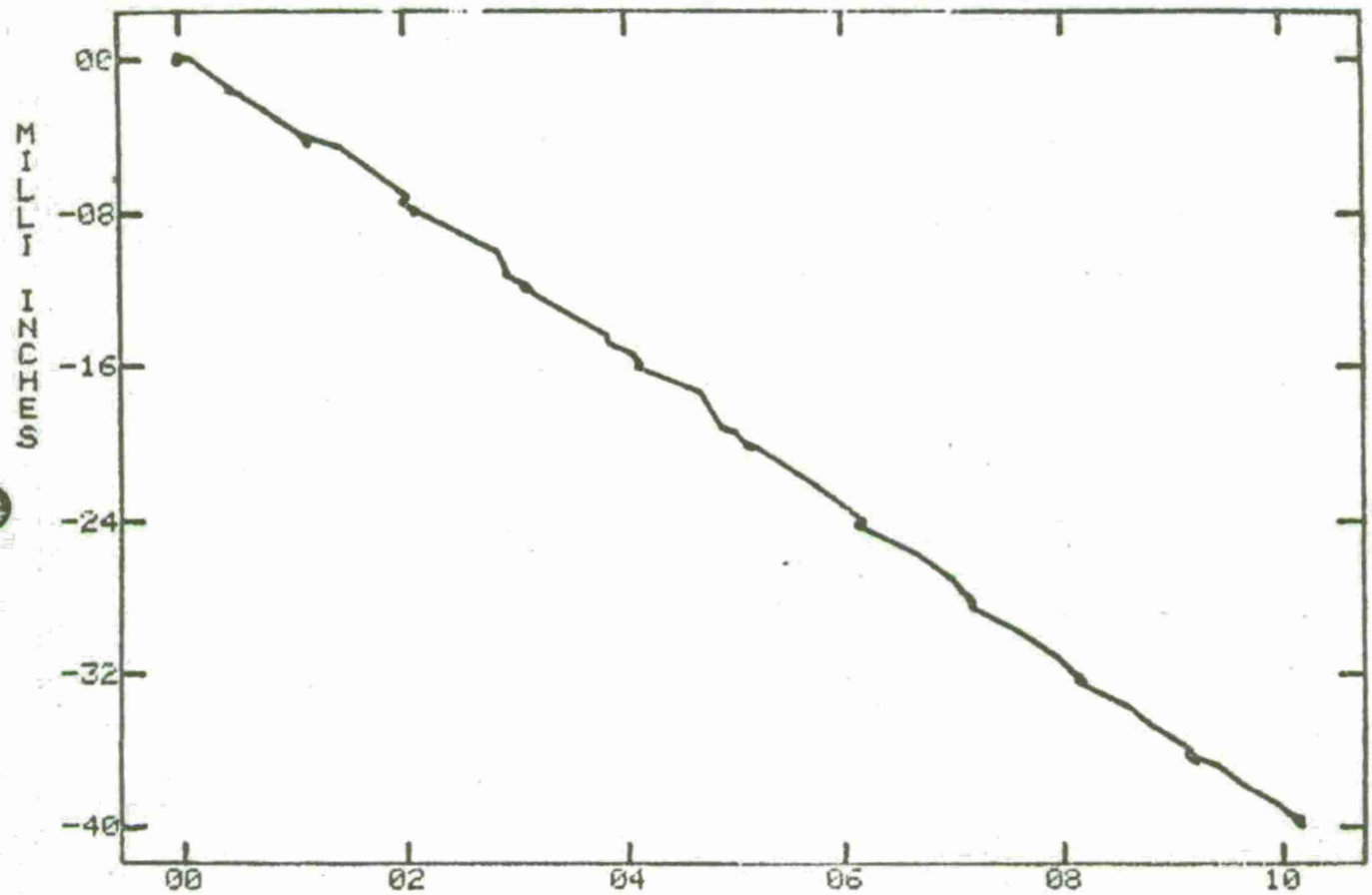
08
10
LBS X 10-2
CH 21 VS CH 1 X 10-2
TEST 37 (2 SEPT 75) AH1G BEND TESTS



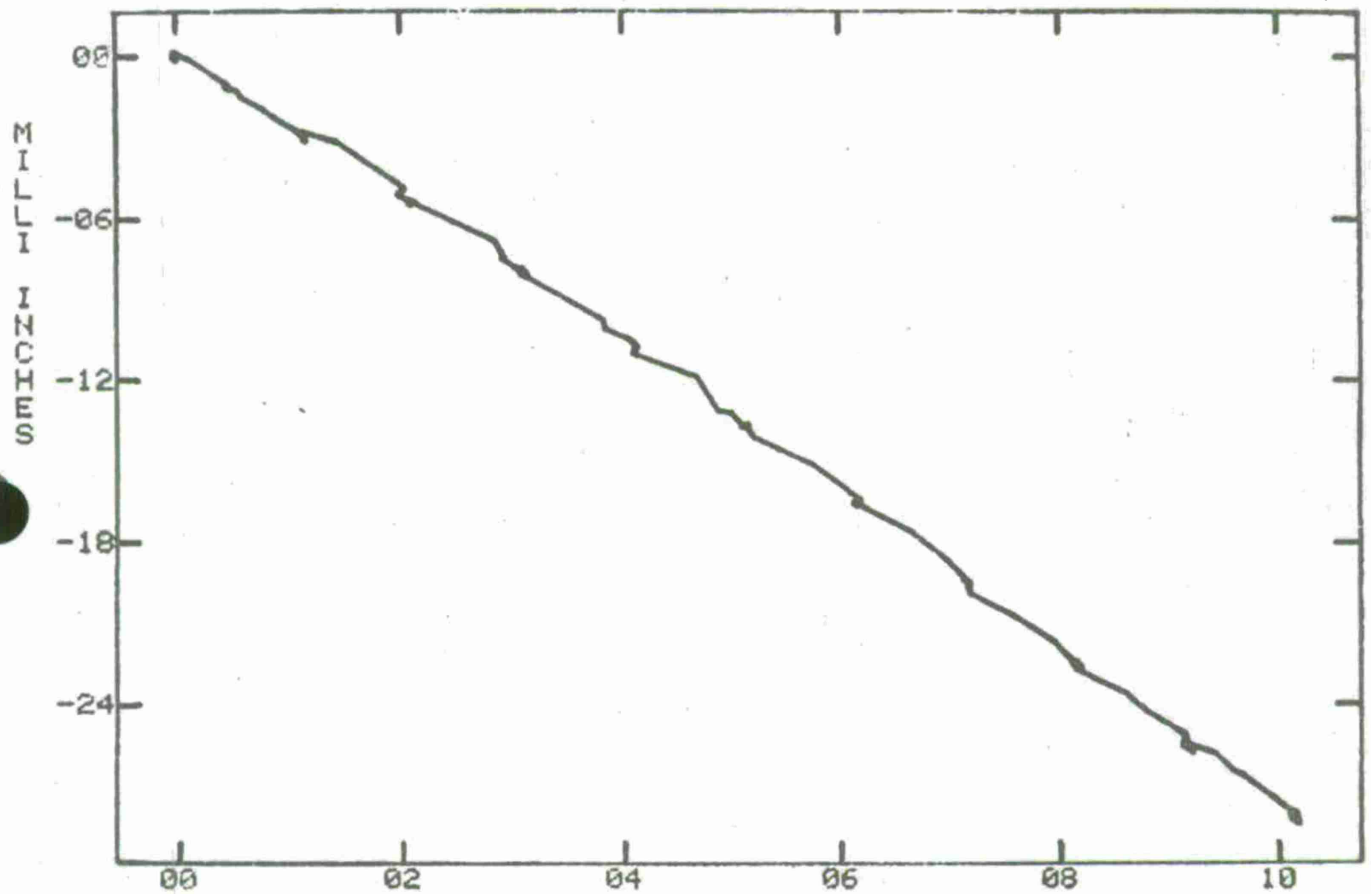
CH 21 VS CH 2 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



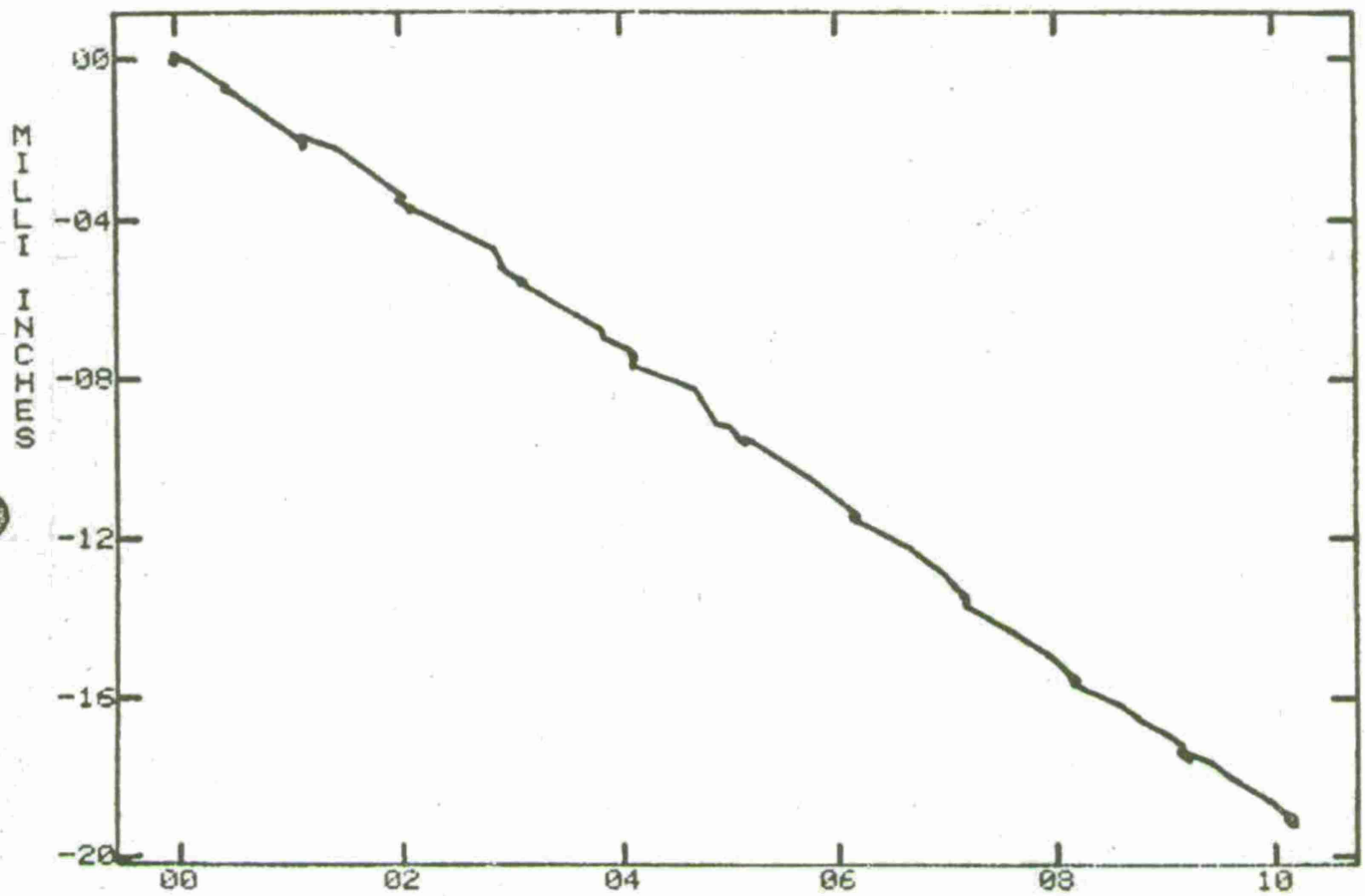
CH 21 VS CH 3 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



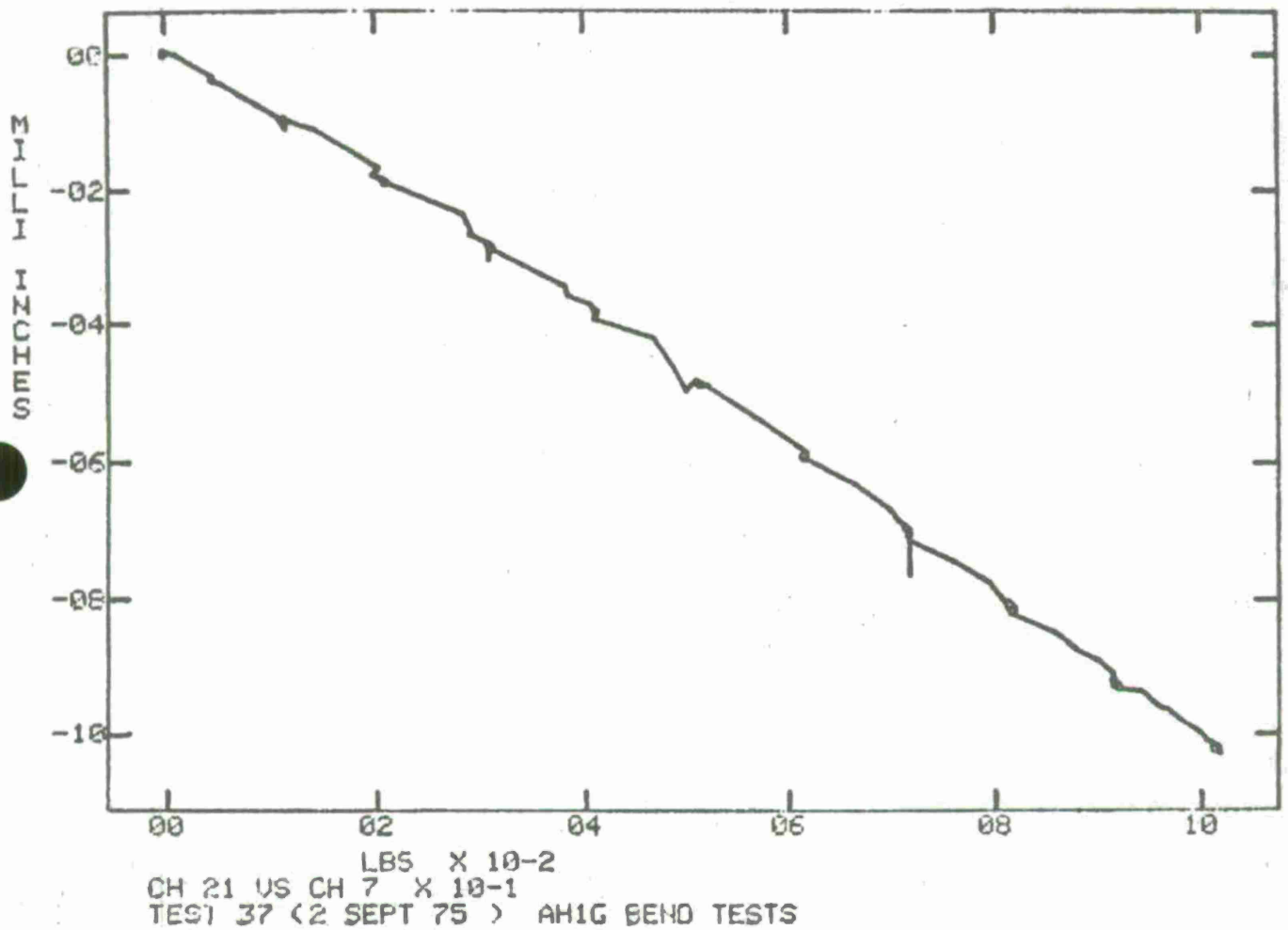
CH 21 VS CH 4 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 5 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 6 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
00
-02
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02
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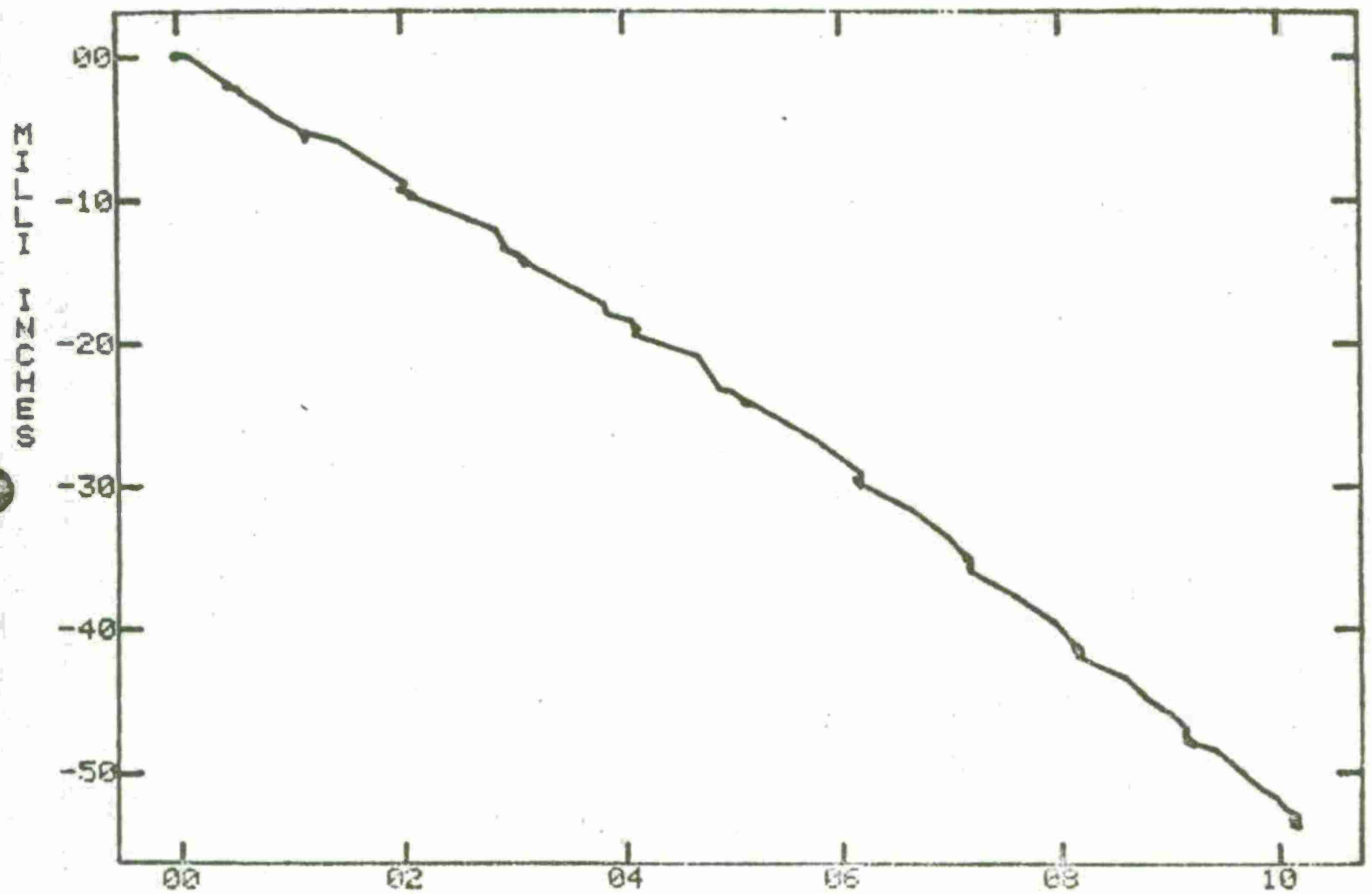
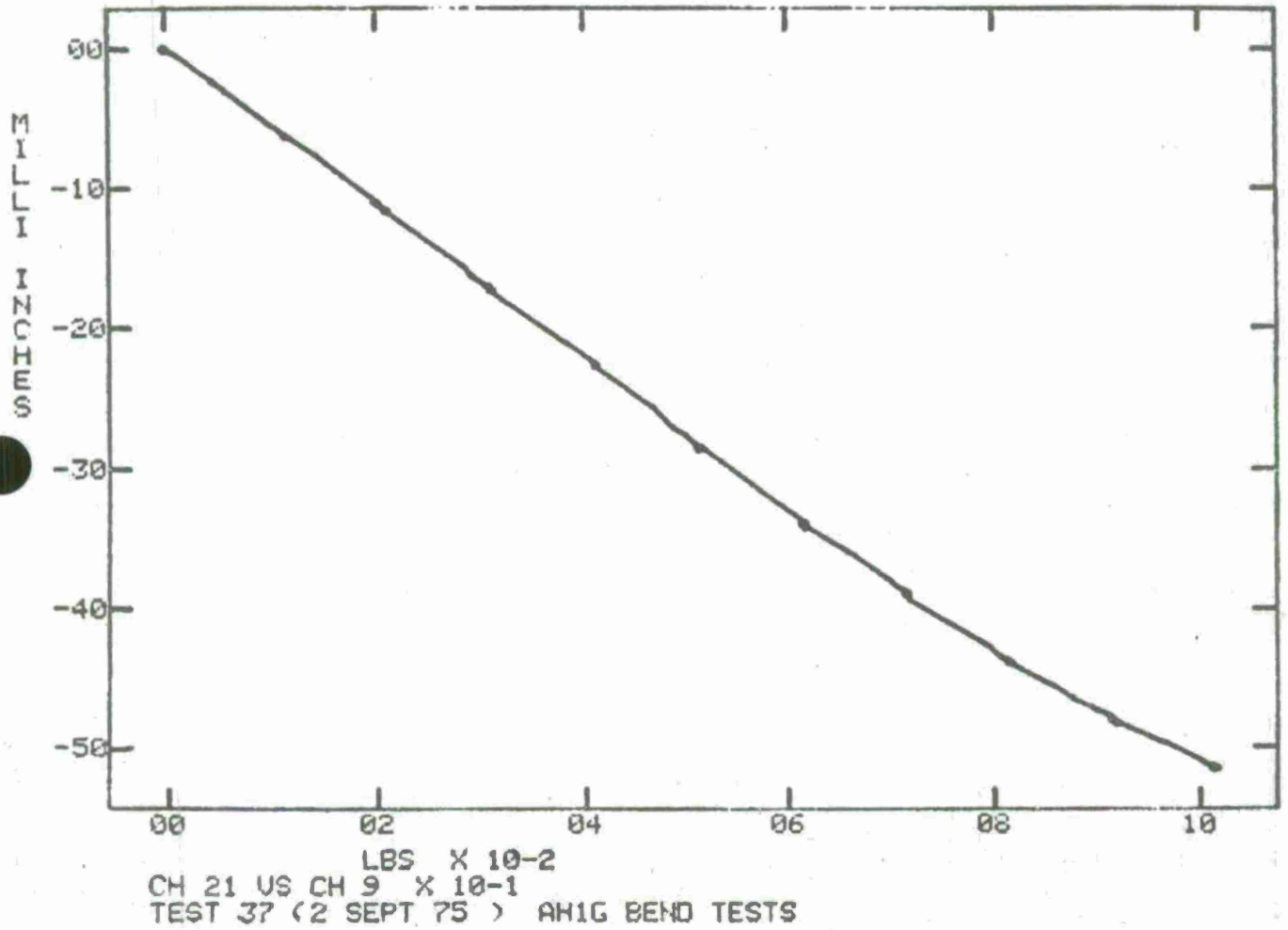
LBS X 10-2
CH 21 VS CH 7 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 8 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS


00
-10
-20
-30
-40
-50
MILLI INCHES
00
02
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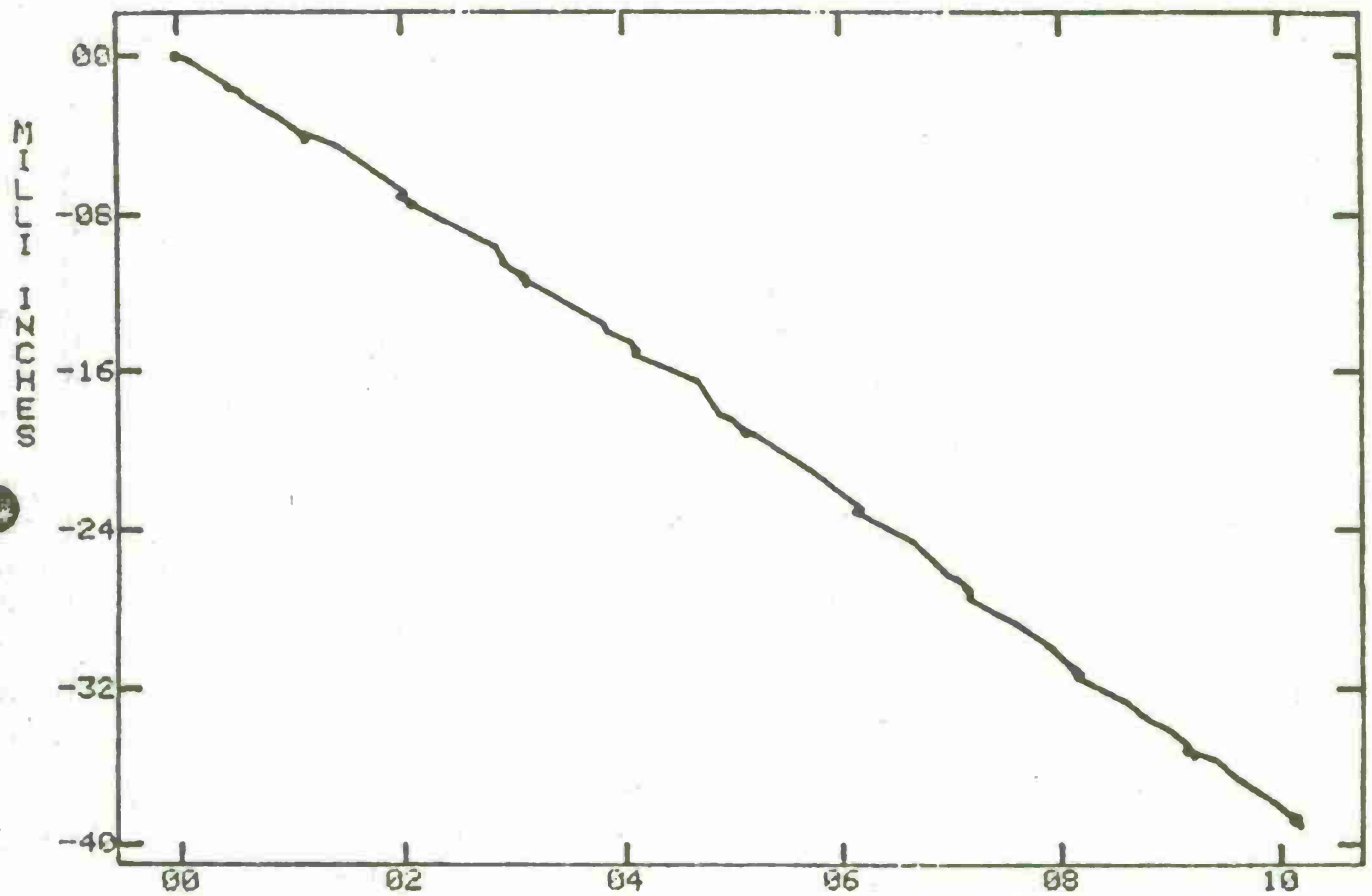
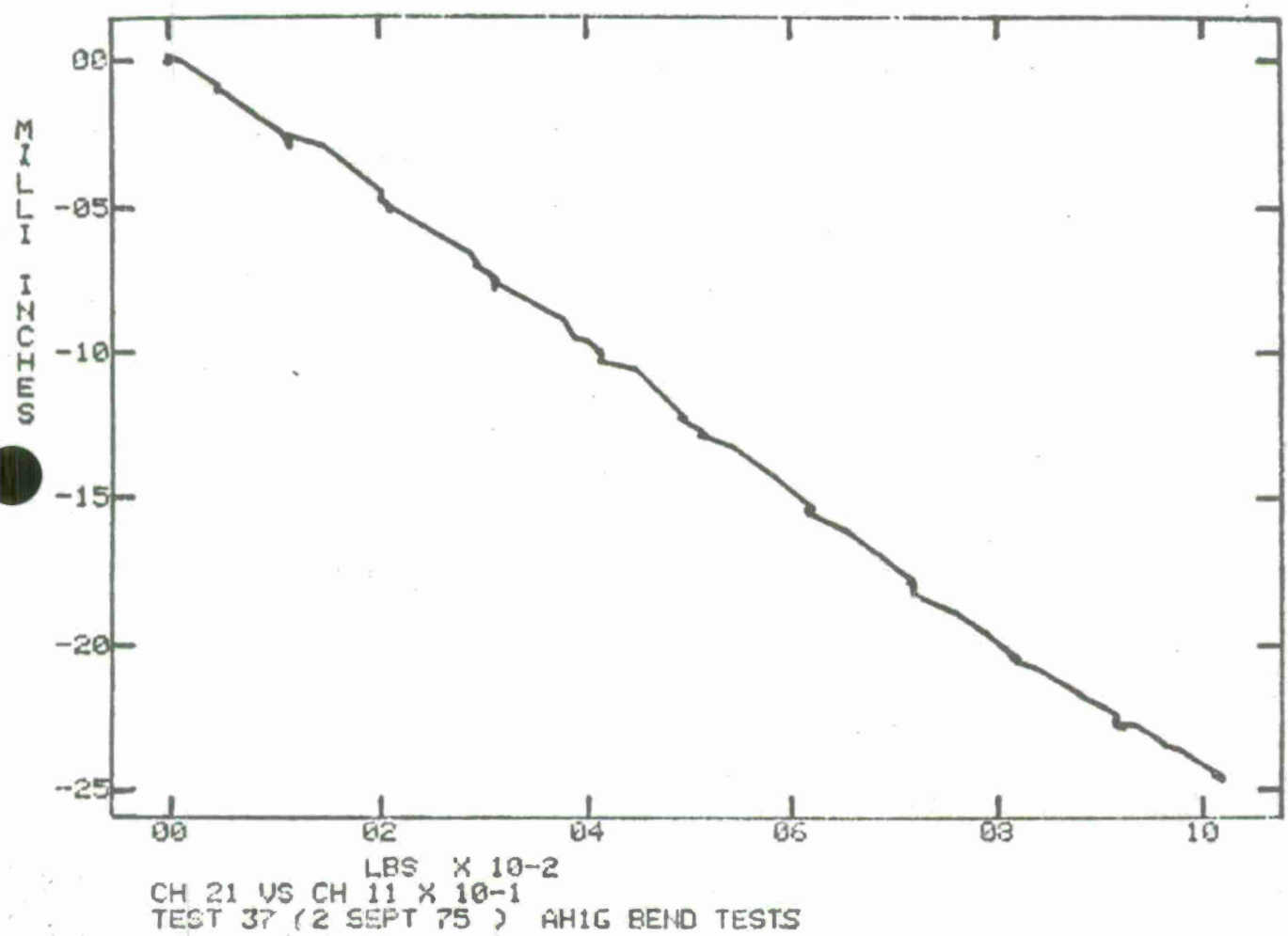
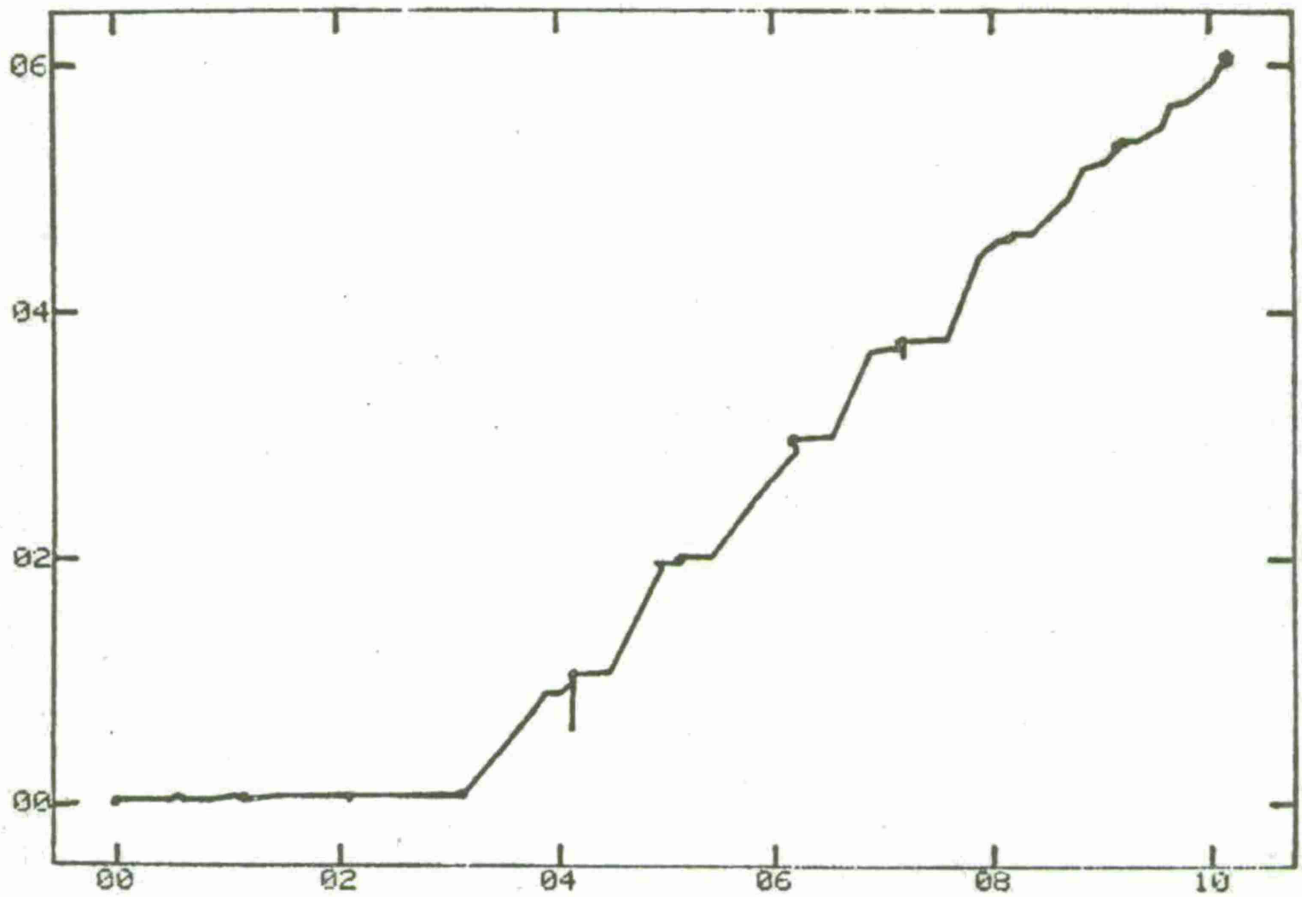
08
10
LBS X 10-2
CH 21 VS CH 9 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



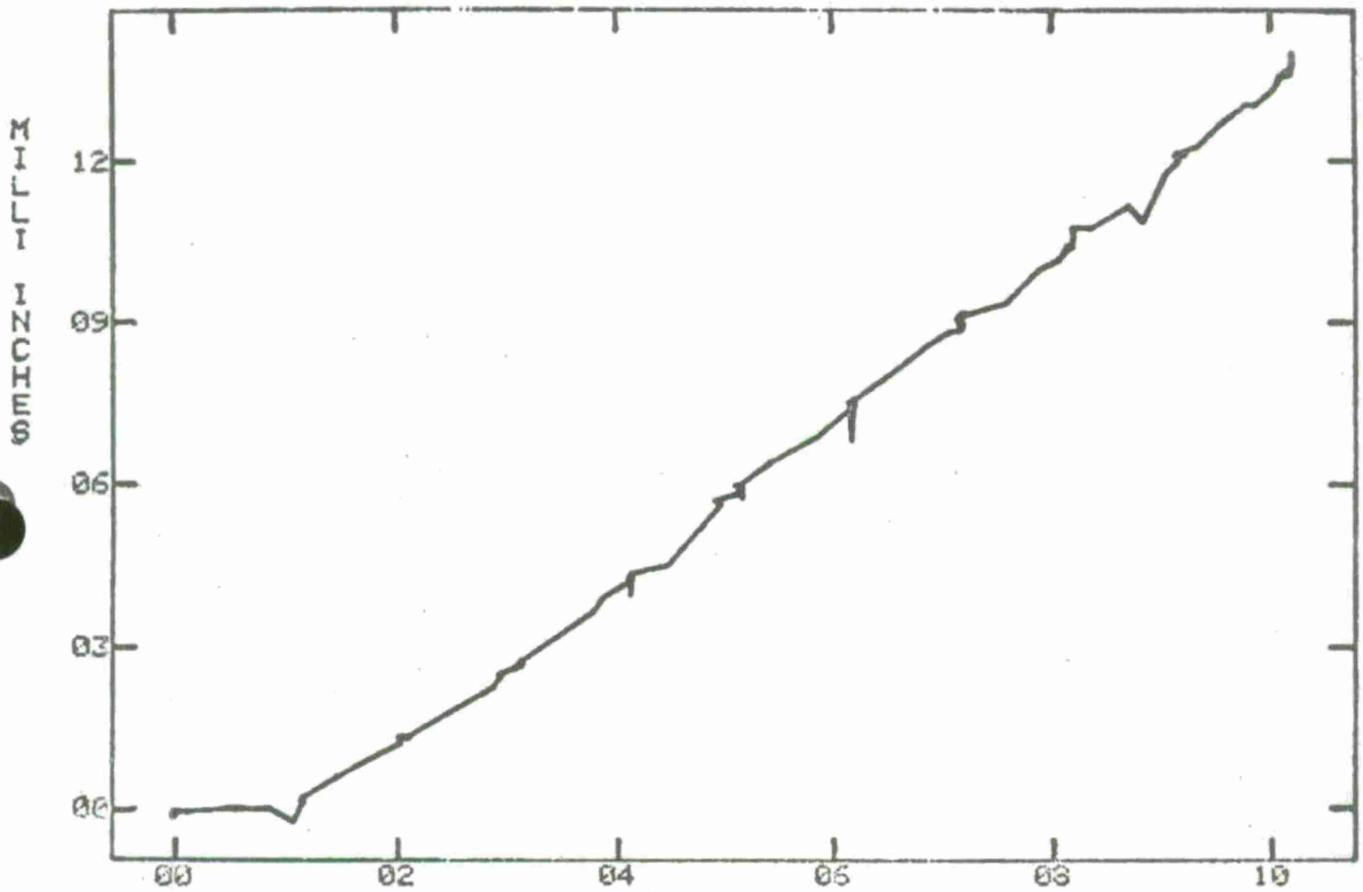
CH 21 VS CH 10 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



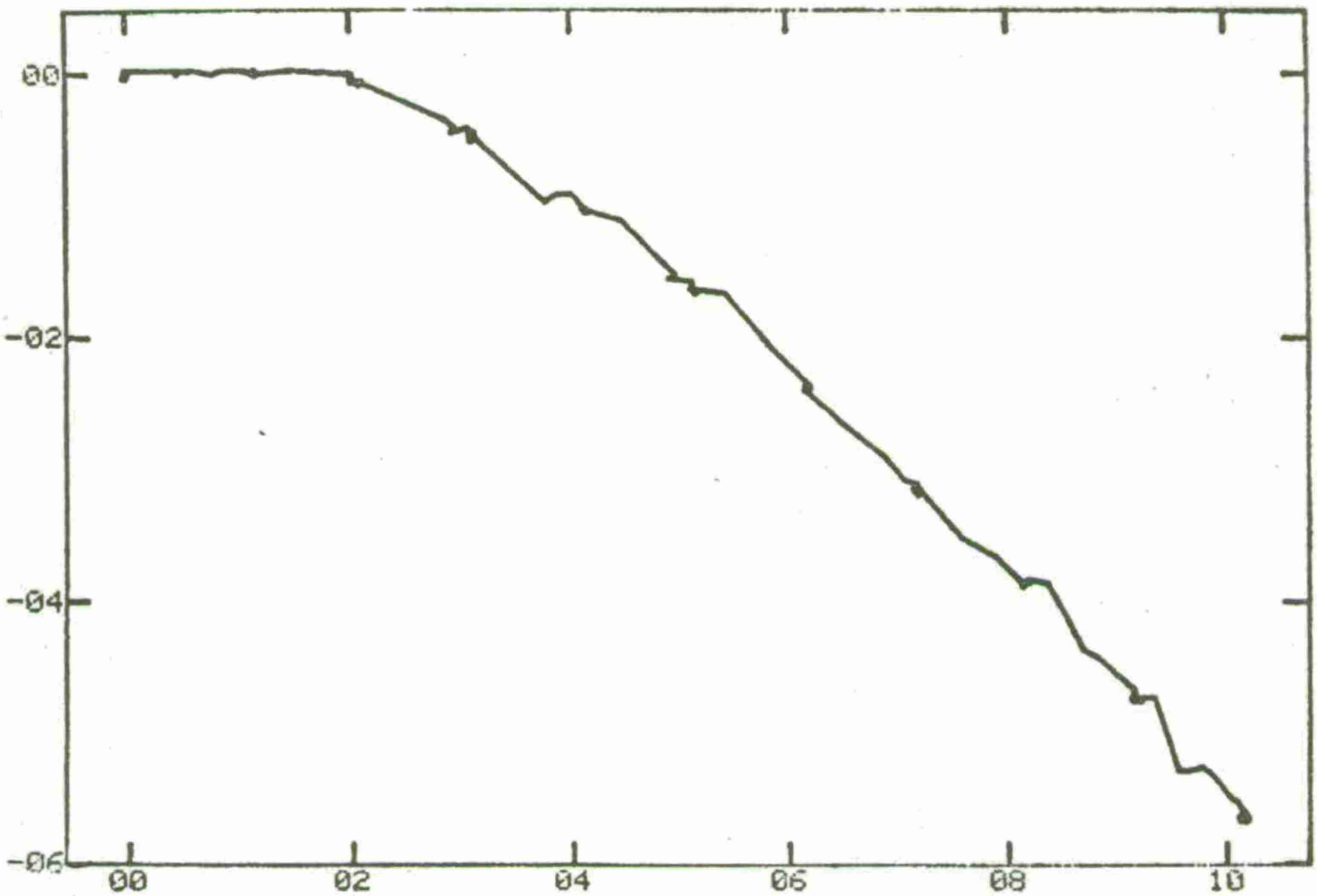
CH 21 VS CH 11 X 10-1
TEST 37 (2 SEPT 75) AH1G BEND TESTS



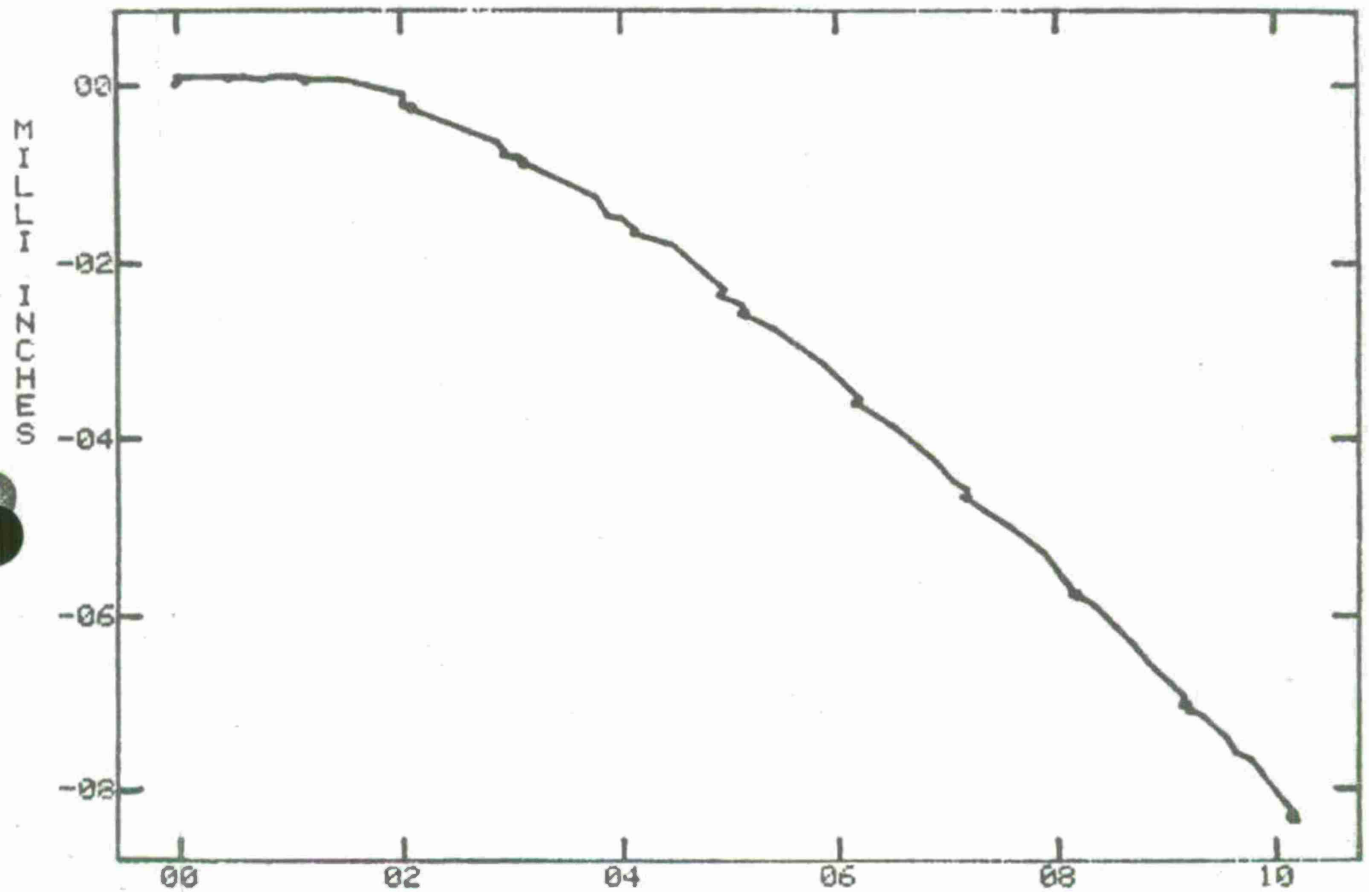
CH 21 VS CH 12 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



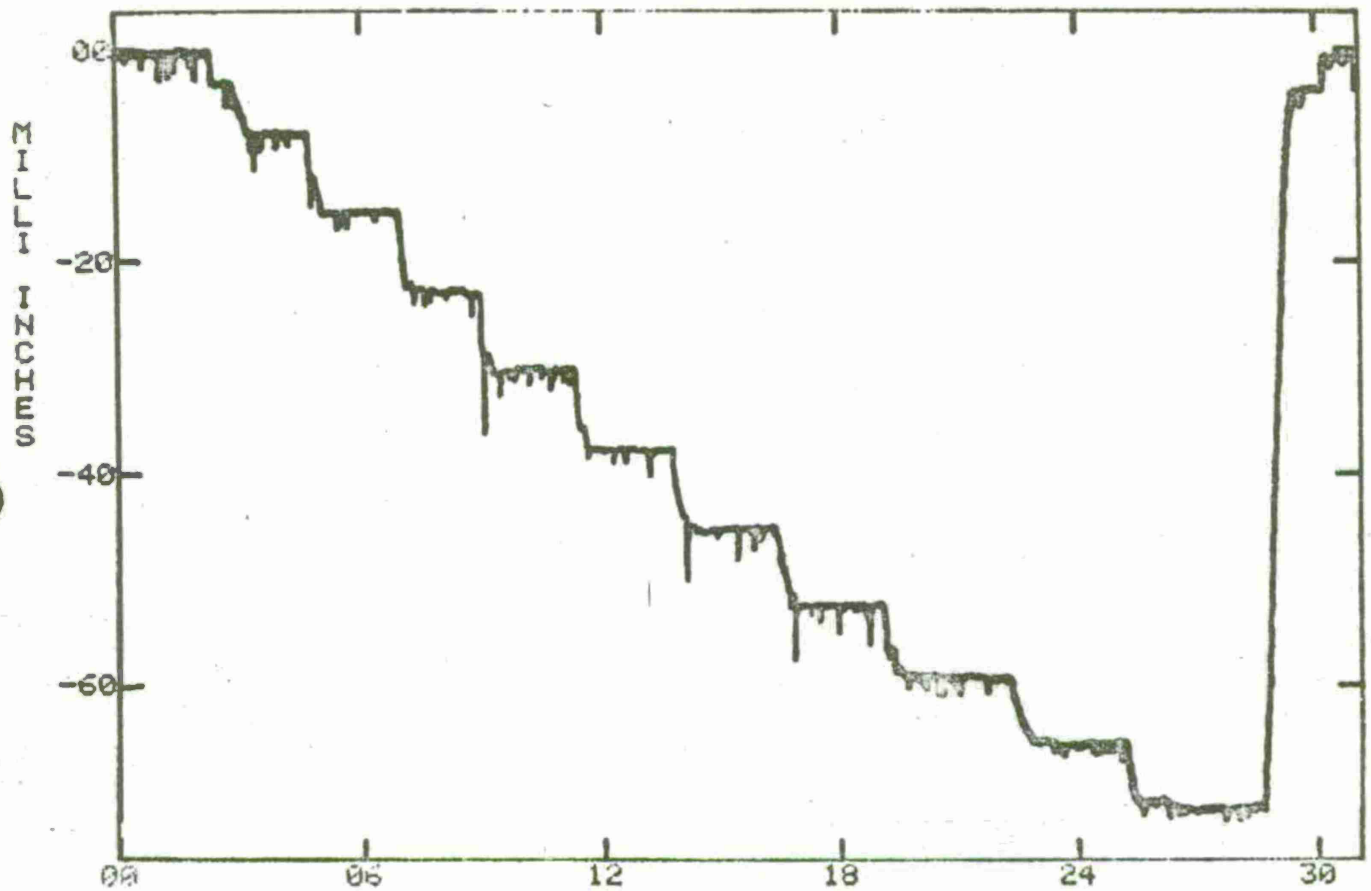
CH 21 VS CH 13 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



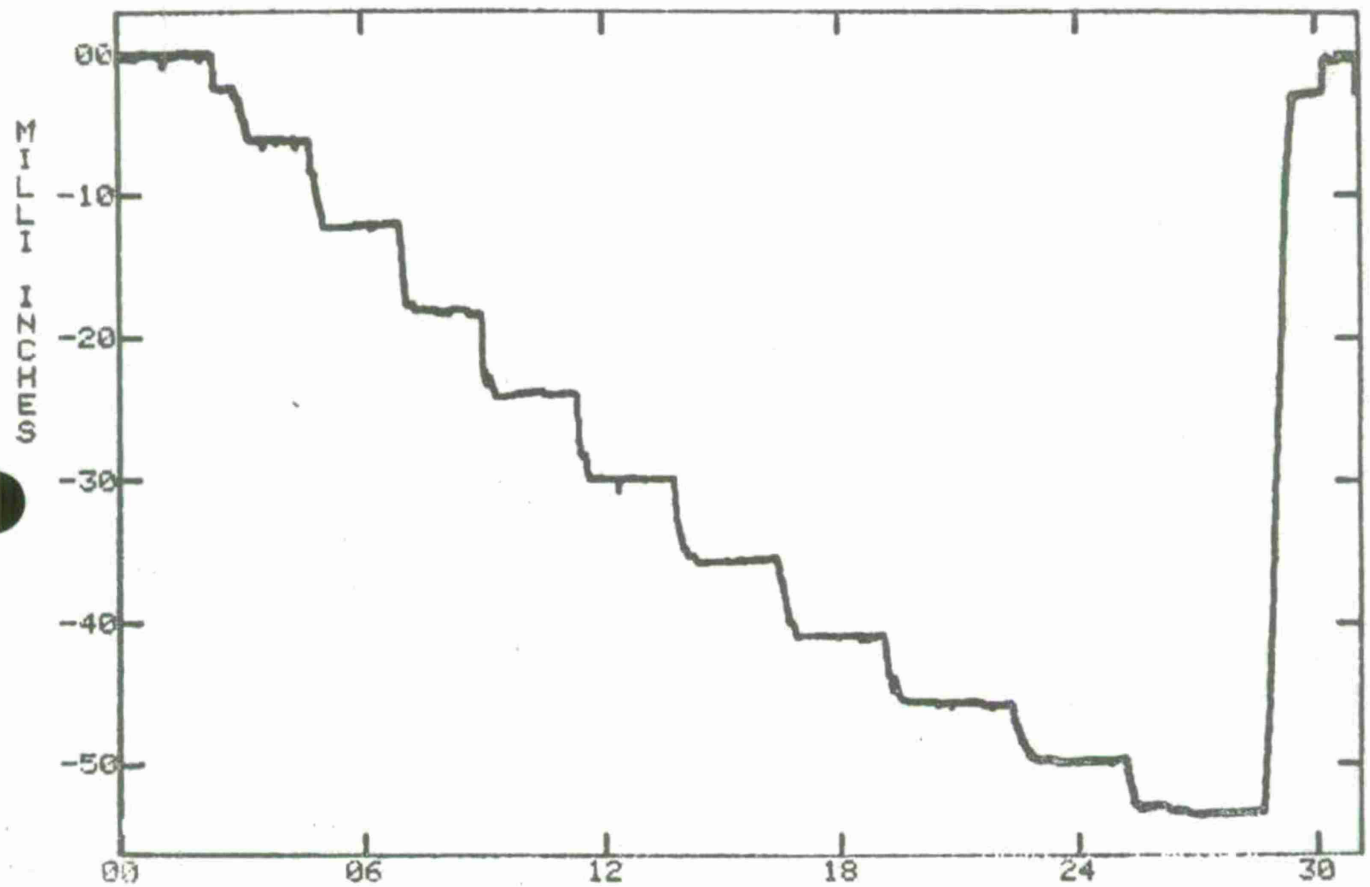
CH 21 VS CH 14 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



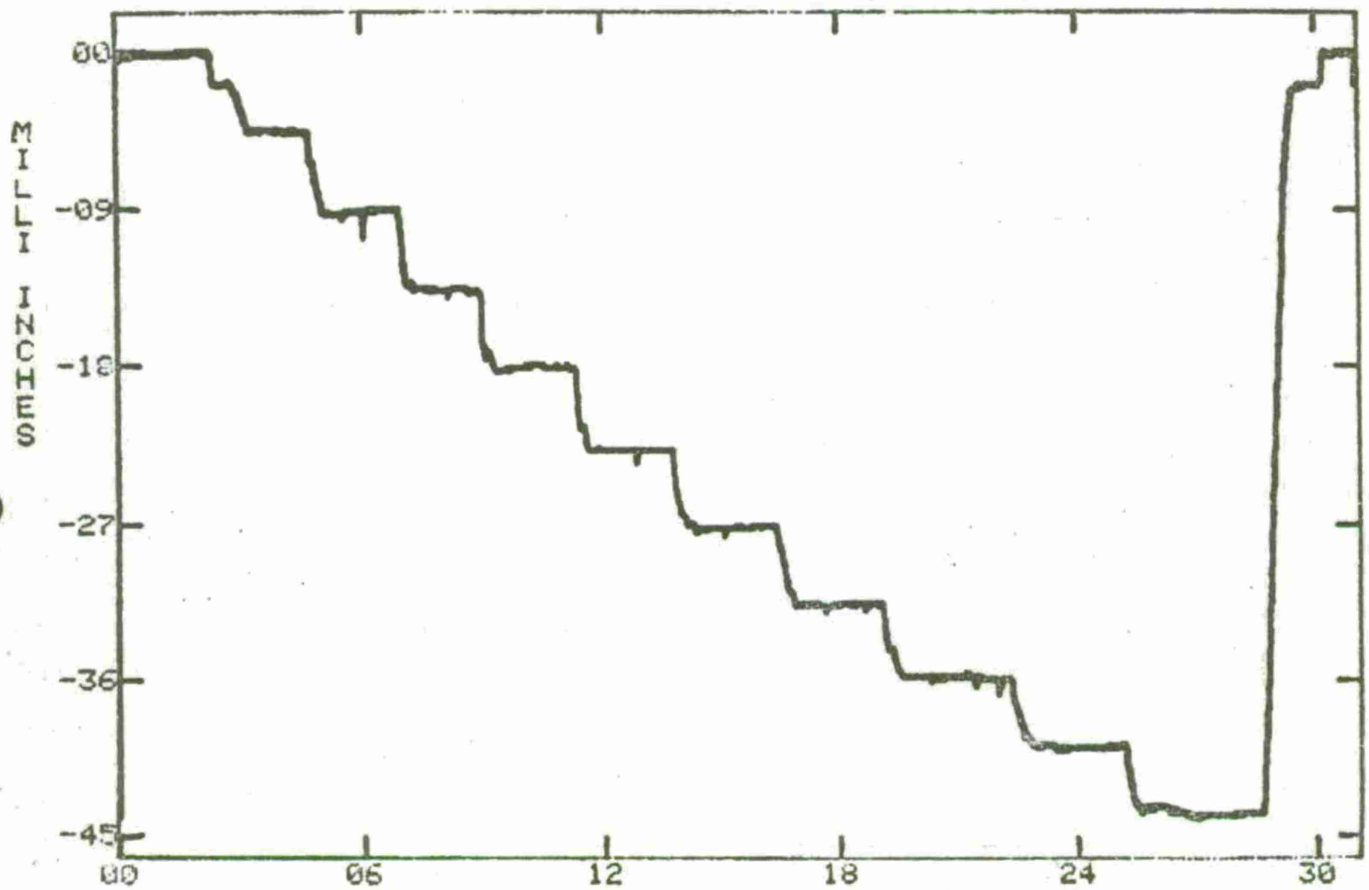
CH 21 VS CH 15 X 10+0
TEST 37 (2 SEPT 75) AH1G BEND TESTS



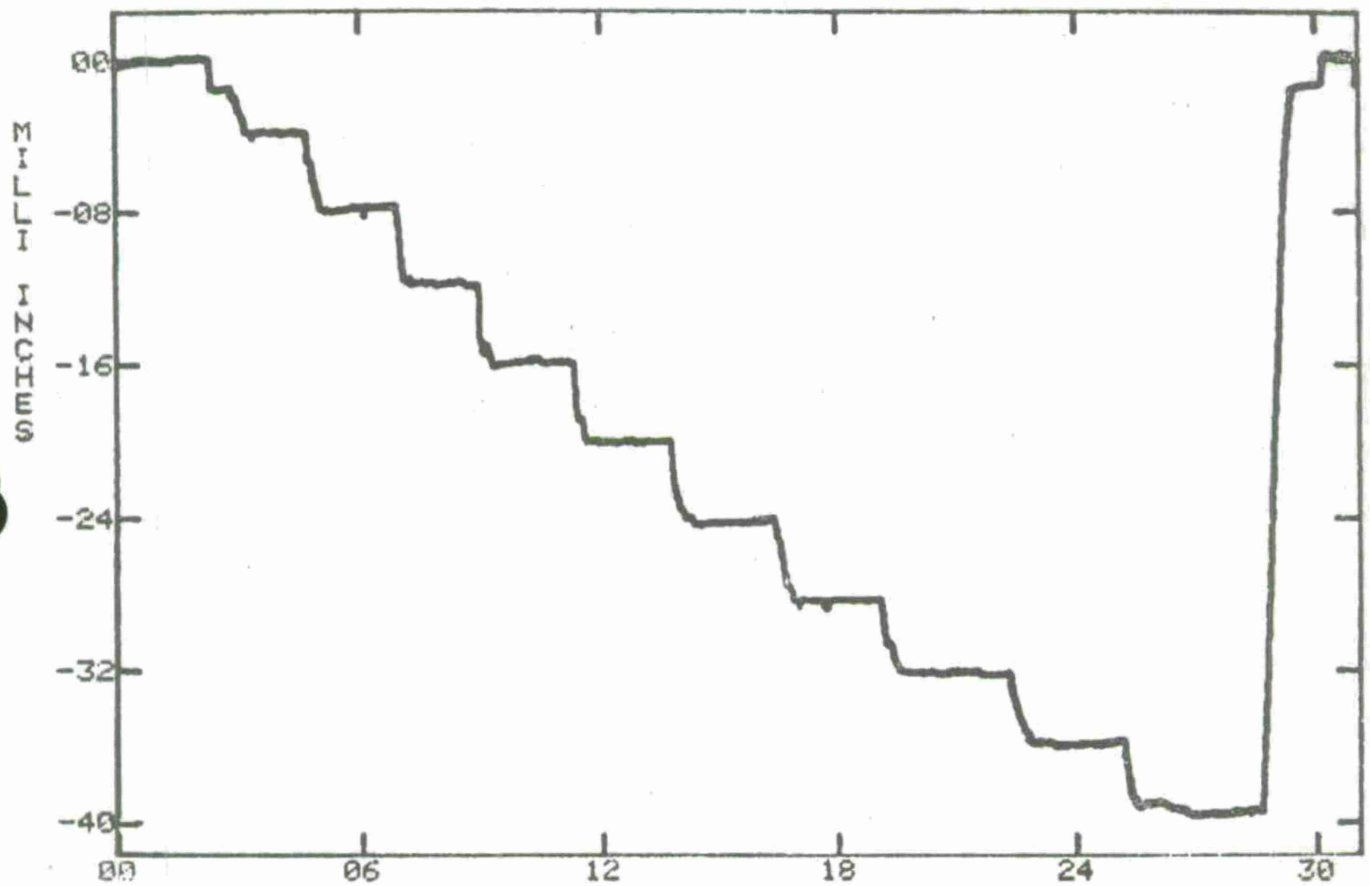
CH 1 LATERAL DEFLECTION ST 61.25 - WL 44.50 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



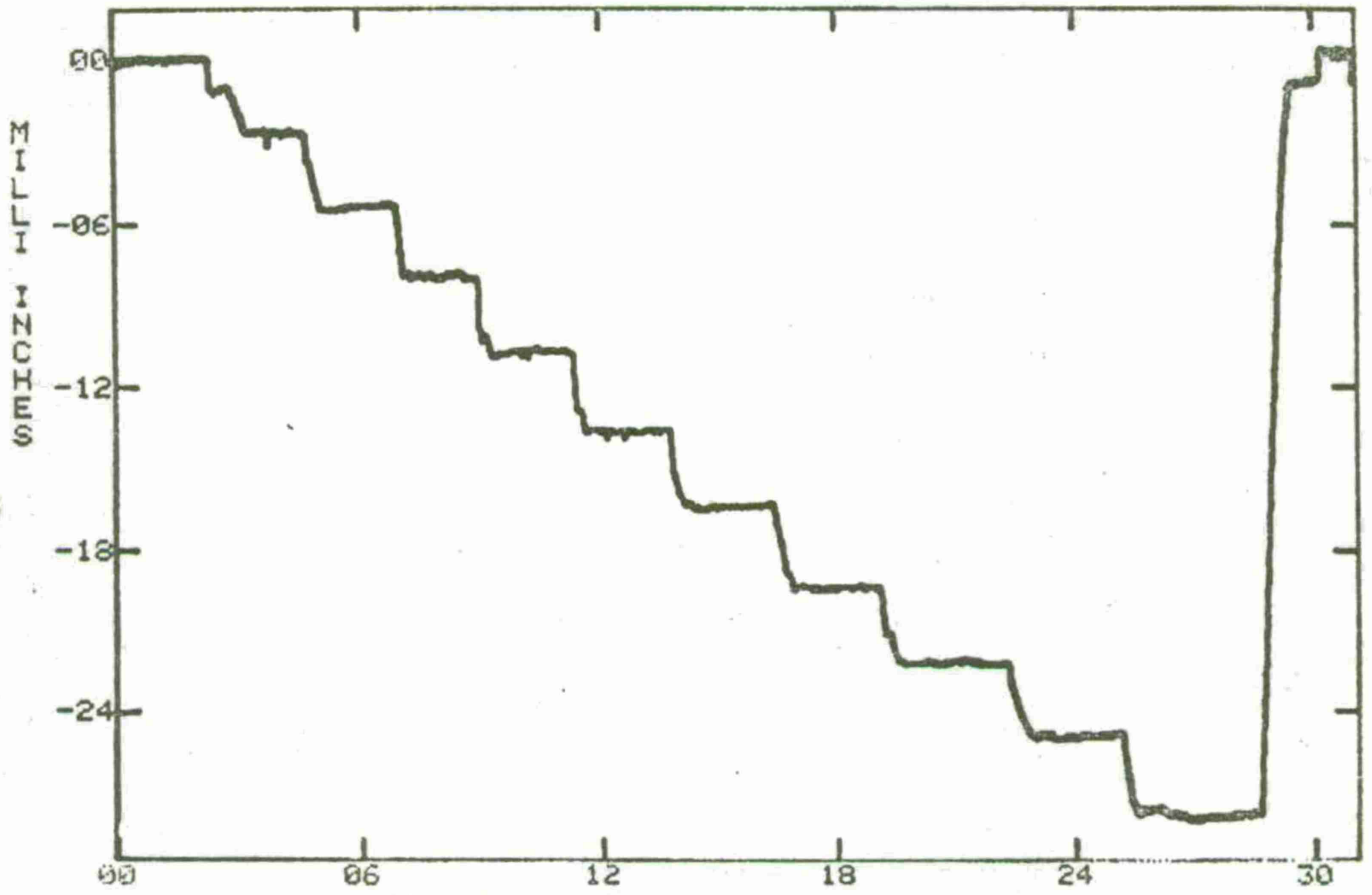
CH 2 LATERAL DEFLECTION ST 93.00 - WL 44.50 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



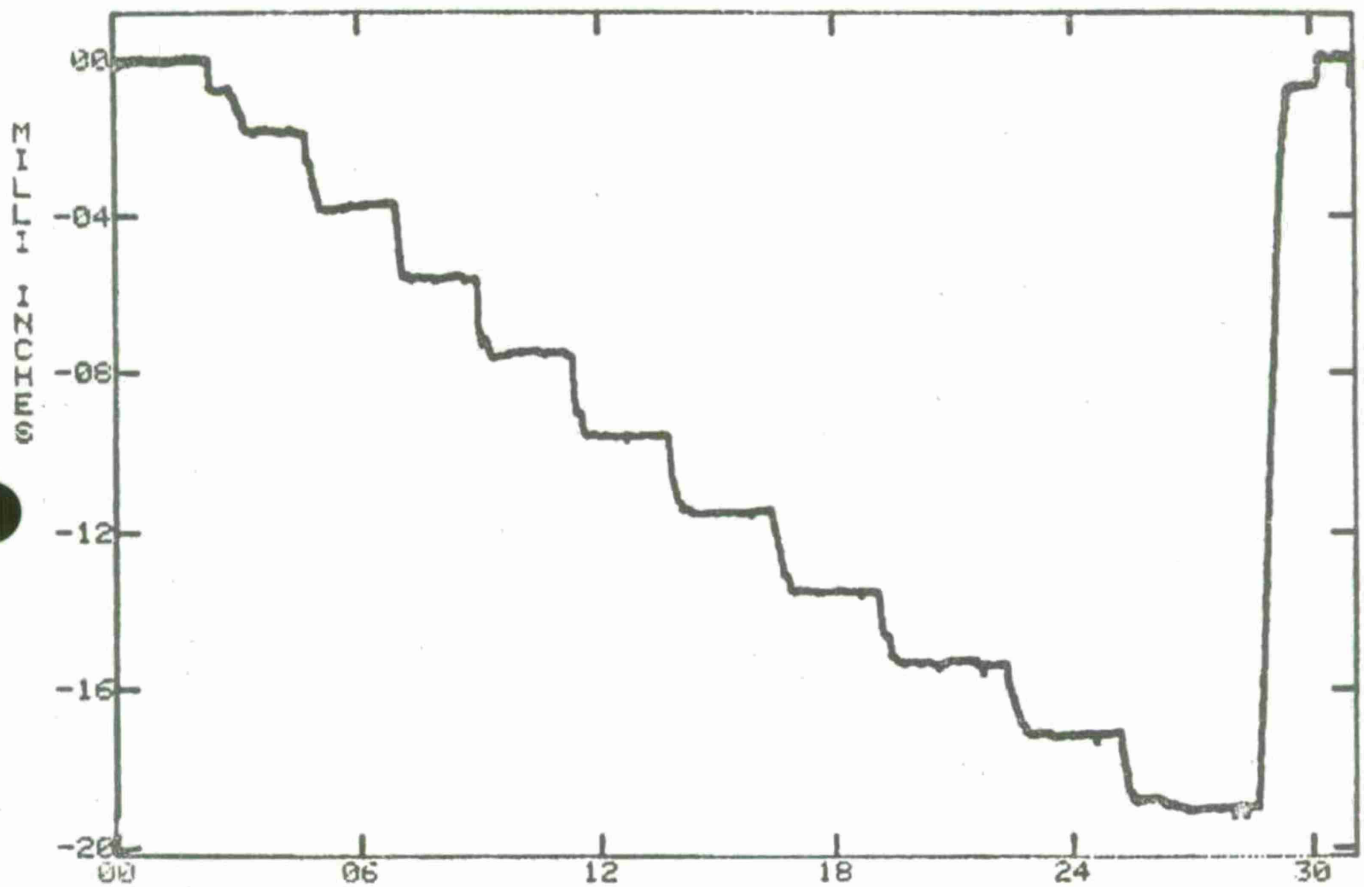
CH 3 LATERAL DEFLECTION ST 133.70 - WL 44.50 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



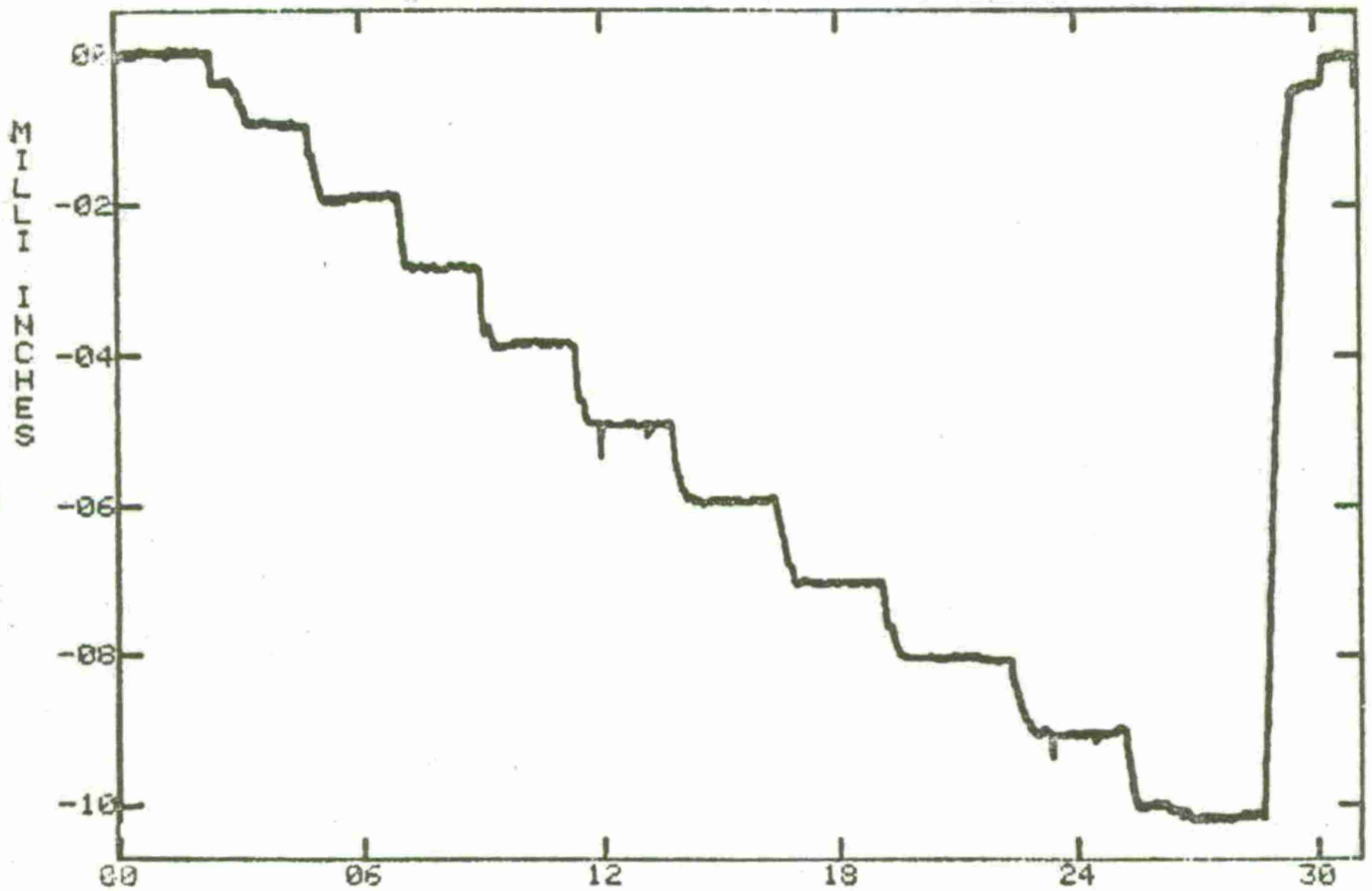
CH 4 LATERAL DEFLECTION ST 148.50 - WL 35.97 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



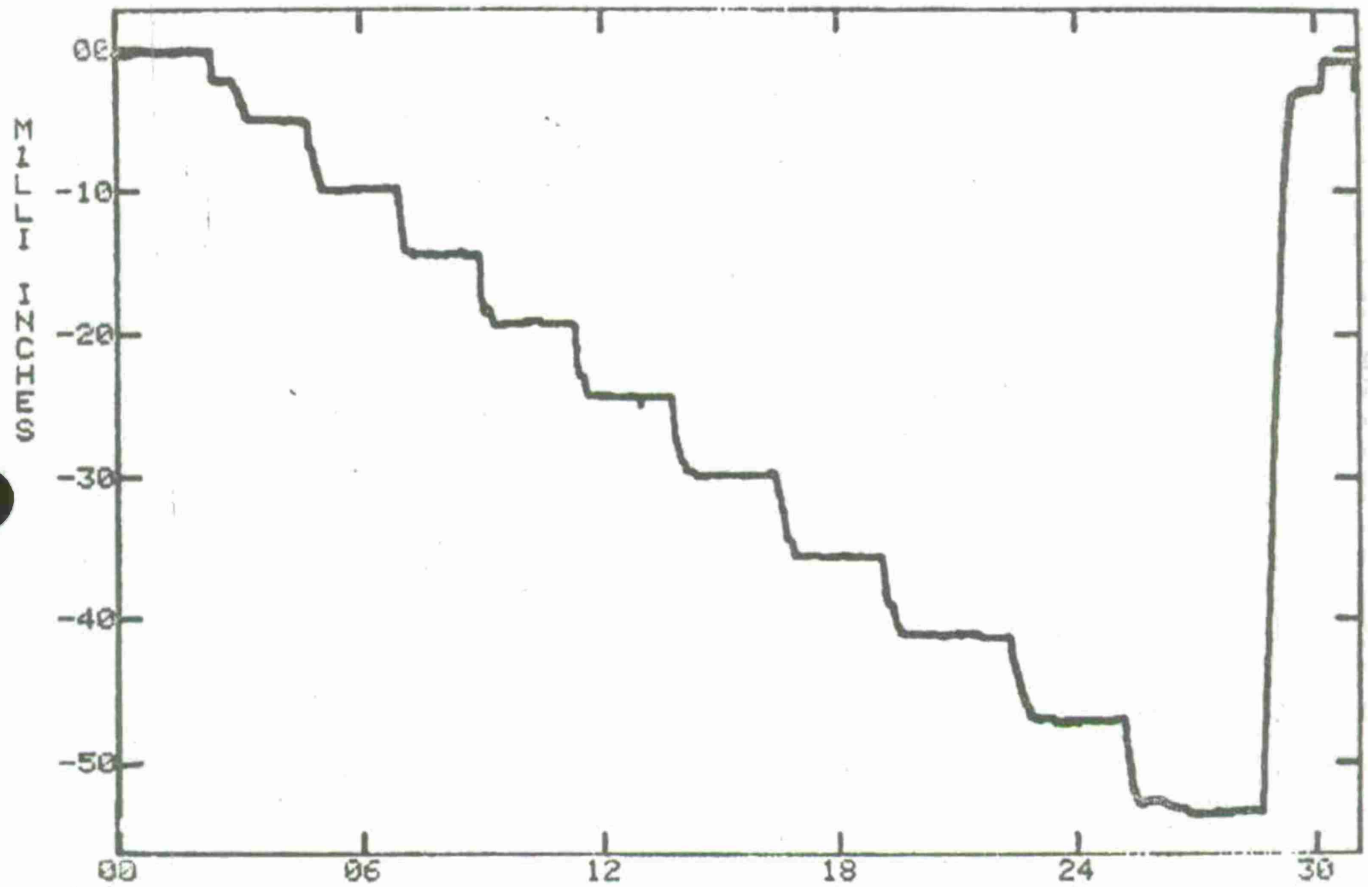
TIME IN SECONDS X 10-1
CH 5 LATERAL DEFLECTION ST 186.25 - WL 35.97 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



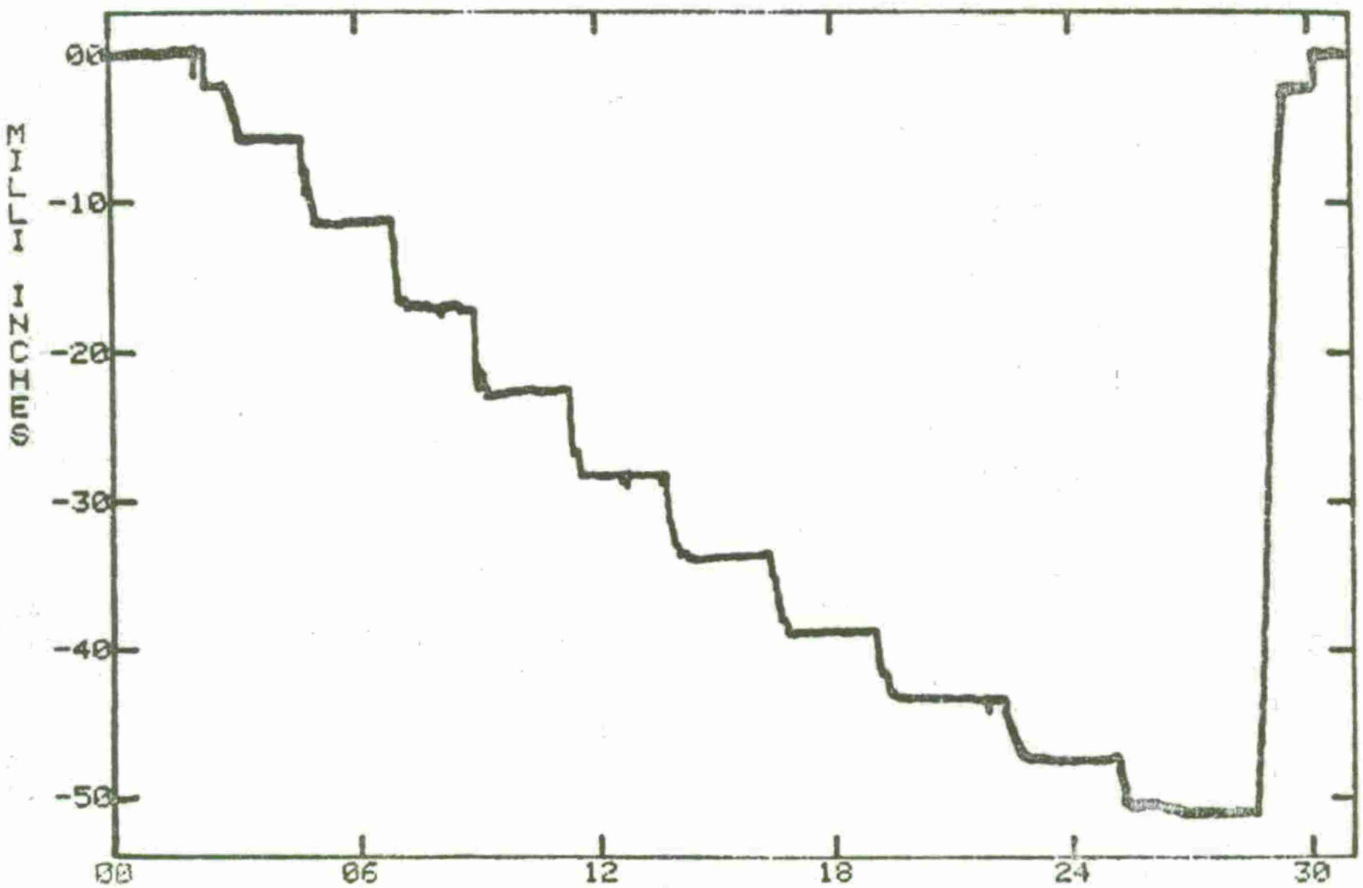
CH 6 LATERAL DEFLECTION ST 213.94 - WL 35.97 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



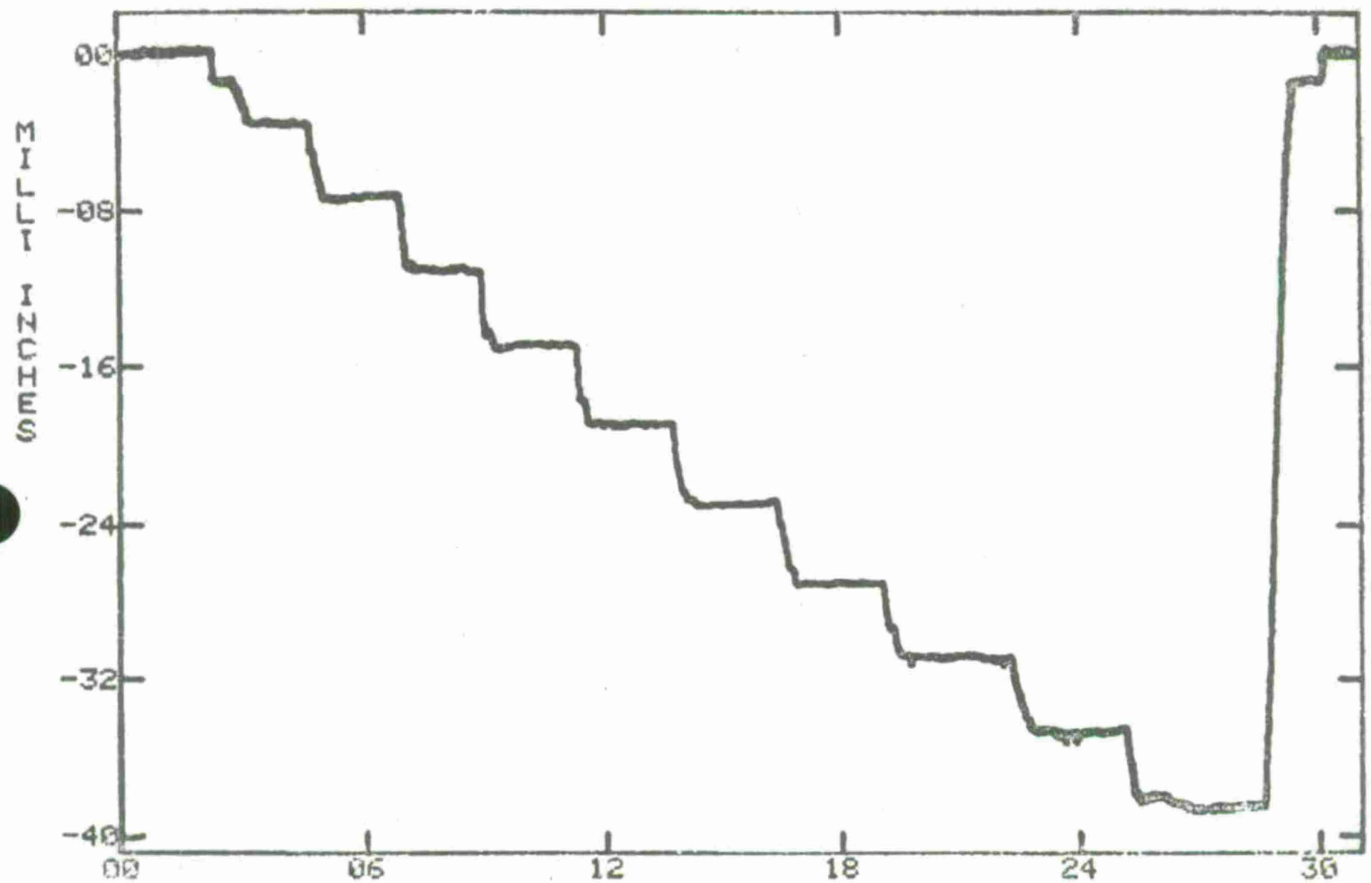
CH 7 LATERAL DEFLECTION ST 250.00 - WL 35.97 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



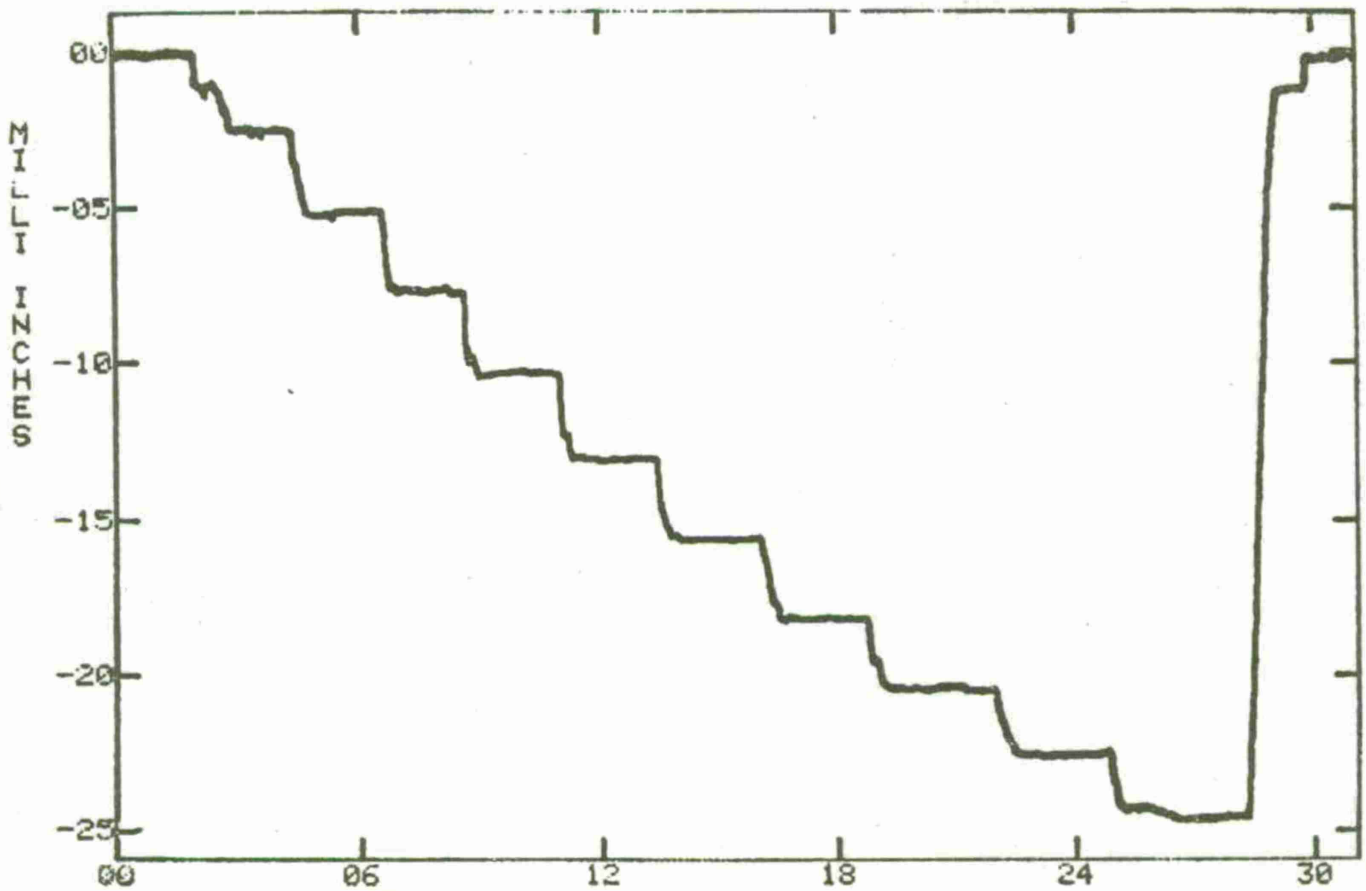
CH 8 LATERAL DEFLECTION ST 270.00 - WL 35.97 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS



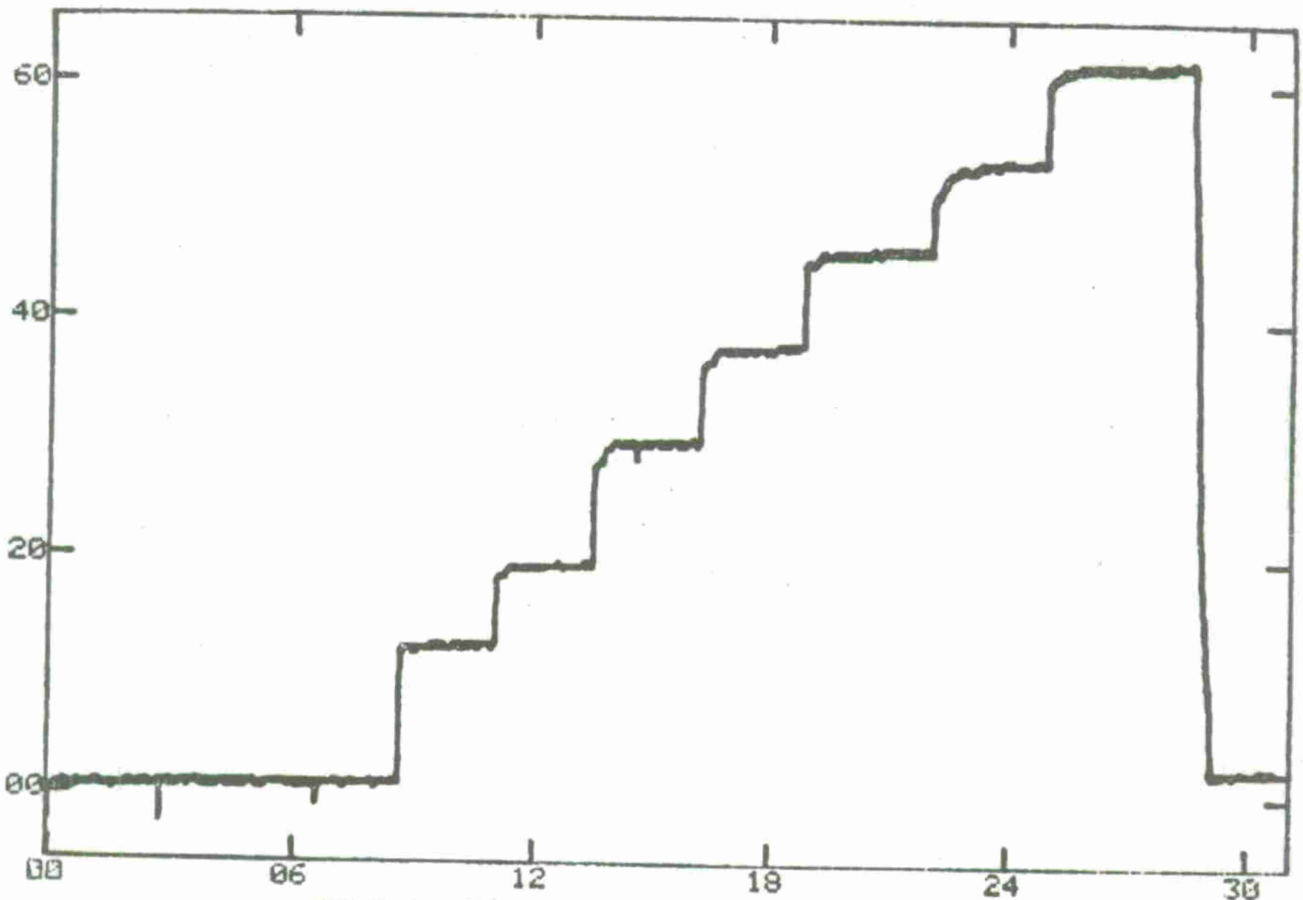
TIME IN SECONDS X 10-1
CH 9 LATERAL DEFLECTION ST 96.00 - WL 62.17 X 10-1
TEST 38 (2 SEPT 75) AH1G EEND TESTS



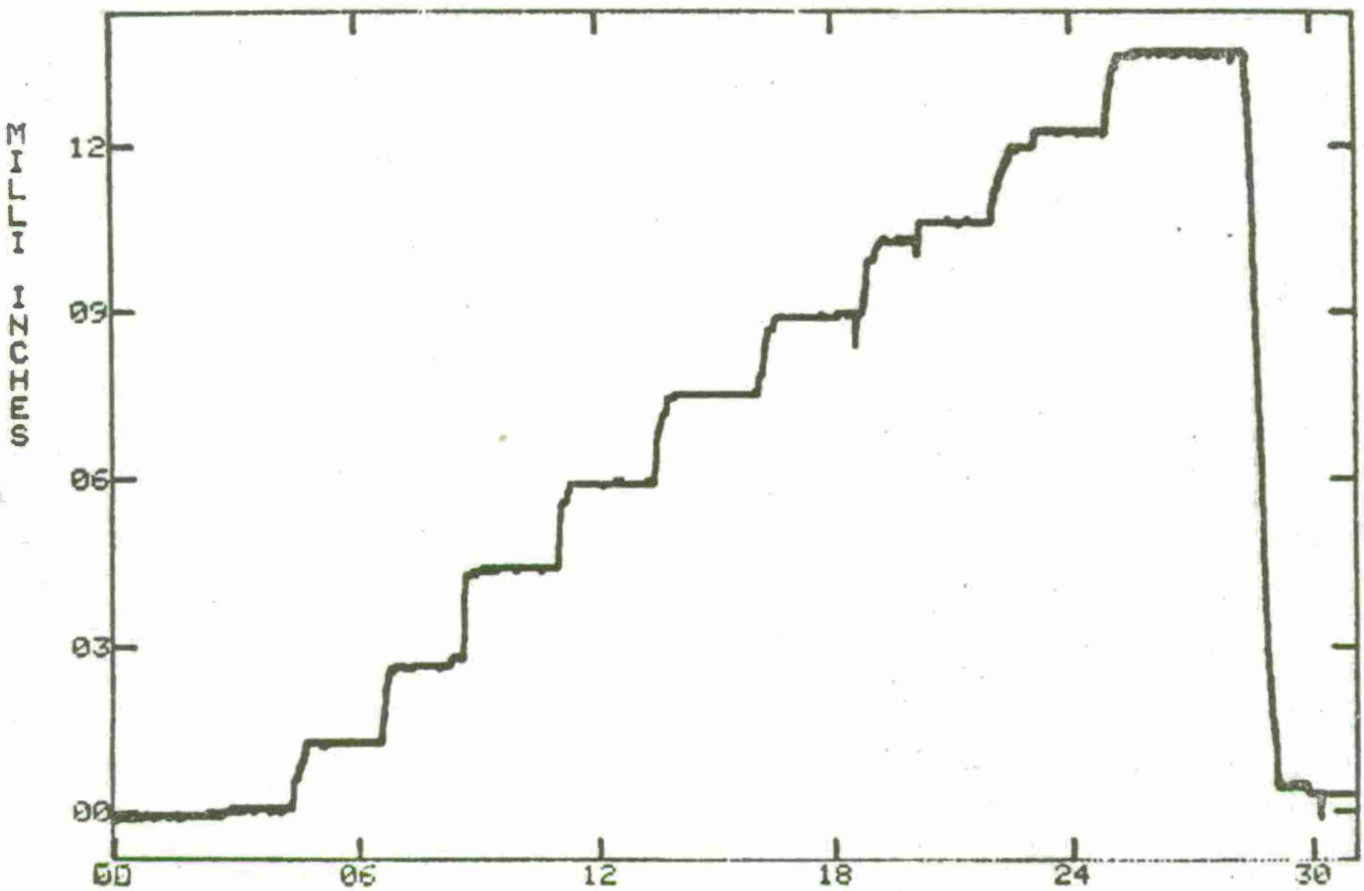
CH 10 LATERAL DEFLECTION ST 148.50 - WL 63.49 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



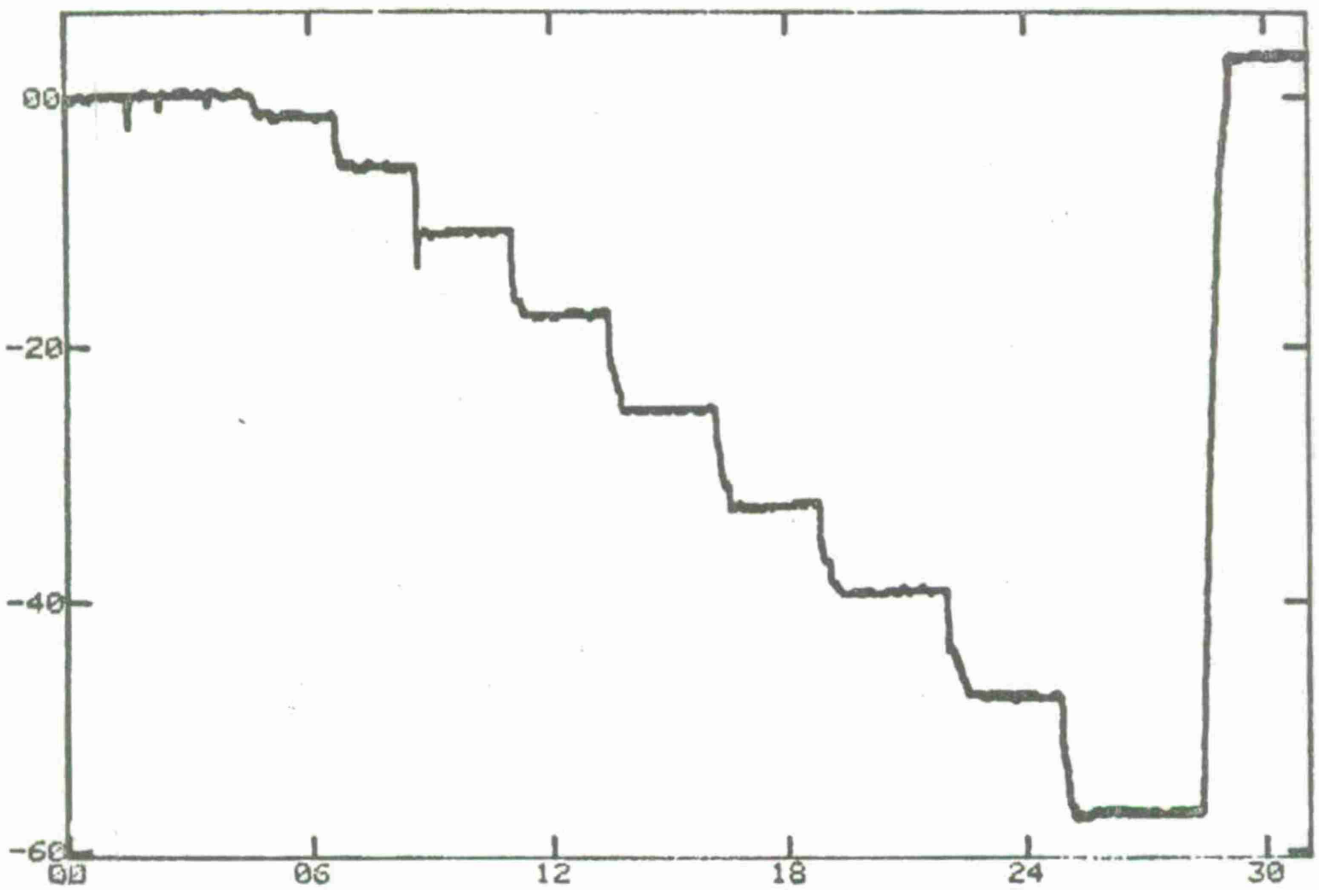
TIME IN SECONDS X 10-1
CH 11 LATERAL DEFLECTION ST 213.94 - WL 65.00 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



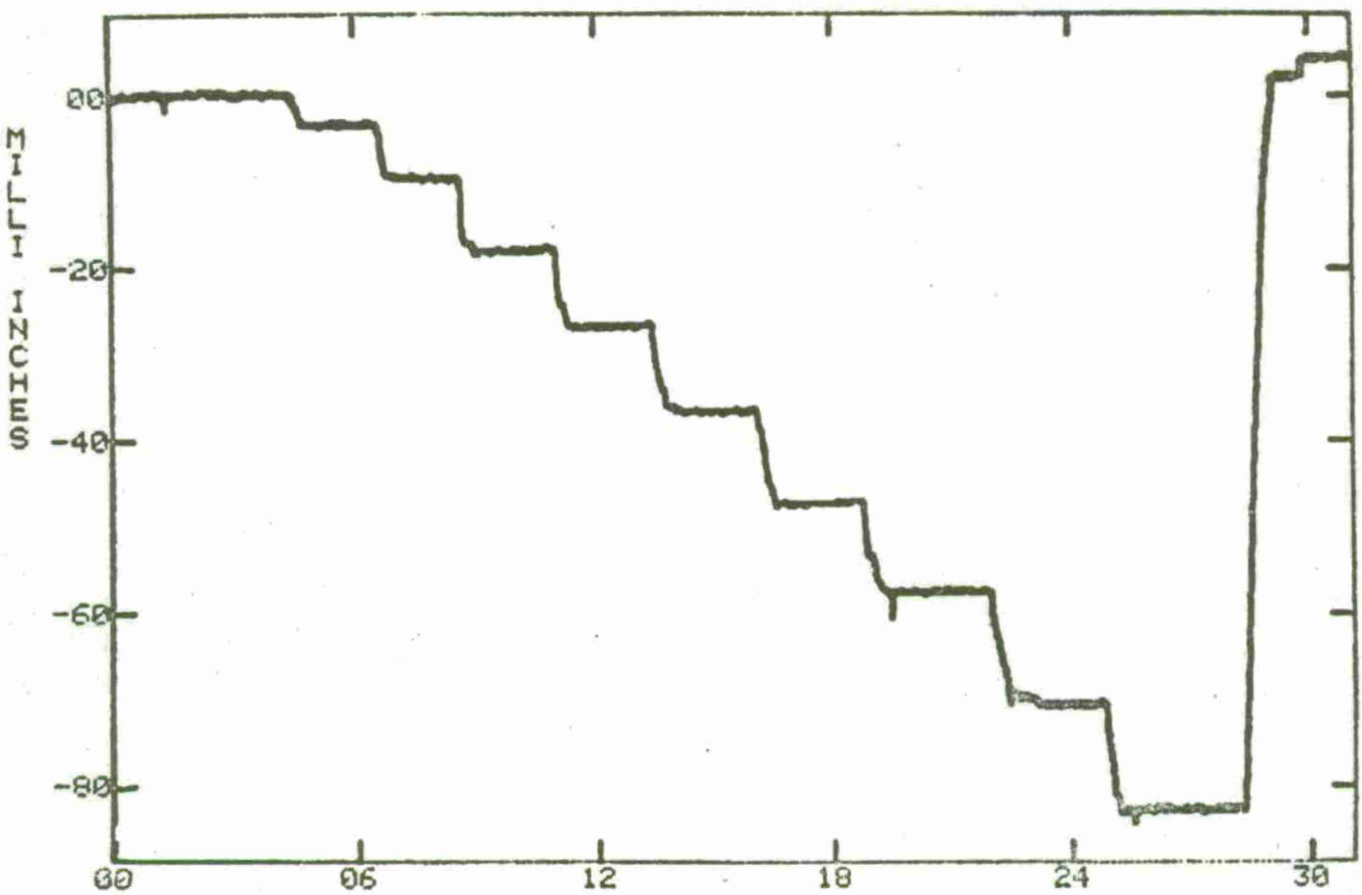
CH 12 BASE ROTATION TOP LEFT HAND X 10+1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



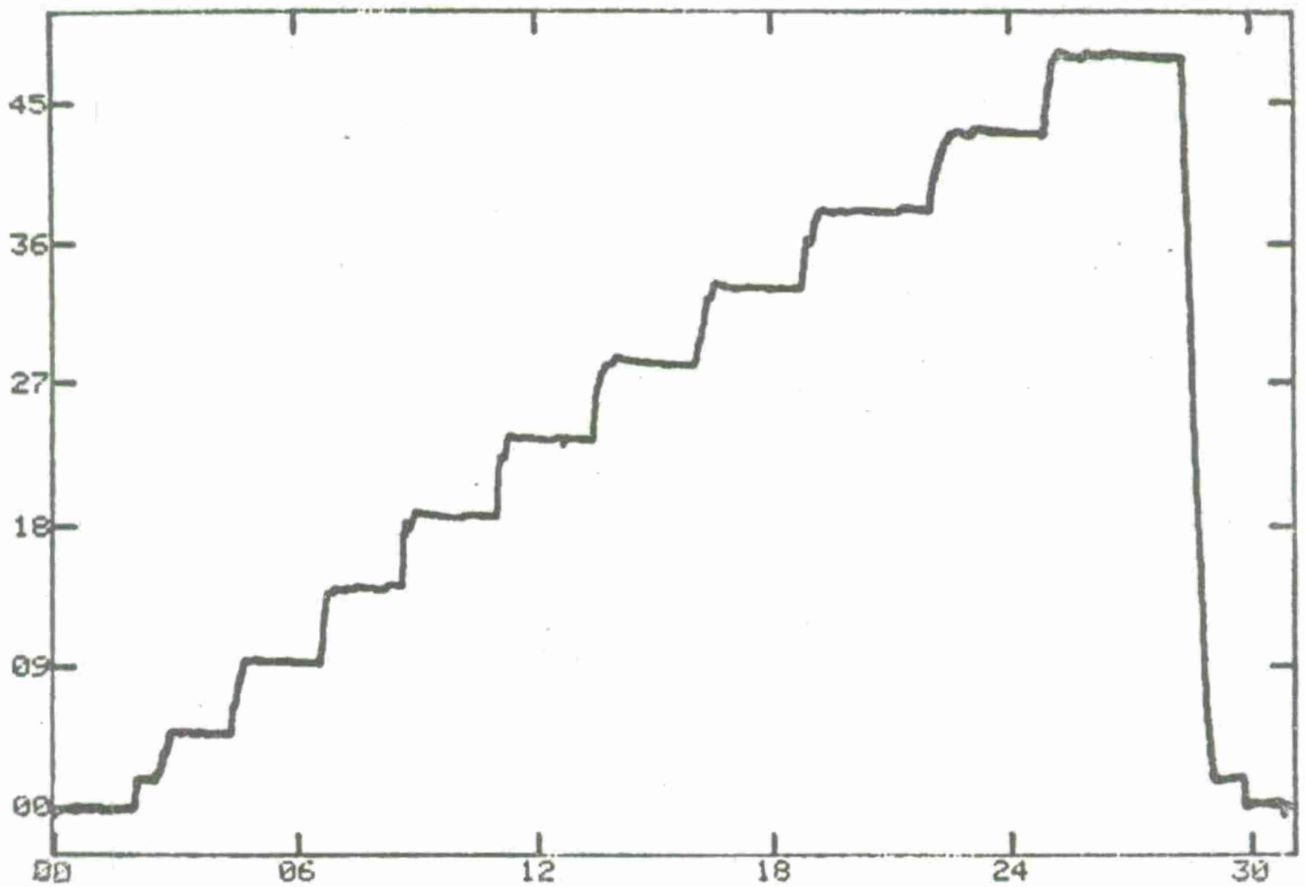
CH 13 BASE ROTATION BOTTOM LEFT HAND X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS



TIME IN SECONDS X 10-1
CH 14 BASE ROTATION TOP RIGHT HAND X 10+1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 15 BASE ROTATION BOTTOM RIGHT HAND X 10+1
TEST 38 (2 SEPT 75) AH1G BEND TESTS


LBS
45
36
27
18
09
00
00
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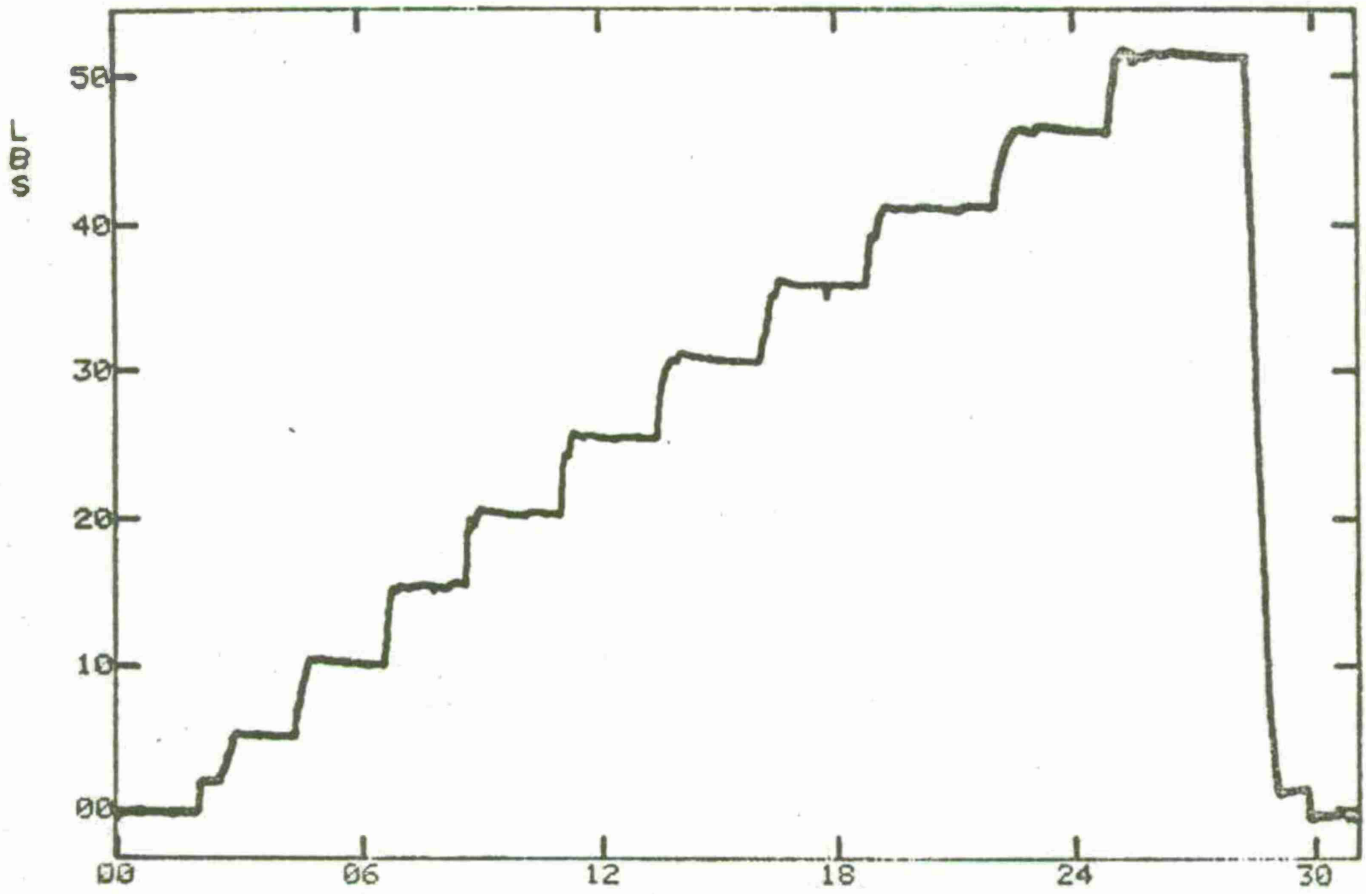
12
18
24
30
TIME IN SECONDS X 10-1
CH 17 BASE LOAD TOP LEFT HAND X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS


LBS
50
40
30
20
10
00
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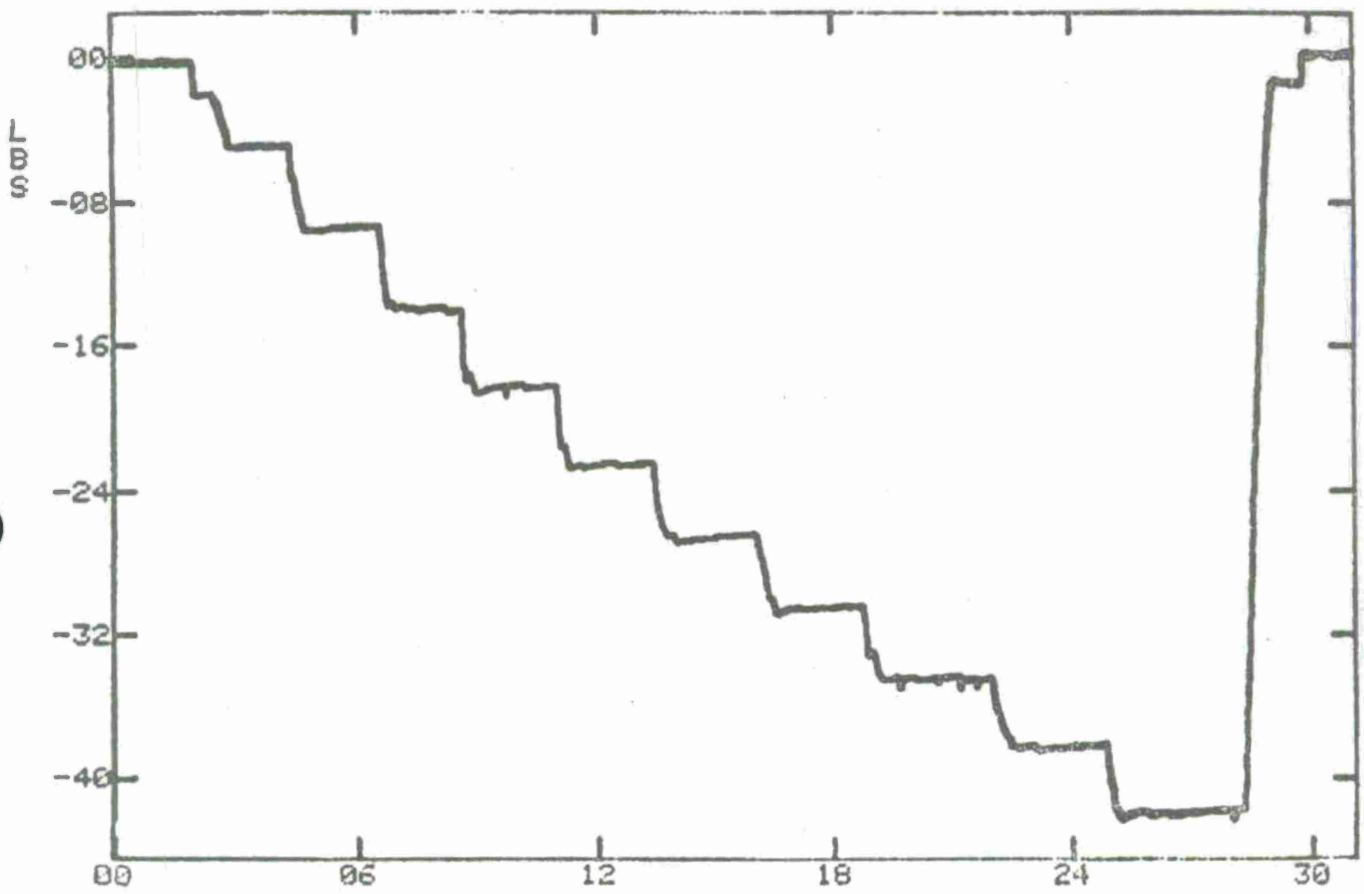
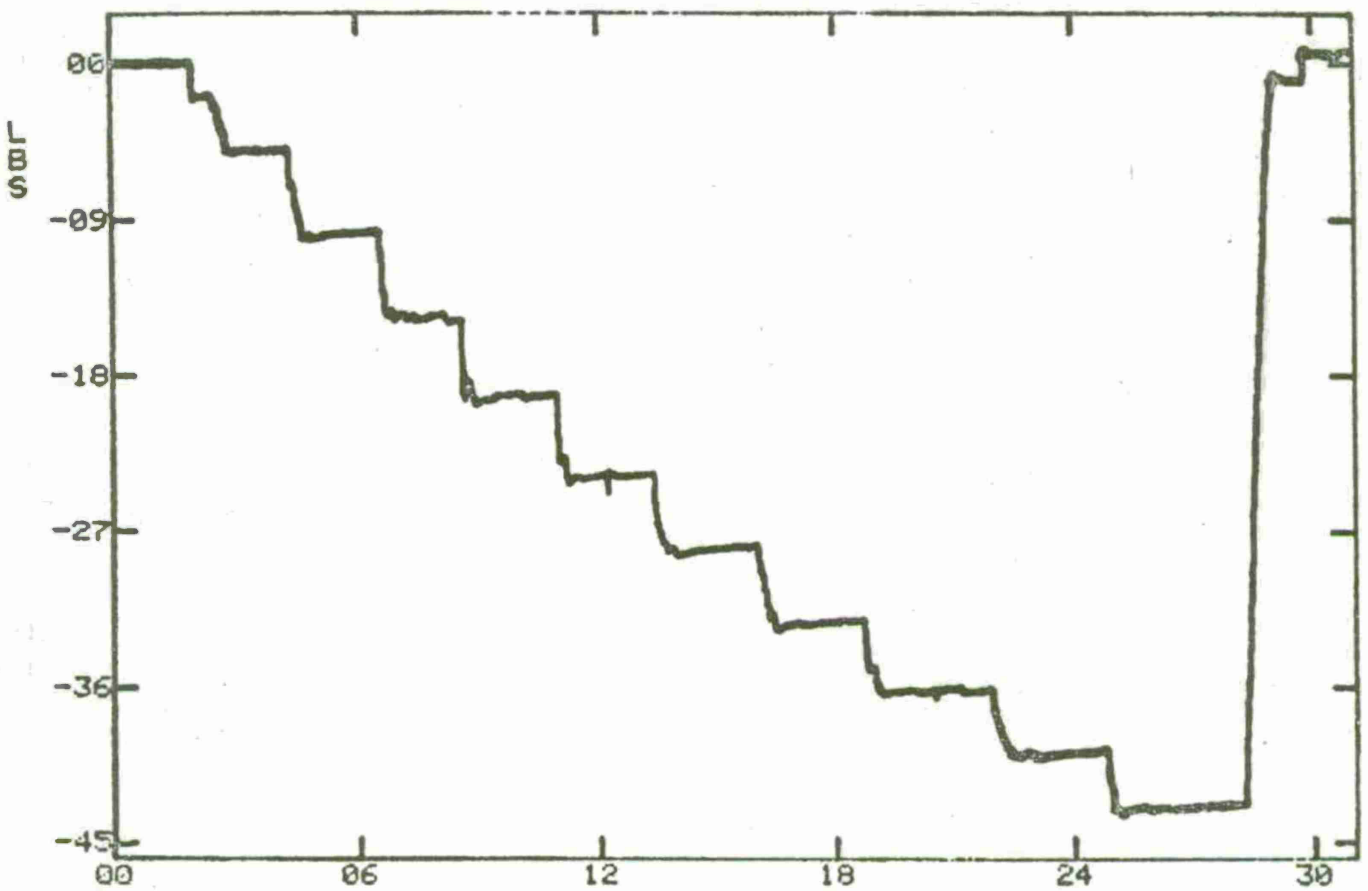
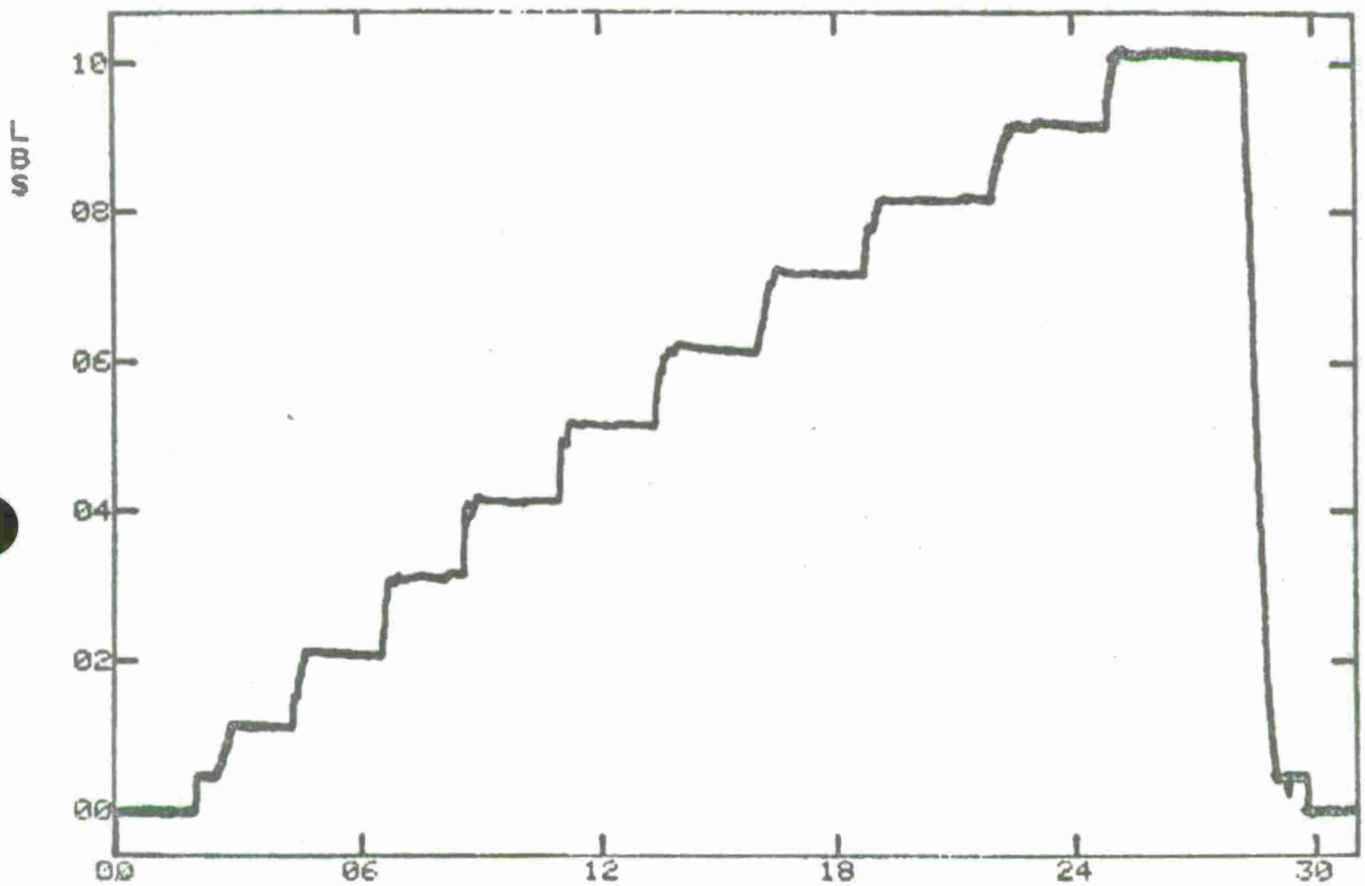
06
12
18
24
30
TIME IN SECONDS X 10-1
CH 18 BASE LOAD BOTTOM LEFT HAND X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 19 BASE LOAD TOP RIGHT HAND X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 20 BASE LOAD BOTTOM RIGHT HAND X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS


LBS
10
08
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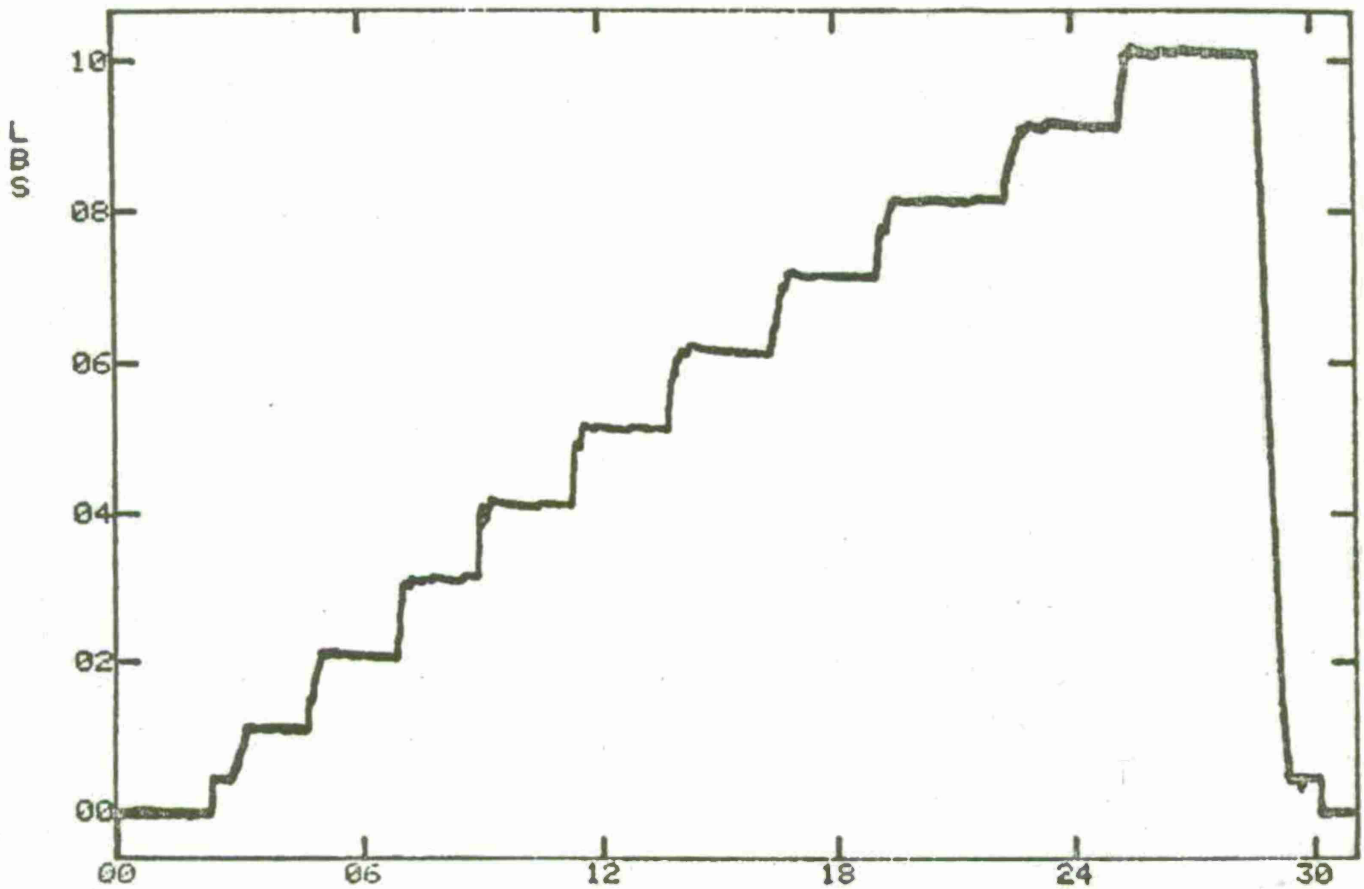
06
12
18
24
30
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS


LBS
10
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12
18
24
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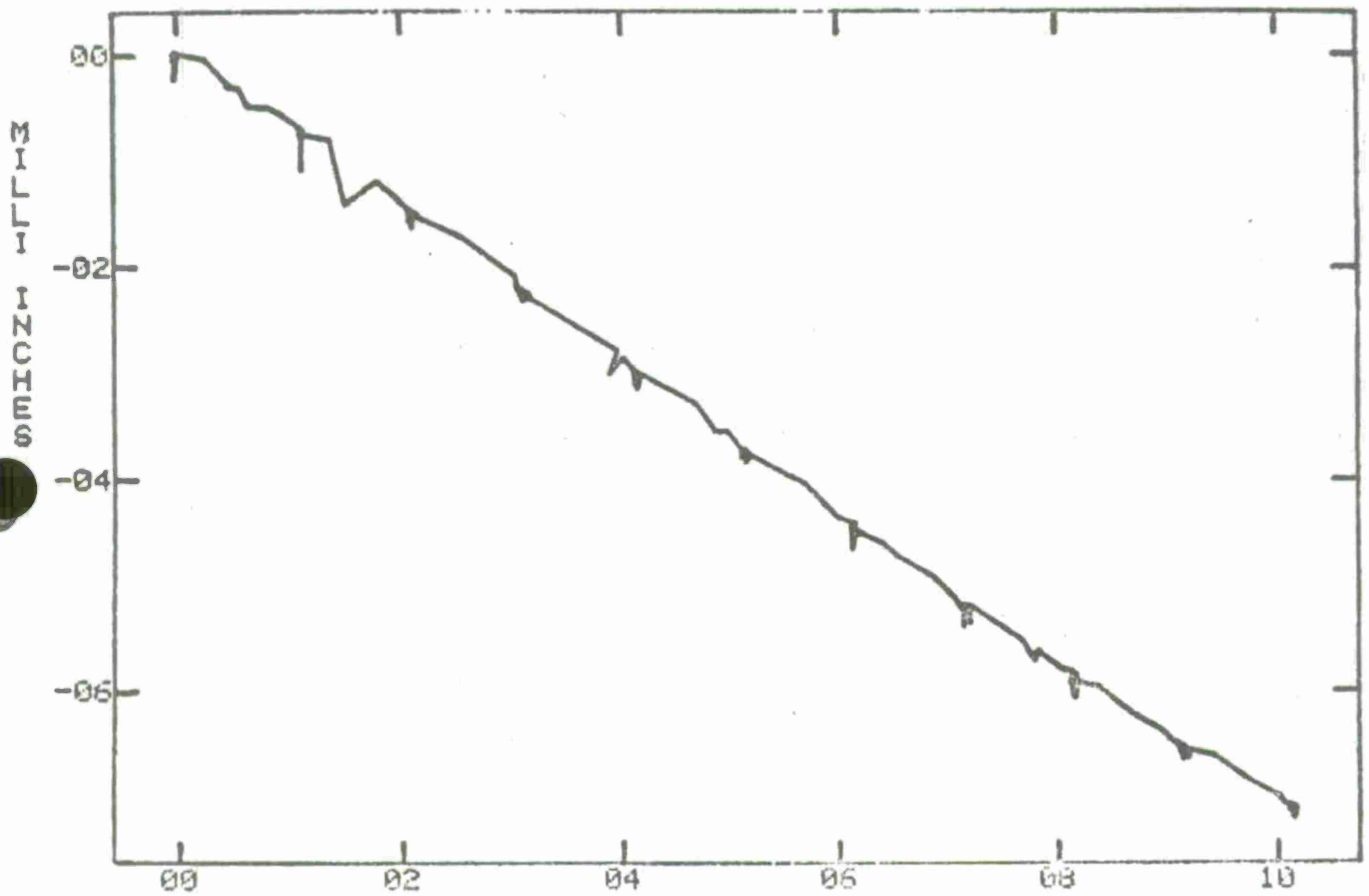
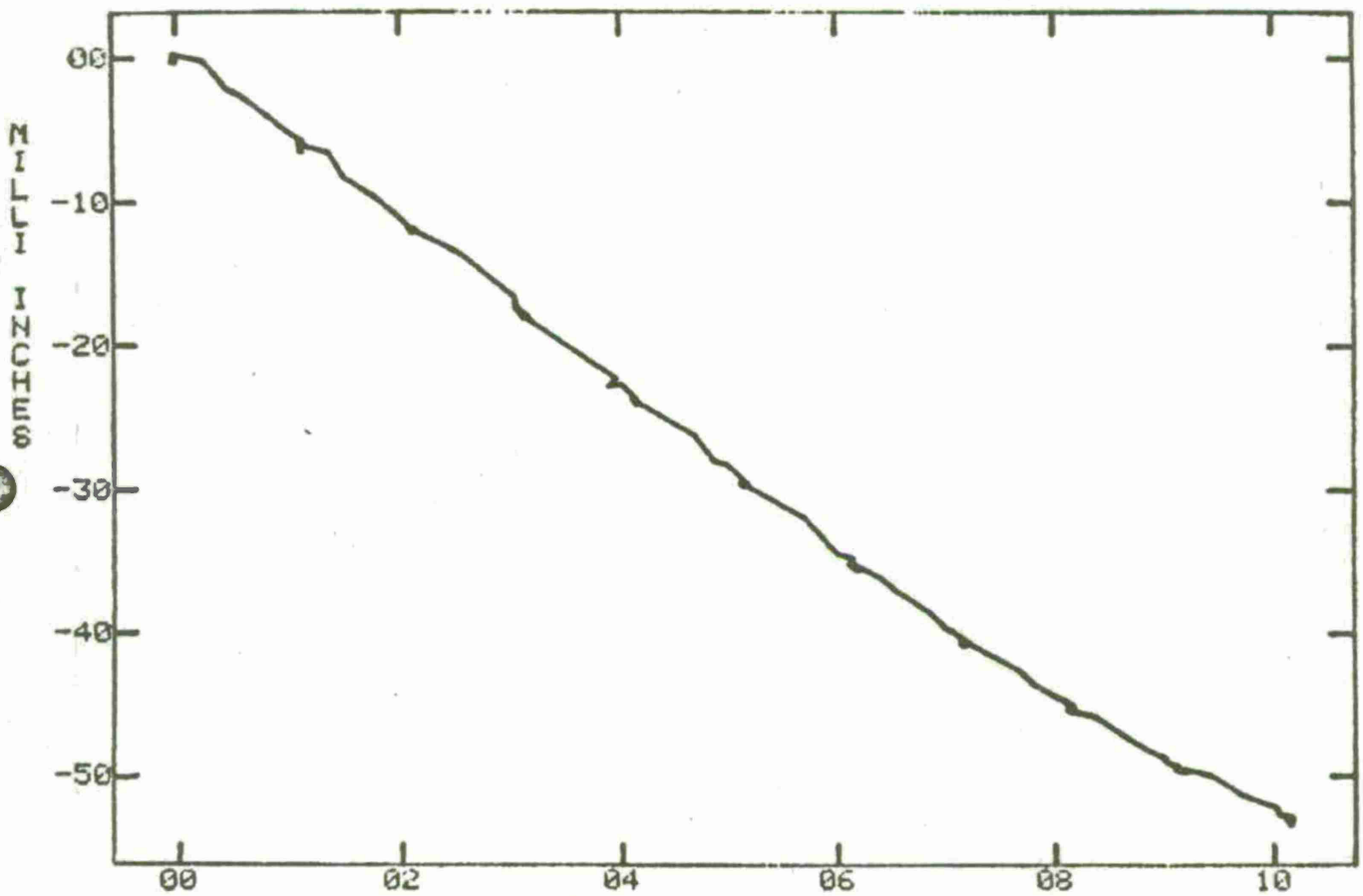
TIME IN SECONDS X 10-1
CH 21 LOAD APPLIED X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 1 X 10-2
TEST 38 (2 SEPT 75) AH1G BEND TESTS


00
-10
-20
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-40
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MILLI INCHES
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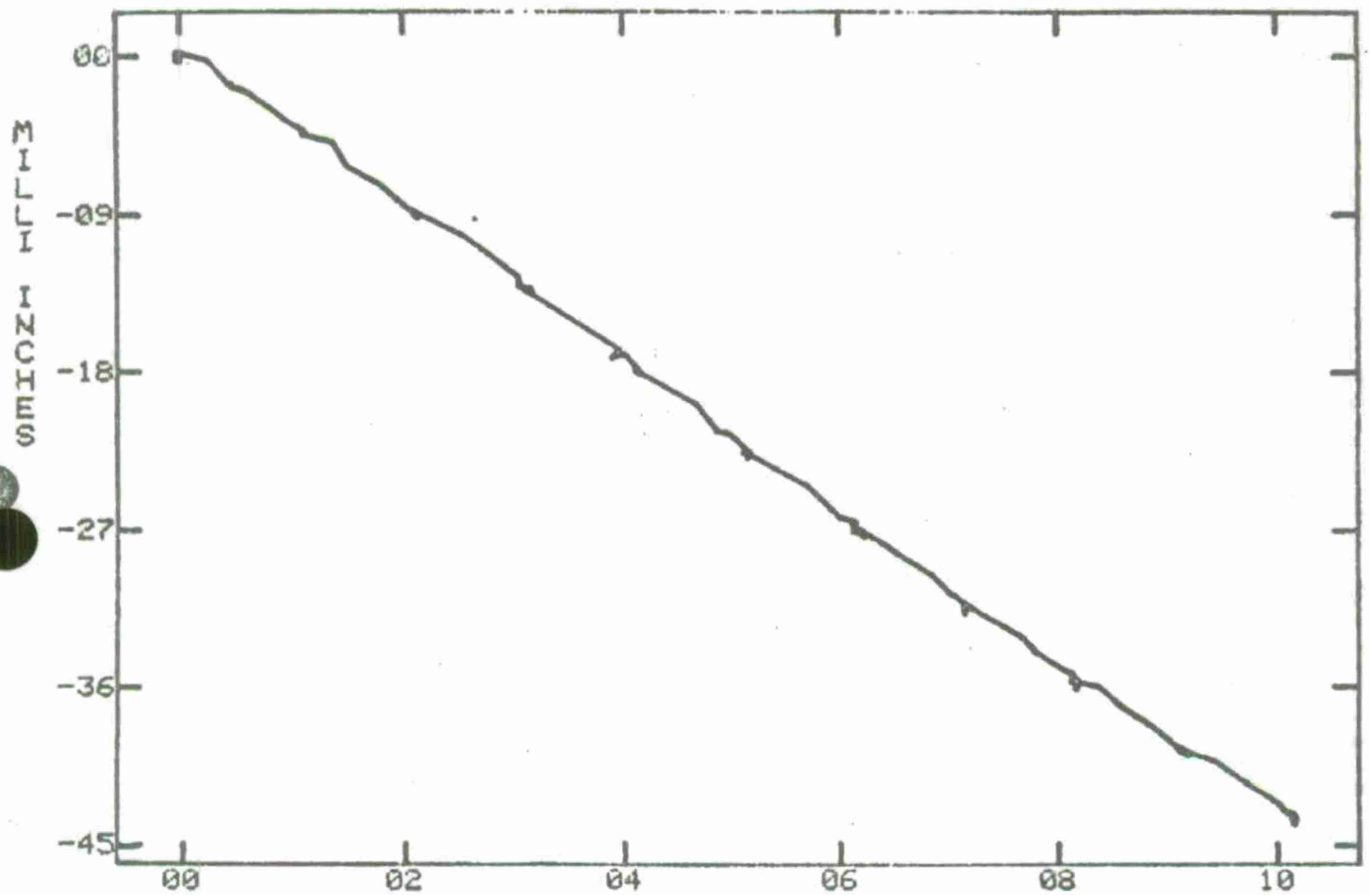
10
LBS X 10-2
CH 21 VS CH 2 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS


00
-09
-18
-27
-36
-45
MILLI INCHES
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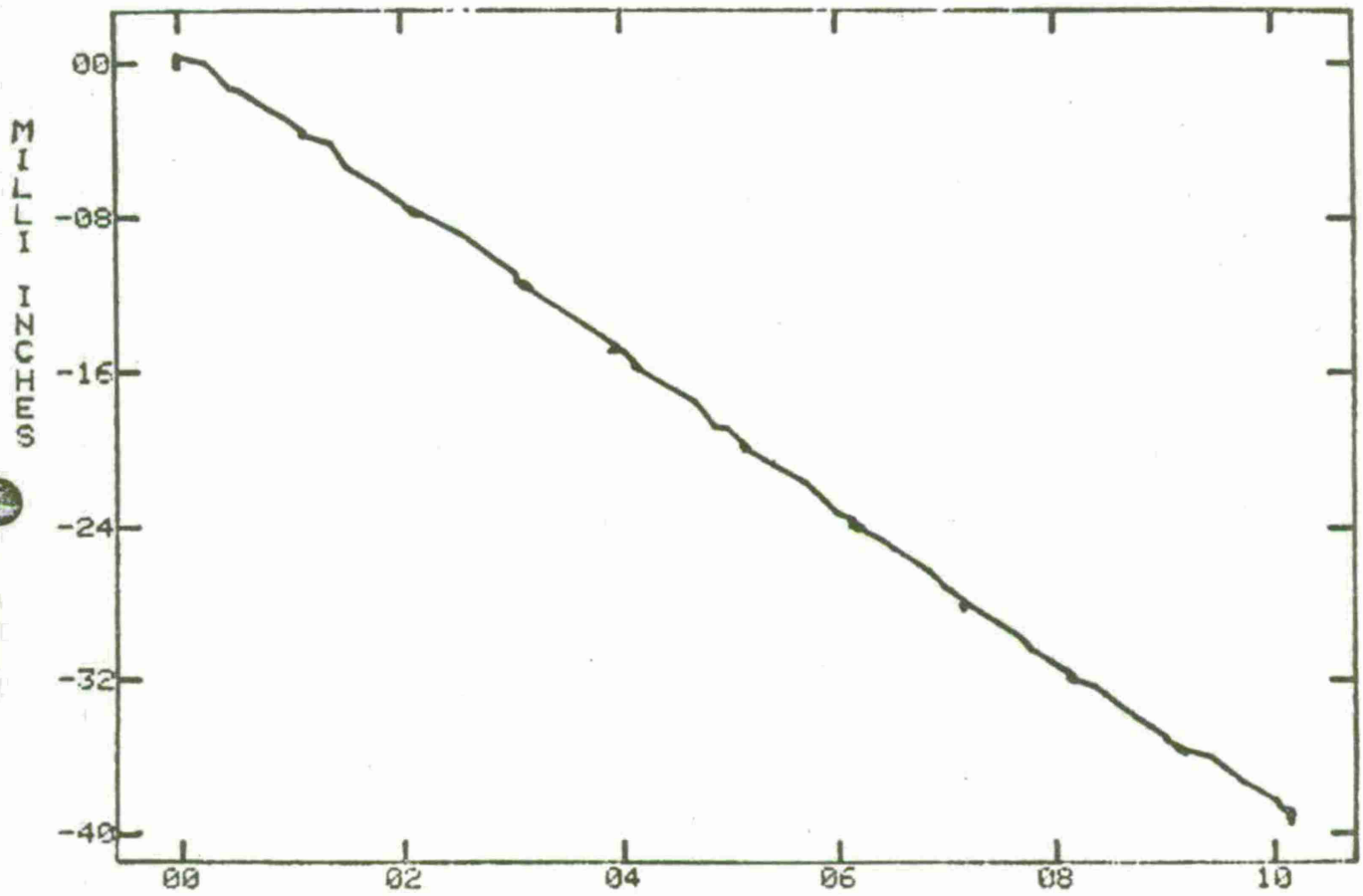
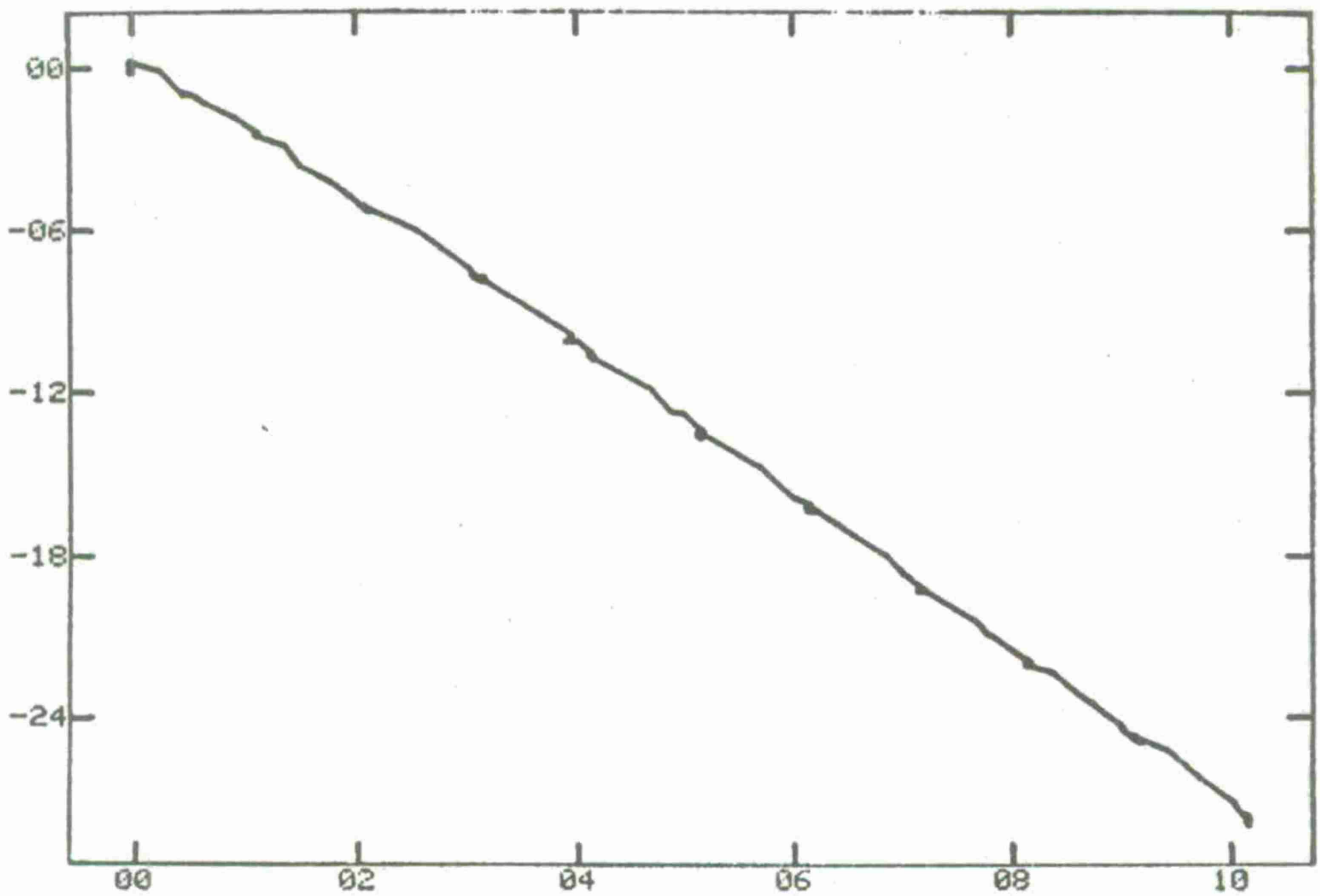
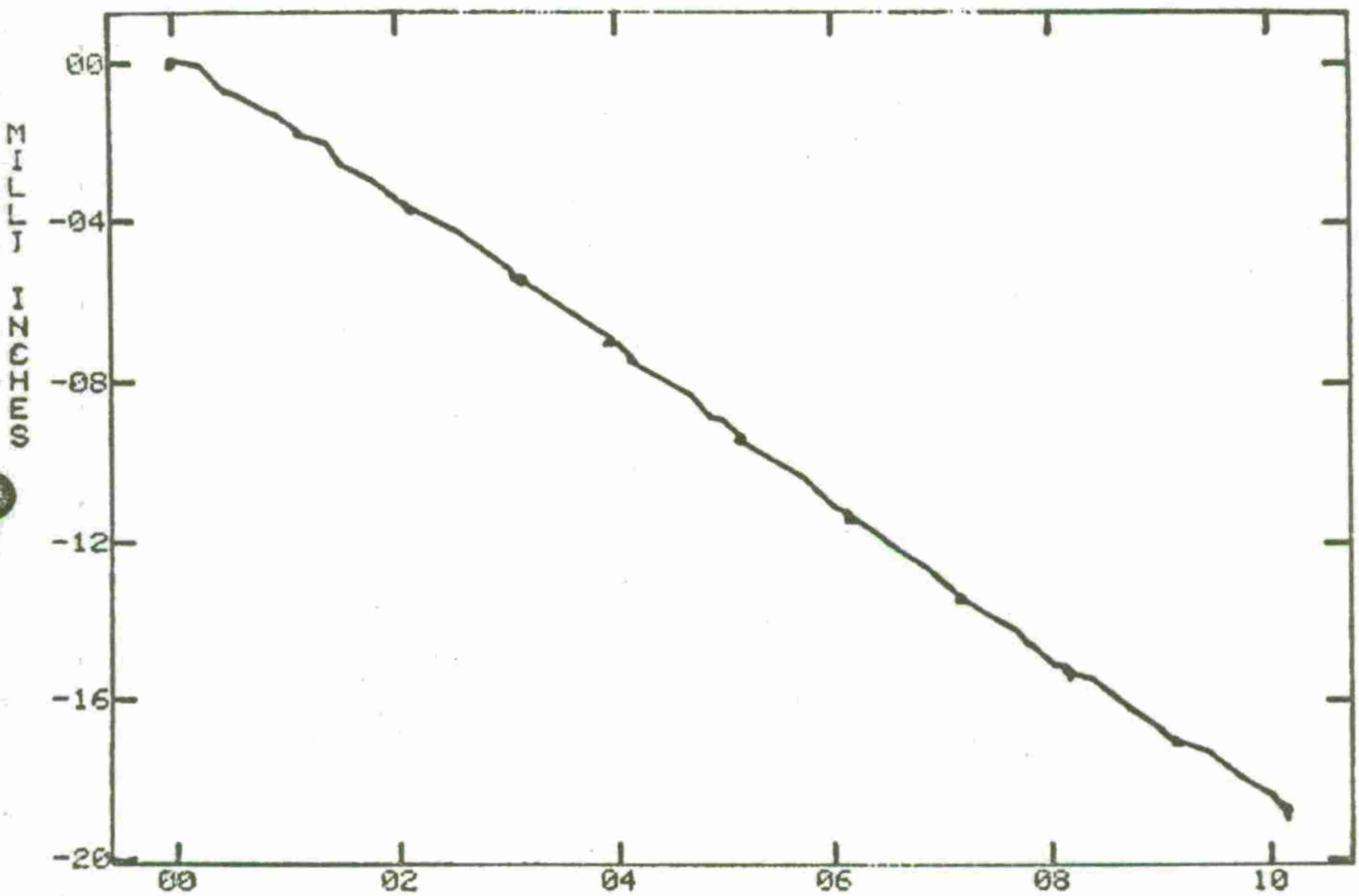
LBS X 10-2
CH 21 VS CH 3 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 4 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 5 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS


00
-04
-08
-12
-16
-20
MILLI INCHES
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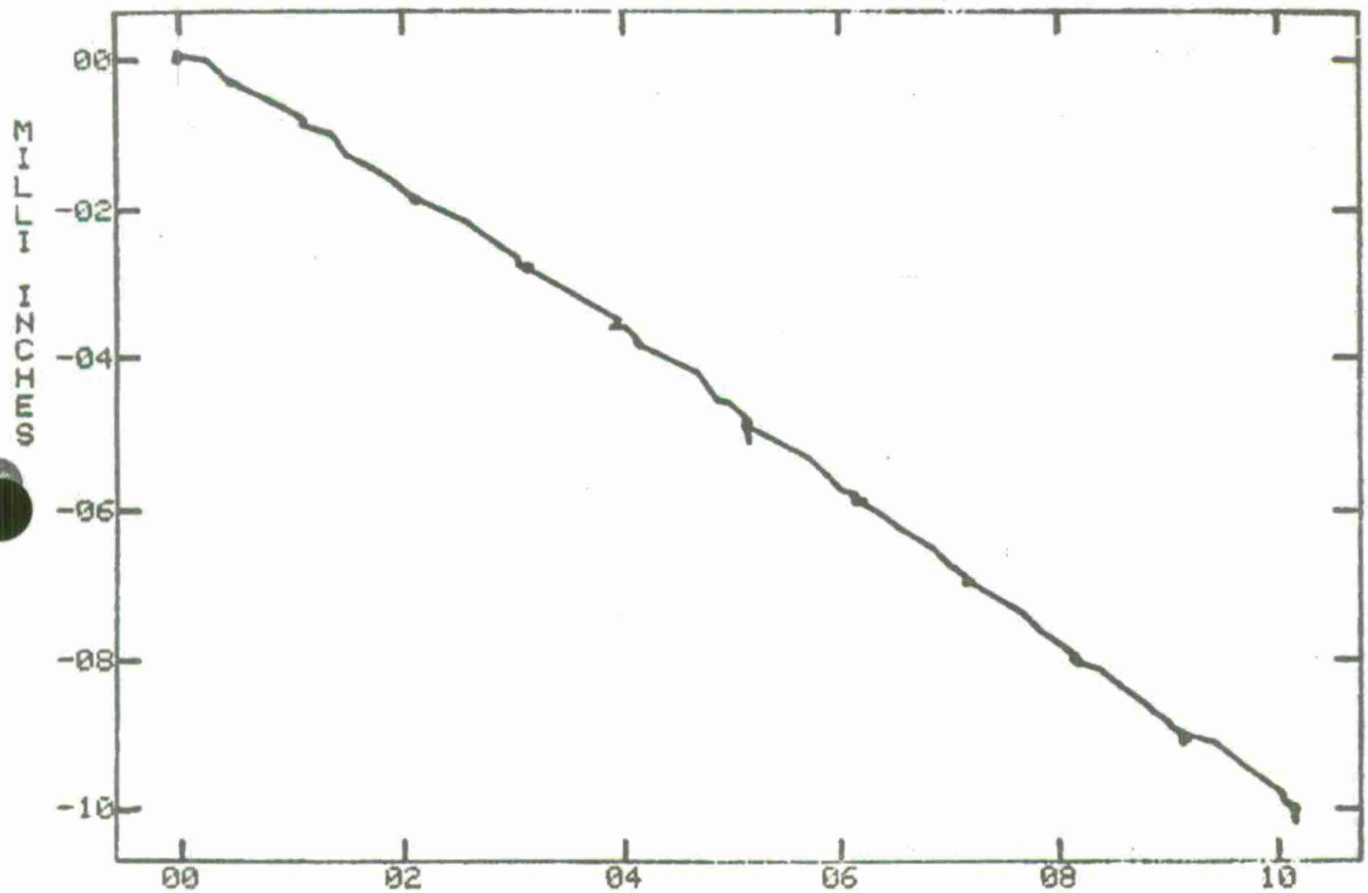
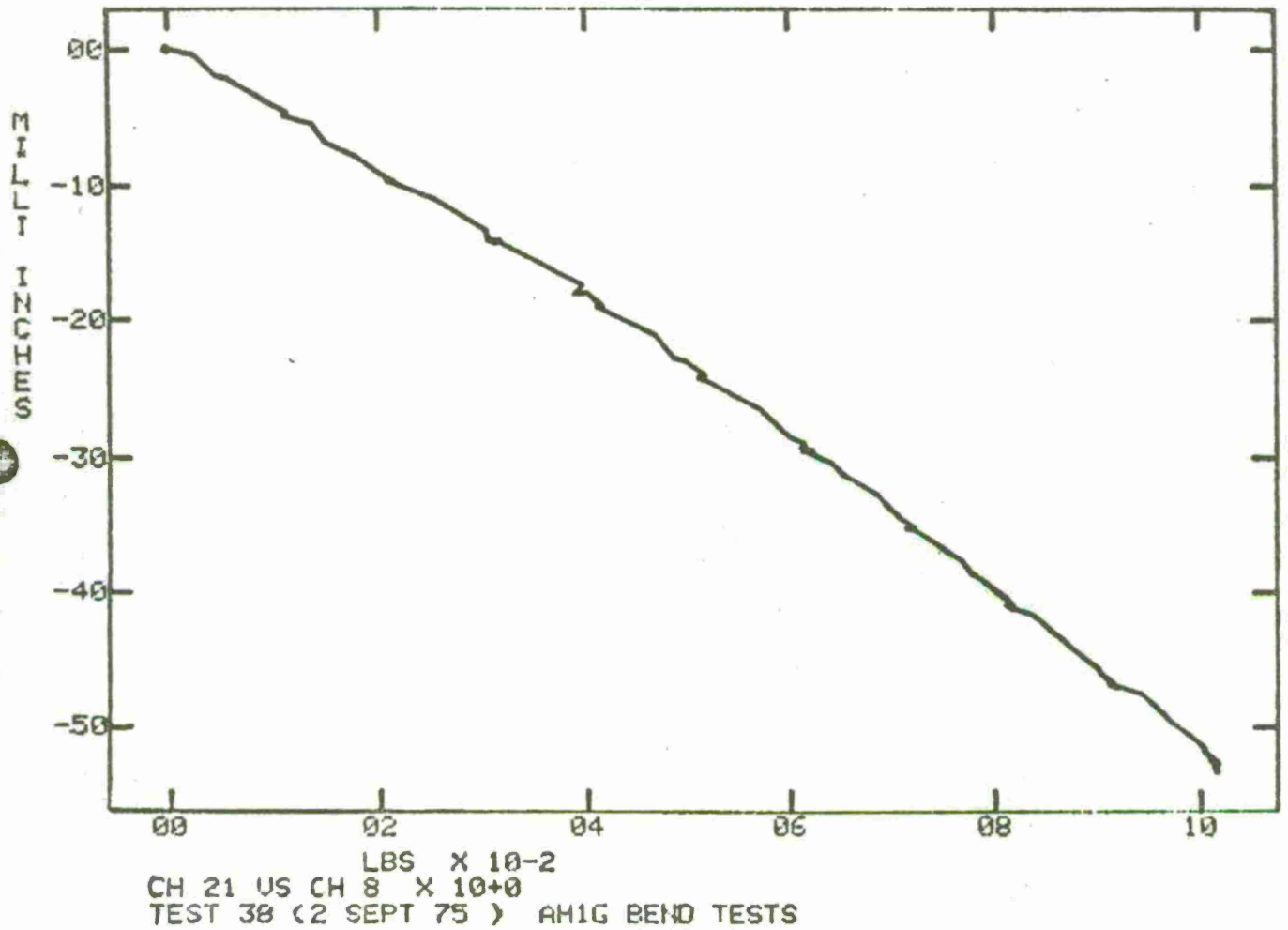
02
04
06
08
10
LBS X 10-2
CH 21 VS CH 6 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 7 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS


00
-10
-20
-30
-40
-50
MILLI INCHES
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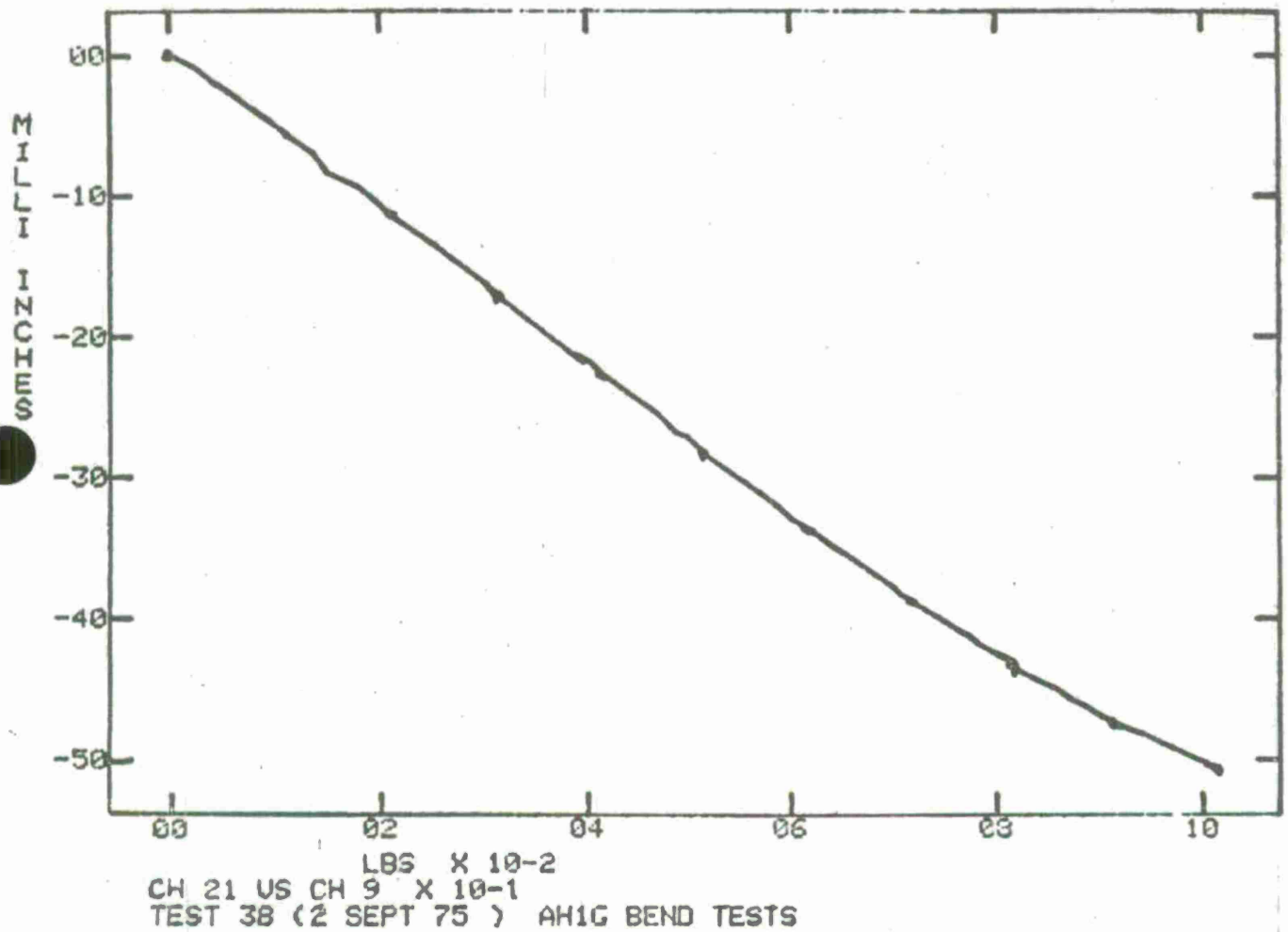
02
04
06
08
10
LBS X 10-2
CH 21 VS CH 8 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
00
-10
-20
-30
-40
-50
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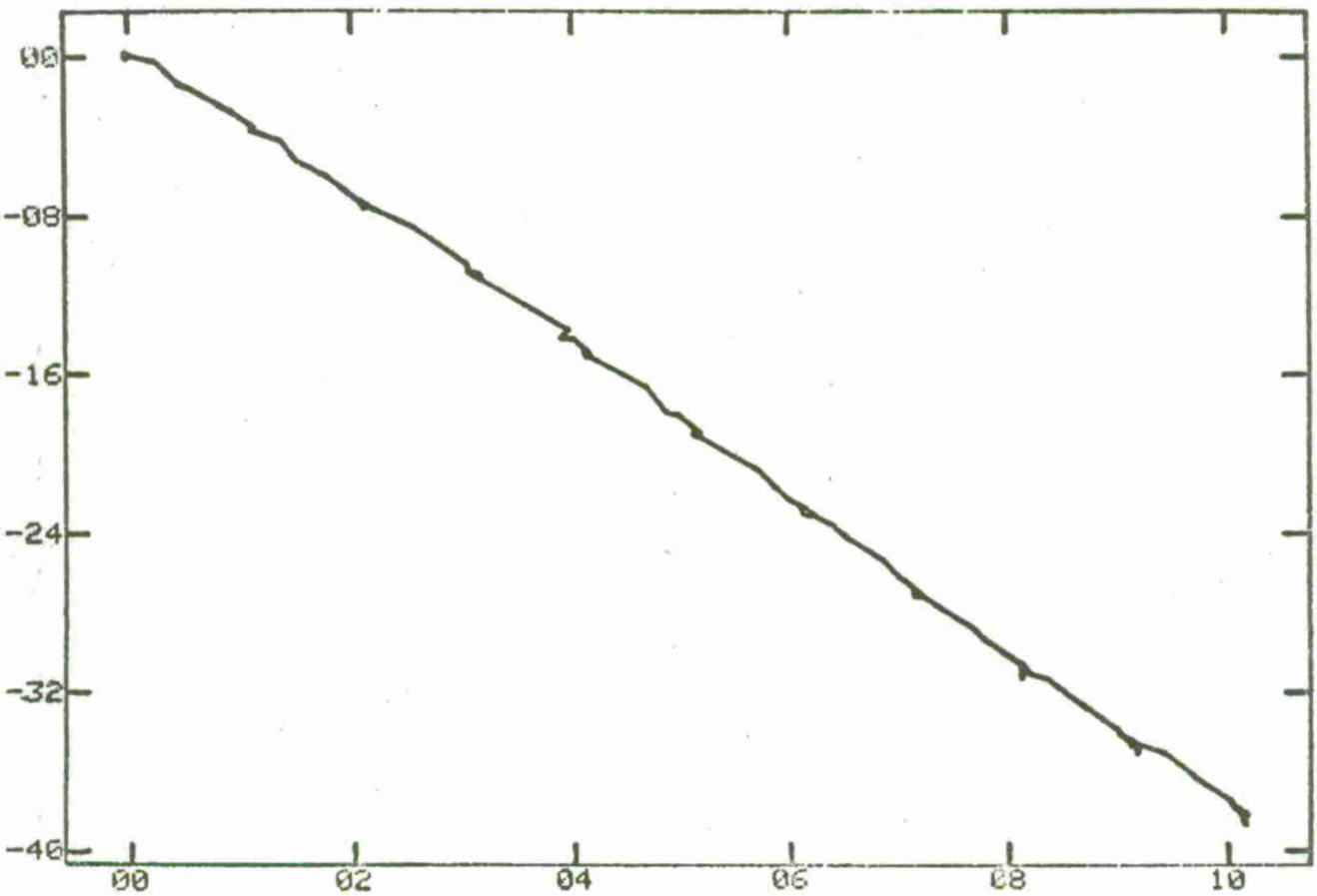
02
04
06
08
10
LBS X 10-2
CH 21 VS CH 9 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 10 X 10-1
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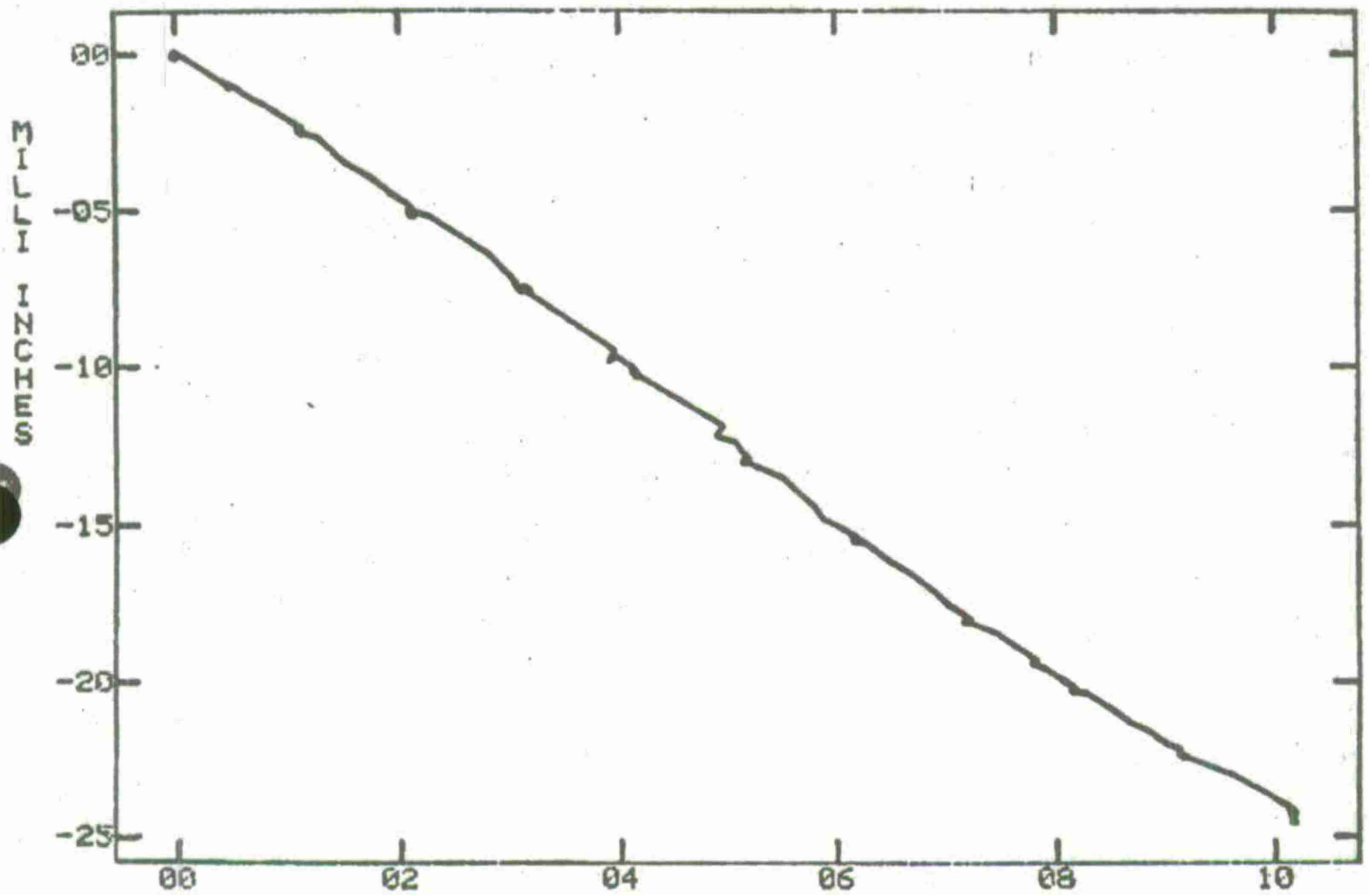
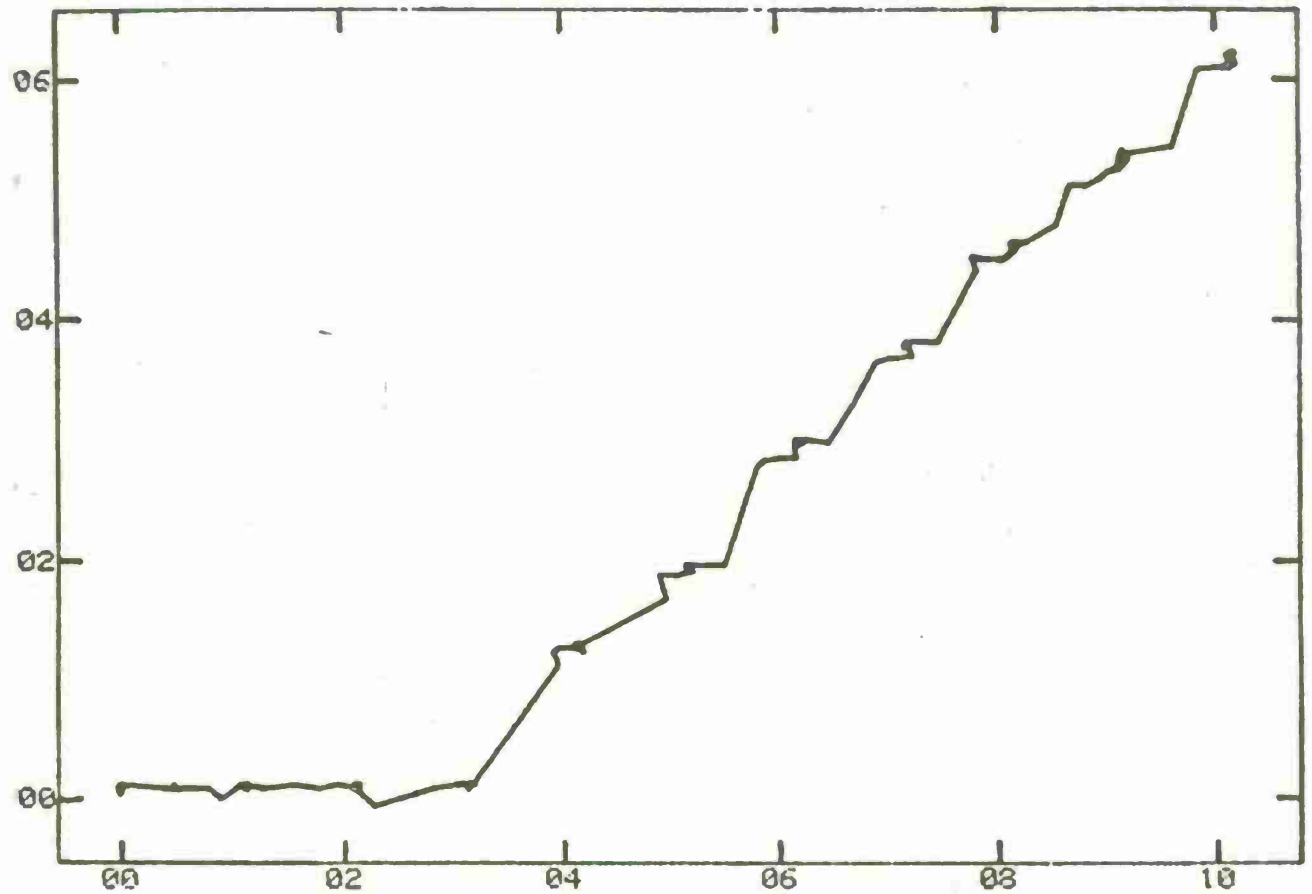
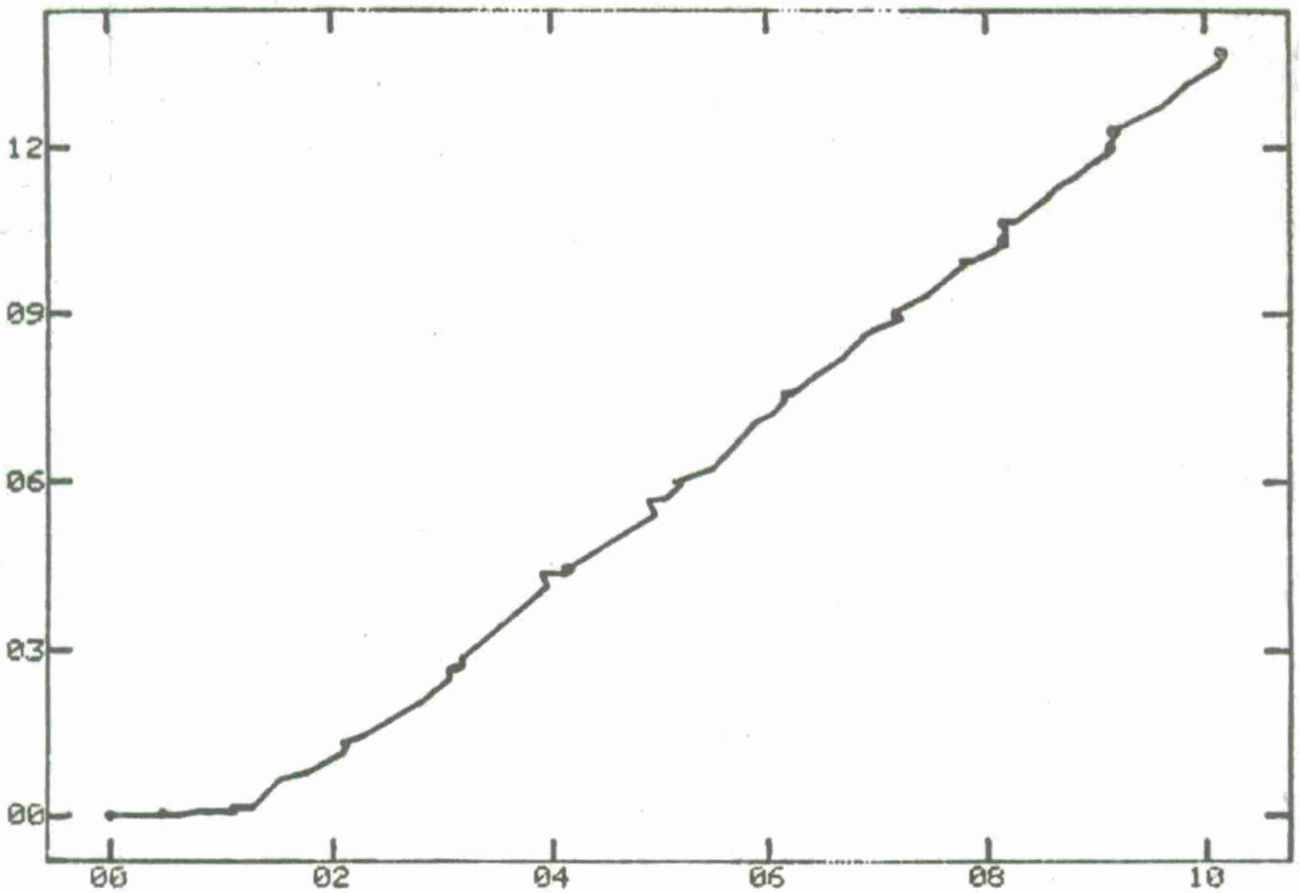


CH 21 VS CH 11 X 10-1
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 12 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS


MILLI INCHES
12
09
06
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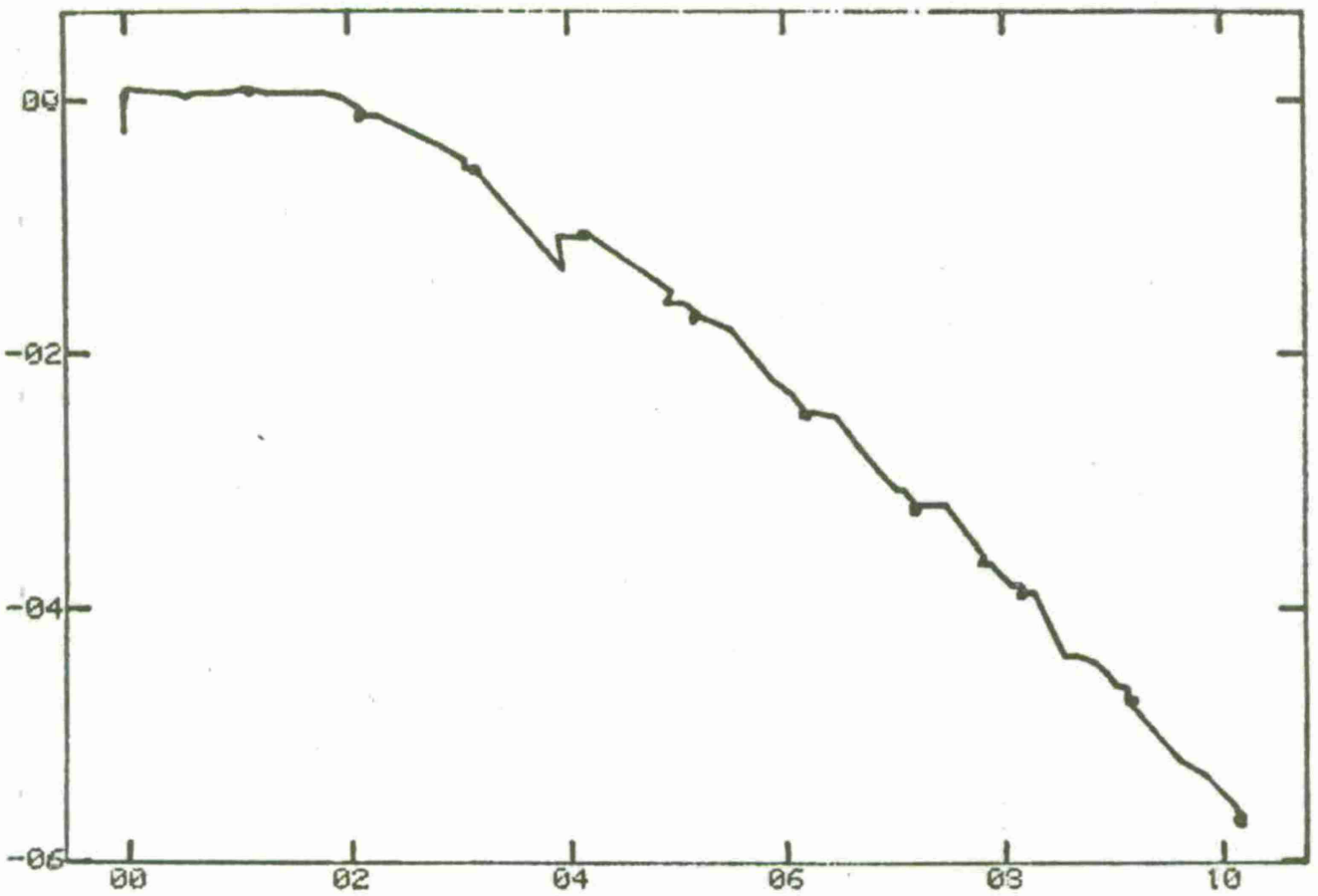
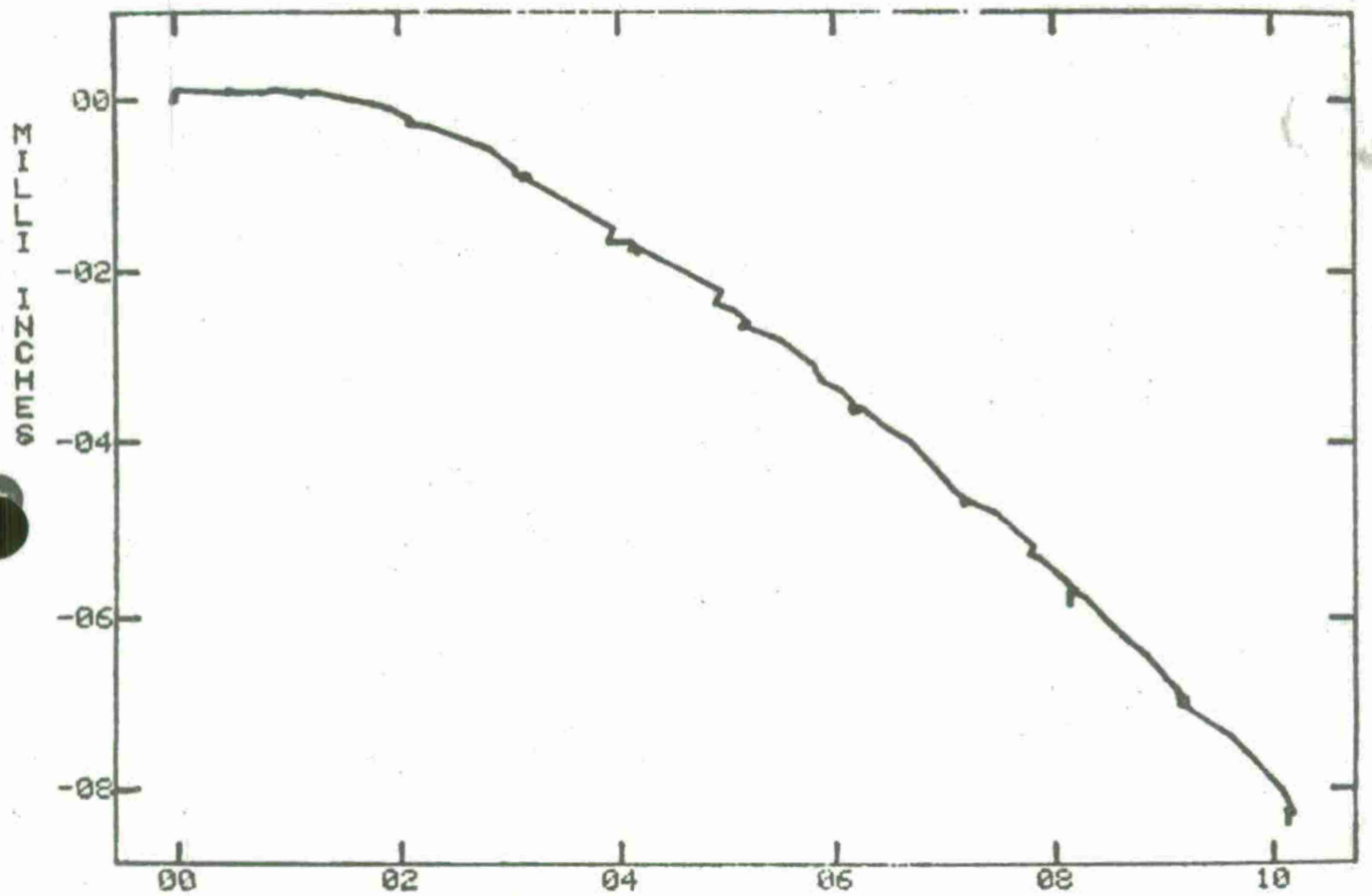
04
06
08
10
LBS X 10-2
CH 21 VS CH 13 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 14 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS



CH 21 VS CH 15 X 10+0
TEST 38 (2 SEPT 75) AH1G BEND TESTS

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Research Directorate, General Thomas J. Rodman Laboratory
Rock Island Arsenal, Rock Island, Illinois 61201

Measurement of the Static Influence Coefficient of the AH-1G Cobra Fusalage

Prepared By: Donald E. Frericks, Edward R. Lindquist, Robert A. Peterson, and Robert J. Radkiewicz
Security Class. (of this report): Unclassified
Technical Report R-TR-76-005

672 Pages, Incl Figures and Illustrations

An AH-1G Cobra Helicopter (minus the tailsection) was mounted in a vertical position by personnel at the Wars Simulation Center, Rock Island Arsenal, and the response of the fusalage to various applied loads was then measured. The response, measured as deflections in the direction of applied load, will be used by Bell Helicoptar Company for the validation of their NASTRAN math modal of the Cobra Helicopter. Initial results of the test indicate good agreement between the experimentally measured deflections and the math modal predicted deflections.

UNCLASSIFIED

1. Helicoptar Bending
2. Spring Rate
3. Influence Coefficient
4. NASTRAN Math Model

I. Donald E. Frericks, Robert A. Peterson, Edward R. Lindquist, and Robert J. Radkiewicz
II. Rock Island Arsenal
III. Research Directorate
General Thomas J. Rodman Laboratory
Rock Island Arsenal

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