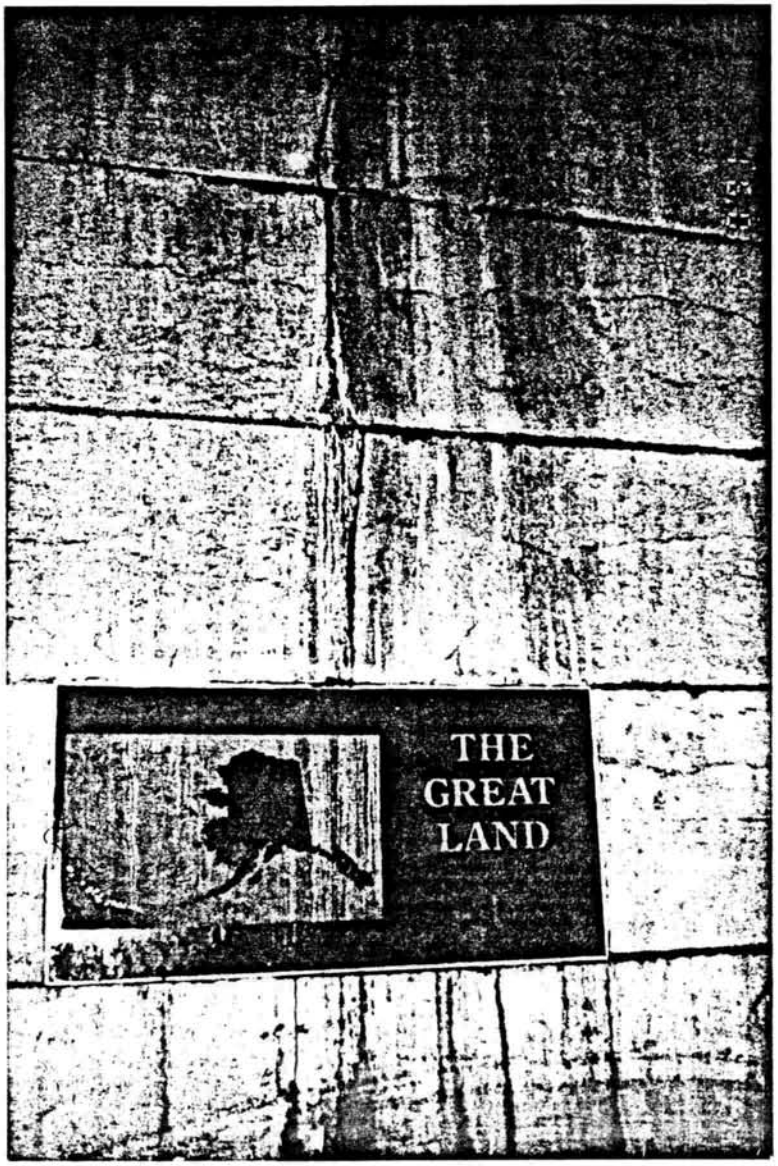

Photo 2. Interior view of the east elevation of the Monument above the 450' level landing. The crack in the stone runs between the 455' level and the 466' level and penetrates all the way through the stone to the exterior. Deposits of calcium carbonate and stains from corroding iron and steel can be seen on the wall above the Alaska memorial stone.

Photo 3. Interior view of the east elevation of the Monument above the 450' level landing. The crack in the stone runs between the 455' level and the 466' level and penetrates all the way through the stone to the exterior.

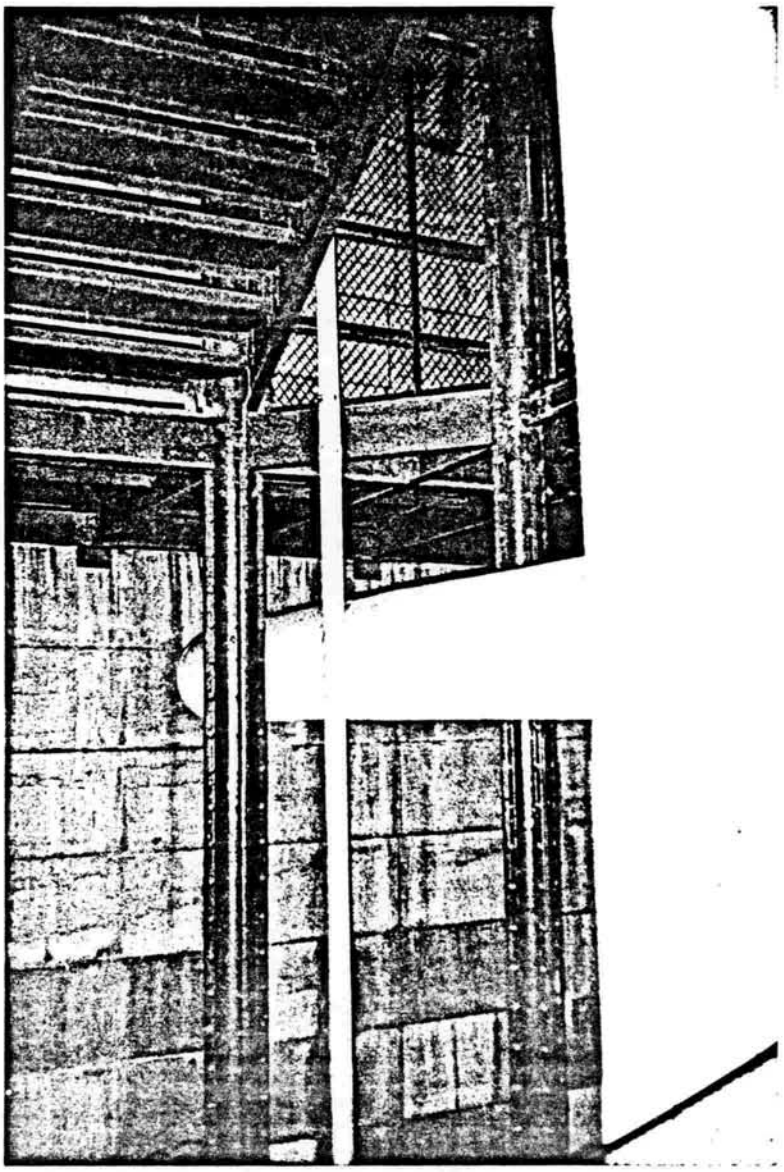

Photo 4. Interior view of the west elevation of the Monument, with the 460' level landing at the upper part of the photo. The crack visible between the two columns runs from the bottom of the top course of granite at the 450' level to the bottom of the center rib at the 470' level.

Photo 5. Interior view of the west elevation of the Monument below the 460' level landing. The crack in the stone runs between the 450' level and the 470' level and includes the top course of granite at the 450' level.

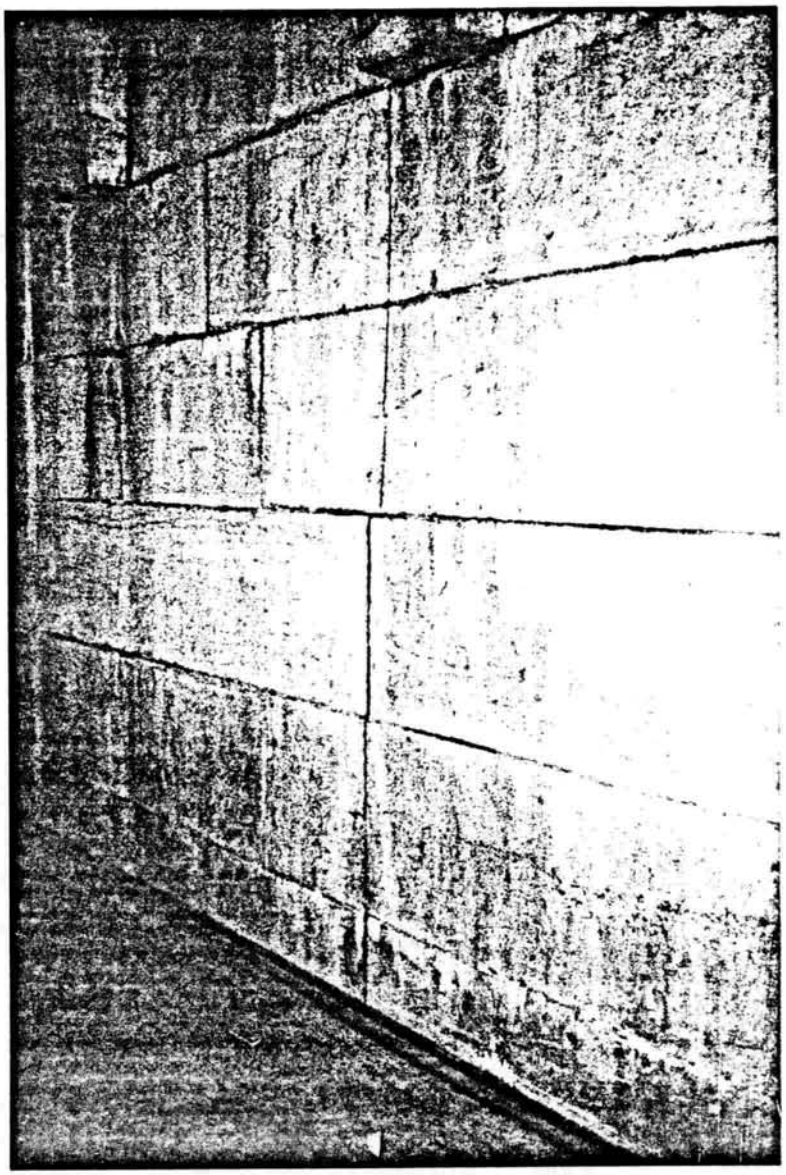

Photo 6. Interior view of the west elevation of the Monument above the 460' landing. The crack runs between the 450' level and the 470' level, going to the bottom of the center rib at the top of the photo.

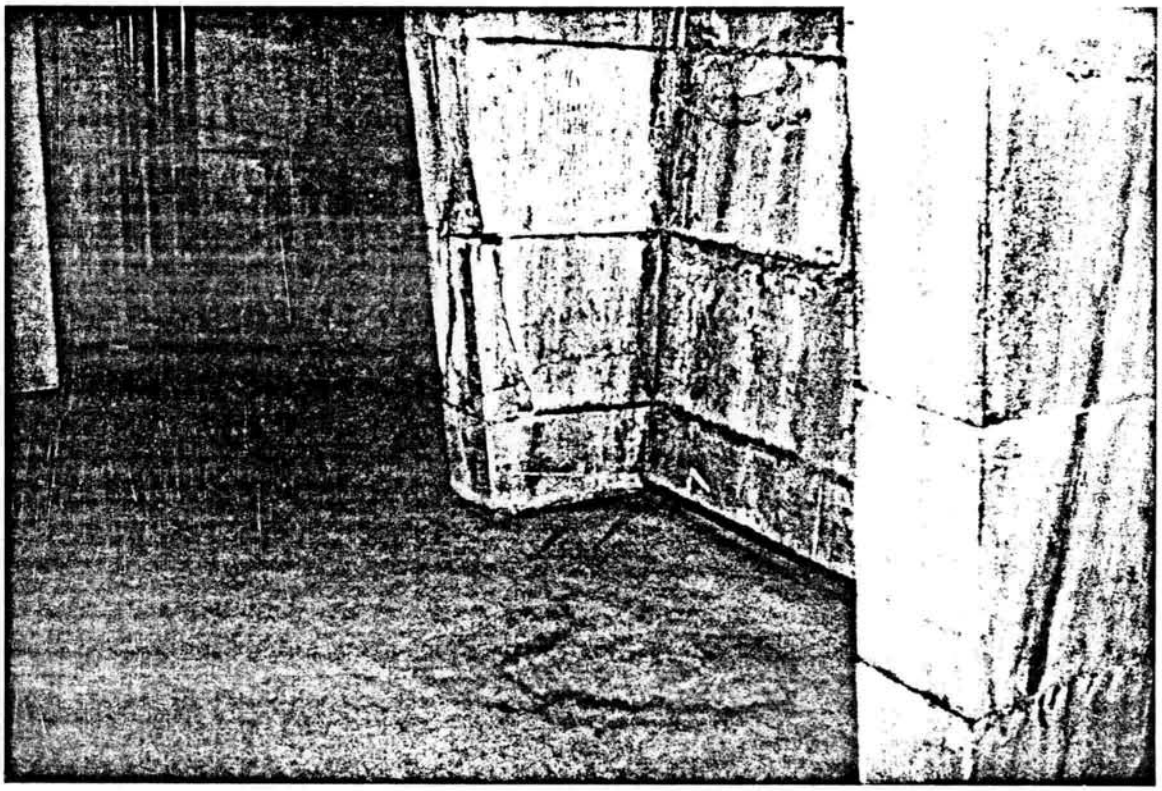

Photo 7. Interior view of the west elevation of the Monument above the 480' level landing. The south rib is cracked between the 482' level and the 485' level, but the cracked part of the stone is loose and is not bearing any weight.

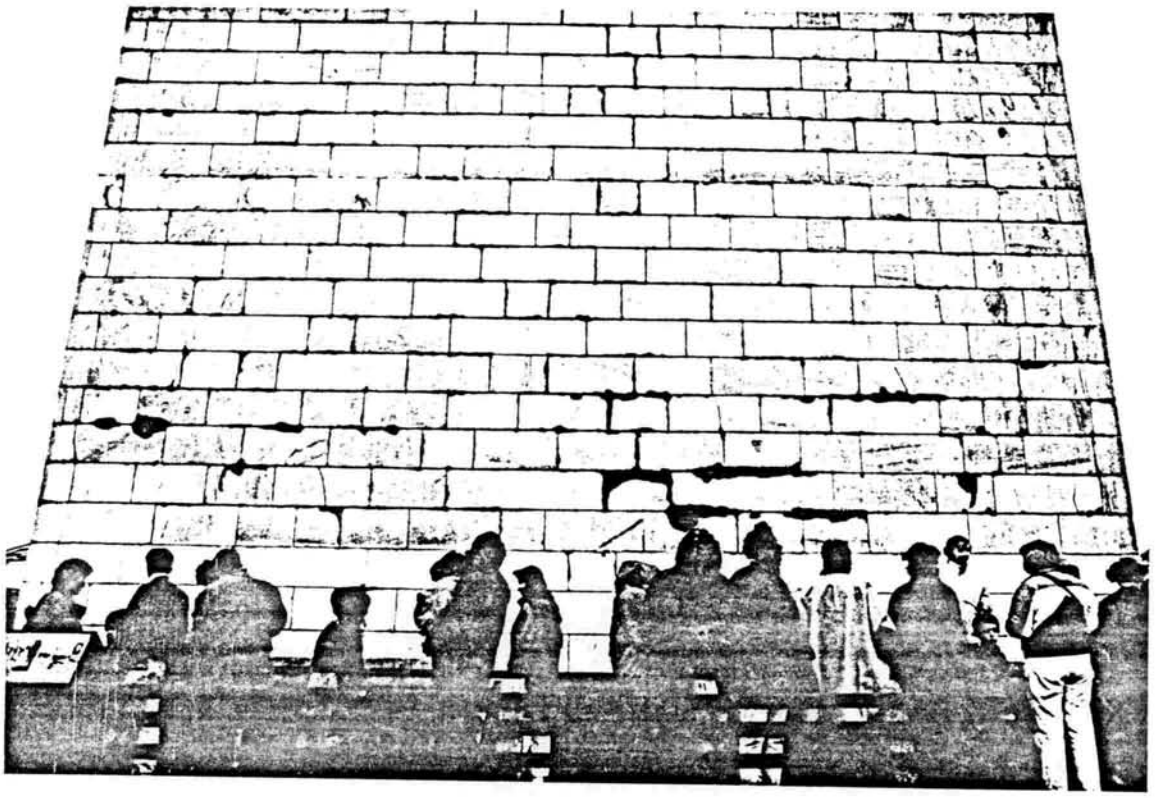

Photo 8. Exterior view of the north elevation of the Monument. The bottom 4 courses of stone to the 8' level are of a lighter color marble. Chips and spalls at the edges of stone have been filled with dark patches of mortar.

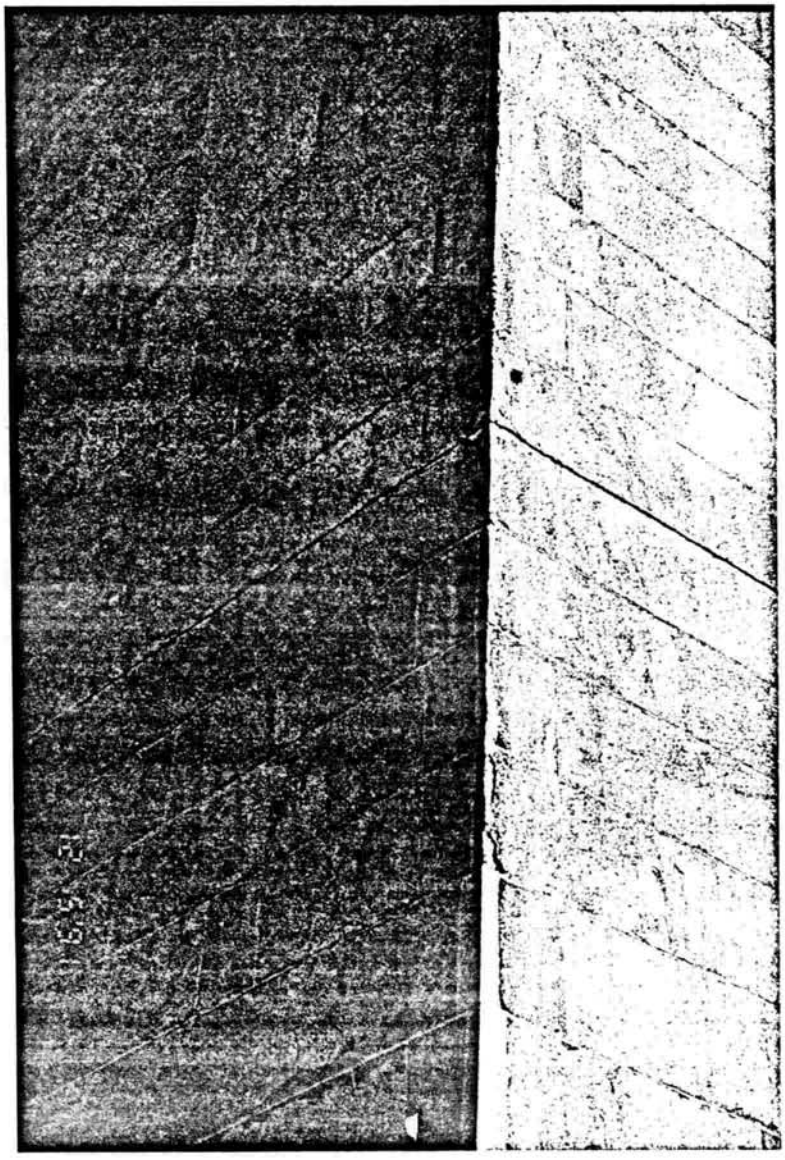

Photo 9. Southwest corner of the Monument. Chips and spalls at the corner have been patched with mortar and with dutchman repairs, but deterioration continues at unrepaired stones. The dark joint just above the center of the photo is the horizontal sealant joint at the 28' level.

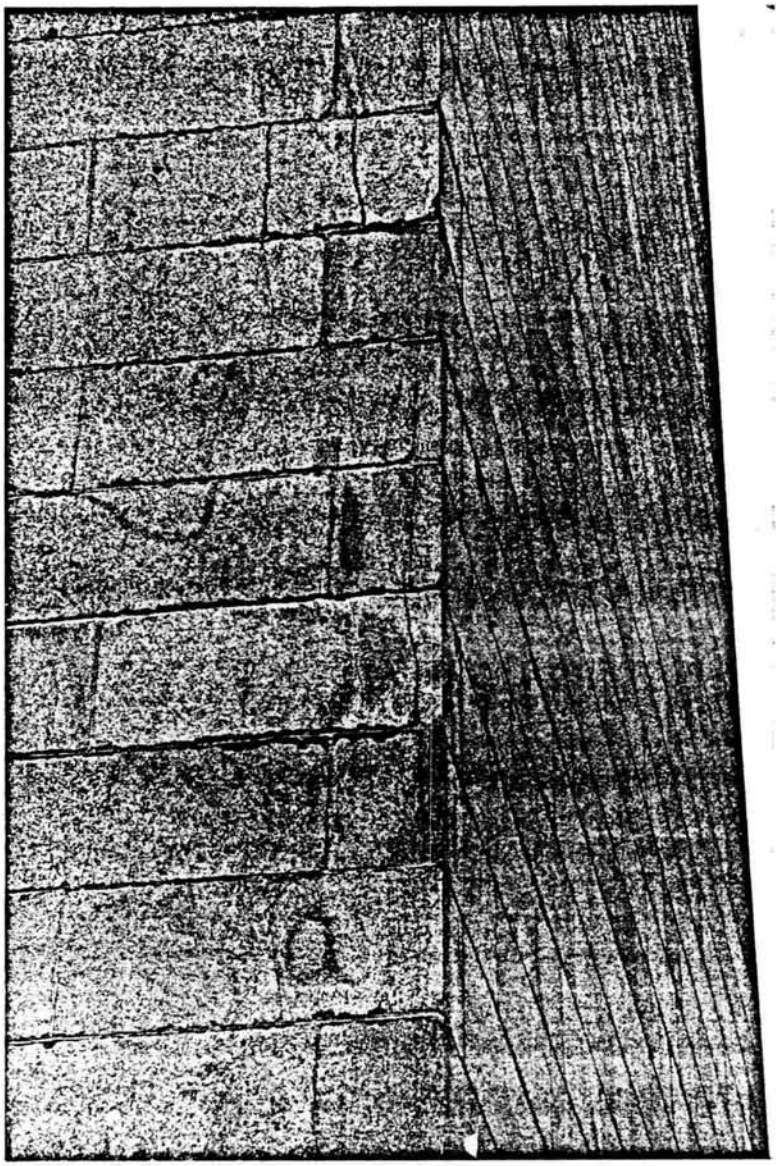

Photo 10. Northeast corner of the Monument. Chips at the edges of the stones have been filled with dark patches of mortar. Vertical cracks have formed in the stones 4" to 6" in from the corners. The fourth joint from the bottom of the picture is the horizontal sealant joint at the 28' level.

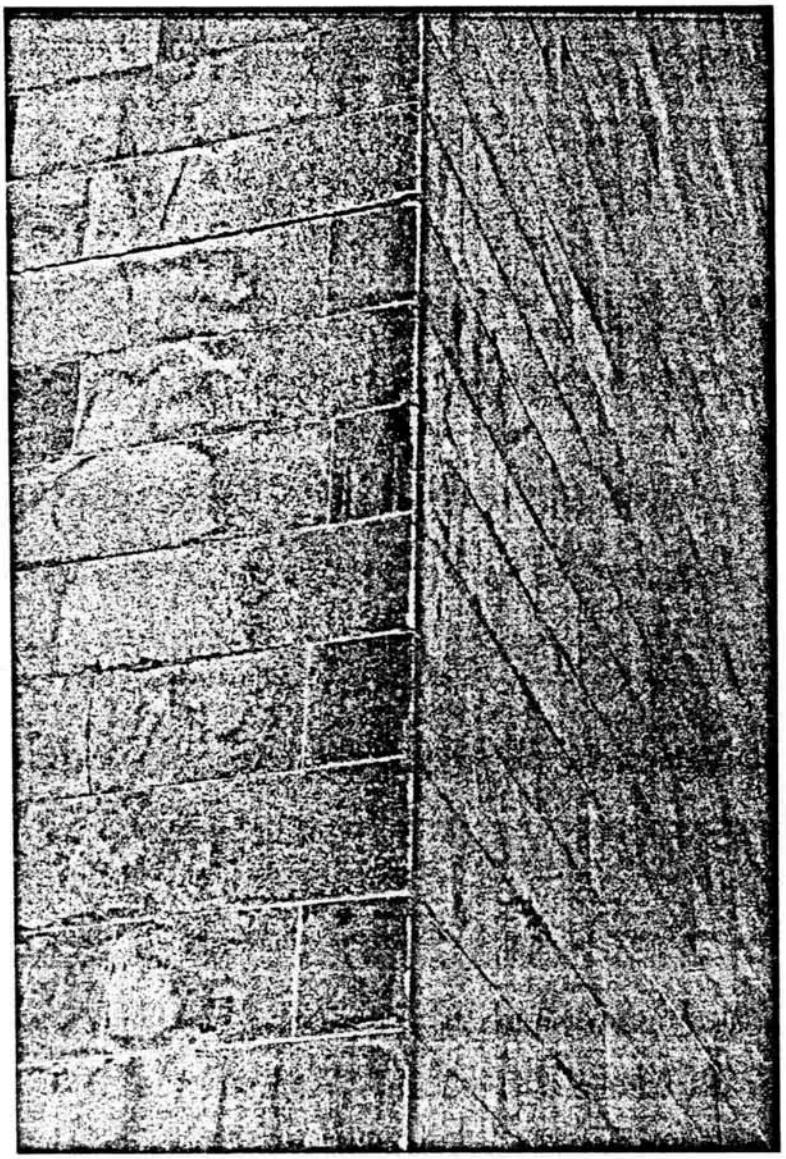

Photo 11. Southeast corner of the Monument. Chips at the edges and corners of the stones have been patched with mortar. The third joint from the top of the photo is the horizontal sealant joint at the 28' level. Red stains can be seen at the corner.

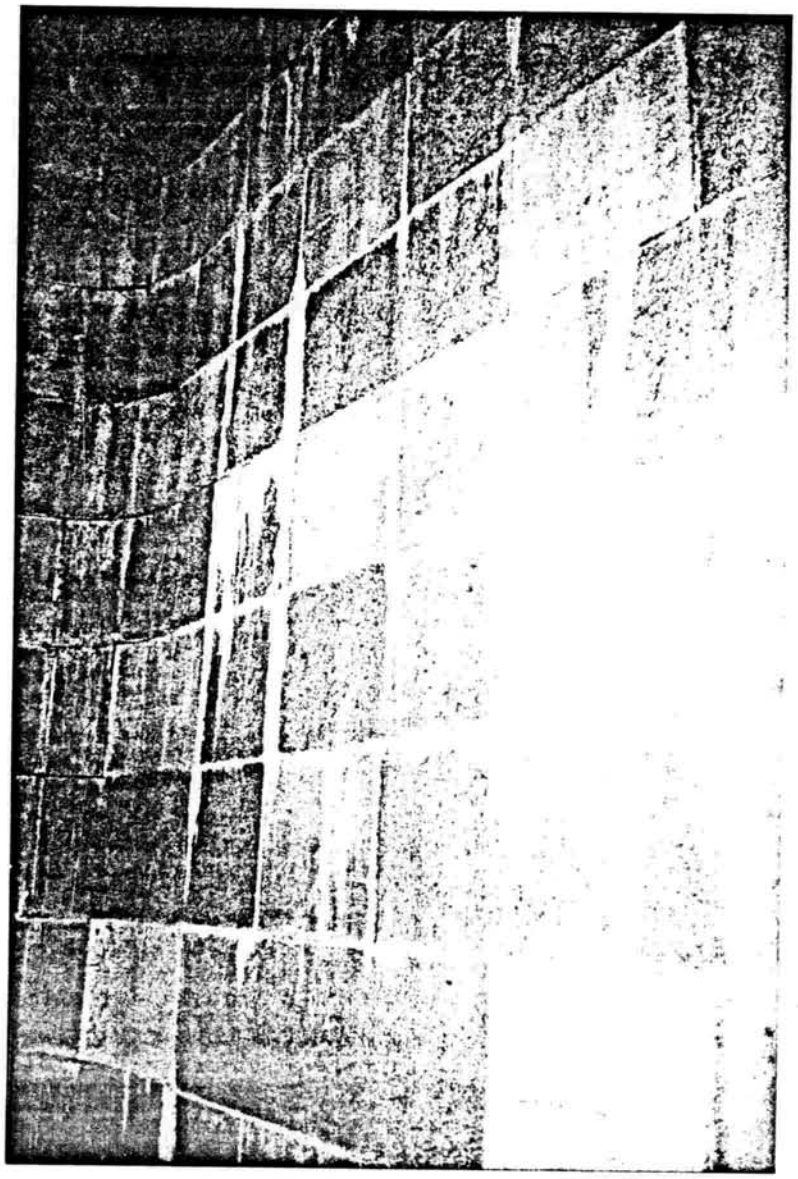

Photo 12. Interior view of the east elevation of the Monument above the 410' level landing. Water leaking through the joints between the stones has leached minerals from the stone and deposited calcium carbonate on the interior walls below the joints.

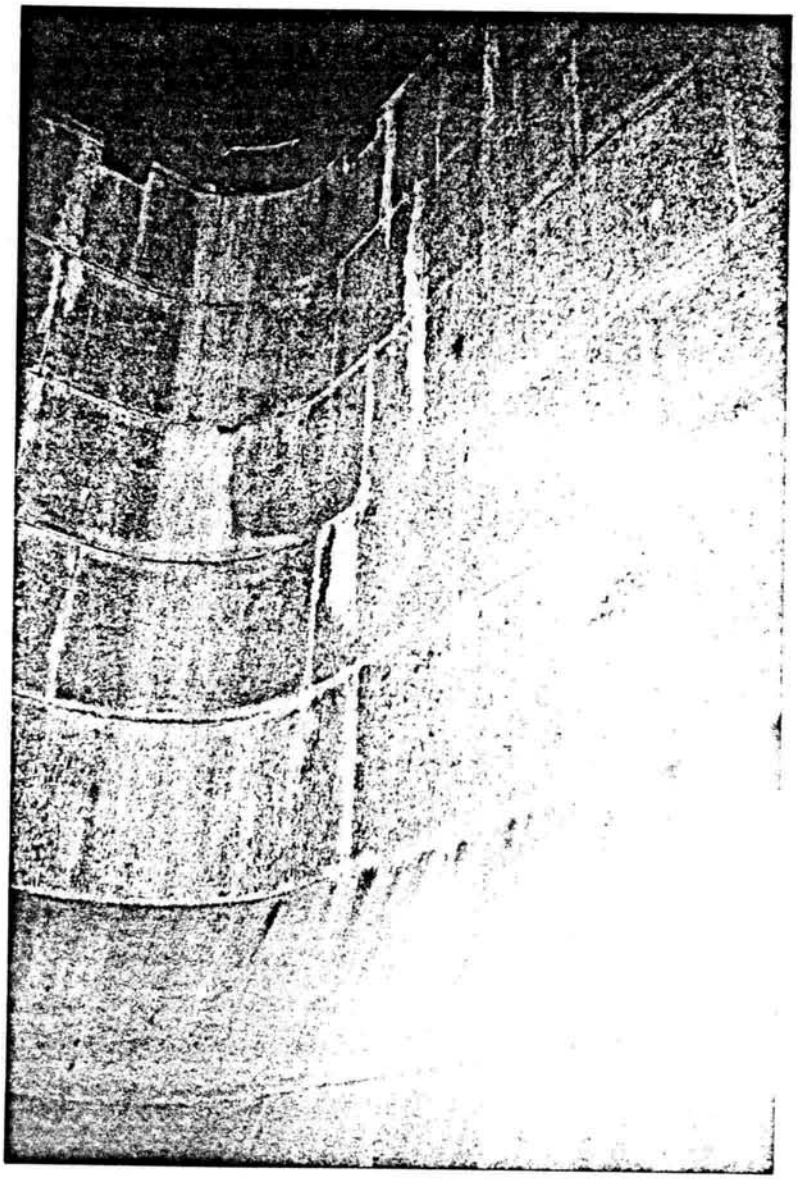

Photo 13. Interior view of the west elevation of the Monument, with the 170' landing at the top of the photo. Water leaking through the joints between the stones has leached minerals from the stone and deposited calcium carbonate on the interior walls below the joints.

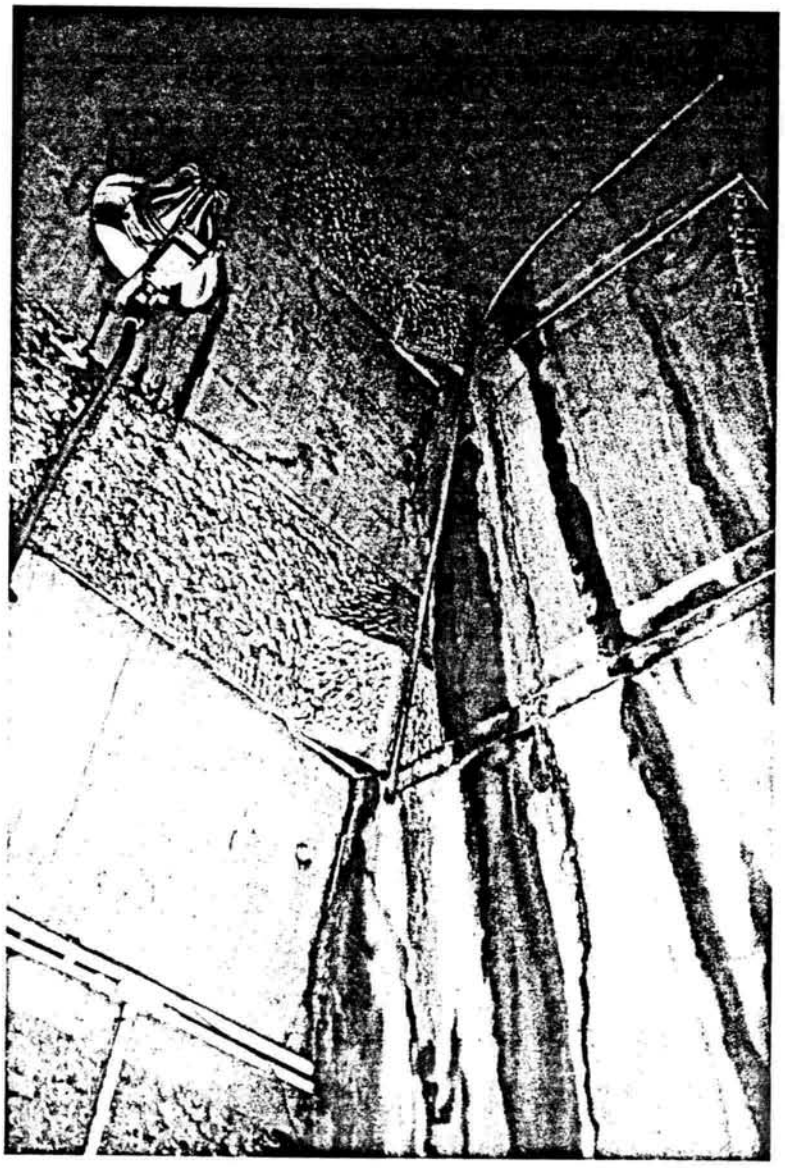

Photo 14. Interior of west elevation of wall of pyramidion, with aircraft warning light at the 516' level and the north rib supporting the wall. Water leaking through the joints between the stone and from the aircraft warning light has stained the walls.

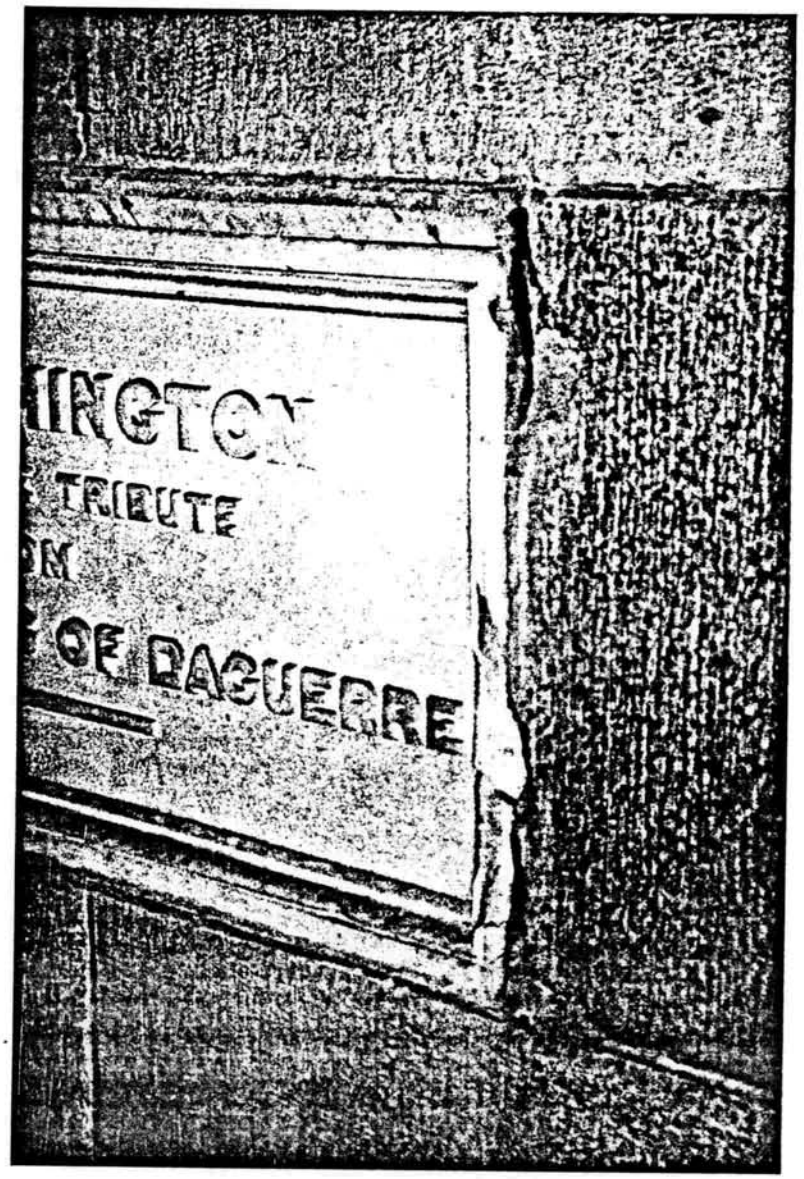

Photo 15. "Two Disciples of Daguerre" memorial stone at the 280' level. The iron cramp holding the memorial stone in place has corroded and has caused the stone to crack and spall. Comparing the existing condition to 1957 and 1973 photographs of the stone show that the damage is worsening.

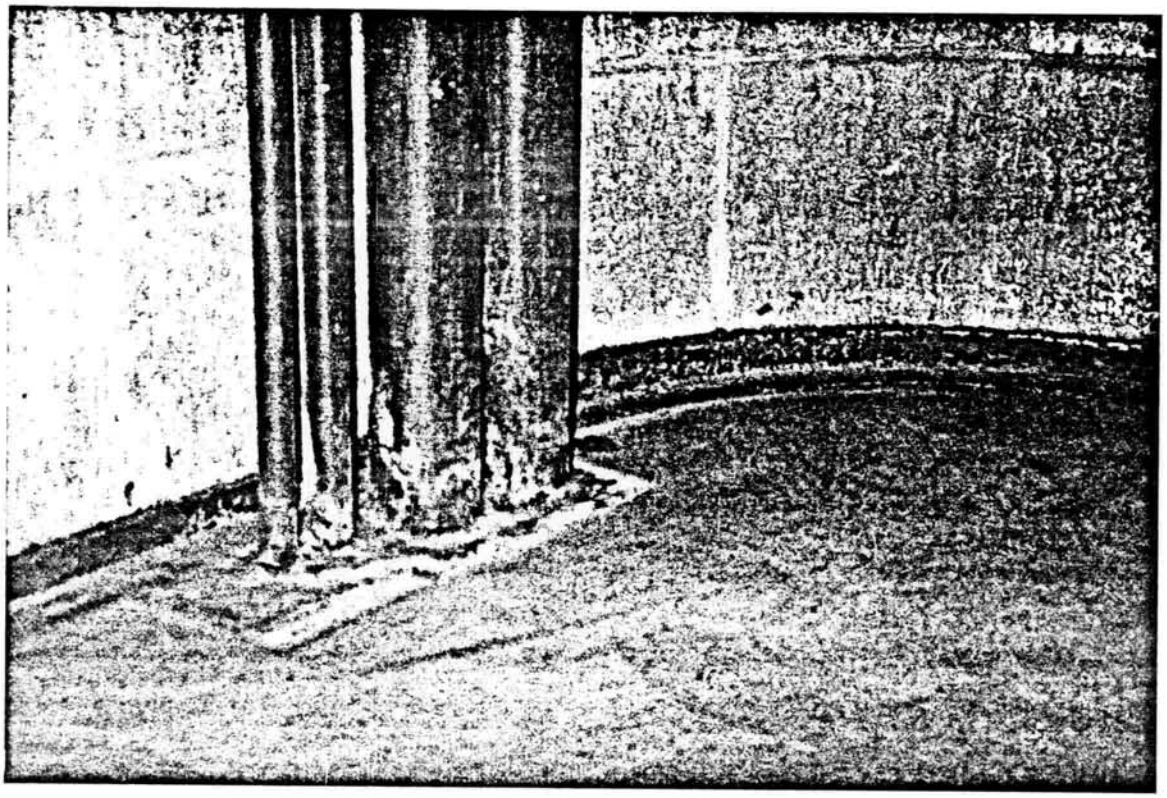

Photo 16. Conduits penetrating the landing at the northeast corner. Corrosion at the four conduits, at the metal plate which holds the conduits and at the angle against the wall is typical at all the landings.

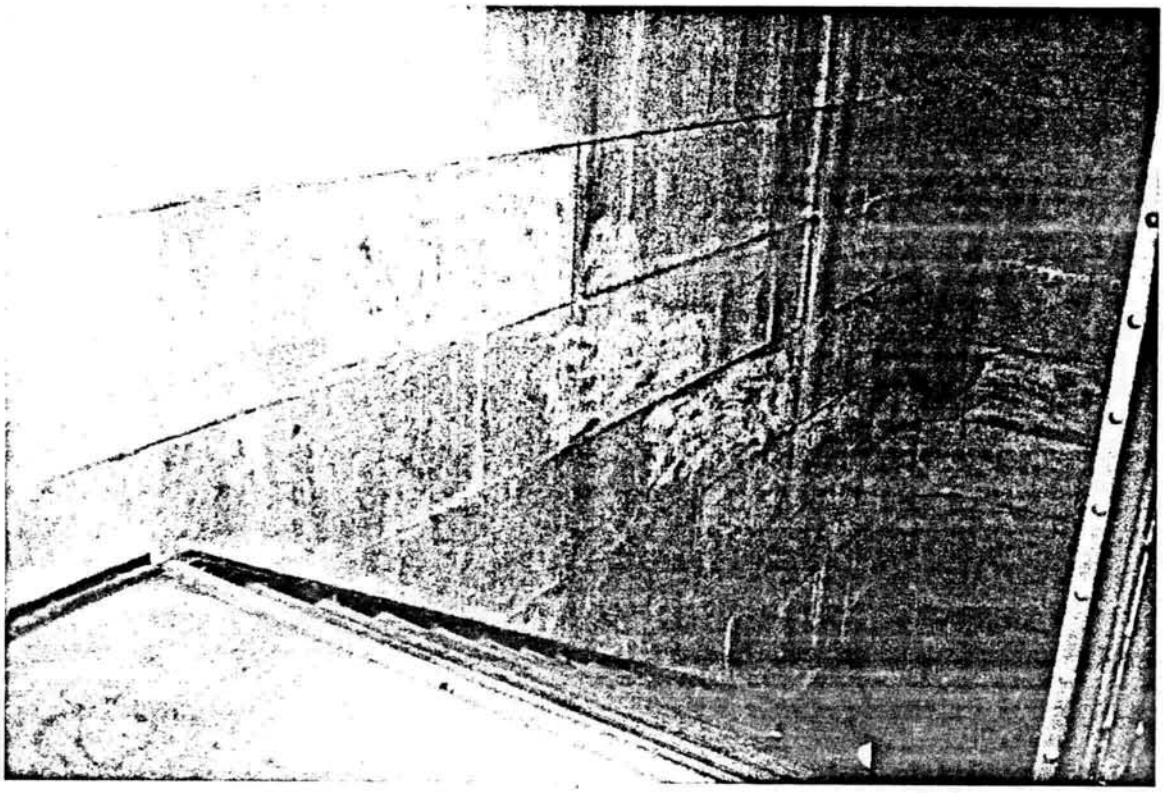

Photo 17. Interior view of west wall of the Monument looking down from the 460' landing. Random scrubbing of the stone has defaced the walls. The angle at the stair stringer is corroded.

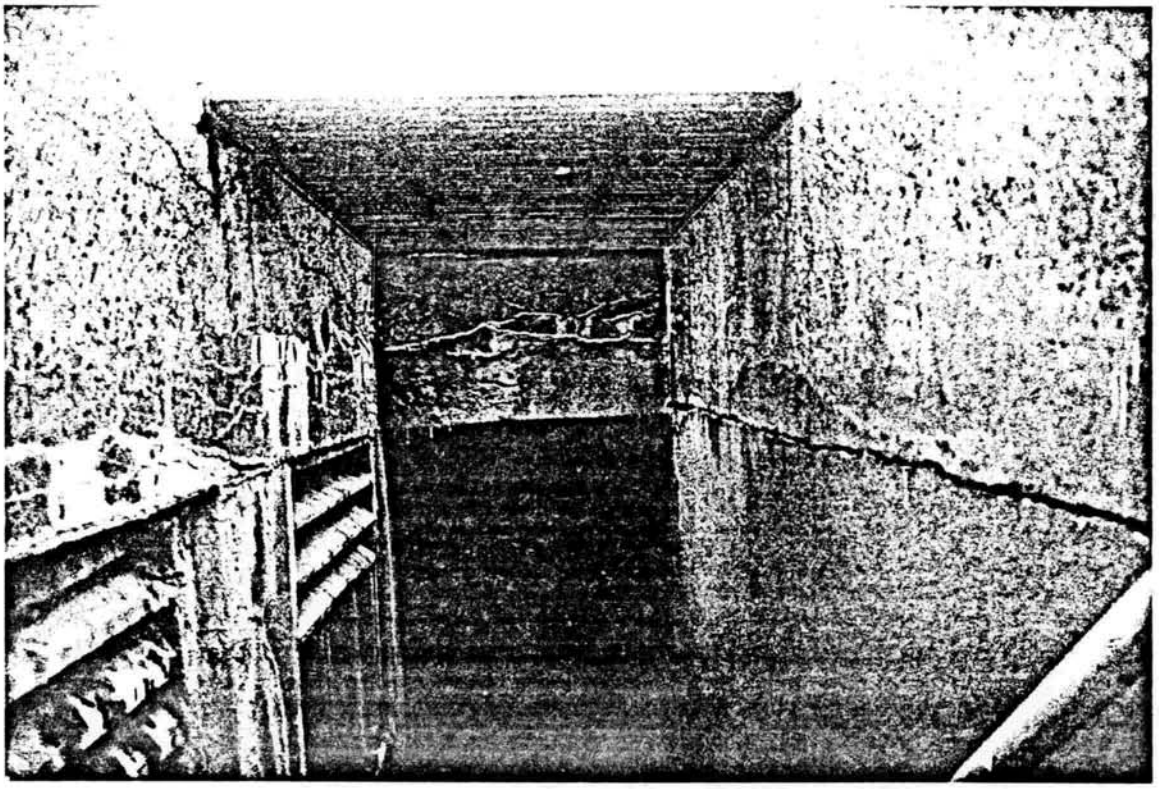

Photo 18. View of areaway for stair to underground service area. Infiltrating water has caused concrete to crack. Metal louvers covering openings to the mechanical room have corroded.

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APPENDIX A: STRUCTURAL ENGINEERING REPORTS

Evaluation of Underground Service Areas

James Madison Cutts

Consulting Structural Engineers

1147 Twentieth Street Northwest Washington DC 20036 202/822-8222

James Madison Cutts, PE
James Devlin Shemro, PE
Guy John Razzi, PE
Thomas Benton McElwain, PE
Carol-Ann Shakely
James Clifton Lakey
Steven Eric Colby
William Howard Bender

April 24, 1992

Ms. Ellen Harris
Oehrlein & Associates
1702 Connecticut Avenue, NW
Washington, DC 20009

Re: Washington Monument

Dear Ms. Harris:

We have inspected the mechanical space and locker-toilet room area which are located under the sidewalk on the west side of the Monument. The access to this area is by means of an outside concrete stair, also adjacent to the west face.

The walls and floors of these spaces are of concrete and show no signs of deterioration. The ceiling construction is of concrete slabs and beams which support the sidewalk above and again show no evidence of deterioration or over stressing.

Adjacent to the mechanical space there is a vent shaft or areaway with steel grating covering it at the sidewalk level. The areaway, which is only about three feet wide, has several concrete beams spanning across the opening which have become badly deteriorated through water infiltration.

The loose and spalled concrete should be removed, the sound concrete sand blasted, and a new epoxy concrete applied. In order to insure a long lasting repair we recommend copper or stainless steel flashing be installed over the tops of the beams and along the tops of the areaway curbs.

The actual capacity of the concrete ceiling construction cannot be determined without the use of extensive destructive testing. However, with the minor repairs mentioned above this underground area will be structurally sound for the foreseeable future.

Sincerely,

James M. Cutts

JMC/nbz

Evaluation of Upper Level Cracks

James Madison Cutts

Consulting Structural Engineers

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Steven Eric Colby
William Howard Bender

June 11, 1992

Ms. Mary Oehrlein
Oehrlein & Associates
1702 Connecticut Avenue, NW
Washington, DC 20009

Re: Washington Monument Study

Dear Ms. Oehrlein:

An inspection of the Monument was made on April 23, 1992 as part of your on-going study for the National Park Service. The emphasis of the inspection was to visually observe the numerous vertical cracks which have appeared over the years following completion of the original construction.

Crack observations, as previously recorded, are incomplete and somewhat inadequate and occur at random intervals of time. There appears to be no record to show when the through wall cracks at the 450 ft. level first occurred. We understand that research by your office has shown that both the detailed exterior photos by the Navy in 1964, and later the thorough visual interior examination by Robinson Engineering of Falls Church, Virginia in 1974, do not refer to these cracks although they are quite visible at the present time on both the exterior and interior of the Monument.

After observing the present crack pattern, together with a consideration of the probable future damage to the Monument if the cracks continue to open, it is our opinion that crack movements should be monitored.

A rough calculation of the change in length of one of the sides of the Monument show that during a normal sunny winter day the outside surface of the stones may expand almost one-eighth (1/8) of an inch more than the inside surface of the same stones. (This is for the dimensions at the 450 $\pm$ level where the wall is only one stone thick) The present inference from this is that the cracks are thermal related.

If the cracks, as observed and shown in your figures 17 through 20, continue to move and grow in length, this information should be properly recorded so that plans for possible remedial action can be made. If their width and length remains stable for say the next five (5) years then sealing with an appropriate material may be the immediate solution. Water egress alone is causing irreversible deterioration and needs to be checked as soon as possible, with or without the monitoring program. However, if there is an increase in width and length for this same or for a shorter time frame, then methods for stabilization should be studied and implemented.

We recommend the installation, both internally and externally, of a number of Linear Displacement Transducers across certain major cracks. These sensors would be coupled with a Data Logger that would periodically read the signals produced by the sensors and convert them to values representing displacement, rotation and temperature. The Data Logger can be powered by AC current. Movements are accurate to 0.001 inches and the operating temperature for the sensors is in the range of −25°F to +150°F.

If it is elected by the Park Service to proceed along these lines, further detailed information on the installation can be discussed. The readings should be taken periodically for at least a year with five years as our recommendations as a minimum time frame before corrective action is undertaken other than temporary sealing.

Sincerely,

James M. Cutts

JMC/nbz

Description of Linear Displacement Transducers

DESCRIPTION OF LINEAR DISPLACEMENT TRANSDUCERS

Chapter 1

INTRODUCTION

WHAT THE SYSTEM DOES FOR YOU

The Movement Monitoring System is a self-contained data recording device for the measurement of long period relative movements. Such movements are defined as linear displacements or angular rotations for the purposes of this manual. Long period relative movement is defined as that displacement which generally takes several minutes or more to complete one cycle. Some examples of long period relative movements are as follows:

1. The opening and closing of a bridge deck expansion joint under thermal or traffic loading.
2. The gradual opening or closing of a concrete crack in the face of a dam with a change in the water level behind the dam.
3. The opening of cracks in building and foundation walls with foundation settlement.
4. The rotation of a stemwall as a portion of a foundation settles differentially.

The shortest recording interval of the system is one minute; therefore, short period movements such as those caused by earthquake cannot be recorded.

THE DATA LOGGER

The data logger is the portion of the system that is housed in the portable case. Its job is to periodically read signals produced in the sensors and convert these signals to values representing displacement, rotation and temperature. Figures 1 and 2 show the four channel system, Model 4C (or Model 4TM and Model 4TH), and the eight channel system, Model 8C (or Model 8TM), respectively.

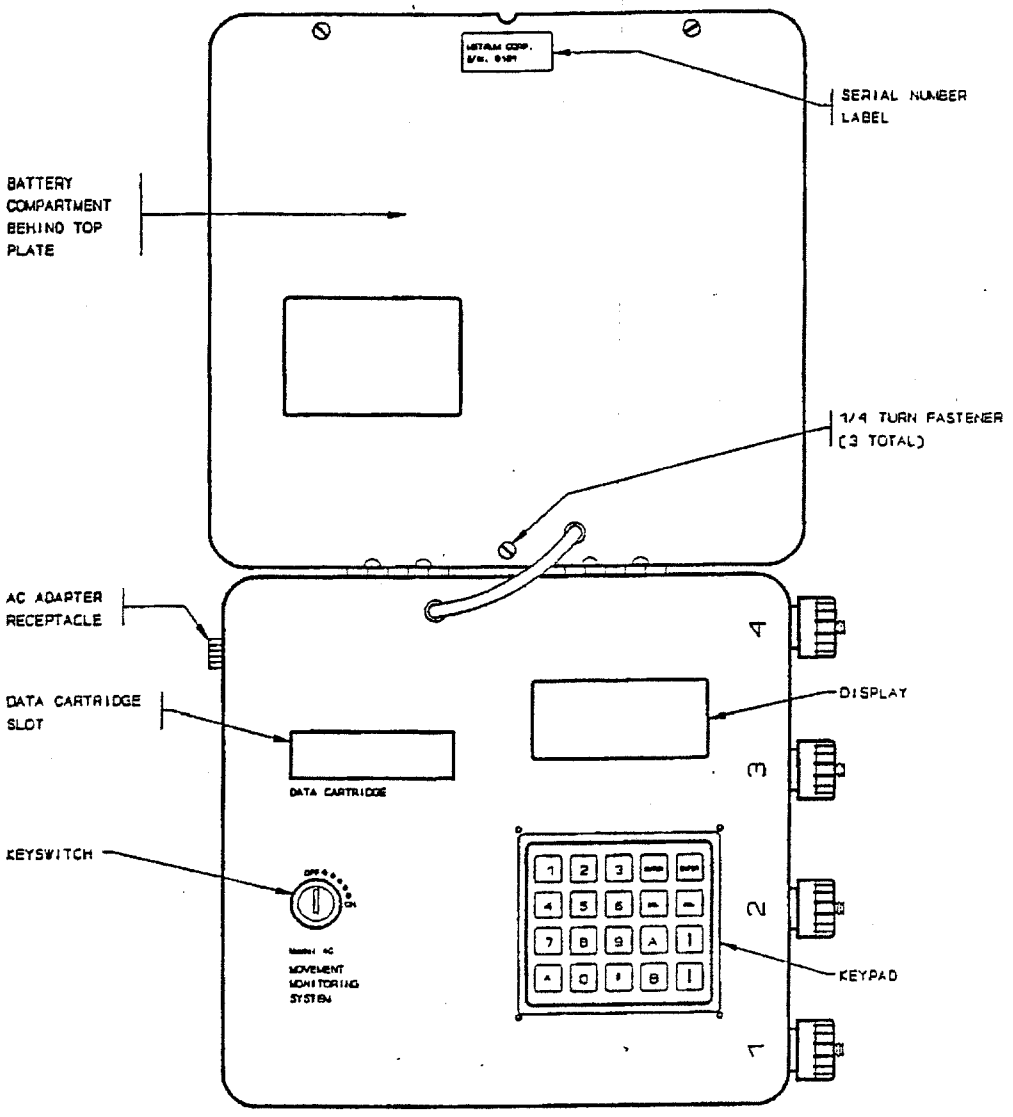
The display panel and the battery compartment located in the upper lid are the only internal parts of the data logger that are of interest to you. The display panel allows you to enter information critical to the operation of the data logger. This information is explained in detail in other portions of this manual.

The battery compartment houses six alkaline "D" cells. The alkaline cells are used when you want the data logger to run solely off battery power. An example of this scenario would be monitoring a crack in a bridge girder where no AC power is available. The nickel-cadmium (also called nicad) cells cannot be used as they provide a lower voltage than necessary.

The four digit serial number printed on the label on the battery compartment lid is the master serial number for your system. The sensor and data cartridge serial numbers are related to this master serial number.

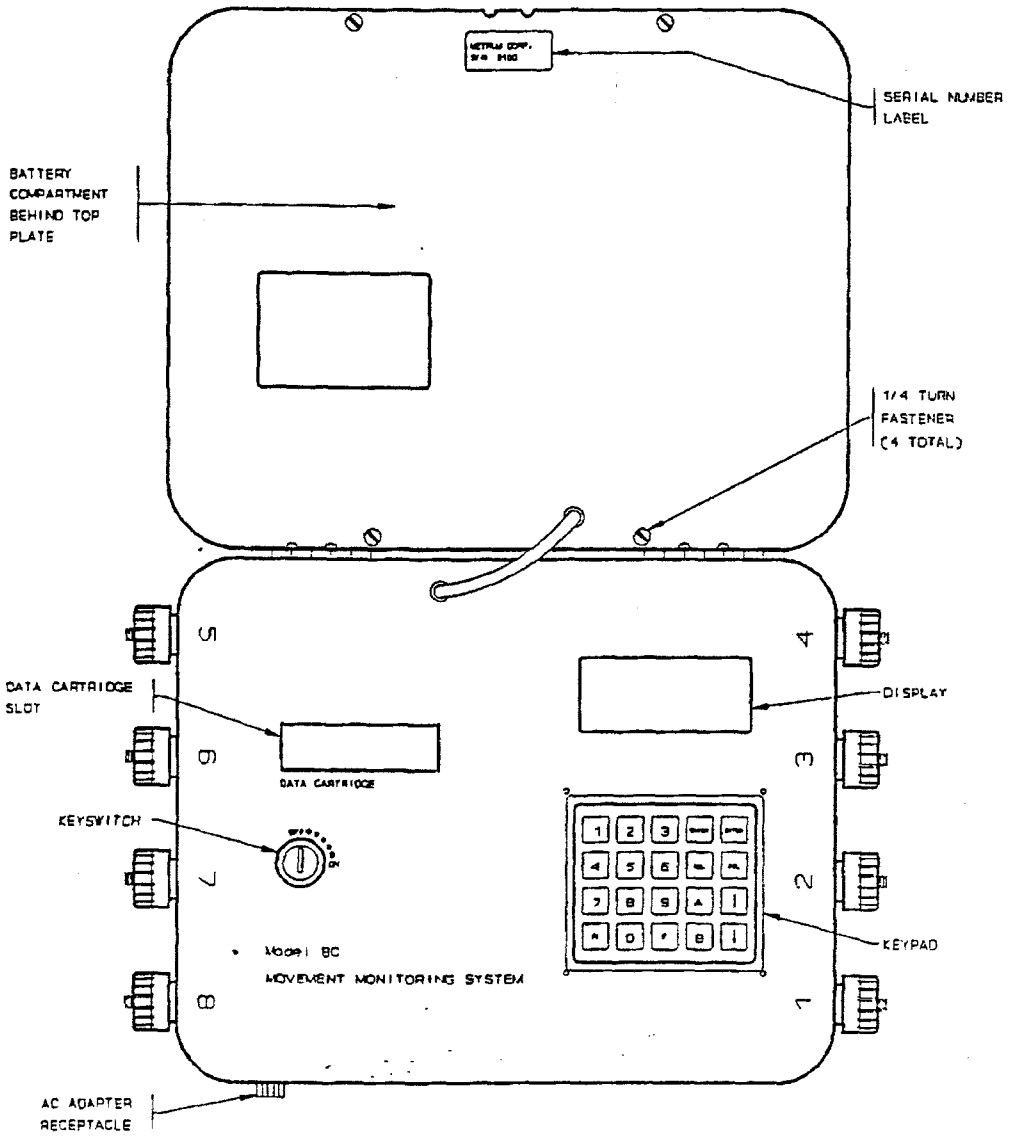
*** CAUTION ***

REMOVAL OF THE DISPLAY PLATE EXPOSES STATIC SENSITIVE DEVICES TO POTENTIAL PERMANENT DAMAGE AND, THEREFORE, VOIDS THE WARRANTY.



MODEL 4C

FIGURE NO. 1



MODEL BC

FIGURE NO. 2

THE DATA CARTRIDGE

The data cartridge is approximately a three inch long by two-and-one-half inch wide by one-half inch deep black plastic cased device. Two data cartridges are provided with the data logger. The data cartridge stores the readings made by the data logger and allows a means of transporting those readings to other locations and computing devices for processing.

During normal use, the data cartridge sits in the open slot in the display panel of the data logger. When the cartridge is full, it is removed from the data logger and another is plugged into the slot.

Care and handling of the data cartridges is of the utmost importance. Some or all of the readings taken during a recording interval can be destroyed if a few simple handling rules are not followed. Chapter 3 of this manual is dedicated to this subject. Please read this chapter before using the data logger.

Please note that each data cartridge has a unique serial number. You will refer to this number when sending data cartridges to [redacted] for processing.

THE AC ADAPTER

An AC line adapter is provided with your system. This allows you to power your system from a 120 VAC outlet if available. Please refer to Chapter 4 for more information.

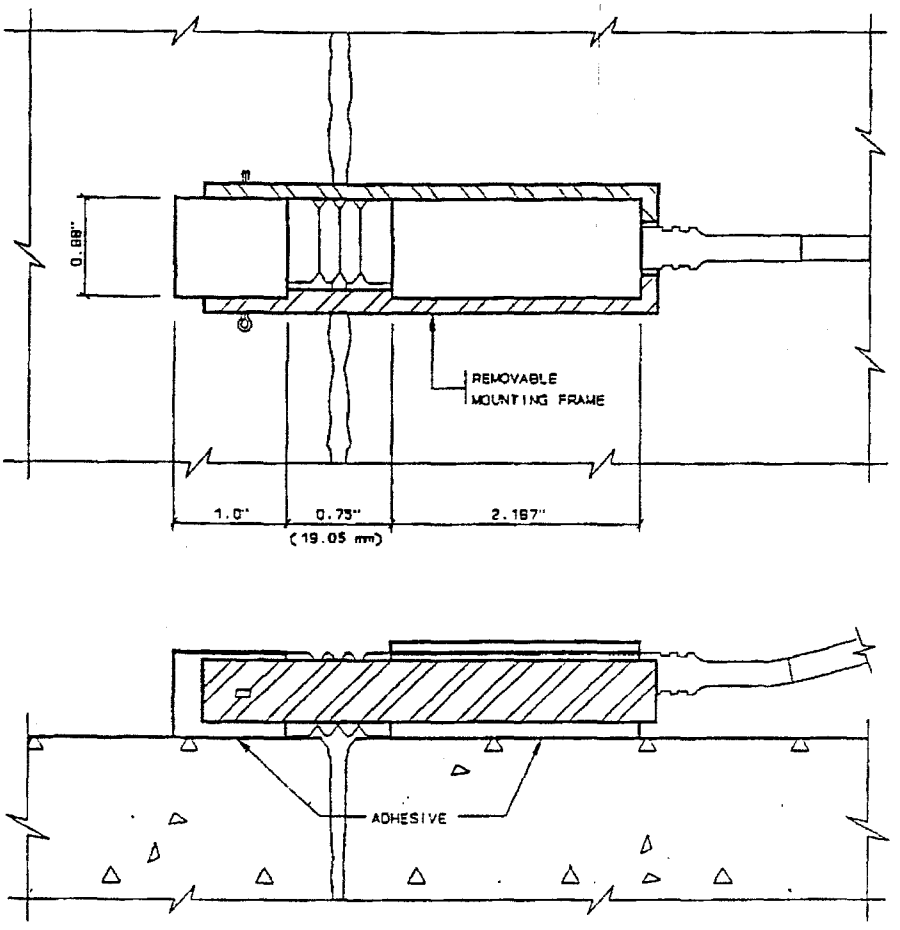


FIGURE NO. 3

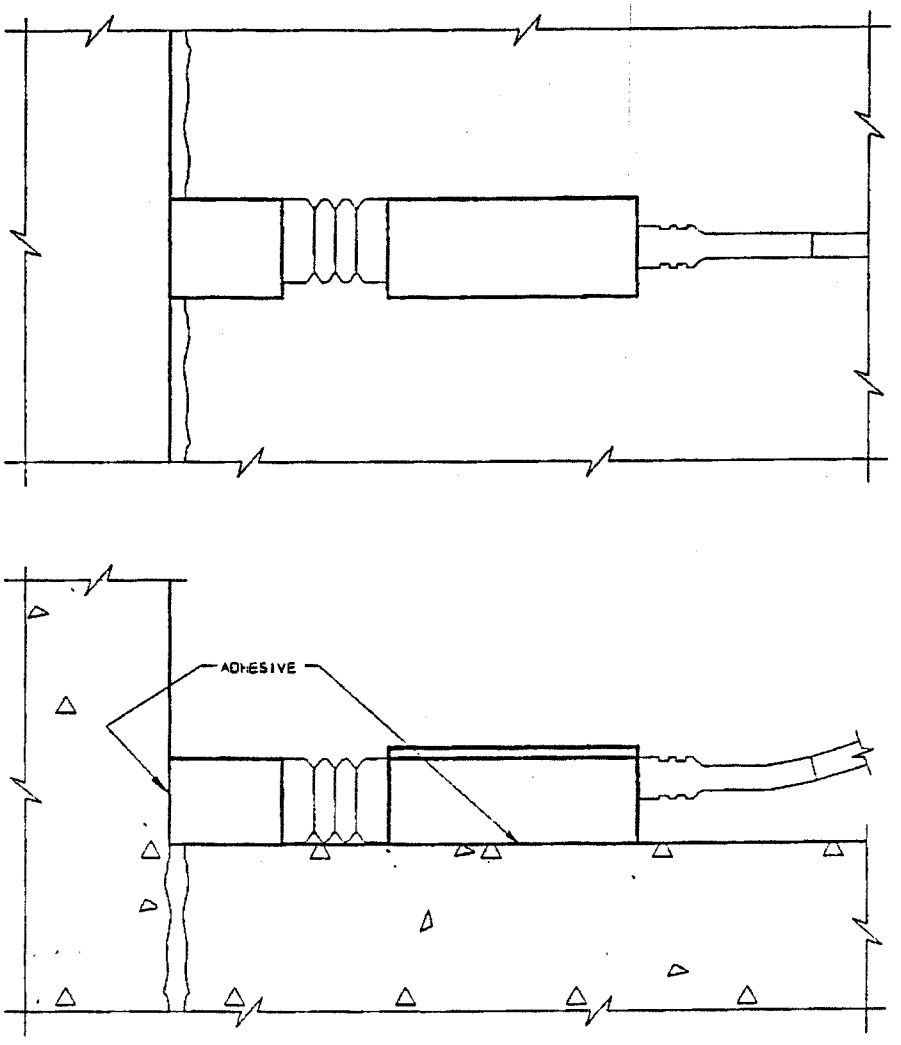
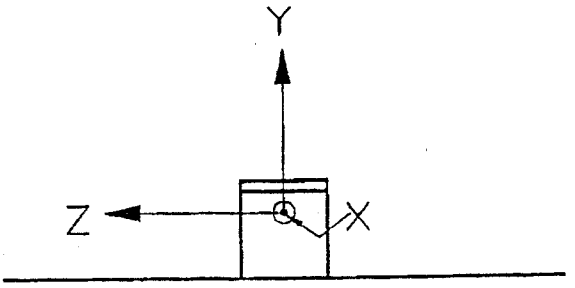


FIGURE NO. 4



SECTION "A-A"

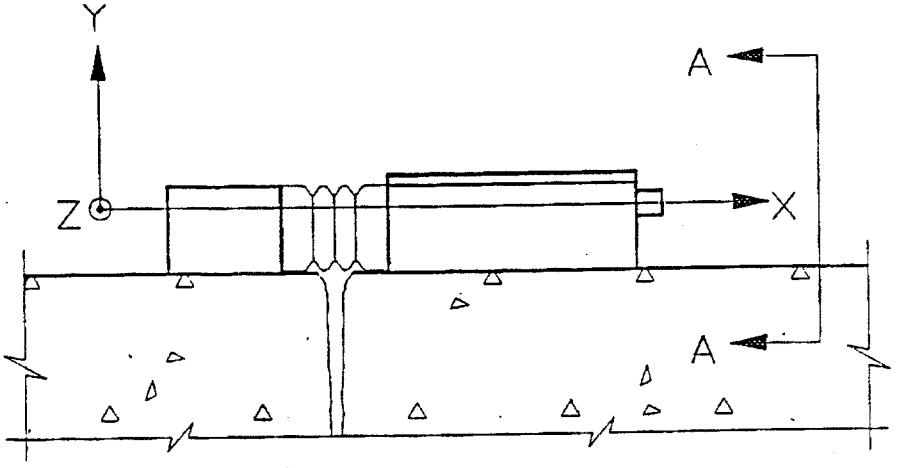


FIGURE NO. 5

THE DISPLACEMENT SENSOR

The displacement sensor is the plastic cased device at the opposite end of each cable from the metal connector. The sensor is placed across the crack or joint that you want to monitor.

The sensor is made up of three main parts: the body, the expansion seal and the anvil. The body is the approximately three inch long plastic portion. The anvil is the approximately one inch long plastic portion opposite the body. The body and the anvil are attached to each other by means of the black flexible, pleated portion called the expansion seal. (See figures 3, 4, and 5 that follow).

In use, the sensor is glued across a crack or joint with the body on one side and the anvil on the other. The expansion seal will straddle the crack. Figure 3 shows the sensor mounted. Figure 4 shows the sensor mounted in a 90 degree position.

Each sensor is capable of reading one-dimensional movement perpendicular to the axis of the sensor. This is the "X" axis shown in Figure 5. Movements in the other two dimensions "Y" and "Z" axis, are mechanically filtered out and have no effect on the readings. Two or three-dimensional movement can be recorded by mounting two or three sensors across a crack with their axes aligned perpendicular to the dimensional movement desired. (Special mounts are available for this purpose from [illegible] Corporation. Please call or write for information.)

Each sensor has a unique serial number that begins with the first four digits of the system serial number plus two digits of its own. For example, a four channel system with serial number 9054 will have sensors serial numbers 905401, 905402, 905403 and 905404. The last two digits of the serial number denotes the channel into which each sensor is connected - 905401 would be plugged into Channel 1, 905402 would be plugged into Channel 2, and so on. **It is very important that the last two digits of the serial number match the channel number into which the sensor is connected.**

THE TILTMETER

The tiltmeters offered by [illegible] for use with the four and eight channel data loggers are available in two types: medium resolution, TM1, and high resolution, TH1. The TH1 tiltmeters are physically larger than the TM1 tiltmeters and are capable of reading smaller angular rotations than the TM1 tiltmeters. However, the two types are similar in installation and use.

The tiltmeters are mounted vertically, that is, the base of the tiltmeter is mounted in a vertical plane. Rotation of this vertical plane is what the tiltmeter reads. For example, if the outward rotation of a retaining wall is of interest, the vertical plane of the tiltmeter is orthogonal (that is, 90 degrees) to the exposed surface of the wall. In another example, if the rotation of a foundation wall due to differential settlement is of interest, the tiltmeter base in mounted in the same vertical plane as the face of the wall. In any case, the tiltmeter is mounted to the wall by means of a mounting bracket. The brackets are bolted to the structure with fasteners such as lag screws, bolts or expansion anchors. Figure 6 shows a tiltmeter mounted orthogonally. Figure 7 shows a tiltmeter mounted directly to the face of a wall.

As with the displacement sensors described above, each tiltmeter has a unique serial number that is related to the overall system serial number. Please to refer to the serial number discussion above.

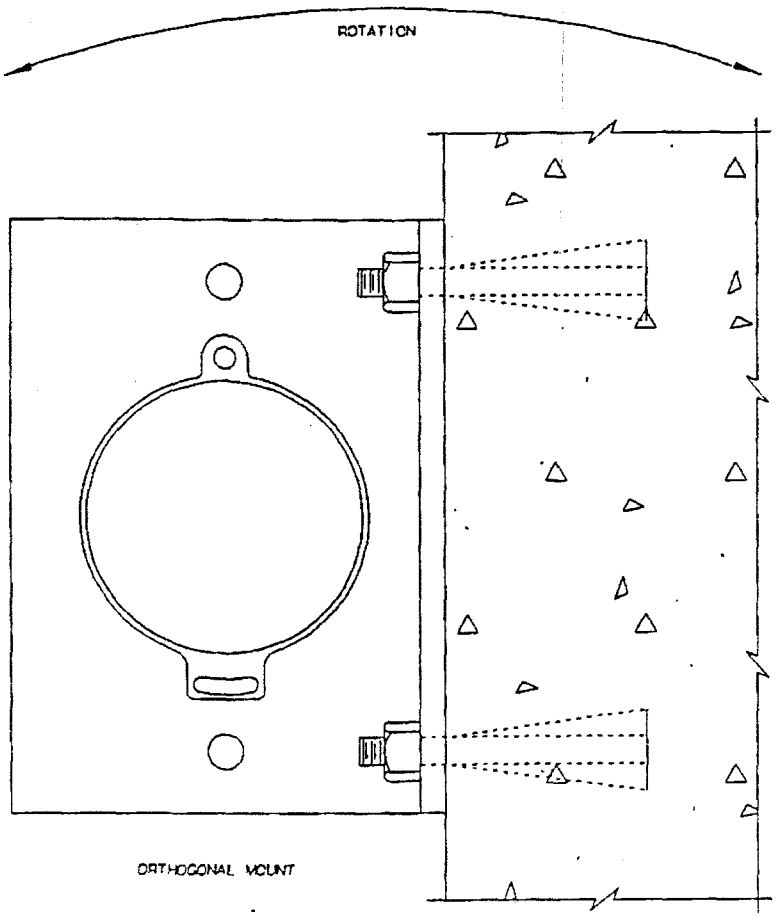


FIGURE NO. 6

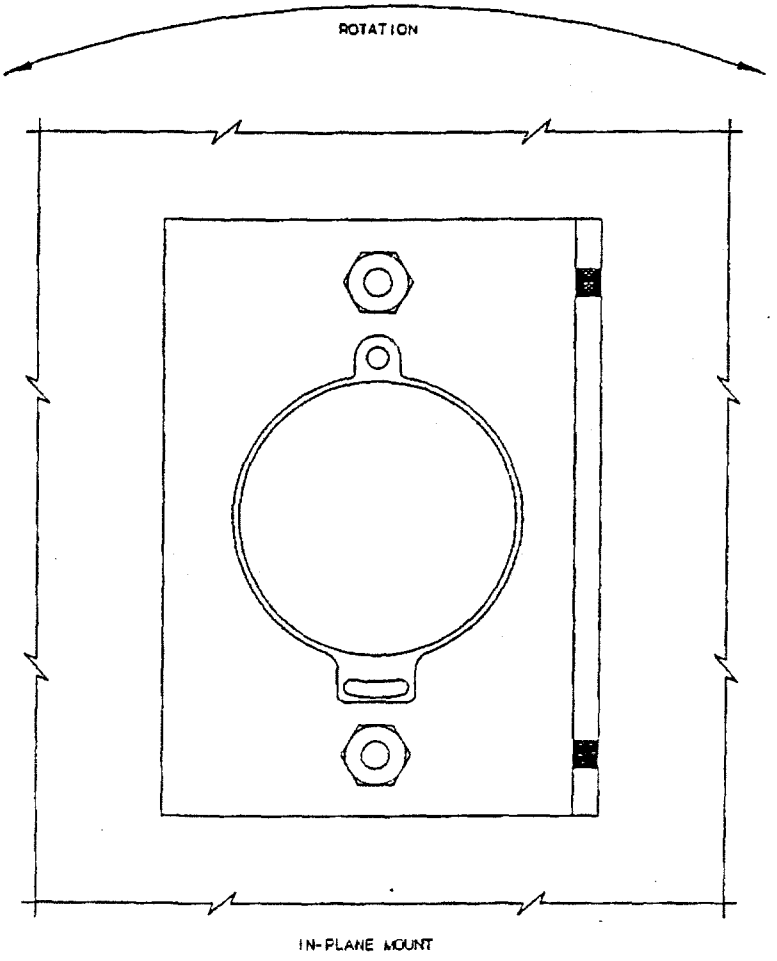


FIGURE NO. 7

SYSTEM LIMITATIONS

The system is designed to operate within the limits described below:

1. Sensor Locations: Four (Model 4C) or eight (Model 8C) one-dimensional displacement or rotation (not both) readings, one channel each.

2. Data Storage Capacity: Approximately 1500, four-channel readings (Model 4C and 4TH) or approximately 850 eight-channel readings (Model 8C). This is equivalent to 30 days of recording at an interval of one-half hour for the Model 4C and 4TH and 30 days at one hour intervals for the Model 8C.

3. Battery Life: + or - 30 days at recording interval of one per hour. (Refer to Chapter 3 for more information.)

4. Resolution: (The smallest discernable movement):

   Displacement sensors: 0.001"
   Medium resolution tiltmeter, TM1: 0.1 degree
   High resolution tiltmeter, TH1: 0.004 degree

5. Accuracy of Readings: (How well does the recorded information match the actual movement?)
   Displacement sensors, full 1/2" travel: Approx. 1%
   Displacement sensors, normal travel (less than 1/8"): Approx. 0.5%.
   Tiltmeter TM1 or TH1: Approx. 1%
   (Refer to Chapter 7 for more information.)

6. Operating Temperature: -25 Degrees F to +150 Degrees F (-32 Degrees C to +65 Degrees C)
   Display visible from -4 Degrees F to +150 Degrees F (-20 Degrees C to +65 Degrees C)

TABULAR DATA OUTPUT

This page shows an example of the tabular output. Four sensor systems are printed vertically on 8-1/2 x 11 sheets and eight channel systems are printed horizontally. S1 is the relative displacement for Channel 1 and T1 is the temperature, and so on. The information in the header is self-explanatory.

S/N = 9100
SITE NO. = 1
CALIB. COEFF. 1 = 2996
CALIB. COEFF. 2 = 3021
CALIB. COEFF. 3 = 3039
CALIB. COEFF. 4 = 3070

DATE	TIME	S1	T1	S2	T2	S3	T3	S4	T4
5/9/91	00:00	0.002	68	0.002	69	0.001	70	0.002	70
5/9/91	01:00	0.002	68	0.002	69	0.001	69	0.001	69
5/9/91	02:00	0.003	68	0.002	68	0.001	69	0.002	69
5/9/91	03:00	0.003	67	0.002	68	0.001	69	0.002	69
5/9/91	04:00	0.003	67	0.002	68	0.001	68	0.002	68
5/9/91	05:00	0.003	67	0.001	67	0.002	68	0.002	68
5/9/91	06:00	0.003	66	0.002	67	0.002	68	0.002	68
5/9/91	07:00	0.002	66	0.002	67	0.001	68	0.001	68
5/9/91	08:00	-0.001	66	0.001	67	0.001	67	-0.000	67
5/9/91	09:00	-0.004	66	0.000	67	0.000	68	-0.001	68
5/9/91	10:00	-0.006	66	0.000	67	-0.000	68	-0.002	68
5/9/91	11:00	-0.006	66	-0.000	67	-0.001	68	-0.002	68
5/9/91	12:00	-0.006	66	-0.001	67	-0.002	68	-0.002	68
5/9/91	13:00	-0.006	66	-0.001	67	-0.002	69	-0.002	69
5/9/91	14:00	-0.005	66	-0.001	67	-0.002	69	-0.000	70
5/9/91	15:00	-0.004	66	-0.001	67	-0.002	70	0.000	71
5/9/91	16:00	-0.004	66	-0.002	67	-0.003	70	0.001	73
5/9/91	17:00	-0.005	67	-0.002	67	-0.004	70	0.002	74
5/9/91	18:00	-0.006	67	-0.002	67	-0.004	70	0.002	73
5/9/91	19:00	-0.006	67	-0.002	67	-0.004	70	0.002	72
5/9/91	20:00	-0.006	67	-0.001	67	-0.003	70	0.002	71
5/9/91	21:00	-0.004	67	0.000	67	-0.002	70	0.002	71
5/9/91	22:00	-0.003	67	0.000	67	-0.001	70	0.002	71
5/9/91	23:00	-0.002	67	0.000	67	0.000	69	0.002	70

Tabular Output Example

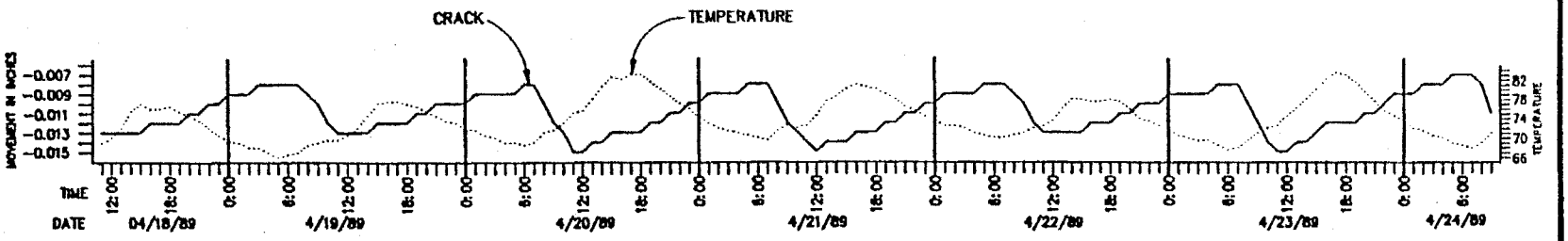
GRAPHICAL DATA OUTPUT

The next page of this manual is an example of graphical output. The graphical output is typically plotted on 24" x 36" vellum for four channel systems and 30" x 42" vellum for eight channel systems. You typically receive a blueprint copy of the original vellum. The vellum can be sent to you, however, by specific request on the Data Reduction Request Form. If you request that the vellum be sent to you, you will have the only copy. [redacted] will not be able to make additional blueprints.

STRUCTURAL MOVEMENT - GRAPHICAL SENSOR DATA

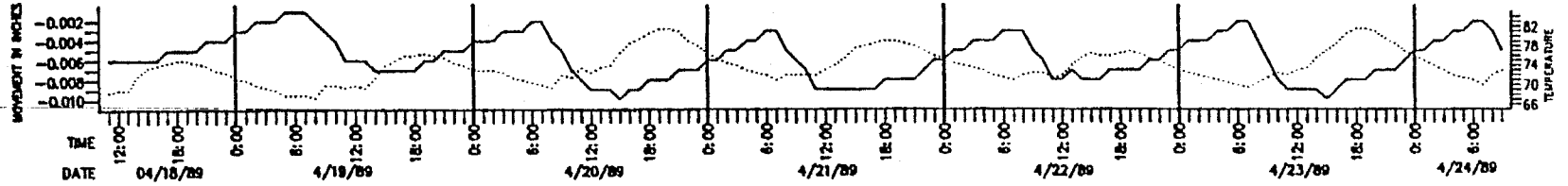
SENSOR 1

HORIZONTAL ~
EAST-WEST
PARALLEL TO WALL



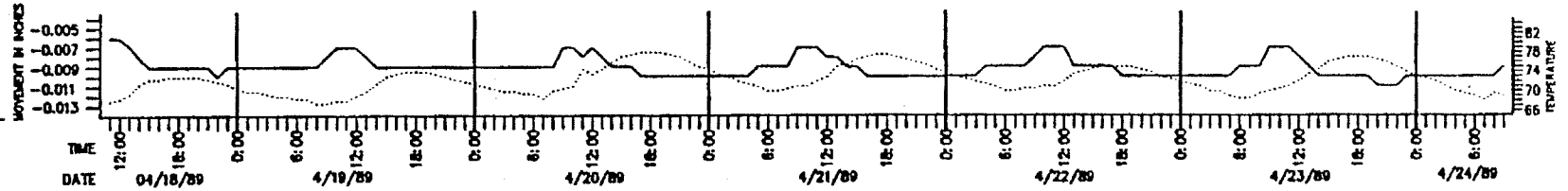
SENSOR 2

VERTICAL



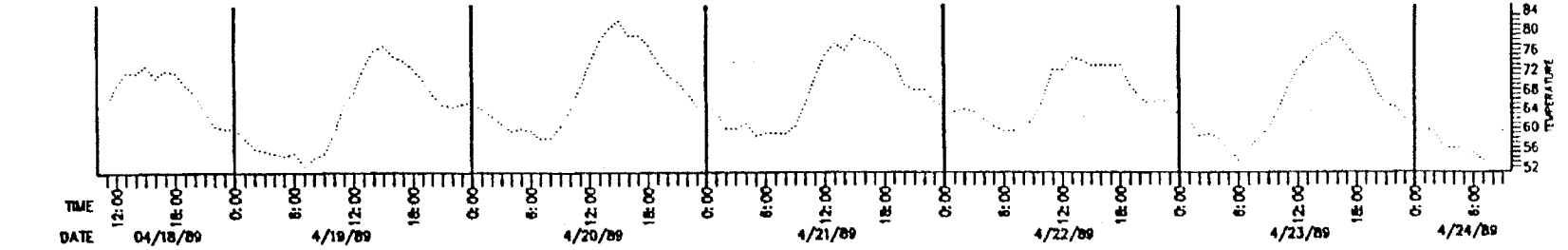
SENSOR 3

HORIZONTAL ~
NORTH-SOUTH
PARALLEL TO WALL



SENSOR 8

OUTSIDE
TEMPERATURE



APPENDIX B: HAZARDOUS MATERIALS REPORTS

Asbestos Survey Report

ASBESTOS SURVEY REPORT

Introduction

On December 23 and 27, 1991, Dewberry & Davis (D&D) conducted asbestos and lead-based paint surveys of the Washington Monument, Washington, DC. The surveys were conducted in accordance with the guidelines of the US Environmental Protection Agency (EPA). This report, provided for the National Park Service, is intended to serve as an assessment of the extent of the use of asbestos-containing materials (ACMs), and other hazardous materials such as lead-based paint (LBP) in the areas described above.

The survey of the Washington Monument included the full height of the monument including mechanical spaces and the elevator equipment space above the observation level. An adjacent underground space consisting of a mechanical space and guard room was also inspected.

Asbestos-containing materials were detected in vinyl floor tile, pipe joint insulation, and transite board within the monument. Two of six plaster samples taken from the ground level elevator lobby contained trace amounts of asbestos. While removal is recommended for damaged friable ACMs, those which are in good condition may be left in place and included in an Operations and Maintenance (O&M) program.

Within the underground mechanical space and guard room, asbestos was identified in vinyl floor tile, pipe and joint insulation, and tank insulation. The majority of this material is located in the mechanical space and is severely deteriorated, presenting an immediate health hazard. The mechanical space should be entered only by personnel wearing respirators and protective clothing.

Background and Survey Method

There has been a growing public awareness of the link between the inhalation of asbestos fibers and various diseases such as asbestosis, mesothelioma, lung and other cancers. As a result, the Federal and state governments have, or are in the process of enacting legislation on the handling of asbestos-containing materials. While this legislation varies between jurisdictions, all entities regard the building owners responsible for asbestos in their buildings.

The asbestos survey entailed a visual inspection throughout the areas defined above by an EPA Certified asbestos inspector and management planner (see inspector's certification). Bulk samples were taken of each suspect homogeneous material. A Homogeneous Material is defined as a material that is uniform in color, appearance, and texture. The homogeneous areas were further defined as thermal system insulation, surfacing material or miscellaneous material. Finally, in the event a material could not be tested because of a constraint, it was noted as an assumed suspect asbestos-containing material. The locations of bulk samples extracted during this survey are noted on the drawings.

Bulk samples were analyzed by a laboratory accredited by the American Industrial Hygiene Association and the United States Department of Commerce, National Institute of Standards and Technology. A sample is considered positive if one percent (1%) or more asbestos by weight is present. The laboratory and analyst qualifications and laboratory reports follow.

Building Background, On-Site Survey and Findings

The Washington Monument is a 550-foot tall stone obelisk located on the Mall in Washington, DC. Interior spaces include the ground floor entrance and elevator lobby, the stairwell and elevator

within the main body of the Monument, and an elevator lobby and observation floor at the 490 and 500-foot levels respectively. Mechanical system spaces are located on the ground level and at and above the 500-foot level. The predominant interior finishes are exposed granite and limestone. One exception is the ground floor elevator lobby which has a plaster finish. Floor finish materials are predominantly terrazzo and concrete, however some vinyl tile was identified.

The adjacent underground mechanical room is of concrete construction with painted walls and ceiling and a vinyl tile floor. The guard room is finished with a painted concrete ceiling glazed block walls and a quarry tile floor.

The survey findings are divided into three sections: Homogeneous areas testing positive for asbestos, homogeneous areas assumed to contain asbestos, and homogeneous areas that are negative for asbestos.

Homogeneous Areas Testing Positive for Asbestos

Sample #	Description	Location	%/Type
104	Vinyl tile, yellow	Ground level Maintenance area	5-10% Chrysotile
105	Vinyl tile, black	Ground level Maintenance area	5-10% Chrysotile
108	Pipe joint insul.	80' level	5-10% Chrysotile
109	Pipe joint insul.	60' level outer layer	40-45% Chrysotile
110	Pipe joint insul.	60' level inner layer	10-15% Chrysotile
117	Transite board	Elev motor room ceiling	60-65% Chrysotile
119	Transite board	Elev motor room roof	35-40% Chrysotile
123	Tank end insul.	Mechanical space	10-15% Chrysotile
124	Tank side insul.	Mechanical space	45-50% Chrysotile
125	Pipe insulation	Mechanical space	15-20% Chrysotile 15-20% Amosite
126	Pipe joint insul.	Mechanical space	15-20% Chrysotile

Homogeneous Areas Testing Positive for Asbestos

Sample #	Description	Location	%/Type
			15-20% Amosite
127	Vinyl floor tile	Mechanical space	1- 2% Chrysotile
128	Pipe insulation	Mechanical space	5-10% Chrysotile
129	Pipe joint insul.	Guard room	15-20% Chrysotile
130	Pipe joint insul.	Guard room	10-15% Chrysotile

Homogeneous Areas Assumed to Contain Asbestos

Sample #	Description	Location
118	Transite board	Elevator motor room wall
120	Transite board	Elevator motor room roof

Homogeneous Areas Testing Negative for Asbestos

Sample #	Description	Location
101	Pipe insulation	10' level mechanical area
102	Pipe insulation	10' level mechanical area
103	Pipe insulation	10' level mechanical area
106	Joint mortar	420' level west wall
107	Joint mortar	110' level east wall
111	Wall plaster	Ground level, elevator lobby
112	Wall plaster	Ground level, elevator lobby
113	Wall plaster	Ground level, elevator lobby
114	Wall plaster	Ground level, elevator lobby
115	Wall plaster	Ground level, elevator lobby
116	Wall plaster	Ground level, elevator lobby
121	Pipe insulation	40' level
122	Pipe insulation	40' level

Within the Monument, asbestos-containing materials were detected in vinyl floor tile, pipe joint insulation, and transite board. ACM pipe joint insulation is located on a heating line extending up through the elevator shaftway. The suspect material was identified only up to the 95' level. Most of this material is in good condition however, joints at the 40' and 60' level are damaged and friable ACM is exposed. Removal of the damaged joints is recommended.

The remainder of the ACM pipe joint insulation is in good condition and may remain in place if it will not be disturbed by restoration or maintenance work. If allowed to remain in place it should be included in an Operations and Maintenance (O&M) plan.

The transite panels used to enclose the elevator motor room are in generally good condition, although some minor deterioration was noted at the panel edges. The panels should be encapsulated and included in an O&M plan until they can be removed as part of a planned renovation.

The concrete underground structure adjacent to the Monument contains a mechanical space and guard room. The vinyl tile, pipe, pipe joint, and tank insulation in the mechanical space is all friable and severely deteriorated. The area should be sealed off and entered only by personnel wearing respirators and protective clothing. The mechanical area should be considered an immediate hazard and air monitoring should be conducted to determine the level of airborne asbestos.

Approximately eight ACM pipe joints were identified in the guard room. Of these, one was severely damaged and should be repaired or removed as soon as possible. While the guard room is not considered to pose an immediate hazard, air sampling is recommended to determine if asbestos fibers have infiltrated from the adjacent mechanical area.

Recommendations

We recommend the following procedures be followed prior to asbestos abatement:

1. Protective equipment should be required for anyone working with or around asbestos-containing materials.

2. Contract a licensed asbestos abatement project designer to prepare construction documents for the removal of ACM.

3. Contract a licensed asbestos abatement contractor to do abatement work.

4. Written records should be kept on all actions and/or personnel affecting ACMs.

If the ACMs are allowed to remain, they must be protected from damage. It is also advisable to notify staff and maintenance personnel of the location of the ACM and conduct periodic inspections to insure that it remains intact.

D&D is pleased to have provided this service to you. If you have questions regarding this report, please feel free to contact me at (703) 849-0363.

Inspector:

Thomas E. Kuepper

Thomas E. Kuepper
Asbestos Inspector/Management Planner/Project Designer