MATILIJA

THE MACNEAL-SCHWENDLER CORPORATION

EC-24

STRUCTURAL ANALYSIS OF MATILIJA DAM

for

Bechtel Corporation

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Bechtel Corporation

REF000000050

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STRUCTURAL ANALYSIS OF MATILIJA DAM

1.0 INTRODUCTION

This report contains a description of the structural analysis of Matilija Dam made for the Bechtel Corporation by The MacNeal-Schwendler Corporation. The analysis was made using an IBM 7094 digital computer and the digital computer program SADSAM which was developed by The MacNeal-Schwendler Corporation.

This analysis of Matilija Dam, which was constructed about 17 years ago, was performed because the dam has noticeably suffered from concrete deterioration and abutment motion. The analytical task involved was somewhat different from the more conventional evaluation of a new design. The first task, accomplished in Phase I of this analysis, was the determination of the currently existing state of the dam with respect to foundation motion and chemical expansion of the concrete.

Using the approximation of existing conditions found in Phase I the analysis proceeded to the prediction of the stress distributions which will result from the application of critical loading conditions in the future. This task was accomplished in Phase II of the analysis.

2.0 DESCRIPTION OF ANALYTICAL MODEL

The actual dam structure of Fig. 2.2 was represented in this study by an analytical model of the dam. This analytical model is described in Sections 2.1 through 2.5.

2.1 GEOMETRY

The analytical model of the dam was considered to have a central surface, to which the internal forces and moments are referenced, defined by circular arcs at the arch center locations of Table 2.1. The radii and centers of these circular arcs are shown in Table 2.1. The dam thickness of the analytical model is defined by circular intrados and extrados faces which result in abutment and crown thicknesses for each arch location which are identical to the actual dam.

Figure 2.1 shows the geometry used for a typical arch elevation and Table 2.1 presents the numerical data for the arches used.

The height of the top arch (arch B of Fig. 2.3) was varied along its length to account for the variation in crest elevation.

2.2 STRUCTURAL IDEALIZATION

Figure 2.2 presents the general arrangement and geometric characteristics of Matilija Dam. The analysis of the dam was accomplished by replacing the continuous structure by a lumped parameter system consisting of horizontal and vertical beams as well as torque boxes and shear panels. In particular, the structural idealization resulted in a grid system containing 5 horizontal arches and 12 vertical cantilevers. Figure 2.3 shows the grid system projected onto a reference cylinder. The horizontal lines represent the center lines of the arch elements and the vertical lines represent the center lines of the cantilever elements. The rectangular panels bounded by the arch and cantilevers are treated as shear panels for both membrane and twisting shear. The horizontal arch elements are idealized as elastic elements that react horizontal thrust, radial shear and bending about a vertical axis. Similarly, the cantilever elements react vertical thrust, radial shear and bending about a horizontal axis. Coupling of the vertical and tangential coordinates exists due to the membrane shear elastic elements. The rotational coordinates of the arches are coupled together by twisting shear elastic elements.

The horizontal curved arches, as idealized, consist of a series of curved beam segments between cantilevers. The curvature of the cantilevers was considered negligible and was not represented in the structural idealization. The cantilever sections were straight beam segments between arches.

The loads acting on the dam structure are approximated by a set of concentrated loads applied to the arch-cantilever intersections. The effects of temperature and chemical expansion are introduced by the application of the effective strains. The various lumped elements used in idealizing the continuous structure are indicated in Fig. 2.4. Table 2.2 lists the physical properties of the structure used in the analysis.

In the analysis of the dam the idealized structure described above was replaced by an analogous electrical network. The solution was then accomplished through the use of a digital computer program (SADSAM) developed by The MacNeal-Schwendler Corporation. The interested reader will find references 1 and 2 useful in understanding the electrical analogy technique of analyzing structural systems.

2.3 TREATMENT OF THE FOUNDATION

The continuous foundation was replaced by a series of lumped flexibilities. These flexibilities are located at the intersections of the arch and/or cantilever with the abutment. The "equivalent depth" of foundation rock used in determination of the lumped flexibilities was assumed to be 2.5 times the abutment thickness for resisting thrust and shear loading and 0.5 times the abutment thickness for resisting twisting and bending loading. Derivation of the effective foundation flexibility was based on original work set forth in Ref. 3 and has been used in MSC in the analysis of other arch dams.

The values of foundation modulus used were provided by Bechtel Corporation. Referring to Fig. 2.3, the foundation at the left abutment defined by the section from 2A to 10K had a modulus of 0.75×10^6 psi. The foundation at the right abutment defined by the section from 12K to 24A had a modulus of 1.0×10^6 psi.

2.4 TREATMENT OF THE SLIP PLANE

An important structural feature of Matilija Dam is a slip plane located below arch J at elevation 960. It was assumed, in this analysis, that only vertical thrust and cantilever bending loads are carried across the slip plane. The slip plane was assumed incapable of carrying any shear load.

2.5 TREATMENT OF EXISTING CRACKS AND CONCRETE DETERIORATION IN THE DAM

The cracking and concrete deterioration simulated in the analytical model were as follows:

a.) Core sample tests and sonoscoping have shown that the modulus of elasticity of the concrete varies in the dam. The modulus of elasticity of the analytical model is shown in Fig. 2.5.

b.) A large horizontal crack exists at approximately elevation 1115 between stations 0+90 and 1+88 which extends through the arch. It was assumed, in this analysis, that the concrete above this crack (the cross-hatched area of Fig. 2.5) is unable to carry load and was omitted from the analytical model.

c.) The vertical construction joints of the dam have separated at the faces and have thereby locally reduced the cross-sectional areas of the arches. This reduced thickness has a negligible effect on the arch thrust flexibility but does have a small effect on the arch bending flexibility. The arch bending flexibility of the analytical model considered the arch blocks, between construction joints to have the geometric shape shown in Fig. 2.6. The reduction in thickness at the construction joints is also shown in Fig. 2.6.

3.0 PHASE I

Since the building of Matilija Dam movements of the structure and abutments have been observed. Investigation of the cause of these movements have indicated internal expansion due to alkali-aggregate reaction and inelastic abutment deflection. Phase I was devoted to studying the deflection of the dam under various loading conditions in an effort to define a chemical expansion distribution and a type of foundation movement which, when included in the analysis, would approximate the observed deflections of the dam.

3.1 LOADING CONDITIONS CONSIDERED

Four types of load were considered in Phase I. In general these load conditions are referred as

1.) Water load

2.) Silt load

3.) Unrestrained thermal contraction

4.) Unrestrained chemical expansion

The hydrostatic pressure was considered to act normal to the inclined face of the dam. The resultant force was resolved into orthogonal components giving a radial and vertical load at the arch-cantilever intersections. The silt load was handled in an identical manner. The density of water containing silt was assumed to be 1.5 times the density of water alone. In general, a triangular distribution of hydrostatic pressure was used, however, in the event that the reservoir surface exceeded a local crest elevation, a trapezoidal hydrostatic distribution was considered appropriate in the region.

Figure 3.1 presents the temperature distributions used in the analysis. Chemical expansion loads were handled in an identical manner to thermal loads, i.e., where a change in physical dimension due to a temperature change is given as

$$(\Delta u)_{thermal} = (\gamma \Delta t)\ell$$

where

γ = coefficient of thermal expansion

and

$100 \times \gamma\Delta t$ = % change in physical dimension

a change in physical dimension due to chemical expansion is given as

$$(\Delta u)_{chem.} = \frac{Factor}{100} \times \ell$$

where

Factor = % elongation of the concrete

Table 3.1 tabulates the load conditions considered in Phase I.

3.2 RESULTS OF PHASE I

Deflections of the dam were observed at the following locations:

Plate 5	Station 0 + 00	Elevation 1138
Plate 6	Station 3 + 29.7	Elevation 1138
Plate 7	Station 6 + 00	Elevation 1138
Plate 9	Station 4 + 53	Elevation 960
Plate 10	Station 3 + 73	Elevation 960
Plate 11	Station 2 + 91	Elevation 960

Deflections calculated in the analysis (shown in Appendix B) are at elevations and stations other than those above. The calculated deflections have been linearly extrapolated to the above plate locations and are shown in Table 3.2.

Appendices A and B contain the stress distribution and deflection results respectively for the loading conditions of Phase I.

3.3 REVIEW OF PHASE I RESULTS

The deflection and stress results, shown in Appendices A and B, of the individual loading conditions of Phase I may be superimposed to yield the results of a combined loading condition. At the conclusion of Phase I an attempt was made, through the superposition of analytical results, to duplicate the deflections of the dam measured in November 1957 and in October 1964 with emphasis on the latter date. Less information is available concerning the condition of the dam in 1957, but it is certain that relatively little chemical expansion had taken place prior to this time and that appreciable foundation settlement had already occurred.

The load combination found to best fit measured deflections, known conditions and assumed reasonable concrete conditions in October 1964 included:

a.) Load condition B + E; the water and silt conditions known to exist.

b.) Load condition H; the temperature condition for October 1964

c.) Load condition M; the translation of the left abutment which, at least, closely duplicates the inelastic deflection at the crest.

d.) 30% of load condition K; thereby applying a chemical expansion of 0.03% above elevation 1062.5

e.) 30% of load condition L; thereby applying an additional 0.03% chemical expansion to the weakened area of the top arch.

f.) 5% of load condition J; thereby applying an additional chemical expansion to the dam varying linearly from 0.005% at elevation 1125 to 0 at elevation 960.

Table 3.2 shows the deflections resulting from the above load superposition in the column labeled "Calc Oct 1964". The corresponding measured deflections are listed in the column labeled "Meas Oct 1964".

All radial deflections and the tangential deflections near the left abutment (at plates 5 and 11) show rather close agreement between the analytical results and measured data. The reliability of tangential deflection measurements at all plates, other than 11, is in doubt and little emphasis was placed on deflection correlation at these coordinates.

The last two columns of Table 3.2 present the calculated and corresponding deflections measured in November 1957. The superposition of loads used in obtaining these calculated deflections includes load condition A, the water load, load condition G, the temperature condition for November 1957, and load condition M, the inelastic foundation movement.

The correlation between measured and calculated deflection is not as excellent in this case as it was in the 1964 comparison, however, it is considered to be satisfactory considering the lack of knowledge concerning the condition of the dam in 1957. The differences between calculated and measured 1957 deflections are probably a result of:

a.) The dam being represented in a "weakened" condition duplicating 1964 Observations and modulus of elasticity measurements. The actual dam was probably stiffer in 1957 than it is today.

b.) Some chemical expansion that may have taken place prior to the 1957 measurements and is not included in this analysis.

4.0 PHASE II

The stresses and deflections of the dam under design loading conditions, which include the chemical expansion and foundation motion defined by Phase I, were predicted in Phase II.

4.1 LOADING CONDITIONS CONSIDERED

For all load cases considered in Phase II thermal contractions due to "maximum temperature drop" as defined in Fig. 3.1 were used.

Earthquake loads were introduced into the analysis in two ways. First, an increase in hydrostatic loading was incorporated according to the plot of Fig. 4.1. Figure 4.1 gives the incremental increase in hydrostatic pressure (including silt). Therefore the resultant earthquake water load is given as

$$(F)_{\substack{\text{Earth-}\\\text{quake}}} = (1 + K)\, F_{\substack{\text{water}\\\text{+ silt}}}$$

In addition to the water loads an earthquake inertia loading caused by acceleration of the structure itself at an acceleration level of 0.1 g was included. The inertia loading was assumed to act downstream parallel to the axis of the dam.

Dead loads were assumed to be transmitted straight downward to the foundation and not to be diffused toward the walls of the canyon by shearing action. In treating the dead loads, both the cantilever thrust and the cantilever bending stresses were included.

Table 4.1 summarizes the loads conditions considered in Phase II.

4.2 RESULTS OF PHASE II

Stress results including the effects of dead load are presented in Appendix C. The corresponding deflections are given in Appendix D. Appendix E contains the principal stress component for both the intrados and extrados. The principal stress components are tabulated for each arch-cantilever intersection for Cases R, S, T and U as defined in Table 4.1. Also in the tabulation are the horizontal and vertical stresses and the shear stresses on which the principal stresses are based. The terms used in the tabulation of principal stresses are defined below

SMAX = Maximum stress (+ compression)

SMIN = minimum stress (+ compression)

Theta = Angle defining orientation of the maximum principal stress (+ counter-clockwise from horizontal when looking upstream)

SX = Horizontal stress (+ compression)

SY = Vertical stress (+ compression)

TAU = Shearing stress (+ sense shown on the sheets of Appendices A and C)

The location code used to identify the stress data may be found on Fig. 2.3.

4.3 REVIEW OF PHASE II RESULTS

The results of Phase II generally show that:

a.) Areas of the dam known to be weak are in a rather low state of stress

b.) Compressive stresses, largest in the earthquake condition, have a maximum value of 1666 psi near the crown of the bottom arch.

c.) Tensile stresses, largest at the low water level, of a significant magnitude are shown to exist in the analytical results. The area of maximum tensile stress is along arch F (elevation 1045). From the stress distributions of Phase I (Appendix A) it is clear that these high tensile stresses are caused by the assumed chemical expansion in which the arches above arch F have expanded far more than arch F. Since the magnitude of the assumed chemical expansion has a rather weak basis, these tensile stresses have an uncertain magnitude. However, we believe that the tensile stresses of the analytical results to be a conservative prediction of stress level because the critical stresses are dependent on the vertical gradient of expansion and the gradient assumed in this analysis is probably more severe than actually exists.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of this analysis closely approximate available measurements made on the dam but the available data is rather meager. This analysis, therefore, provides the best prediction of existing and future stresses and deflections which can be made at this time. We recommend that in the future the following action be taken.

a.) The dam should be examined regularly for horizontal cracks as evidence of more severe expansion gradients than have existed heretofore.

b.) Future measurements of dam deflections can be correlated with the analytical results by means of further superposition of the results of this analysis.

c.) If correlation cannot be found through superposition of results of this analysis and further deterioration is significant, then a new analysis should be undertaken.

REFERENCES

1. MacNeal, R. H., "Arch Dam Analysis With an Electric Analog Computer". Proceedings of the ASCE, Vol. 86, No. EM4, August 1960, pp.127-151.

2. MacNeal, R. H., ELECTRIC CIRCUIT ANALOGIES FOR ELASTIC STRUCTURES. John Wiley and Sons, New York, London, 1962.

3. UBER DIE BERECHNUNG DER FUNDAMENTDEFORMATION. Anhandlinger det Norske Videnskaps - Academi. Oslo, 1925.

TABLE 2.1. Geometry of Arches

Arch	Elevation	x_a (ft)	y_a (ft)	r_a (ft)	e (ft)	t_c (ft)	δ (deg)
A	1125.0	0	0	292.50	0	8.00	0
B	1110.0	0	0	292.50	0	8.00	0
C	1095.0	6.14	- 0.12	287.02	0	9.50	0
D	1080.0	11.50	- 0.33	282.67	0	11.00	0
E	1062.5	20.40	- 0.12	274.61	3.92	13.50	-0.46
F	1045.0	31.33	1.42	264.55	8.82	17.00	1.98
G	1027.5	51.90	5.90	245.38	15.82	20.50	5.02
H	1010.0	67.81	9.64	230.30	21.56	24.00	5.65
I	992.5	83.14	13.40	216.17	26.92	27.50	6.54
J	975.0	98.54	17.88	200.56	32.62	31.50	7.68
K	960.0	111.85	20.96	187.60	38.20	35.00	7.10

TABLE 2.2. Physical Properties

Unit Weight of Water, 62.4 lb/ft^3

Unit Weight of Concrete, 144 lb/ft^3

"Normal" Modulus of Elasticity of Concrete in Tension and Compression (see Section 2.5), 4×10^6 psi

Shear Modulus of Concrete, 1.733×10^6 psi

Coefficient of Thermal Expansion for Concrete, $5.6 \times 10^{-6}/^{\circ}F$

TABLE 3.1. Phase I Load Conditions

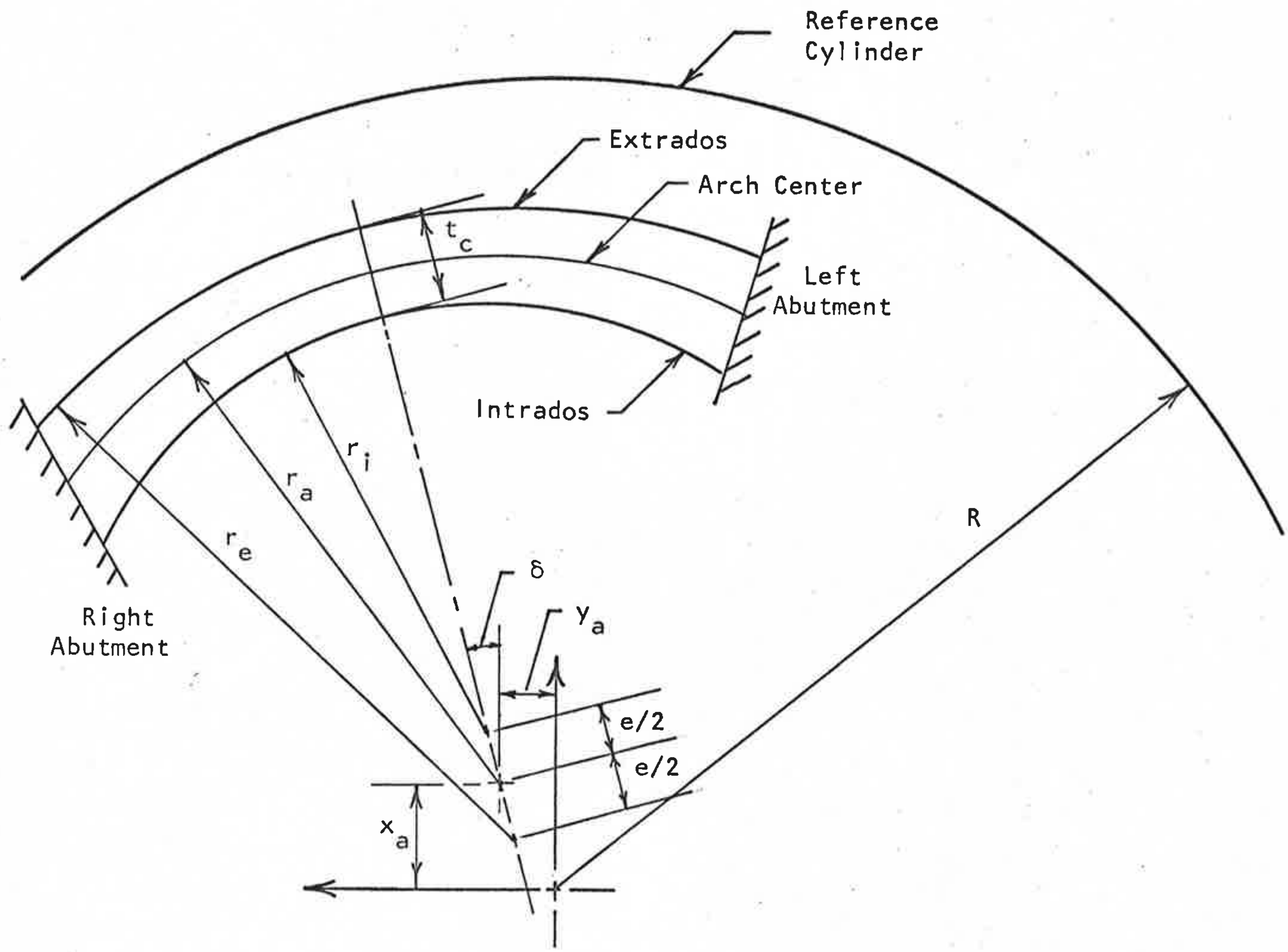
Condition	Description
A	Water load only - elevation 1103
B	Water load only - elevation 1069
B + E	Water elevation 1069, silt elevation 1037
G	Thermal contraction representing November 1957
H	Thermal contraction representing October 1964
J	Chemical expansion varying linearly from 0.1% unrestrained elongation at elevation 1125 to 0 at elevation 960
K	Chemical expansion of 0.1% above elevation 1062.5 and 0 below
L	Chemical expansion of 0.1% above elevation 1095 between stations 0 + 68 and 3 + 43.0; 0 expansion for the remainder of the dam
M	Horizontal translation of the left abutment in a direction that the tangential motion of elevation 1110 is .7896 inches into the abutment and the radial displacement .1596 inches downstream. The resultant motion was 0.8056 inches. The left abutment was translated at all elevations 0.8056 inches in the same azimuth direction.

TABLE 3.2. Deflection Results of Phase I

Plate Number	Cond. A	Cond. B	Cond. B + E	Cond. G	Cond. H	Cond. J	Cond. K	Cond. L	Cond. M	Calc. Oct '64	Meas. Oct '64	Calc. Nov '57	Meas. Nov '57
	Radial Deflection (inches)												
5	- .0038	- .0053	- .0065	.0043	.0034	- .0596	- .0751	- .0120	.1596	.1274	.15	.1601	.16
6	.6984	.2263	.3321	.2216	.1660	-4.035	-4.405	-1.024	.5949	- .7376	- .75	1.515	1.13
7	- .0566	- .0462	- .0580	.0171	.0080	- .6186	- .7810	.0046	.0257	- .2882	- - -	- .0138	- - -
9	.5140	.3424	.4380	.1555	.1372	- .5906	.0354	.0049	.2683	.8261	.80	.9378	.62
10	.7482	.4886	.6228	.2416	.2121	-1.026	- .0738	.0136	.5182	1.284	1.30	1.508	1.13
11	.5325	.3531	.4506	.1666	.1463	- .7224	- .0530	.0163	.5973	1.147	1.20	1.301	.82
	Tangential Deflections (inches)												
5	- .0502	- .0233	- .0284	.0218	.0175	- .2777	- .2860	- .0137	- .7896	- .9043	- .90	- .8185	- .84
6	- .0757	- .0381	- .0467	- .0179	- .0162	.1062	.0183	.1461	- .2902	- .2985	.11	- .3838	.16
7	.0590	.0161	.0195	- .0214	- .0169	.2737	.0965	- .0023	- .0028	.0416	- .10	.0148	.08
9	.1970	.1226	.1547	.0413	.0356	- .2781	- .0720	.0056	- .0505	.1060	.30	.0188	.30
10	- .0106	- .0078	- .0099	- .0060	- .0075	.0069	- .0046	.0021	- .2246	- .2439	- .10	- .2412	.05
11	- .2202	- .1370	- .1735	- .0558	- .0487	.3192	.0789	.0033	- .4791	- .6607	- .85	- .7551	- .80

TABLE 4.1. Phase II Load Conditions

Condition	Water Elevation (ft)	Silt Elevation (ft)	Temperature Condition	Earth-Quake	Conditions From Phase I
R	1069	1037	Maximum Drop (see Fig. 3.1)	No	M + 0.3 L + 0.3 K + 0.05 J (see Table 3.1 for definitions)
S	1125	1037		No	
T	1138	1069		No	
U	1125	1037		Yes	



$$r_i = r_a - \frac{e + t_c}{2}$$

$$r_e = r_a + \frac{e + t_c}{2}$$

FIG. 2.1. Geometry of Typical Arch

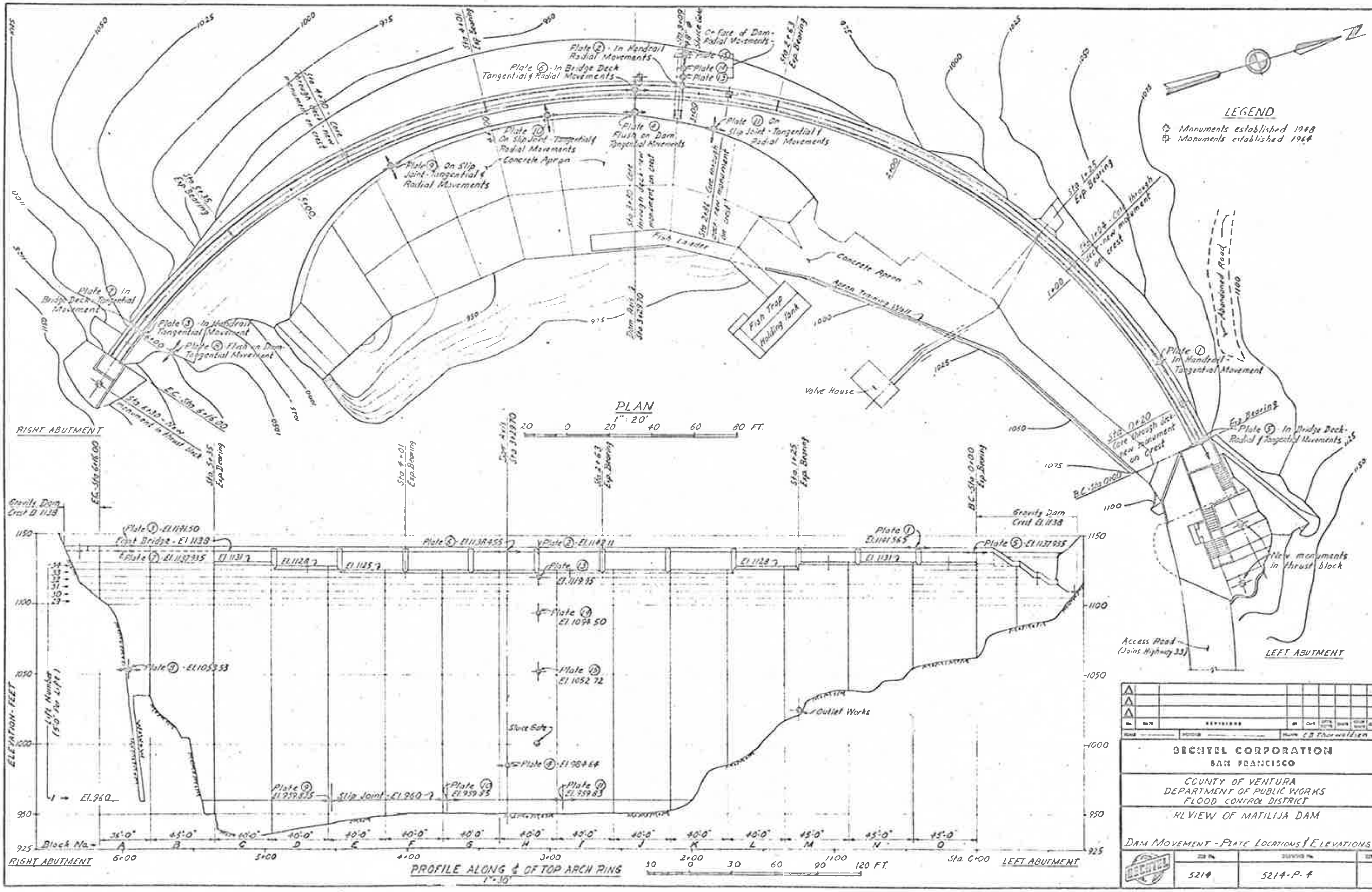


FIG. 2.2. General Arrangement and Geometric Characteristics of Matilija Dam

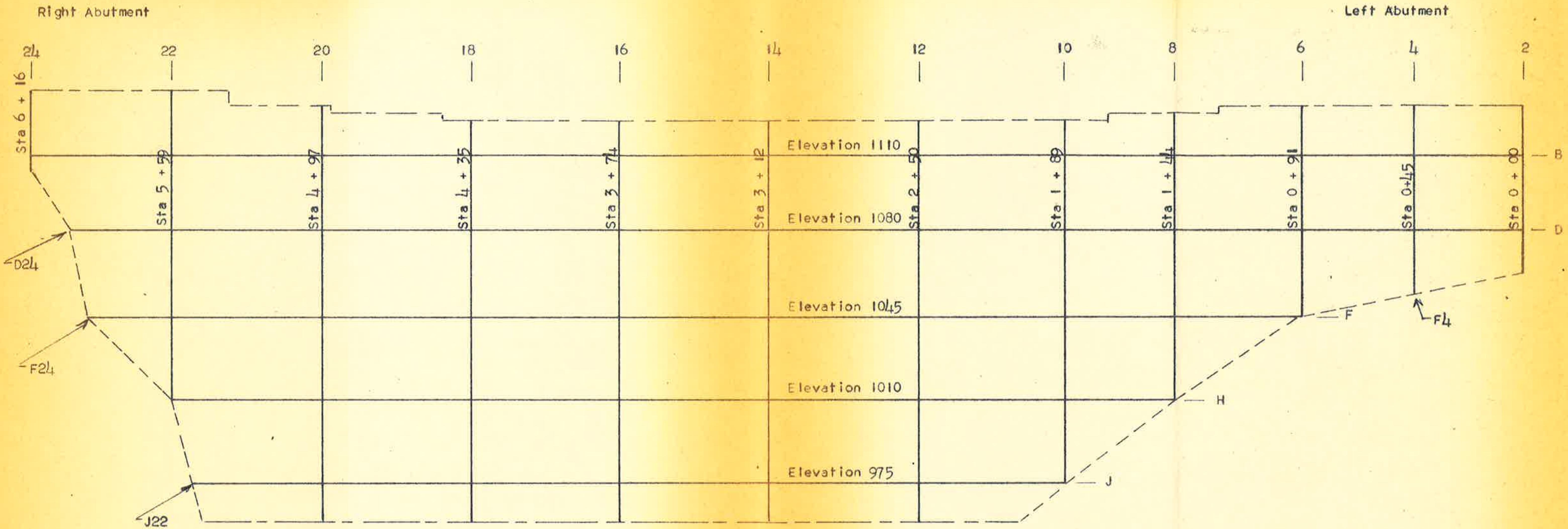


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FIG. 2.3 Arch and Cantilever Centerline Locations
View Looking Upstream

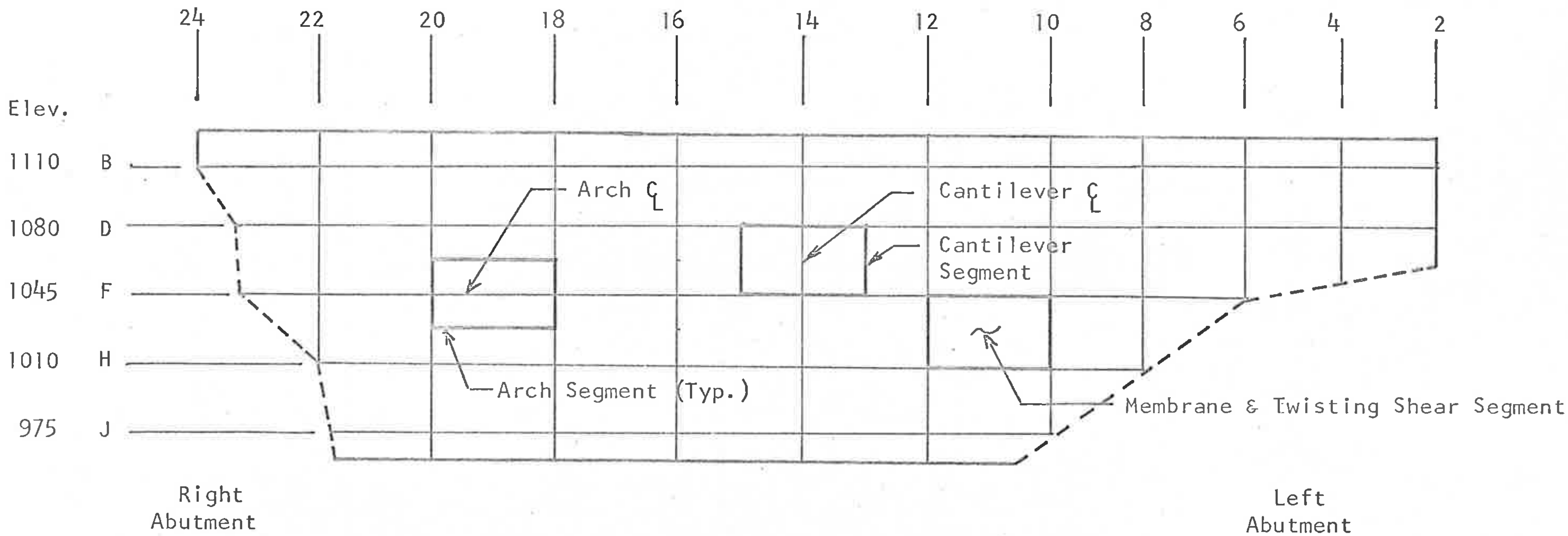


FIG. 2.4. Lumped Element Identification

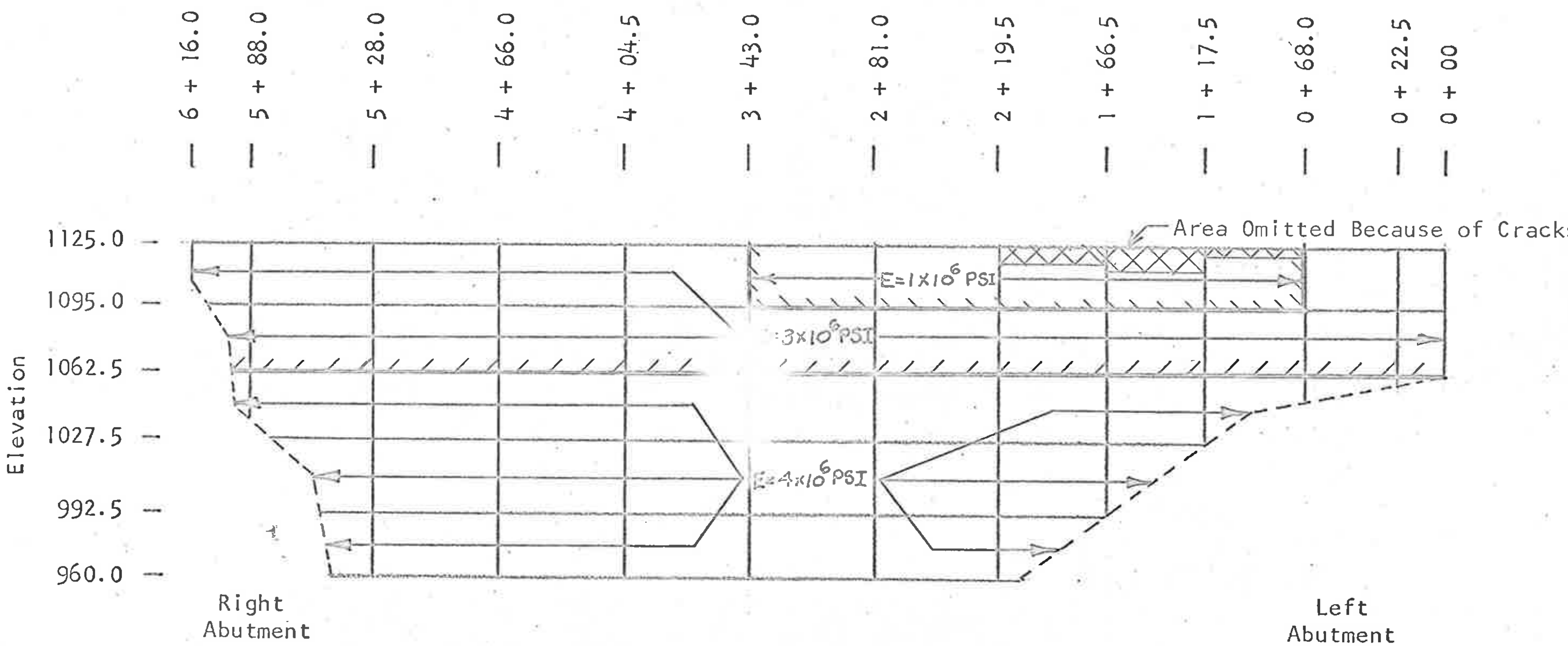
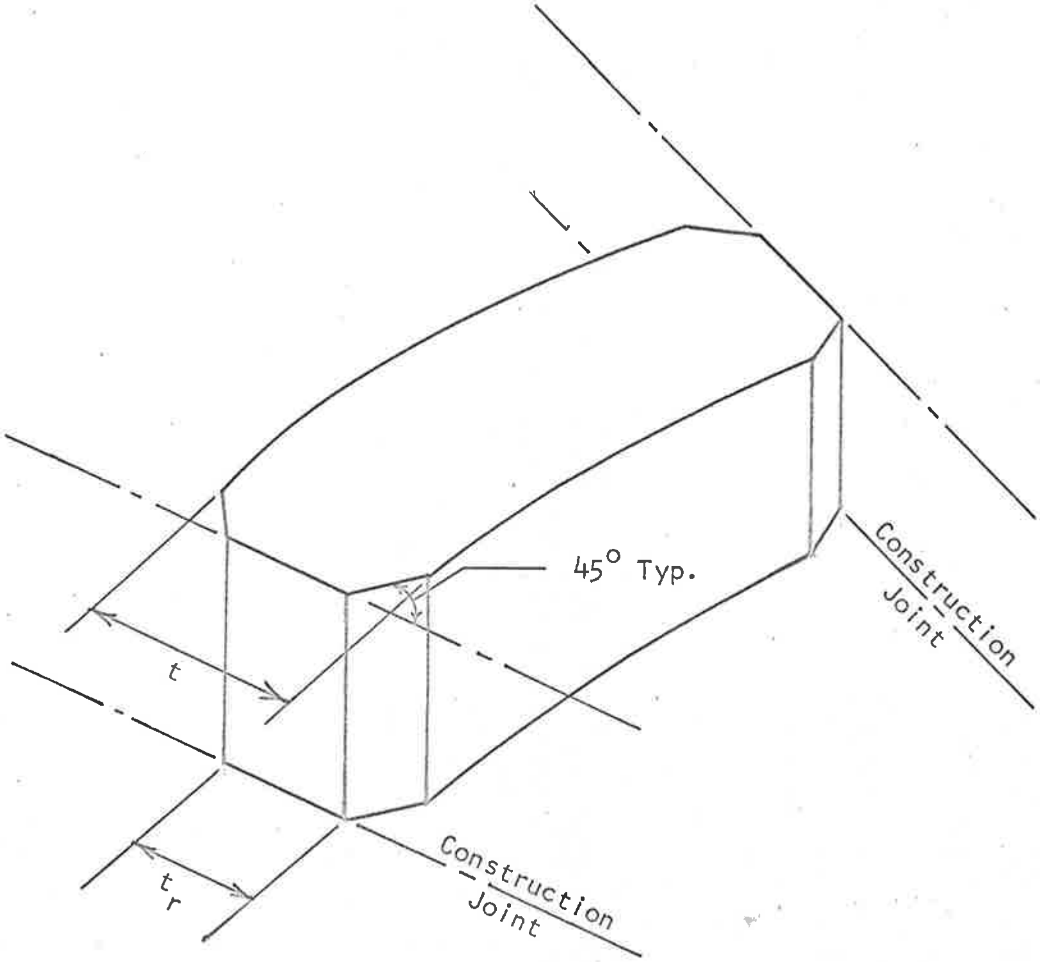


FIG. 2.5. Modulus of Elasticity of Analytical Model



From Elev.	To Elev.	t_r/t
960	1062.5	1.0
1062.5	1095	.90
1095	Crest	.75

FIG. 2.6. Arch Thickness Reduction at Construction Joints

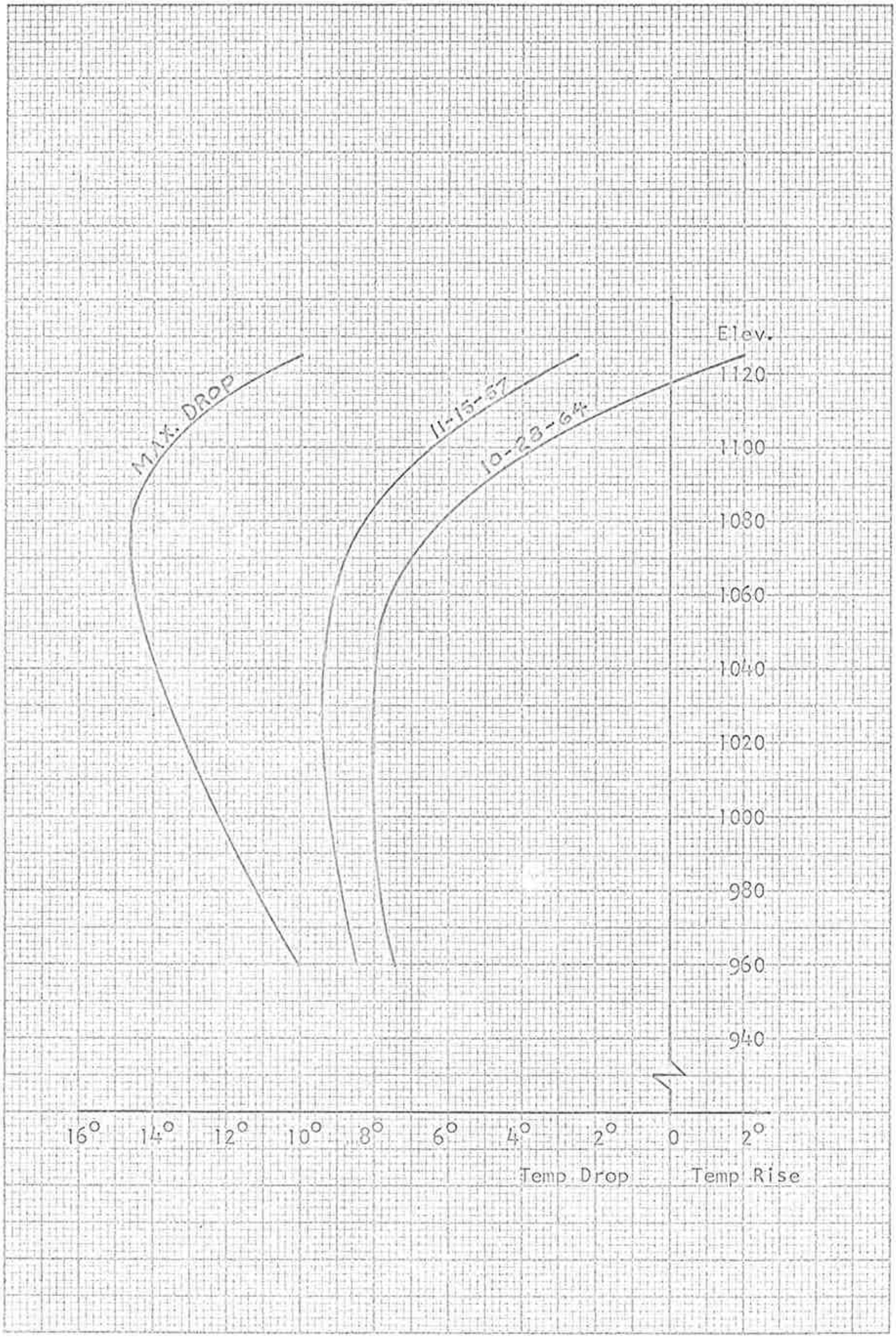


FIG. 3.1. Temperature Variation on Given Dates
From Grouting Temperature

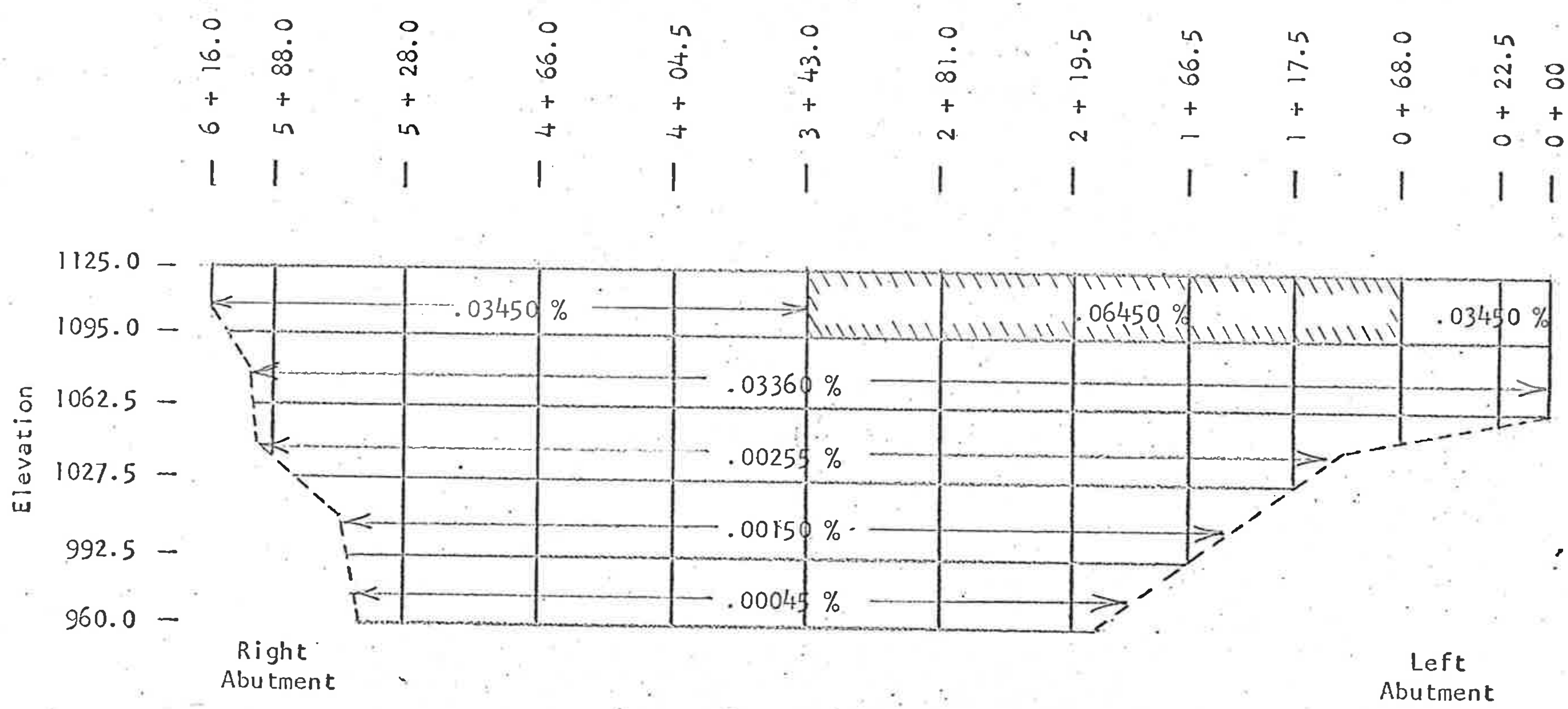


FIG. 3.2 ASSUMED TOTAL CHEMICAL EXPANSION FOR ARCHES AND CANTILEVERS FOR MATILIJA DAM

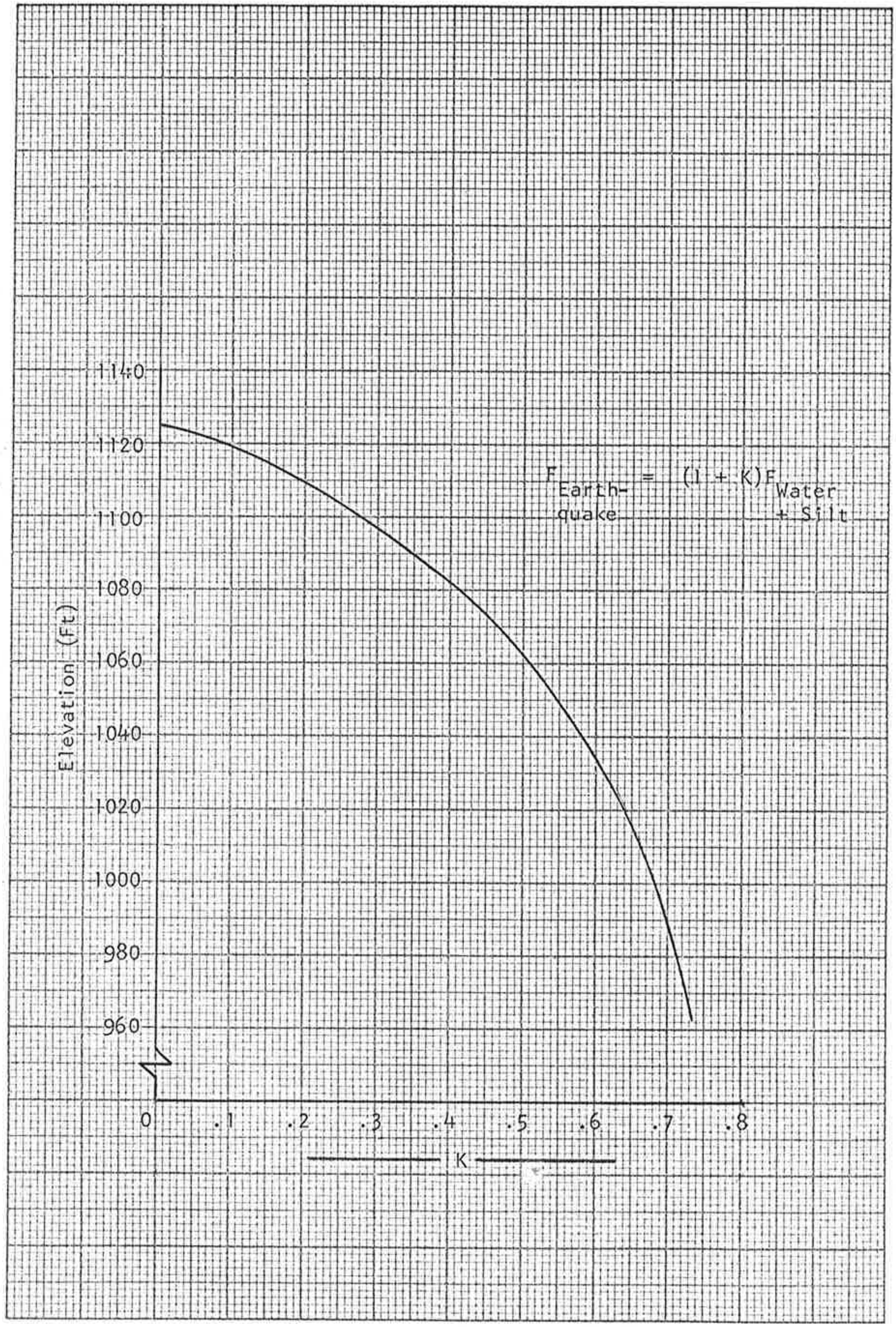
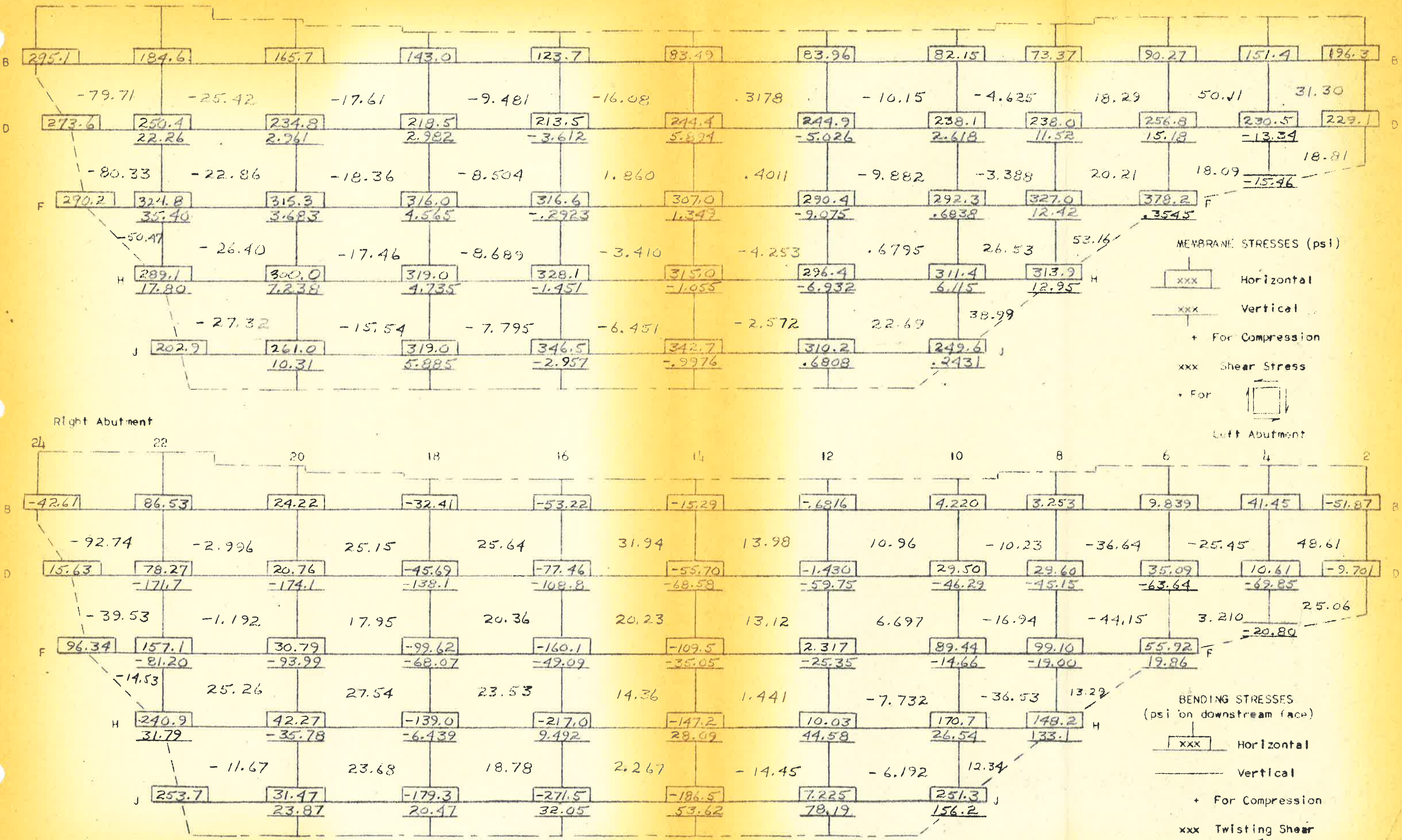


FIG. 4.1. Incremental Increase in Hydrostatic Pressure Due to Earthquake

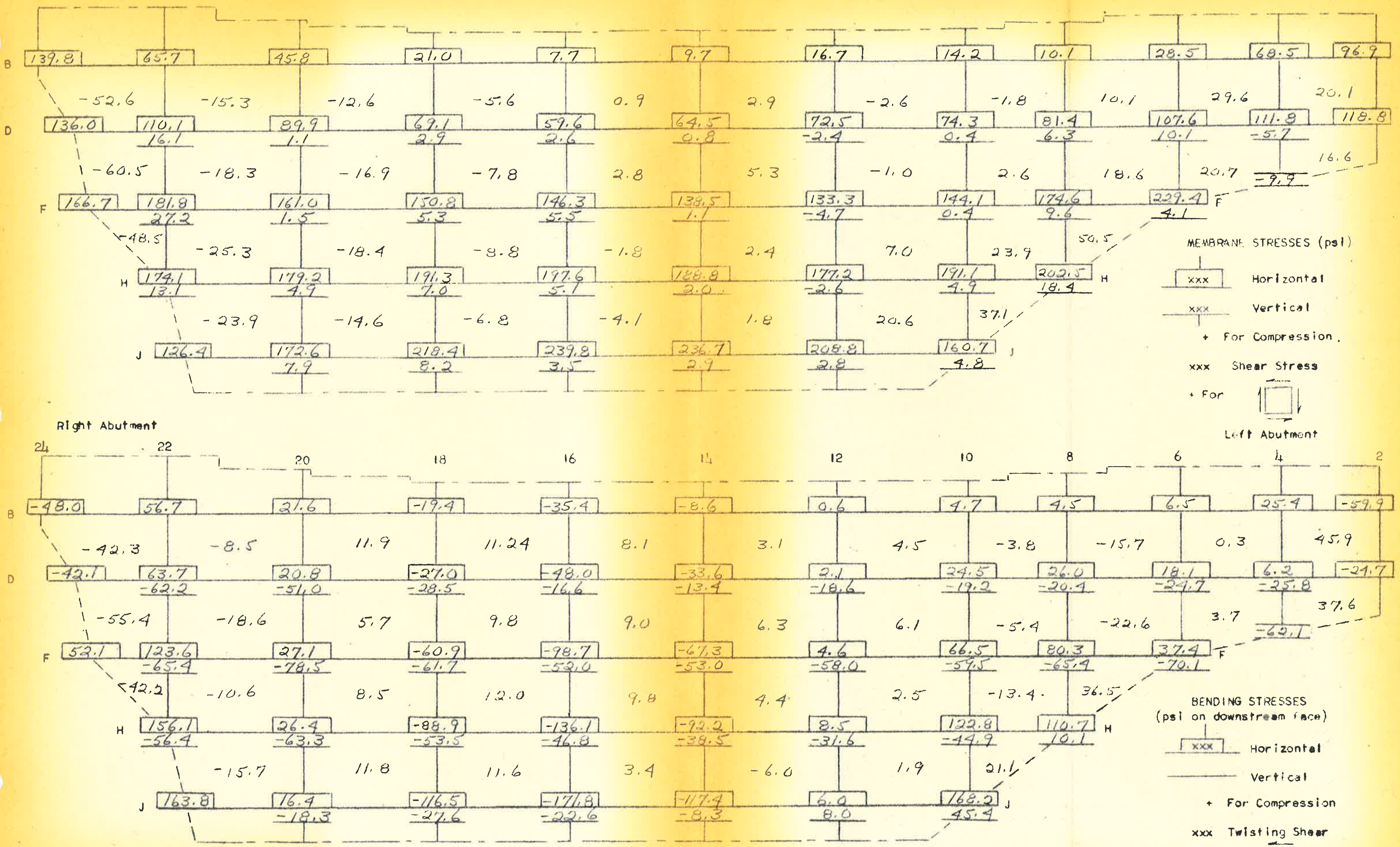
APPENDIX A

PHASE I. STRESS RESULTS

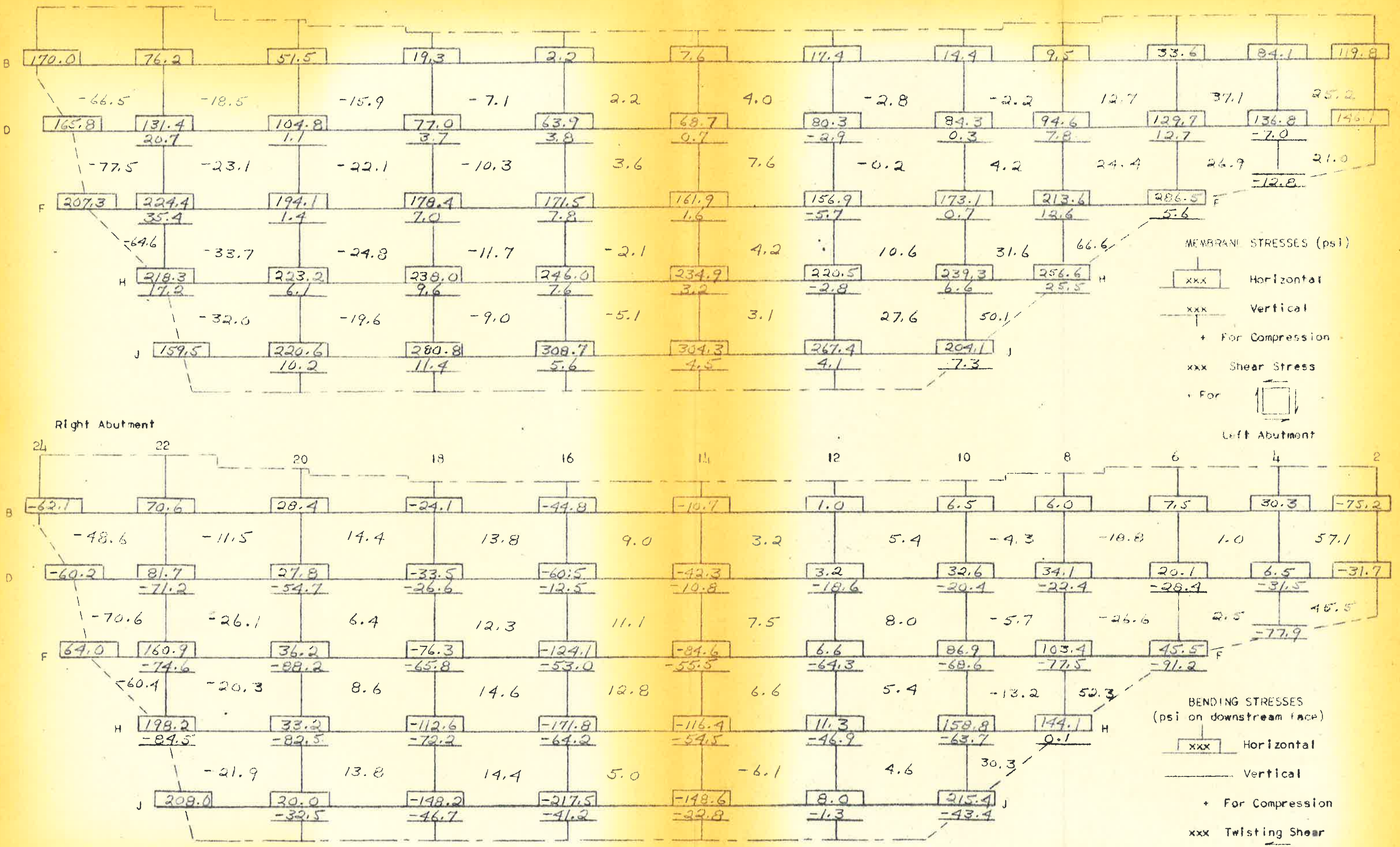


Load Condition A, Water Load Only, Elevation 1103

FIG. A-1

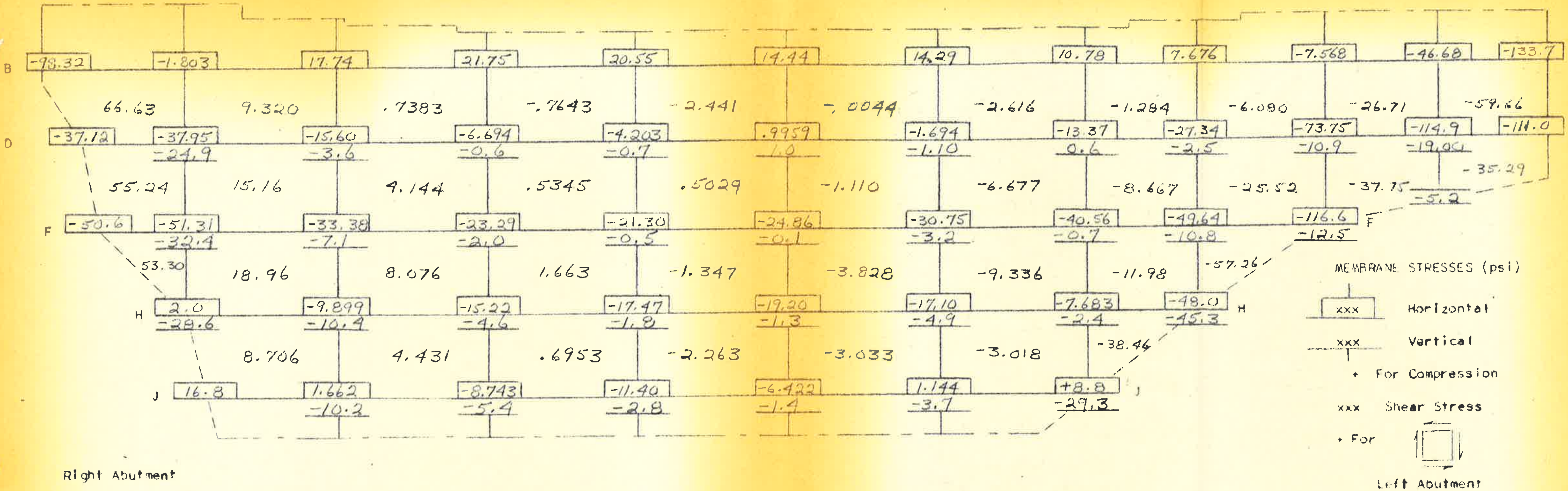


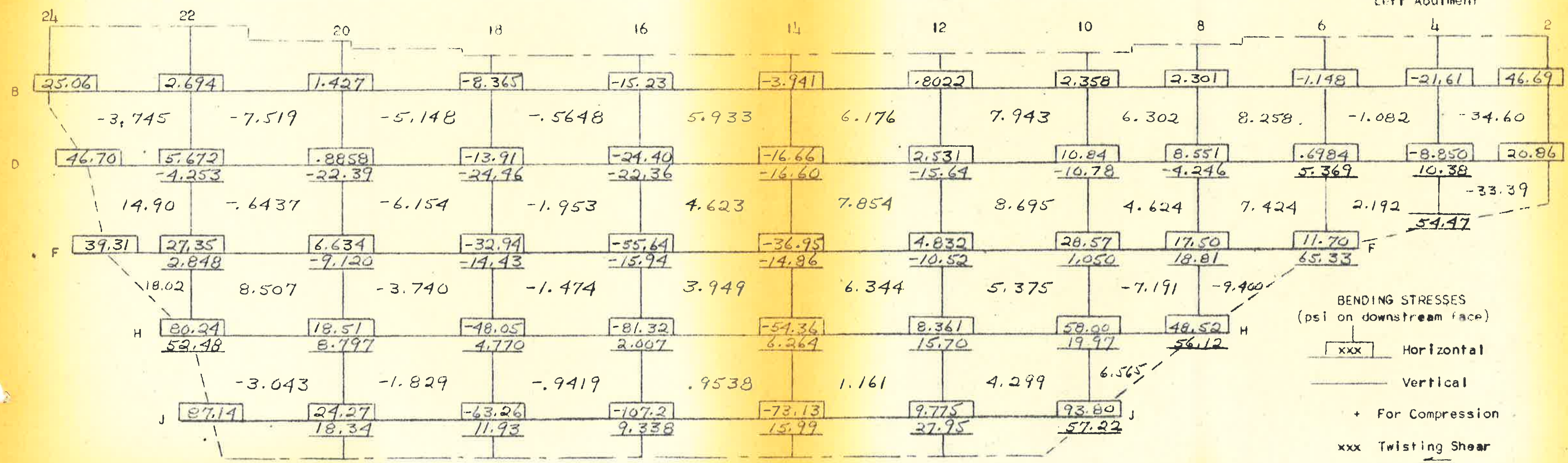
Load Condition B, Water Load Only, Elevation 1069
FIG. A-2



Load Condition B+E, Water Elevation 1069, Silt Elevation 1037

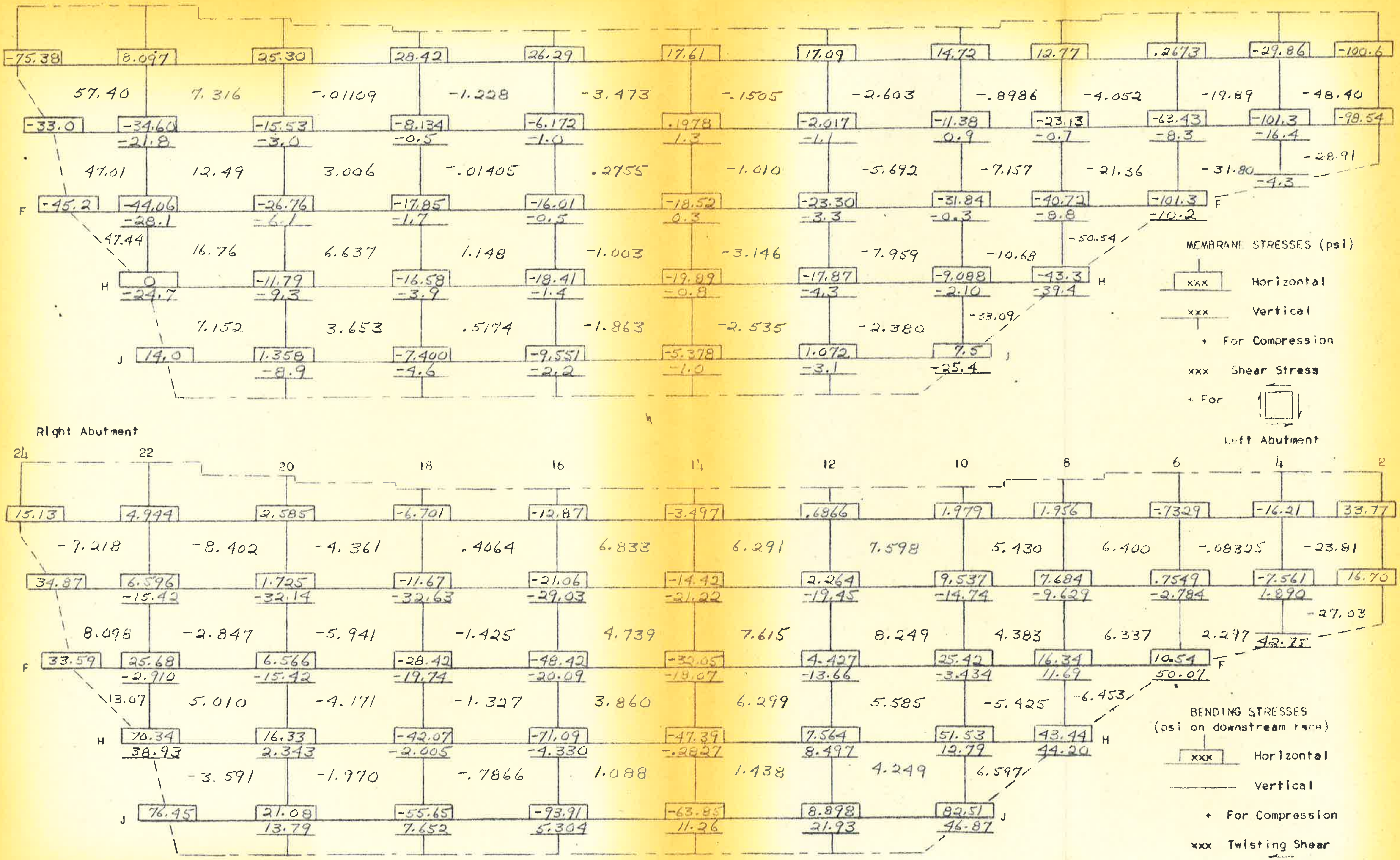
FIG. A-3





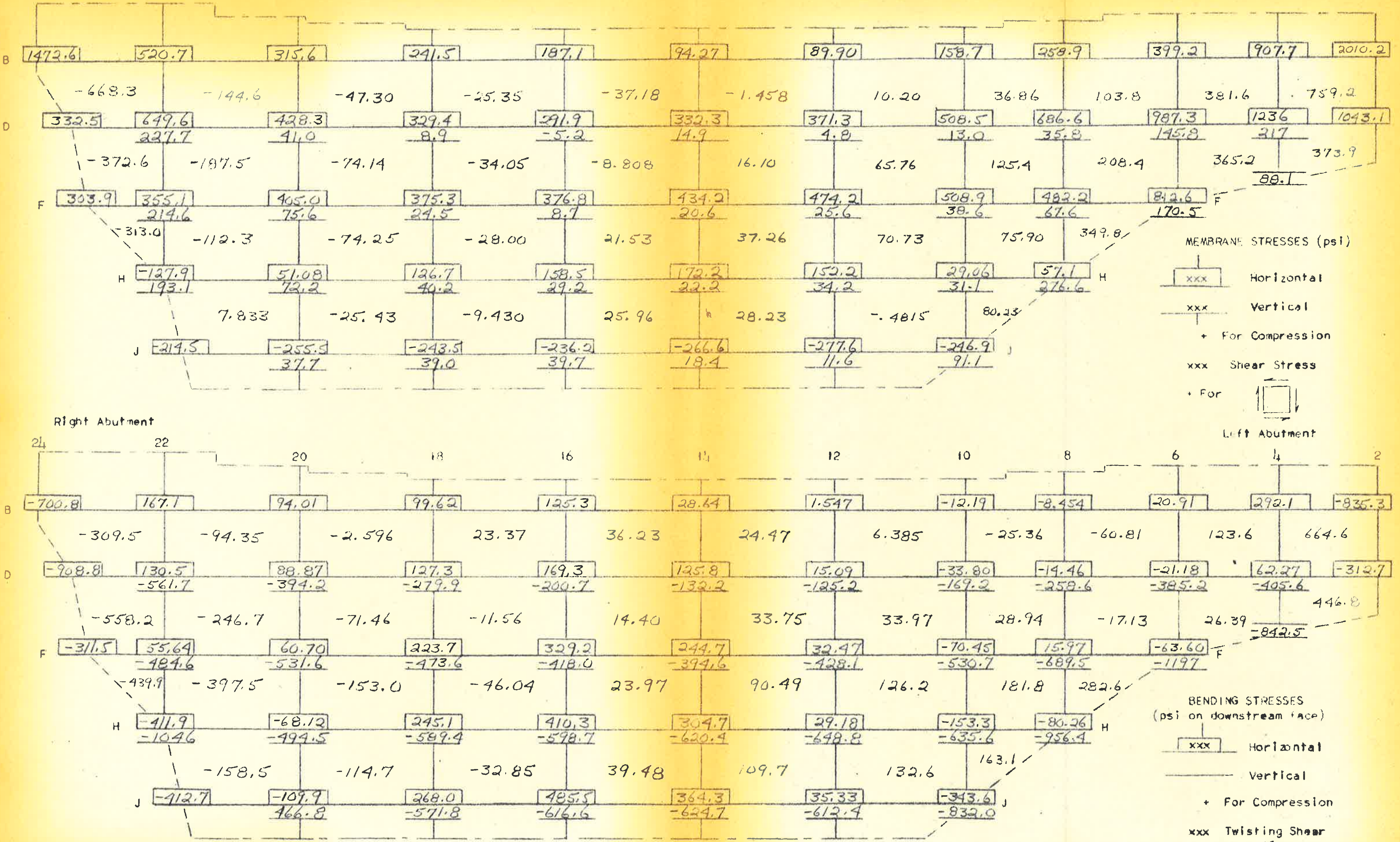
Load Condition G, Thermal Contraction Only, November 1957

FIG. A-4



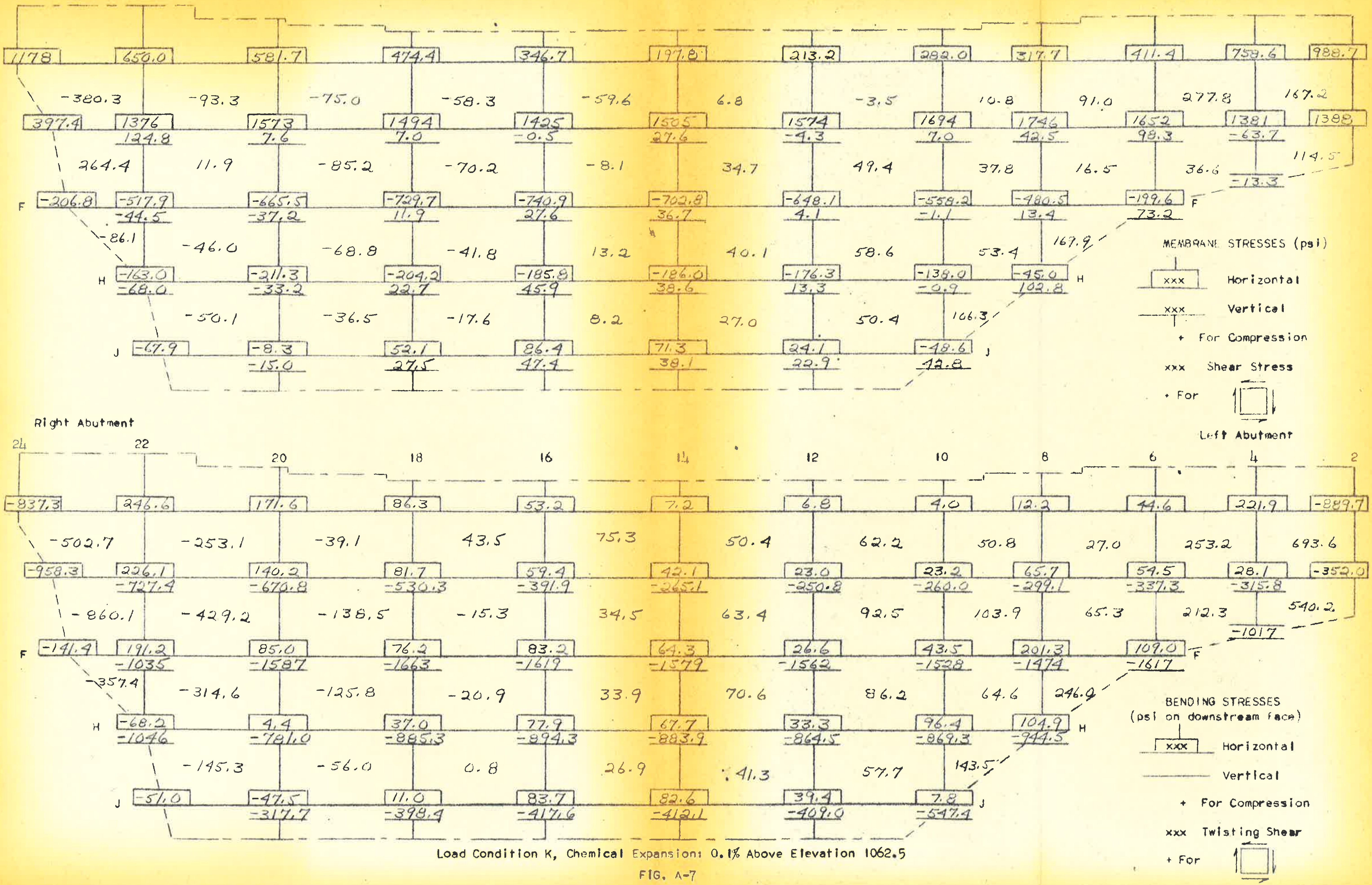
Load Condition H, Thermal Contraction Only, October 1964

FIG. A-5



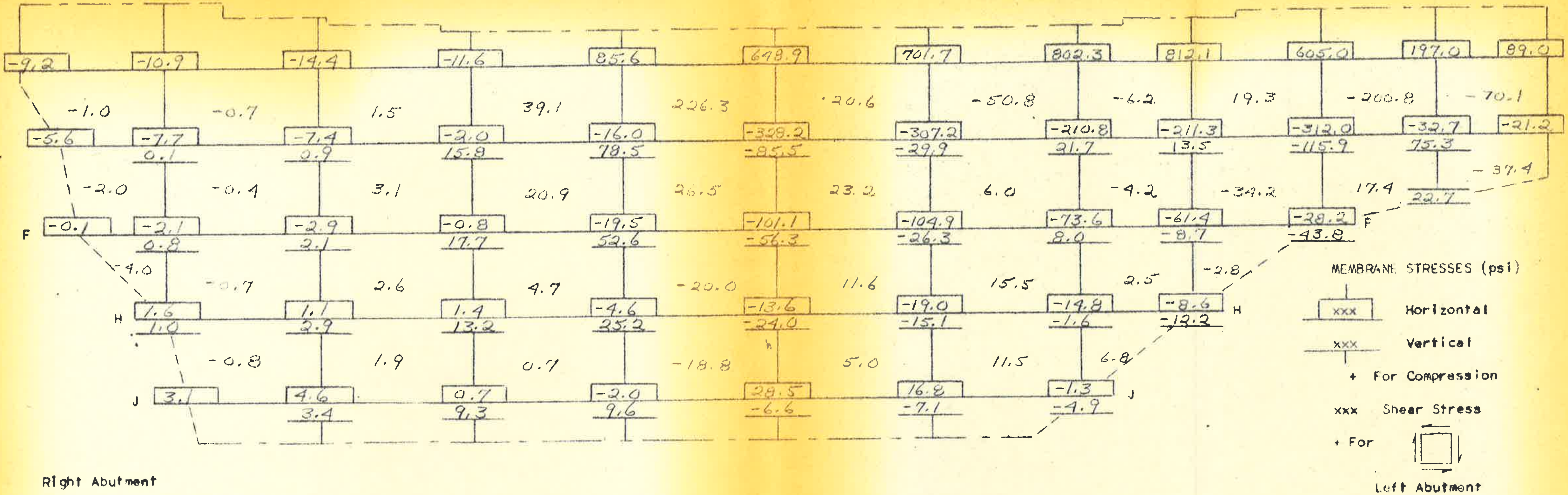
Load Condition J, Chemical Expansion: 0.1% Elevation 1125
0% Elevation 960

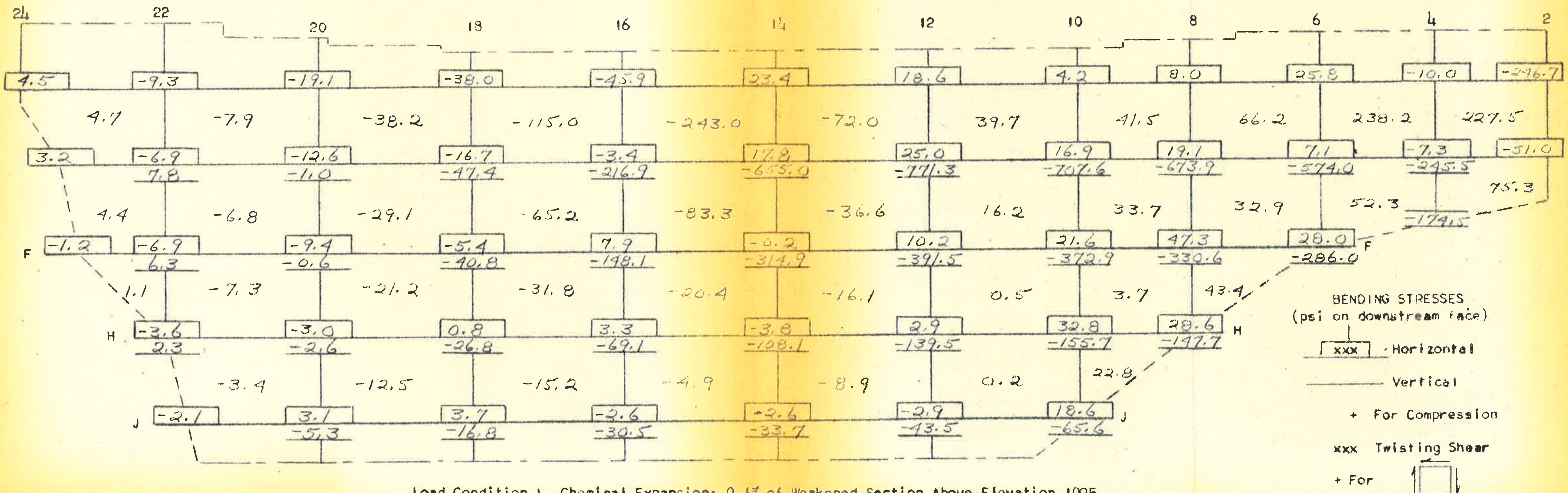
FIG. A-6



Load Condition K, Chemical Expansion: 0.1% Above Elevation 1062.5

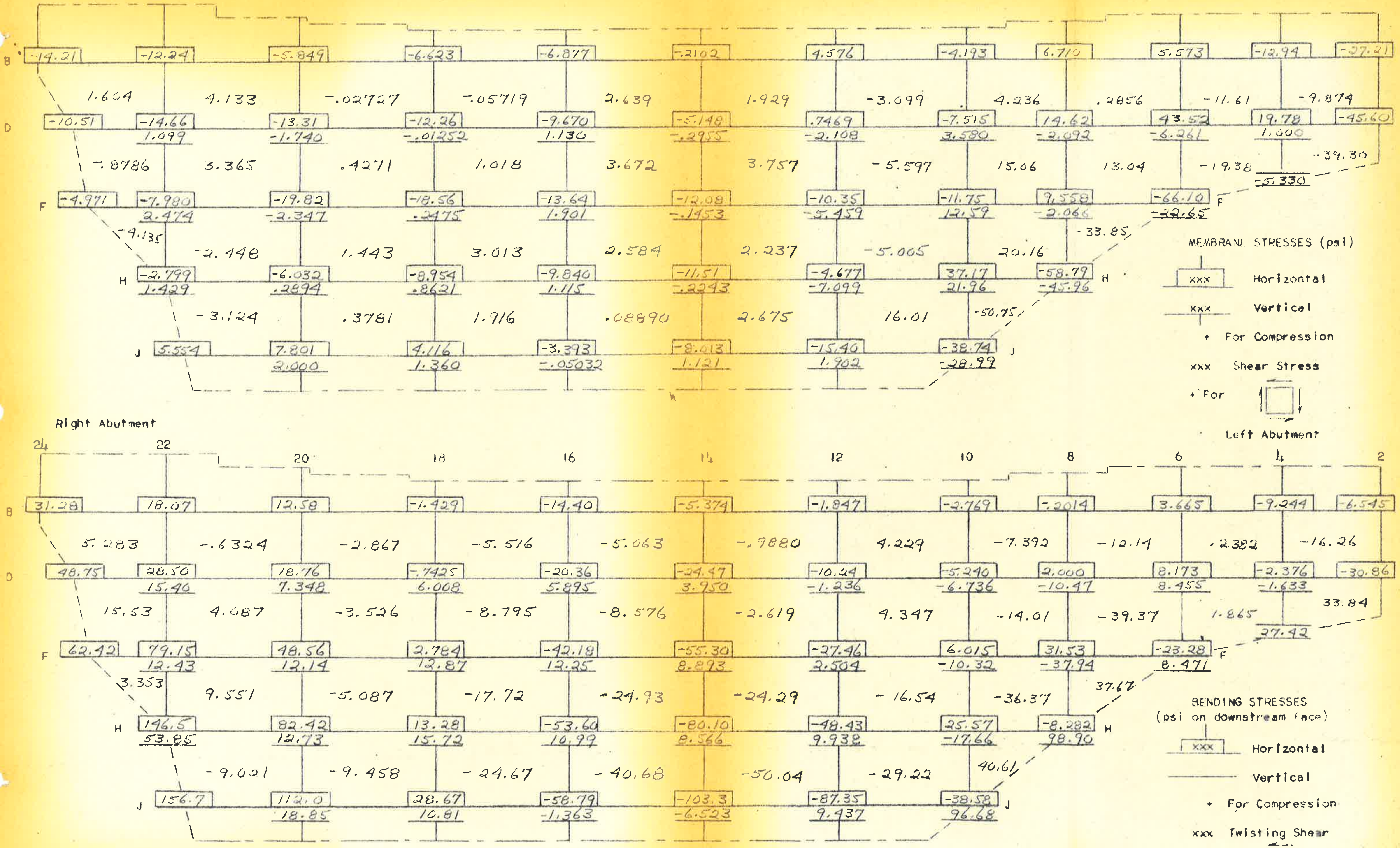
FIG. A-7





Load Condition L, Chemical Expansion: 0.1% of Weakened Section Above Elevation 1095

FIG. A-8

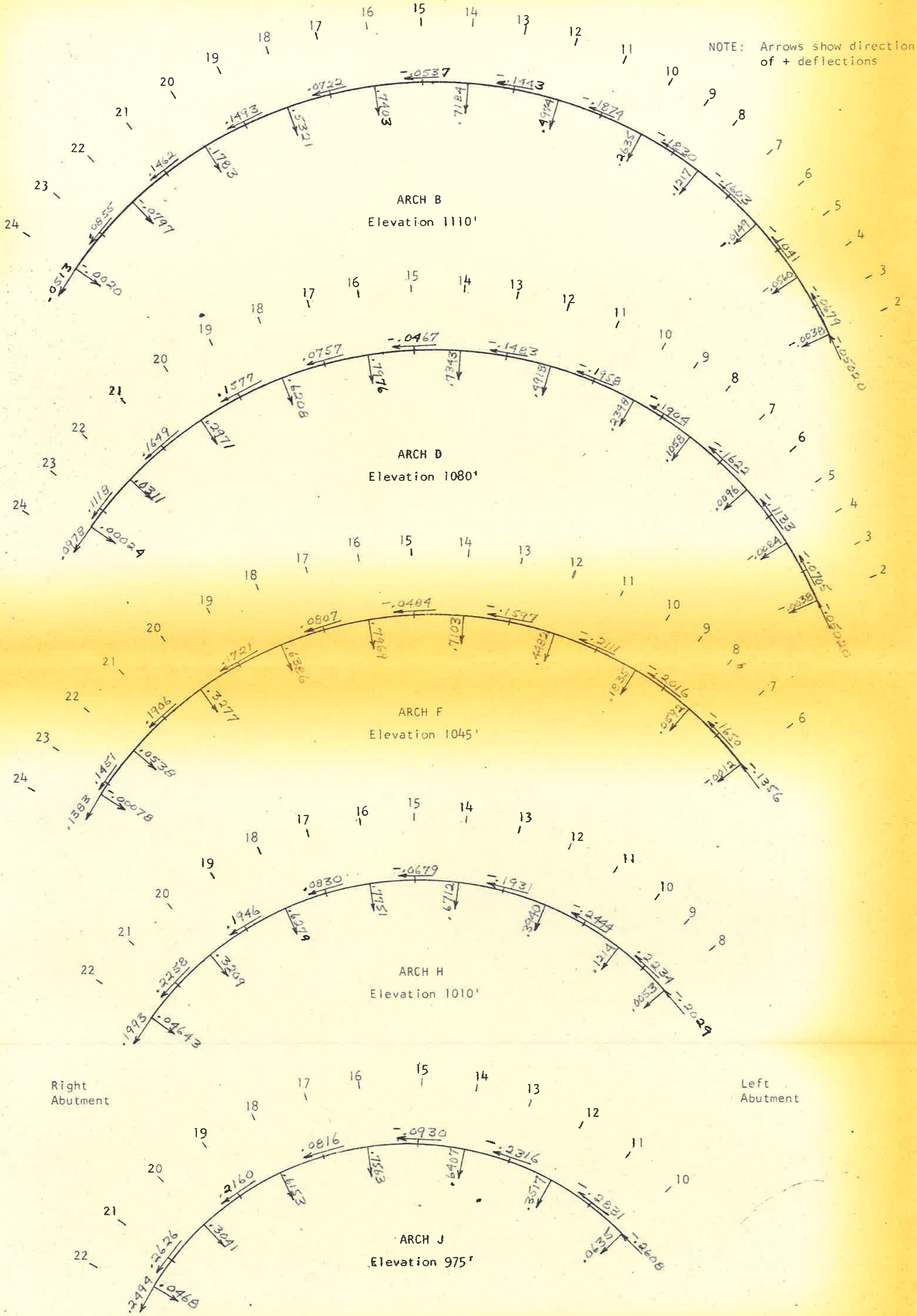


Load Condition M, Translation of the Left Abutment

FIG. A-9

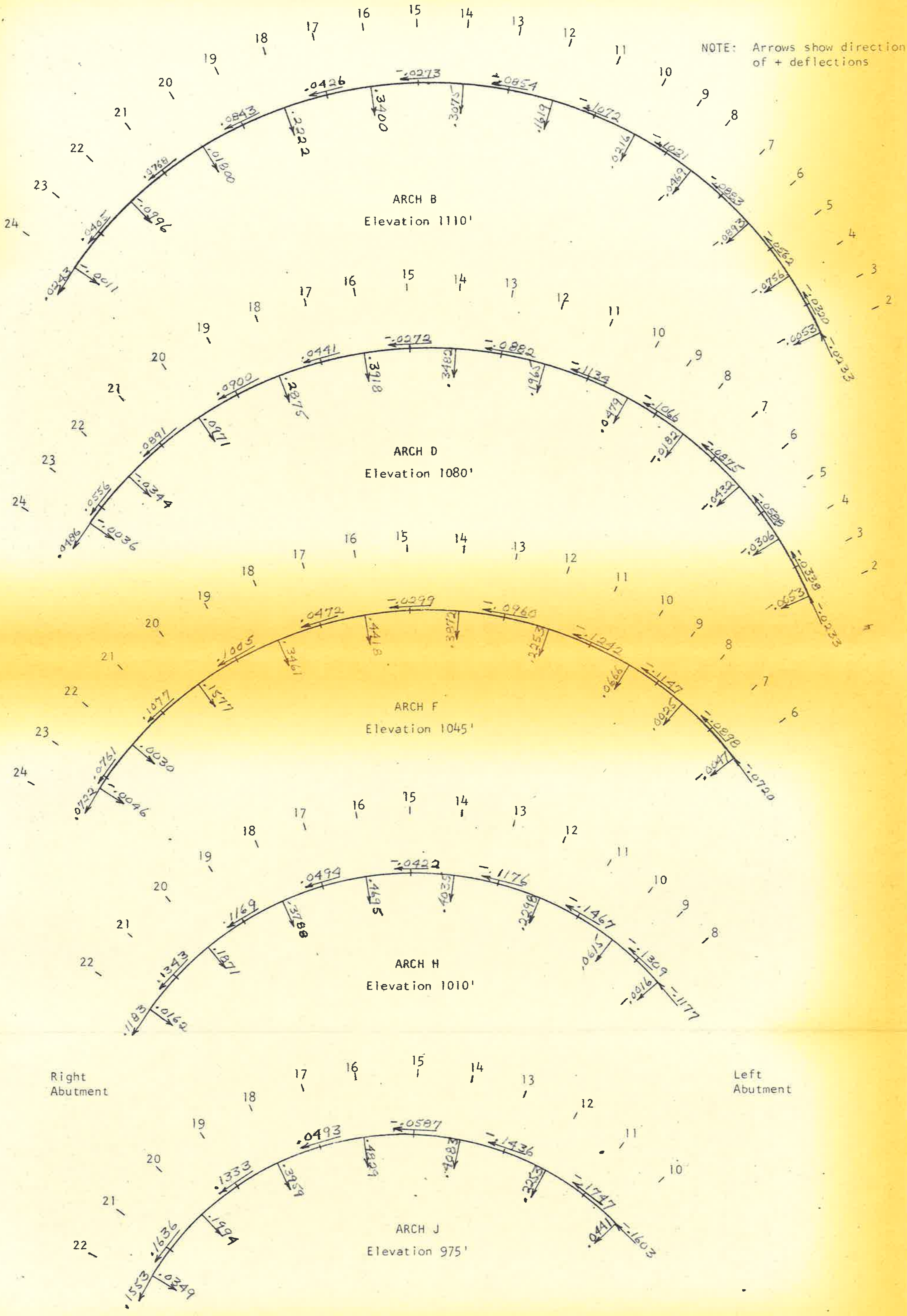
APPENDIX B

PHASE I. DEFLECTION RESULTS



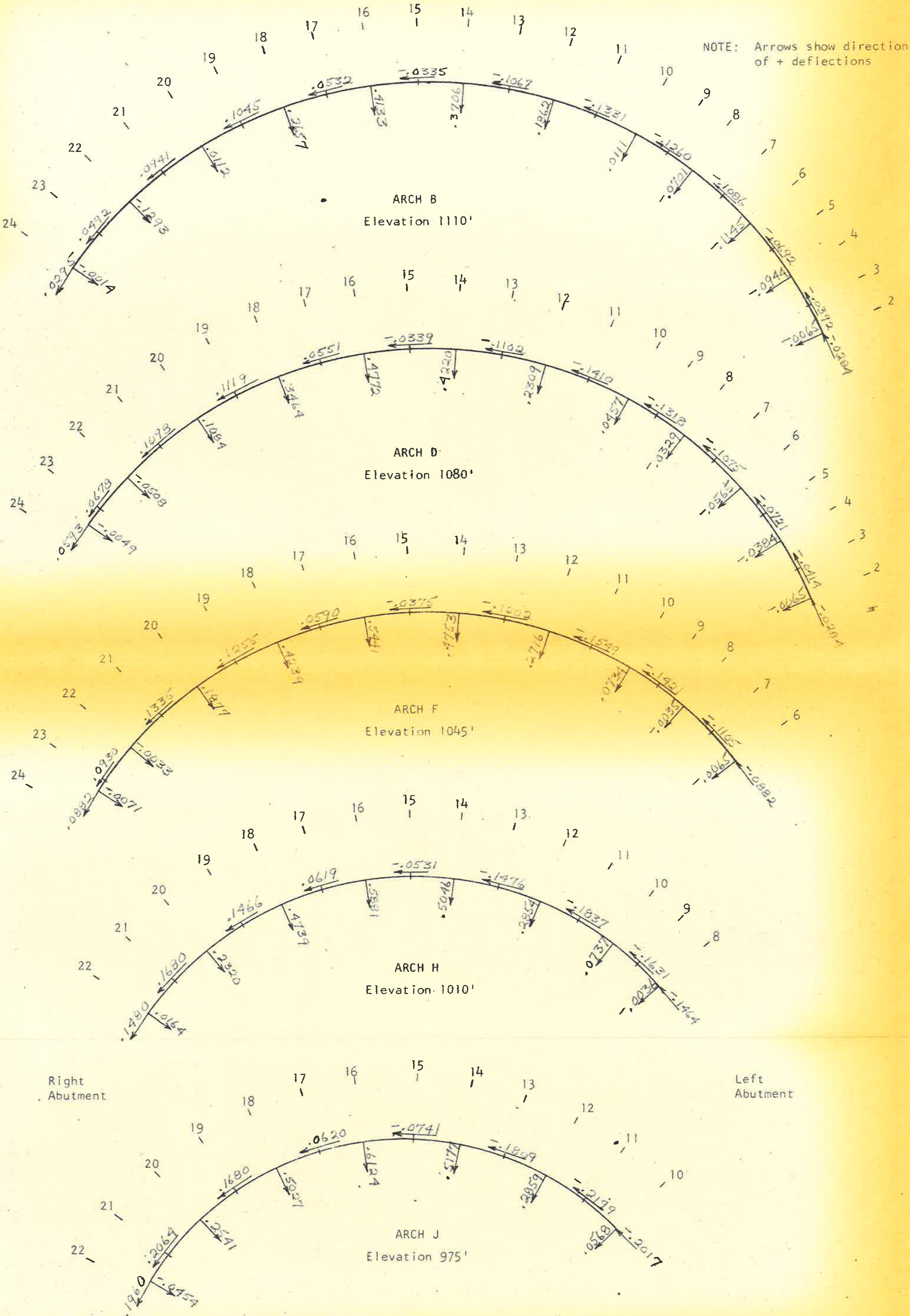
Load Condition A, Water Load Only. Elevation 1103

FIG. B-1



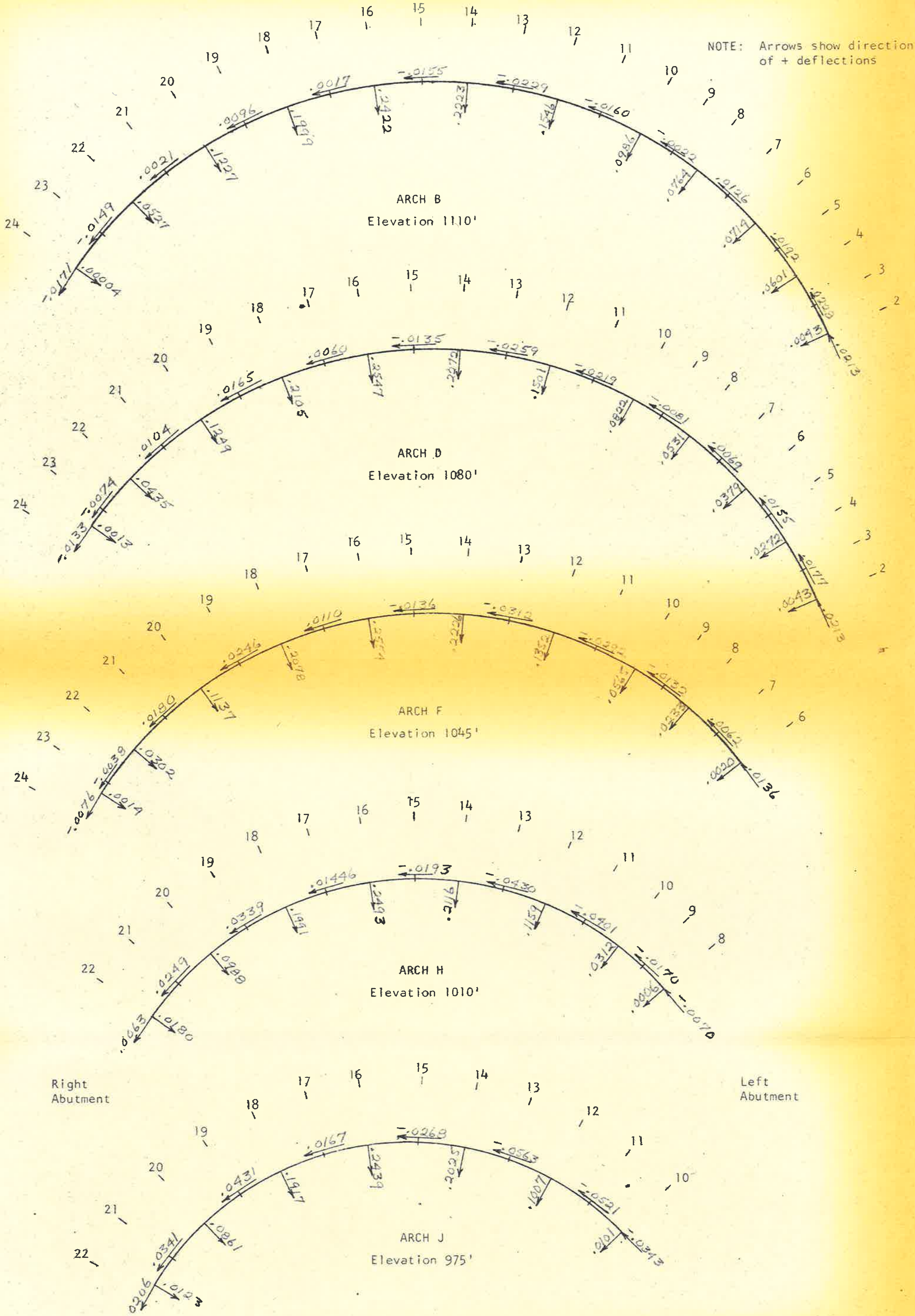
Load Condition B. Water Load Only. Elevation 1069

FIG. B-2



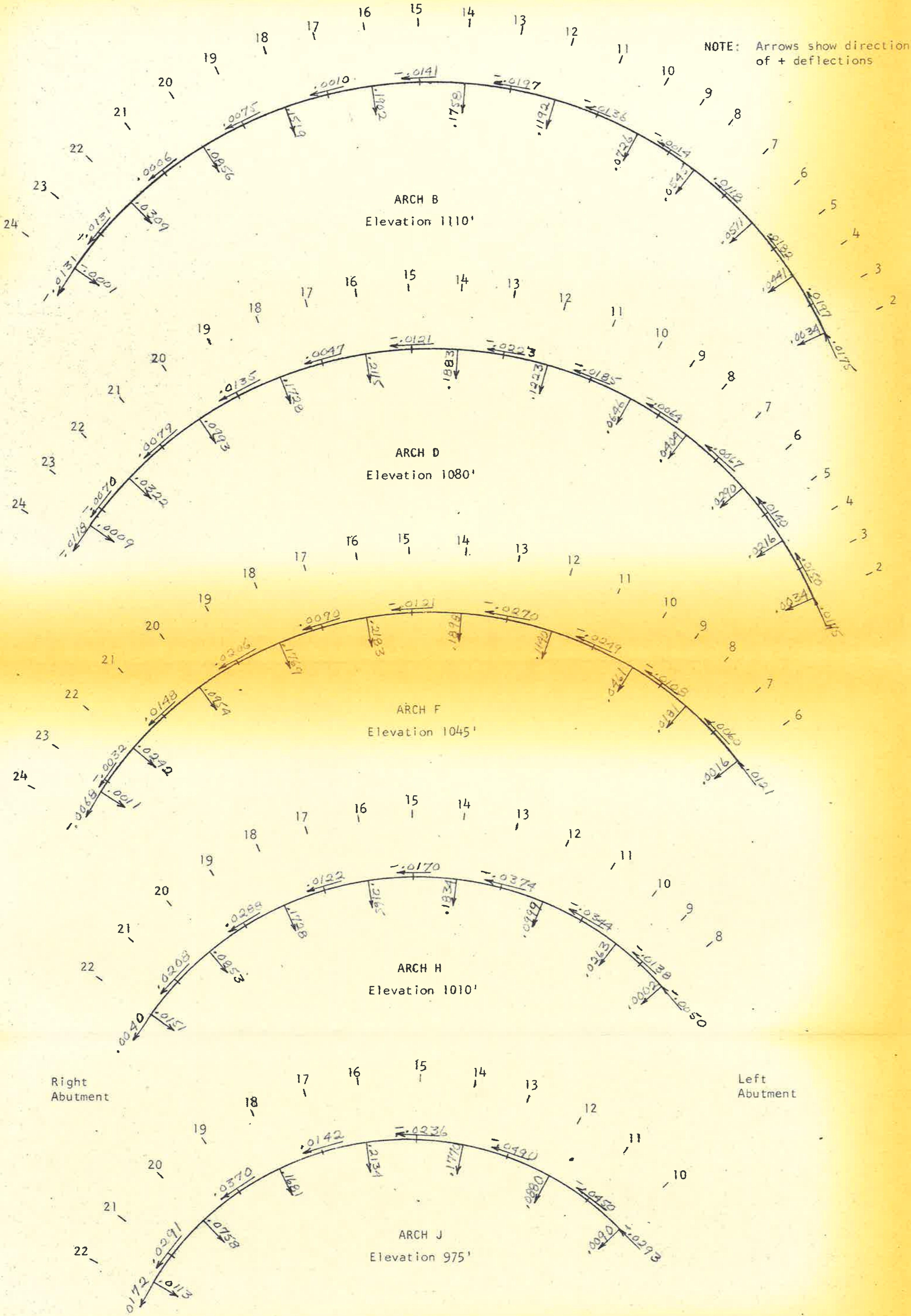
Load Condition B+E. Water Elevation 1069. Silt Elevation 1037

FIG. B-3



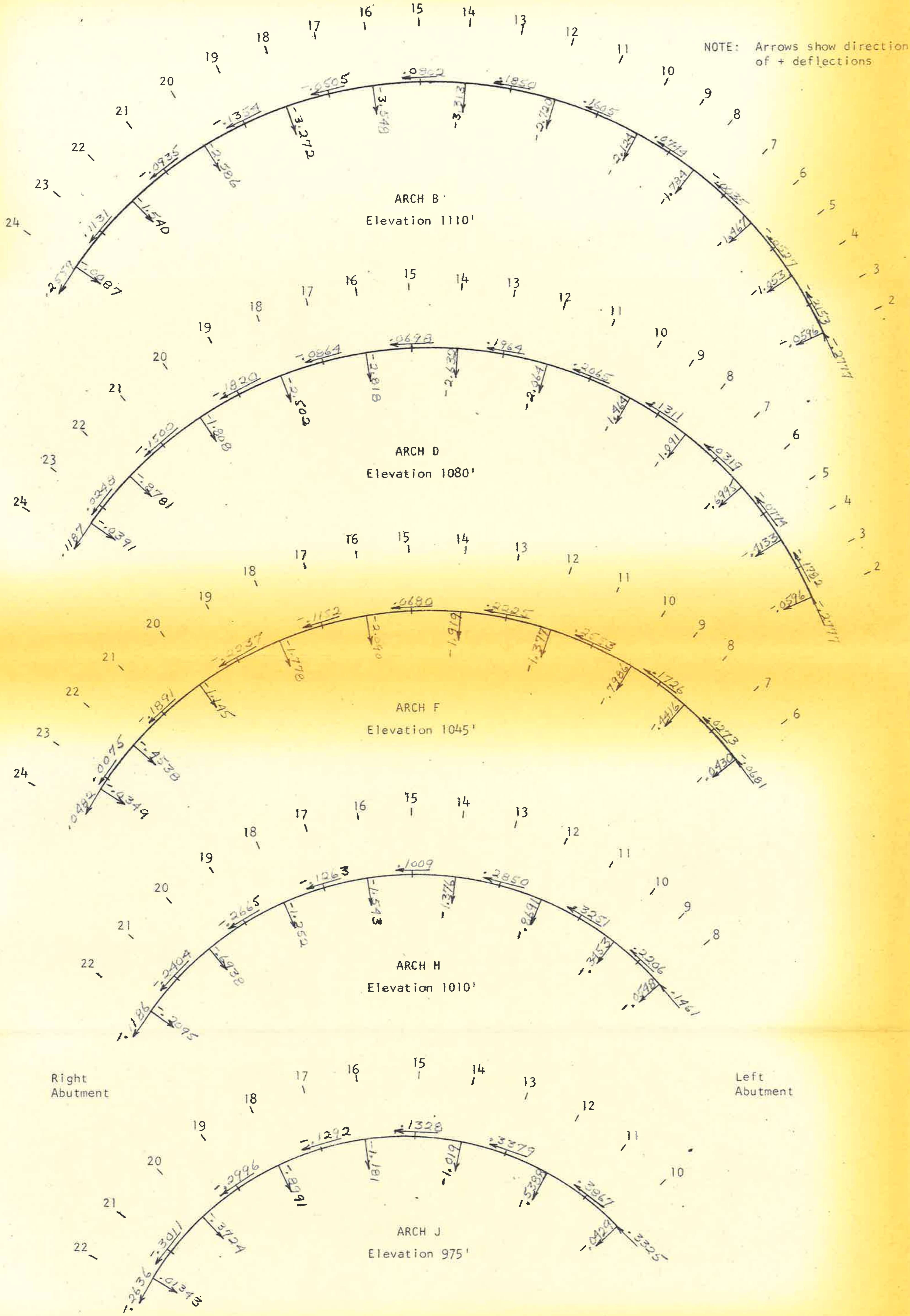
Load Condition G. Thermal Contraction Only. November 1957

FIG. B-4



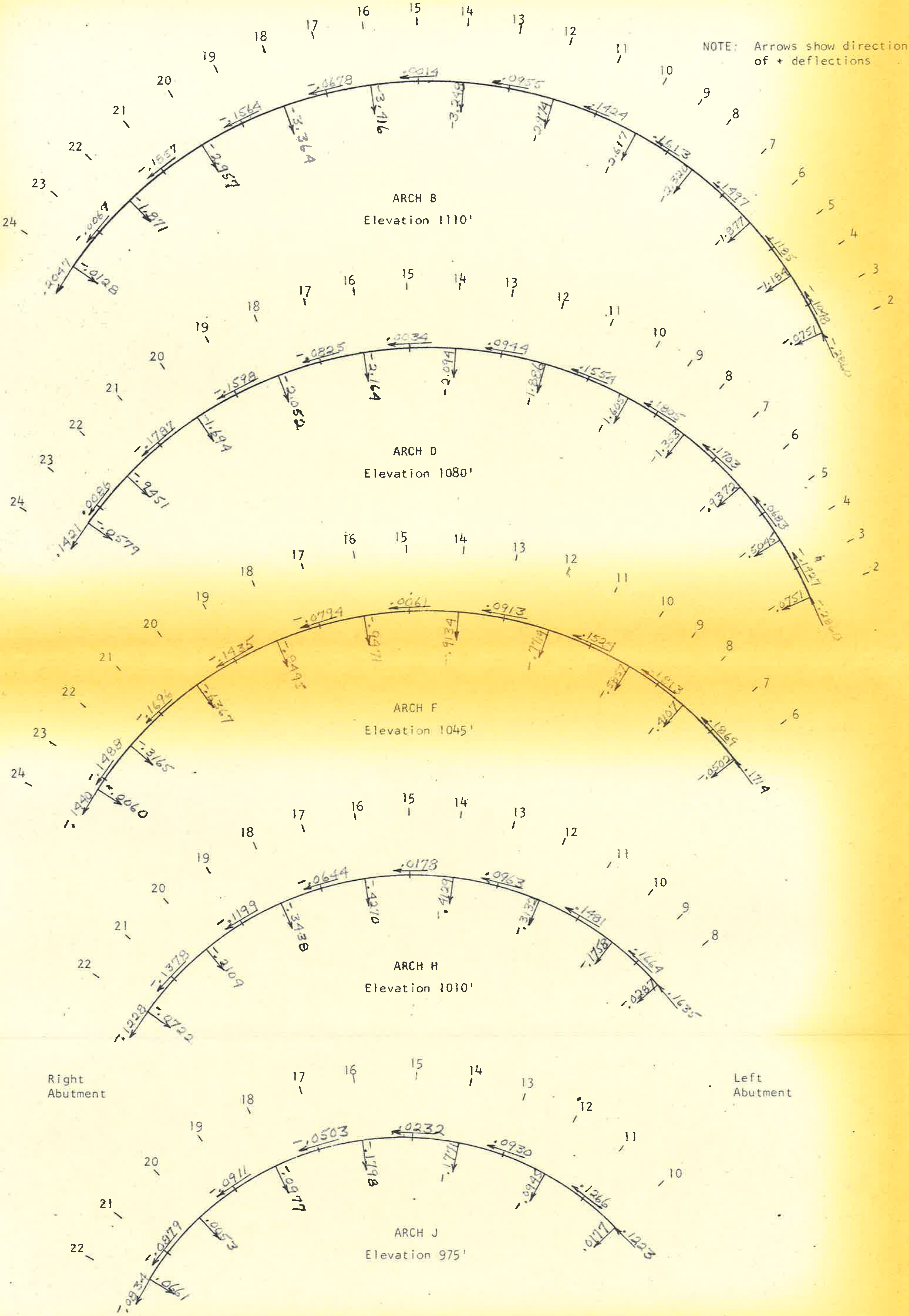
Load Condition H. Thermal Contraction Only. October 1964

FIG. B-5



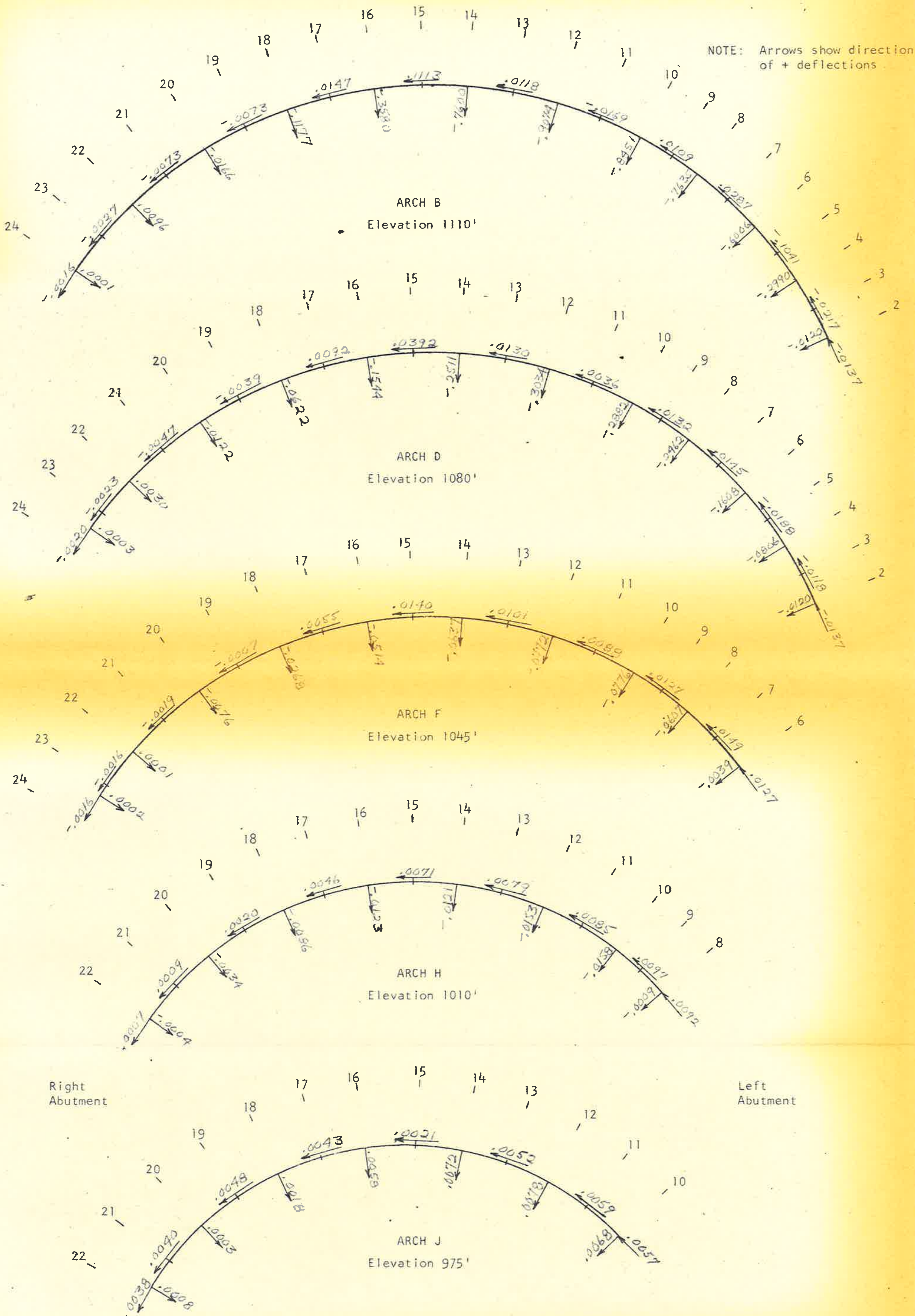
Load Condition J, Chemical Expansion: 0.1% Elevation 1125
0% Elevation 960

FIG. B-6



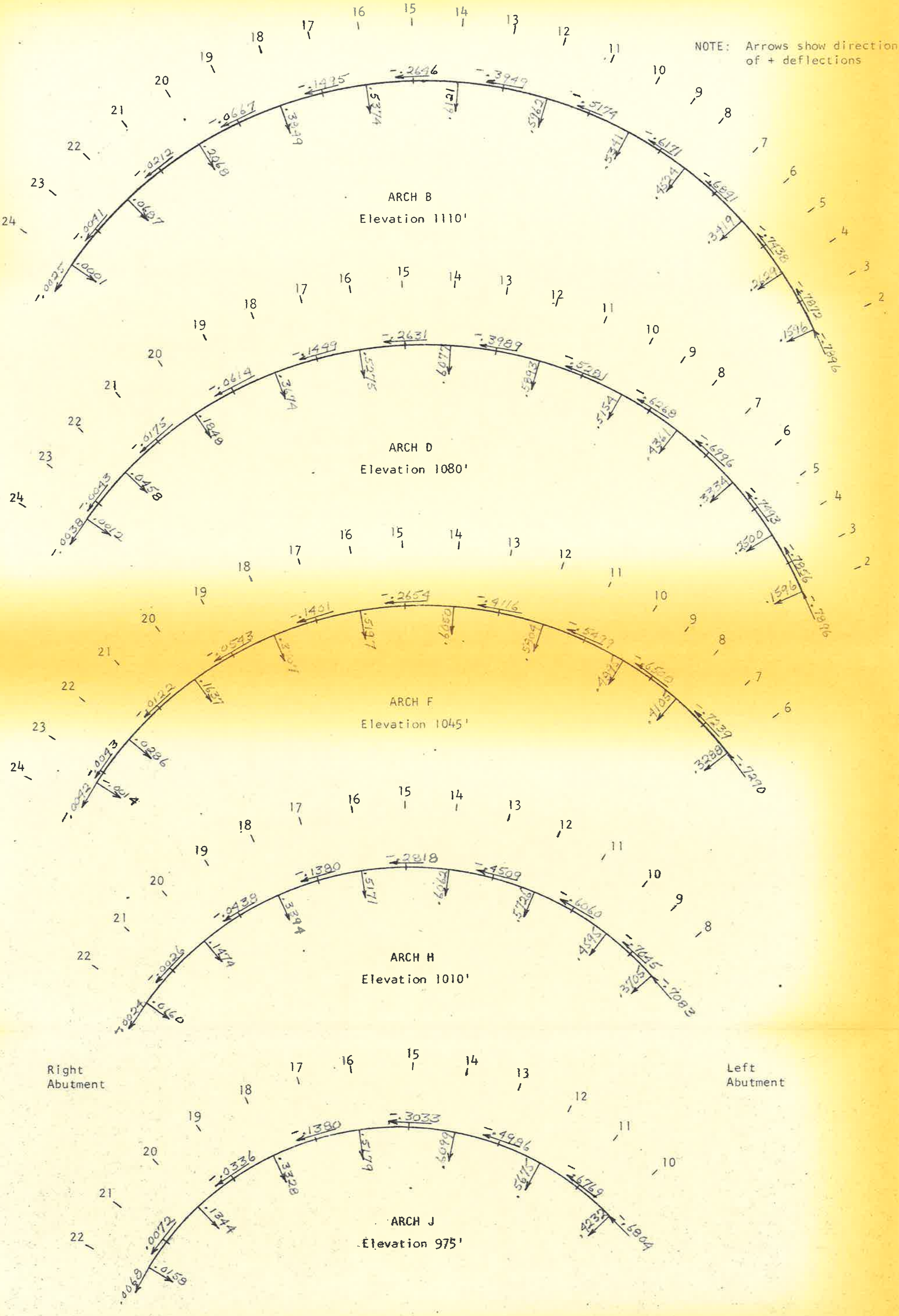
Load Condition K, Chemical Expansion: 0.1% Above Elevation 1062.5

FIG. B-7



Load Condition L. Chemical Expansion: 0.1% of Weakened Section Above Elevation 1095

FIG. B-8

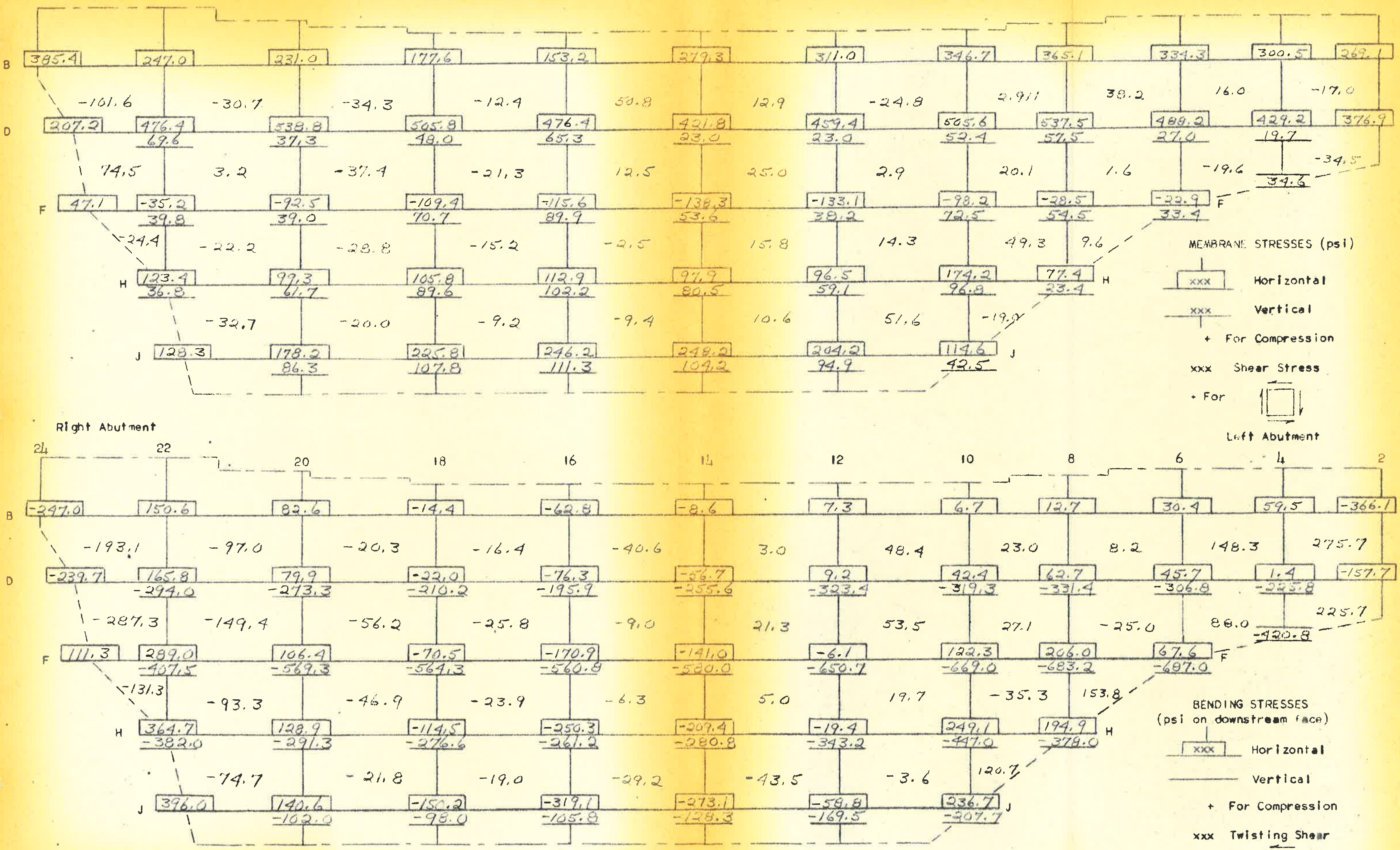


Load Condition M, Translation of the Left Abutment

FIG. B-9

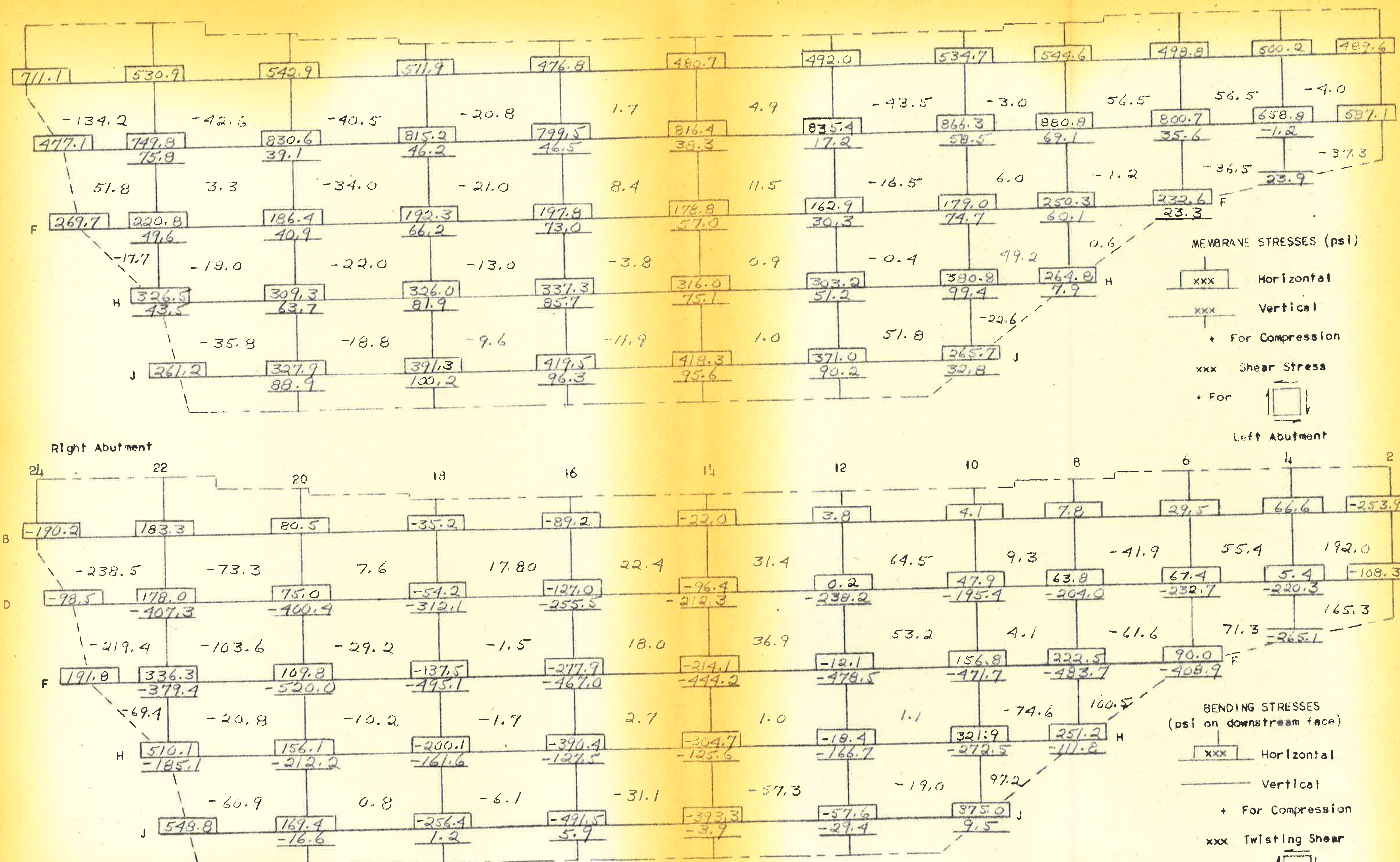
APPENDIX C

PHASE II. STRESS RESULTS



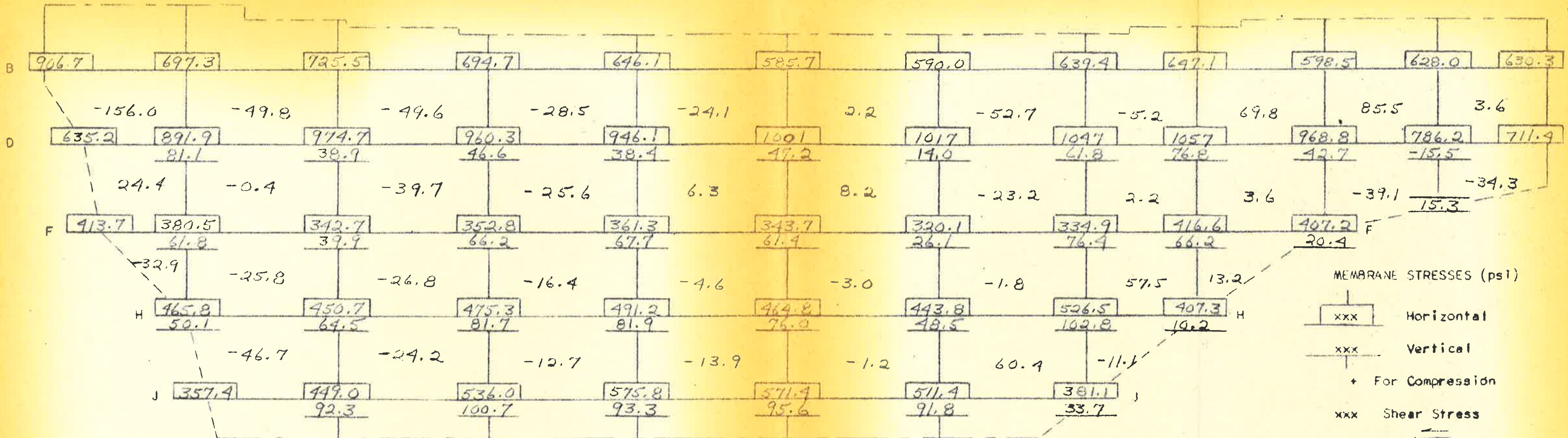
Load Condition R, Water Elevation 1069

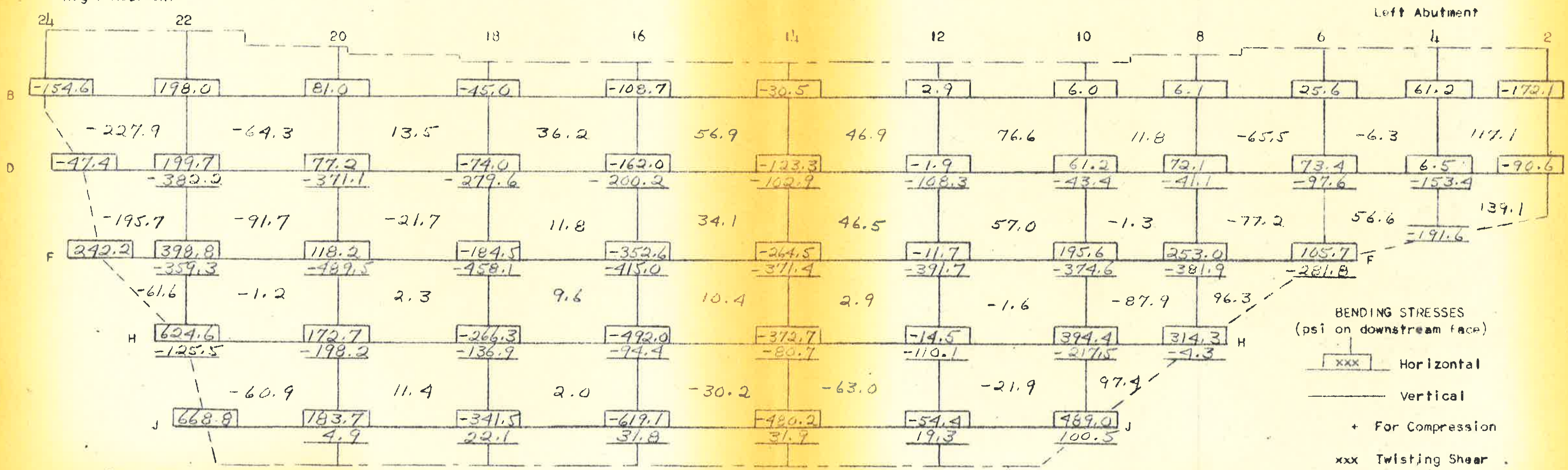
FIG. C-1



Load Condition S, Water Elevation 1125

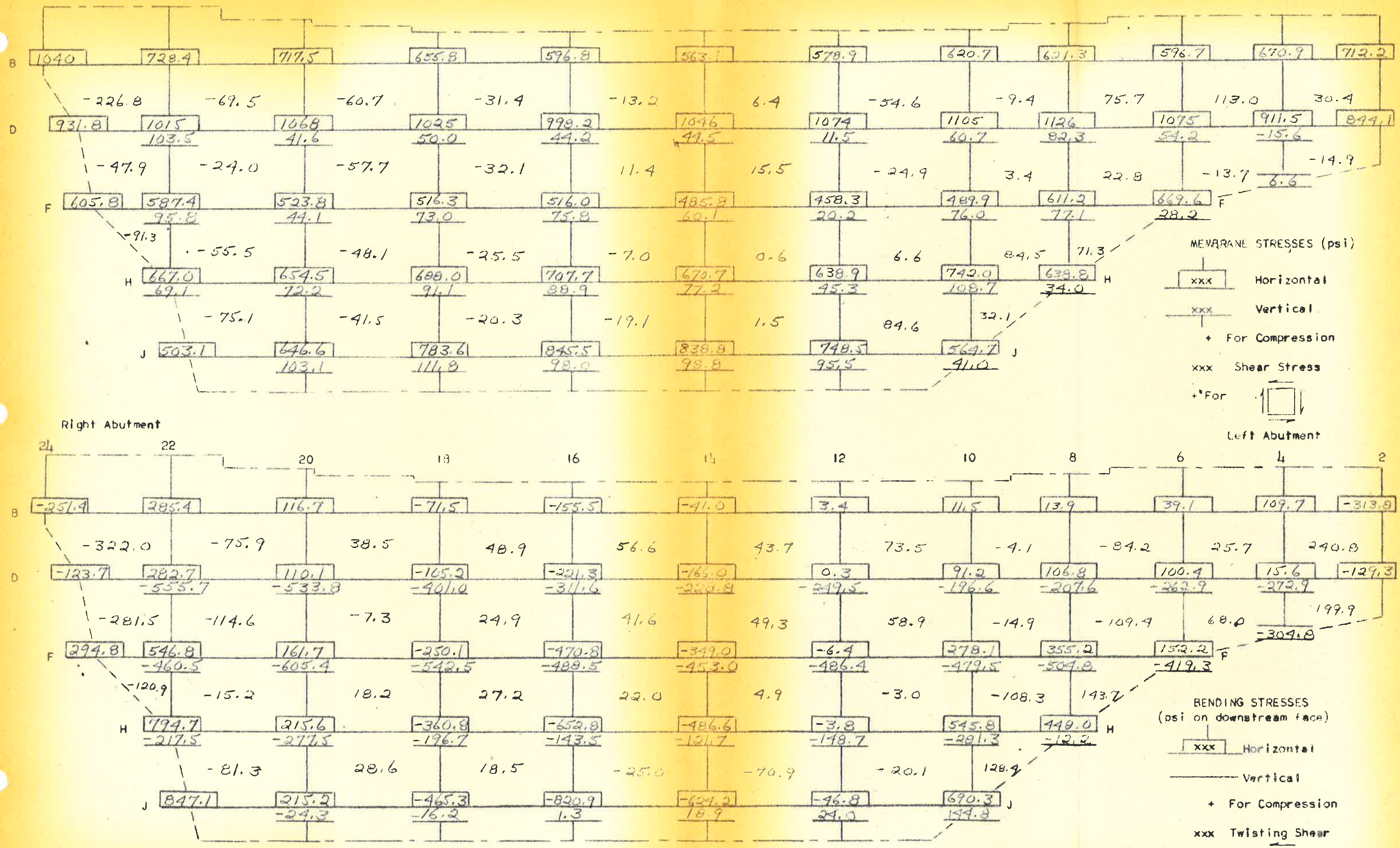
FIG. C-2





Load Condition T, Water Elevation 1138

FIG. C-3

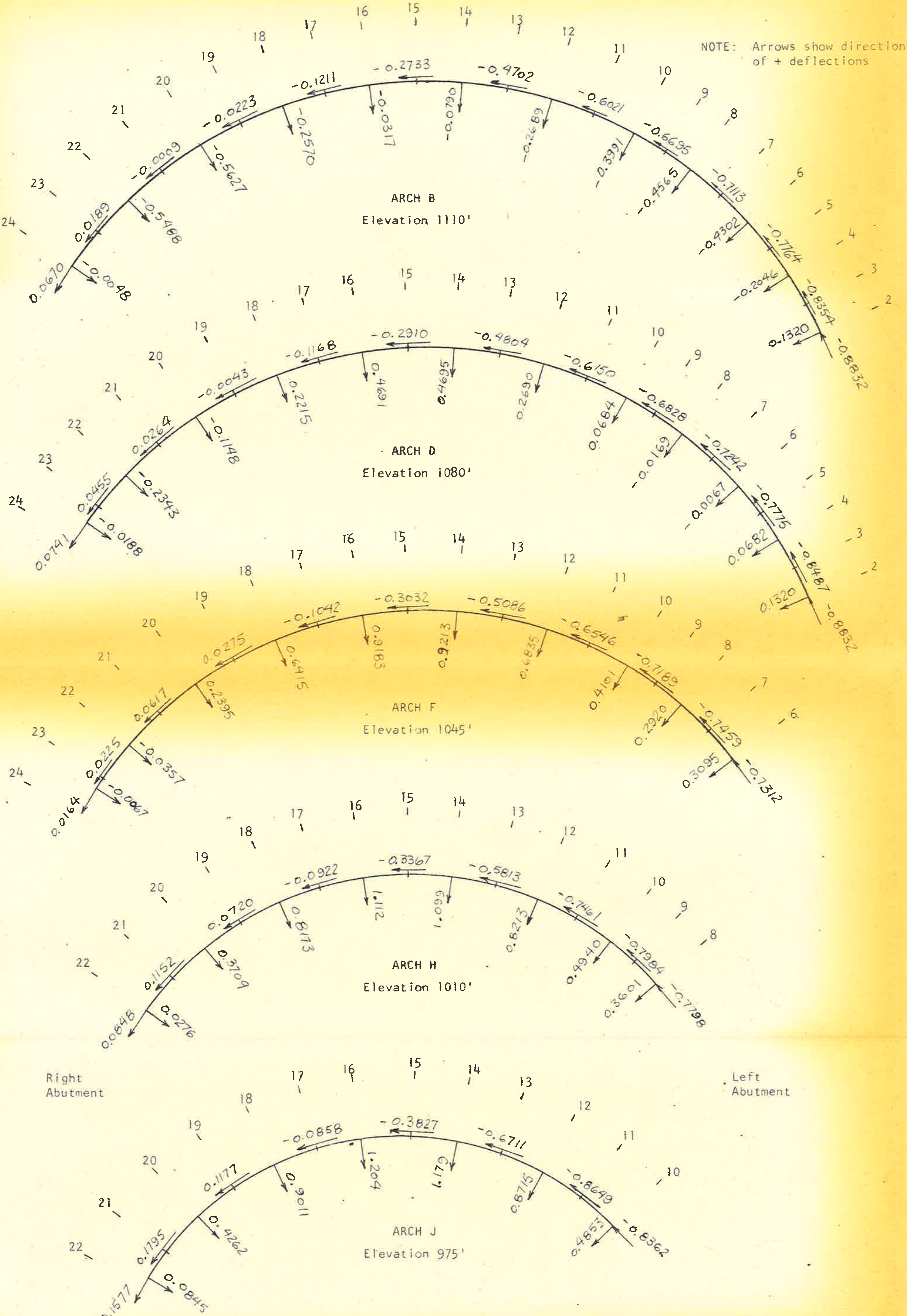


Load Condition U, Earthquake Condition, Water Elevation 1125, Silt Elevation 1037

FIG. G-4

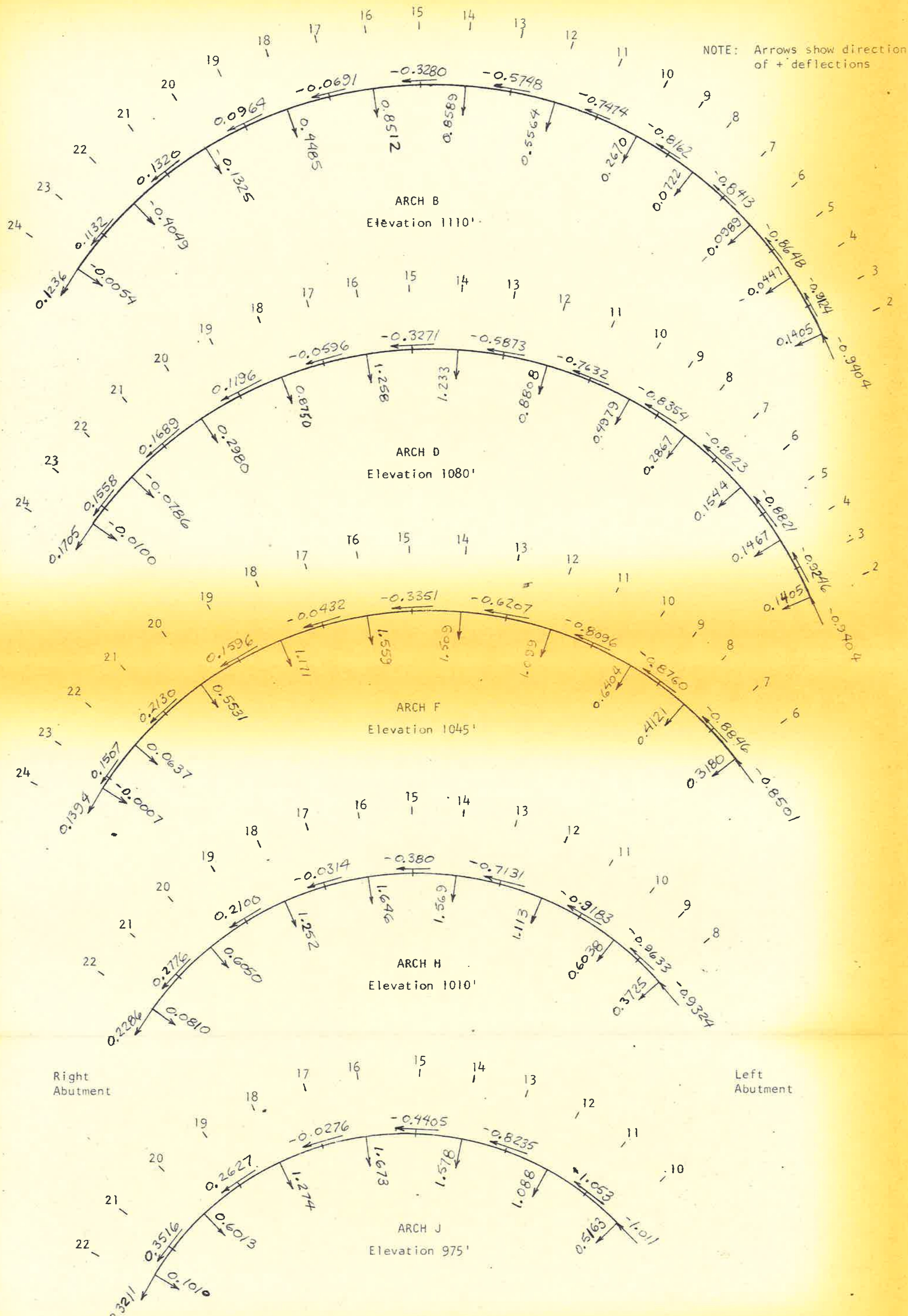
APPENDIX D

PHASE II. DEFLECTION RESULTS



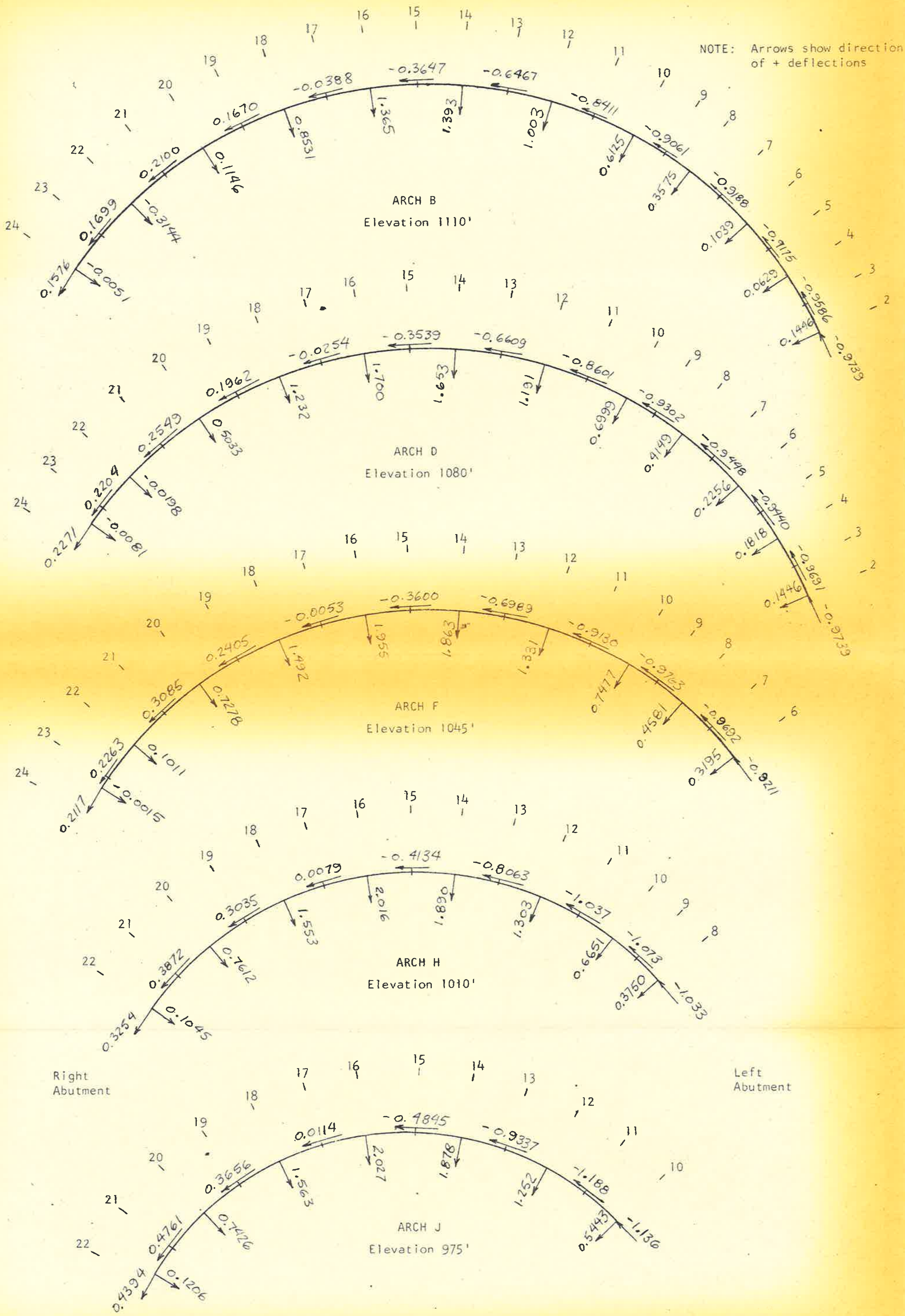
Load Condition R, Water Elevation 1069

FIG. D-1



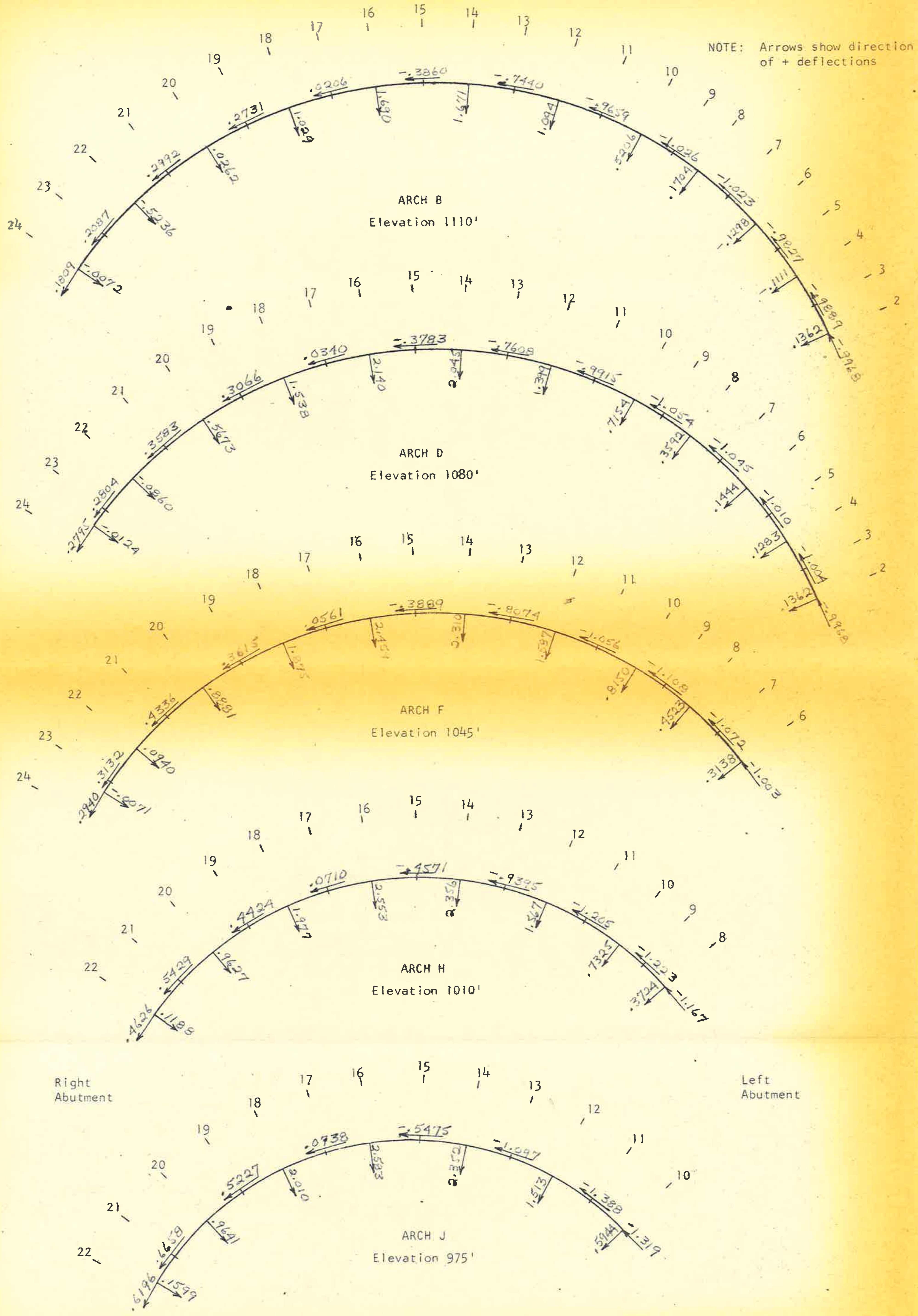
Load Condition S, Water Elevation 1125

FIG. D-2



Load Condition T, Water Elevation 1138

FIG. D-3



Load Condition U, Earthquake Condition, Water Elevation 1125, Silt Elevation 1037

FIG. D-4

APPENDIX E

PHASE II. PRINCIPAL STRESS RESULTS

TABLE E-1

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B 2	INTRADOS	89.7	-186.7	55.3	-97.0	0.	129.4
	EXTRADOS	667.3	-32.1	-12.4	635.2	0.	-146.3
B 4	INTRADOS	388.7	-28.8	15.2	360.0	0.	105.8
	EXTRADOS	281.2	-40.1	-20.7	241.0	0.	-106.2
B 6	INTRADOS	372.2	-7.5	8.1	364.7	0.	52.7
	EXTRADOS	306.0	-2.1	-4.8	303.8	0.	-25.6
B 8	INTRADOS	378.7	-0.9	2.7	377.8	0.	18.1
	EXTRADOS	352.4	-0.0	0.4	352.4	0.	2.5
B10	INTRADOS	353.9	-0.4	2.0	353.4	0.	12.4
	EXTRADOS	341.6	-1.6	-3.9	340.0	0.	-23.3
B12	INTRADOS	318.6	-0.3	1.8	318.3	0.	9.9
	EXTRADOS	304.5	-0.8	-3.0	303.7	0.	-15.8
B14	INTRADOS	270.9	-0.2	1.4	270.7	0.	6.5
	EXTRADOS	290.1	-2.2	5.0	287.9	0.	25.3

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B16	INTRADOS	90.7	-0.2	-3.0	90.4	0.	-4.7
	EXTRADOS	218.6	-2.6	6.2	216.0	0.	23.8
B18	INTRADOS	165.9	-2.6	-7.2	163.2	0.	-20.8
	EXTRADOS	192.0	-0.0	-0.7	192.0	0.	-2.5
B20	INTRADOS	320.1	-6.5	-8.1	313.6	0.	-45.5
	EXTRADOS	149.6	-1.1	5.0	148.4	0.	13.1
B22	INTRADOS	423.9	-26.3	-14.0	397.6	0.	-105.6
	EXTRADOS	110.5	-14.1	19.7	96.4	0.	39.5
B24	INTRADOS	232.0	-93.6	-32.4	138.4	0.	-147.3
	EXTRADOS	635.7	-3.3	4.1	632.4	0.	45.7
D 2	INTRADOS	359.8	-140.6	32.0	219.2	0.	225.0
	EXTRADOS	651.8	-117.2	-23.0	534.6	0.	-276.4
D 4	INTRADOS	473.5	-249.2	14.1	430.6	-206.3	170.7
	EXTRADOS	554.7	118.4	-32.6	427.8	245.3	-198.2

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D 6	INTRADOS	538.9	-285.0	4.5	533.9	-280.0	63.9
	EXTRADOS	459.2	316.9	-20.0	442.5	333.6	-45.8
D 8	INTRADOS	600.8	-274.8	1.6	600.2	-274.1	24.0
	EXTRADOS	475.5	388.1	4.9	474.8	388.7	7.4
D10	INTRADOS	549.8	-268.9	2.7	548.0	-267.1	38.3
	EXTRADOS	476.7	357.9	-19.7	463.2	371.5	-37.7
D12	INTRADOS	470.2	-302.3	2.6	468.6	-300.6	35.5
	EXTRADOS	457.1	339.4	-14.0	450.2	346.2	-27.6
D14	INTRADOS	365.7	-233.4	1.8	365.1	-232.8	19.0
	EXTRADOS	483.3	273.5	8.8	478.5	278.4	31.6
D16	INTRADOS	400.5	-131.3	-1.7	400.1	-130.8	-15.6
	EXTRADOS	555.9	257.9	5.9	552.7	261.0	30.3
D18	INTRADOS	488.6	-167.2	-4.9	483.8	-162.4	-56.0
	EXTRADOS	527.8	258.0	0.7	527.8	258.0	3.3

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D20	INTRADOS	631.5	-249.0	-6.9	618.7	-236.2	-105.5
	EXTRADOS	477.6	291.7	18.5	458.9	310.4	55.9
D22	INTRADOS	684.2	-266.6	-12.1	642.2	-224.6	-195.3
	EXTRADOS	507.1	166.9	49.5	310.6	363.4	168.1
D24	INTRADOS	238.0	-270.5	133.2	-32.5	0.	-253.7
	EXTRADOS	541.7	-94.8	22.7	446.9	0.	226.6
F 4	INTRADOS	39.6	-426.0	16.9	0.	-386.4	129.8
	EXTRADOS	520.4	-65.0	109.5	0.	455.4	-183.9
F 6	INTRADOS	47.4	-656.5	3.8	44.3	-653.4	46.3
	EXTRADOS	722.4	-94.0	93.5	-90.9	719.4	-49.6
F 8	INTRADOS	180.6	-631.8	3.6	177.5	-628.7	50.3
	EXTRADOS	737.8	-234.6	90.6	-234.5	737.7	-10.0
F10	INTRADOS	26.5	-598.6	3.5	24.1	-596.3	37.9
	EXTRADOS	741.7	-220.5	89.7	-220.4	741.7	5.4

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
F12	INTRADOS	-136.0	-615.4	4.7	-139.2	-612.2	39.4
	EXTRADOS	689.3	-127.1	90.7	-127.0	689.2	-10.4
F14	INTRADOS	-278.3	-527.6	3.6	-279.3	-526.6	15.4
	EXTRADOS	633.6	2.5	89.1	2.7	633.4	10.0
F16	INTRADOS	-283.7	-473.9	-7.0	-286.5	-471.1	-22.9
	EXTRADOS	650.7	55.1	89.1	55.3	650.5	9.6
F18	INTRADOS	-167.4	-505.8	-11.1	-179.9	-493.3	-63.9
	EXTRADOS	635.5	-39.1	88.9	-38.9	635.3	12.5
F20	INTRADOS	34.4	-550.6	-10.8	13.9	-530.1	-107.8
	EXTRADOS	613.7	-204.1	85.4	-198.9	608.5	65.1
F22	INTRADOS	291.4	-405.0	-13.5	253.7	-367.3	-157.6
	EXTRADOS	484.7	-361.3	77.9	-324.2	447.7	173.1
F24	INTRADOS	279.5	-121.5	-33.4	158.0	0.	-184.3
	EXTRADOS	204.2	-268.8	48.9	-64.6	0.	234.3

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H 8	INTRADOS	280.5	-362.7	6.6	272.0	-354.2	73.3
	EXTRADOS	402.0	-119.4	93.2	-117.8	400.4	-28.6
H10	INTRADOS	426.4	-353.6	3.6	423.3	-350.5	49.5
	EXTRADOS	543.5	-74.9	90.1	-74.9	543.5	-1.3
H12	INTRADOS	78.0	-285.0	2.8	77.1	-284.2	17.5
	EXTRADOS	405.0	113.0	84.3	115.8	402.2	28.7
H14	INTRADOS	-109.0	-202.2	-9.3	-111.5	-199.8	-14.9
	EXTRADOS	369.7	299.5	70.4	307.3	361.8	22.1
H16	INTRADOS	-117.5	-178.8	-34.7	-137.4	-158.9	-28.7
	EXTRADOS	373.9	352.8	45.4	363.2	363.5	10.5
H18	INTRADOS	2.5	-198.4	-13.7	-8.7	-187.1	-46.2
	EXTRADOS	366.7	219.7	86.3	220.3	366.1	9.6
H20	INTRADOS	243.5	-246.3	-10.2	228.2	-231.1	-85.1
	EXTRADOS	354.4	-32.4	85.1	-29.6	351.5	33.2

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H22	INTRADOS	505.7	-362.9	-8.3	487.8	-345.0	-123.6
	EXTRADOS	426.9	-249.5	83.8	-241.6	419.0	72.7
J10	INTRADOS	361.9	-175.8	8.1	351.3	-165.2	74.9
	EXTRADOS	254.3	-126.8	96.4	-122.1	249.6	-42.2
J12	INTRADOS	145.7	-74.9	2.0	145.4	-74.6	7.6
	EXTRADOS	318.4	209.0	45.4	263.0	264.4	54.6
J14	INTRADOS	11.2	-60.2	134.7	-24.9	-24.1	-35.7
	EXTRADOS	526.0	227.8	7.2	521.3	232.5	37.0
J16	INTRADOS	17.8	-85.2	110.2	-72.9	5.5	-33.4
	EXTRADOS	565.9	216.4	2.4	565.3	217.1	14.8
J18	INTRADOS	90.7	-5.3	-23.4	75.6	9.8	-34.9
	EXTRADOS	376.2	205.6	1.9	376.0	205.7	5.8
J20	INTRADOS	334.7	-31.6	-12.0	318.8	-15.7	-74.6
	EXTRADOS	191.4	34.5	81.9	37.6	188.3	21.9

WATER ELEV. 1069 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
J22	INTRADOS	545.5	-21.2	-11.1	524.3	0.	-107.4
	EXTRADOS	6.4	-274.1	81.3	-267.7	0.	42.0

TABLE E-2

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B 2	INTRADOS	268.6	-32.9	19.3	235.7	0.	94.0
	EXTRADOS	756.2	-12.7	-7.4	743.5	0.	-98.0
B 4	INTRADOS	576.5	-9.7	7.4	566.7	0.	75.0
	EXTRADOS	439.1	-5.4	-6.3	433.6	0.	-48.7
B 6	INTRADOS	530.2	-1.9	3.4	528.3	0.	31.6
	EXTRADOS	470.6	-1.3	3.0	469.3	0.	24.9
B 8	INTRADOS	552.5	-0.0	0.5	552.4	0.	5.2
	EXTRADOS	537.6	-0.9	2.3	536.8	0.	21.5
B10	INTRADOS	538.9	-0.1	0.7	538.8	0.	6.8
	EXTRADOS	532.3	-1.7	-3.2	530.6	0.	-30.1
B12	INTRADOS	496.2	-0.4	1.7	495.8	0.	14.3
	EXTRADOS	490.5	-2.3	-3.9	488.2	0.	-33.6
B14	INTRADOS	459.2	-0.5	1.9	458.7	0.	15.1
	EXTRADOS	502.9	-0.3	-1.3	502.6	0.	-11.8

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B16	INTRADOS	387.7	-0.1	0.8	387.6	0.	5.3
	EXTRADOS	566.4	-0.4	-1.5	566.0	0.	-14.8
B18	INTRADOS	476.9	-0.2	-1.1	476.7	0.	-9.0
	EXTRADOS	548.0	-0.9	-2.3	547.1	0.	-21.7
B20	INTRADOS	625.6	-2.2	-3.4	623.4	0.	-37.2
	EXTRADOS	462.5	-0.0	-0.5	462.4	0.	-4.3
B22	INTRADOS	734.5	-20.3	-9.4	714.2	0.	-122.1
	EXTRADOS	350.8	-3.2	5.5	347.6	0.	33.7
B24	INTRADOS	580.7	-59.8	-17.8	520.9	0.	-186.3
	EXTRADOS	904.3	-3.0	3.3	901.3	0.	52.2
D 2	INTRADOS	526.2	-47.4	16.7	478.8	0.	158.0
	EXTRADOS	748.5	-53.1	-14.9	695.4	0.	-199.3
D 4	INTRADOS	679.1	-236.5	7.3	664.2	-221.7	115.6
	EXTRADOS	687.4	184.8	-15.1	653.4	218.9	-126.3

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D 6	INTRADOS	868.6	-197.9	1.3	868.1	-197.3	24.6
	EXTRADOS	733.7	267.7	1.6	733.3	268.1	13.0
D 8	INTRADOS	944.6	-135.1	-0.4	944.6	-135.1	-8.0
	EXTRADOS	819.5	270.4	3.9	817.0	272.9	37.1
D10	INTRADOS	914.6	-137.4	1.0	914.2	-137.1	18.5
	EXTRADOS	822.2	249.8	-4.7	818.4	253.7	-47.0
D12	INTRADOS	836.8	-222.4	1.9	835.6	-221.2	35.6
	EXTRADOS	840.8	249.6	-5.6	835.2	255.2	-57.4
D14	INTRADOS	721.3	-175.4	2.2	720.0	-174.2	33.8
	EXTRADOS	913.4	249.7	-1.8	912.8	250.4	-20.5
D16	INTRADOS	672.5	-209.3	0.4	672.5	-209.2	6.2
	EXTRADOS	927.3	301.0	-2.0	926.5	301.8	-22.1
D18	INTRADOS	761.9	-267.0	-1.7	761.0	-266.1	-30.4
	EXTRADOS	870.9	356.6	-3.1	869.4	358.1	-27.7

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D20	INTRADOS	910.4	-366.3	-3.5	905.6	-361.5	-78.1
	EXTRADOS	757.0	437.9	3.8	755.6	439.3	21.2
D22	INTRADOS	955.6	-359.5	-8.4	927.8	-331.7	-189.1
	EXTRADOS	663.1	391.6	35.4	571.8	482.9	128.3
D24	INTRADOS	519.1	-140.6	-27.5	378.6	0.	-270.1
	EXTRADOS	631.4	-55.8	16.6	575.6	0.	187.8
F 4	INTRADOS	24.9	-266.3	17.0	0.	-241.4	81.4
	EXTRADOS	356.5	-67.5	113.5	0.	289.0	-155.2
F 6	INTRADOS	322.2	-385.4	0.2	322.2	-385.4	2.6
	EXTRADOS	432.8	140.6	94.3	142.2	431.2	-21.7
F 8	INTRADOS	472.8	-423.6	0.4	472.8	-423.6	5.8
	EXTRADOS	544.7	26.9	87.6	27.8	543.8	21.6
F10	INTRADOS	335.8	-396.8	0.4	335.8	-396.8	5.5
	EXTRADOS	547.0	21.8	88.5	22.2	546.6	13.7

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
F12	INTRADOS	151.6	-448.7	2.1	150.8	-447.9	21.9
	EXTRADOS	510.8	173.3	94.1	175.0	509.1	-24.2
F14	INTRADOS	-34.3	-388.5	3.1	-35.3	-387.5	18.9
	EXTRADOS	502.0	391.9	95.4	392.9	501.0	-10.4
F16	INTRADOS	-80.1	-394.3	-0.5	-80.1	-394.2	-3.0
	EXTRADOS	541.9	473.6	100.1	475.7	539.8	-11.7
F18	INTRADOS	57.1	-430.9	-3.9	54.8	-428.6	-33.1
	EXTRADOS	562.2	329.2	92.9	329.8	561.6	-11.9
F20	INTRADOS	300.6	-483.3	-4.3	296.2	-478.9	-58.6
	EXTRADOS	562.2	75.5	87.3	76.6	561.1	23.3
F22	INTRADOS	567.9	-340.2	-6.3	557.1	-329.4	-98.4
	EXTRADOS	450.1	-136.2	79.2	-115.5	429.4	108.2
F24	INTRADOS	493.9	-32.8	-14.5	461.1	0.	-127.4
	EXTRADOS	204.8	-127.3	38.3	77.5	0.	161.5

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H 8	INTRADOS	517.3	-105.1	2.9	515.7	-103.5	31.2
	EXTRADOS	119.2	12.8	86.2	13.3	118.7	7.0
H10	INTRADOS	703.2	-173.9	1.4	702.7	-173.4	20.7
	EXTRADOS	372.7	57.8	86.7	58.9	371.6	18.3
H12	INTRADOS	284.8	-115.7	-0.7	284.8	-115.6	-5.2
	EXTRADOS	330.6	208.8	15.8	321.6	217.8	31.9
H14	INTRADOS	20.0	-58.7	-19.4	11.3	-50.0	-24.7
	EXTRADOS	621.4	200.4	2.4	620.7	201.2	17.7
H16	INTRADOS	-27.9	-66.9	126.5	-53.1	-41.7	-18.6
	EXTRADOS	727.7	213.3	-0.1	727.7	213.3	-0.5
H18	INTRADOS	127.9	-81.8	-5.5	125.9	-79.8	-20.1
	EXTRADOS	526.6	242.9	-2.3	526.1	243.4	-11.5
H20	INTRADOS	468.9	-153.5	-4.3	465.4	-150.0	-46.4
	EXTRADOS	274.4	153.2	90.4	153.2	274.4	-0.9

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H22	INTRADOS	840.6	-145.7	-3.8	836.3	-141.4	-65.3
	EXTRADOS	229.8	-184.9	87.1	-183.9	228.8	20.6
J10	INTRADOS	645.5	37.5	5.1	640.7	42.3	53.7
	EXTRADOS	27.1	-113.7	100.2	-109.3	22.7	-24.6
J12	INTRADOS	313.9	60.2	-2.7	313.4	60.8	-11.7
	EXTRADOS	441.6	106.7	11.3	428.6	119.6	64.5
J14	INTRADOS	118.2	-1.5	118.1	25.0	91.7	-49.7
	EXTRADOS	813.7	97.4	3.1	811.6	99.5	38.8
J16	INTRADOS	107.1	-76.8	99.3	-72.0	102.2	-29.4
	EXTRADOS	911.1	90.3	0.5	911.0	90.4	7.9
J18	INTRADOS	141.9	94.5	-22.6	134.9	101.5	-16.8
	EXTRADOS	647.9	98.7	-1.2	647.7	98.9	-11.5
J20	INTRADOS	504.9	64.7	-7.5	497.3	72.3	-57.3
	EXTRADOS	158.6	105.3	3.0	158.5	105.5	2.8

WATER ELEV. 1125 + SILT ELEV. 1037 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
J22	INTRADOS	821.4	-11.4	-6.7	810.0	0.	-96.6
	EXTRADOS	2.2	-289.8	85.0	-287.6	0.	25.1

TABLE E-3

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B 2	INTRADOS	466.0	-7.8	7.4	458.2	0.	60.3
	EXTRADOS	806.4	-4.0	-4.0	802.4	0.	-56.8
B 4	INTRADOS	692.8	-3.6	4.1	689.2	0.	50.0
	EXTRADOS	566.9	-0.1	-0.6	566.8	0.	-5.4
B 6	INTRADOS	624.8	-0.7	1.9	624.1	0.	20.9
	EXTRADOS	578.5	-5.6	5.6	572.9	0.	56.7
B 8	INTRADOS	653.2	-0.0	0.2	653.2	0.	2.7
	EXTRADOS	642.4	-1.4	2.6	641.0	0.	29.6
B10	INTRADOS	645.5	-0.1	0.7	645.4	0.	7.6
	EXTRADOS	635.5	-2.1	-3.3	633.4	0.	-36.6
B12	INTRADOS	593.5	-0.6	1.8	592.9	0.	18.2
	EXTRADOS	590.3	-3.2	-4.2	587.1	0.	-43.5
B14	INTRADOS	556.0	-0.8	2.1	555.2	0.	20.5
	EXTRADOS	617.8	-1.6	-2.9	616.2	0.	-31.4

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
B16	INTRADOS	537.6	-0.2	1.1	537.4	0.	10.2
	EXTRADOS	756.6	-1.8	-2.8	754.8	0.	-36.4
B18	INTRADOS	649.7	-0.1	-0.6	649.6	0.	-7.1
	EXTRADOS	741.1	-1.4	-2.5	739.7	0.	-32.0
B20	INTRADOS	808.3	-1.7	-2.7	806.5	0.	-37.5
	EXTRADOS	644.7	-0.2	-1.1	644.4	0.	-12.2
B22	INTRADOS	912.3	-17.0	-7.8	895.3	0.	-124.5
	EXTRADOS	500.2	-0.9	2.5	499.3	0.	21.6
B24	INTRADOS	798.3	-46.2	-13.5	752.1	0.	-191.9
	EXTRADOS	1062.5	-1.2	1.9	1061.3	0.	35.9
D 2	INTRADOS	640.6	-19.8	10.0	620.7	0.	112.7
	EXTRADOS	826.9	-24.9	-9.8	802.0	0.	-143.5
D 4	INTRADOS	799.4	-175.8	4.8	792.7	-169.1	80.5
	EXTRADOS	787.9	129.6	-6.4	779.7	137.7	-72.7

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D 6	INTRADOS	1042.3	-55.1	0.4	1042.2	-55.1	6.8
	EXTRADOS	899.1	136.4	4.0	895.4	140.1	53.0
D 8	INTRADOS	1129.3	35.3	-0.8	1129.1	35.5	-15.5
	EXTRADOS	987.9	114.7	3.3	984.9	117.7	50.6
D10	INTRADOS	1108.4	18.0	0.9	1108.2	18.2	16.3
	EXTRADOS	989.3	101.5	-3.6	985.8	105.0	-55.8
D12	INTRADOS	1016.6	-96.0	2.1	1015.1	-94.5	40.4
	EXTRADOS	1024.8	116.2	-4.6	1018.9	122.1	-73.2
D14	INTRADOS	879.8	-58.0	2.7	877.7	-55.9	44.3
	EXTRADOS	1126.7	147.5	-2.8	1124.3	149.9	-47.9
D16	INTRADOS	784.4	-162.3	1.0	784.1	-162.0	16.8
	EXTRADOS	1111.3	235.2	-3.5	1108.1	238.4	-52.7
D18	INTRADOS	886.9	-233.8	-1.3	886.3	-233.2	-25.9
	EXTRADOS	1037.3	323.1	-3.7	1034.3	326.0	-45.8

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
D20	INTRADOS	1056.1	-336.6	-3.1	1051.9	-332.4	-75.9
	EXTRADOS	897.5	409.7	0.7	897.4	409.8	6.2
D22	INTRADOS	1117.1	-326.8	-7.6	1091.6	-301.3	-190.4
	EXTRADOS	729.3	426.0	20.5	692.2	463.1	99.4
D24	INTRADOS	698.2	-110.4	-21.7	587.8	0.	-277.6
	EXTRADOS	712.5	-29.9	11.6	682.6	0.	146.0
F 4	INTRADOS	19.1	-195.6	17.4	0.	-176.5	61.1
	EXTRADOS	273.2	-66.3	116.2	0.	206.9	-134.5
F 6	INTRADOS	512.5	-261.2	-0.4	512.5	-261.2	-5.1
	EXTRADOS	305.4	296.9	134.7	301.1	301.2	-4.3
F 8	INTRADOS	669.6	-315.7	0.1	669.6	-315.7	1.6
	EXTRADOS	452.7	159.0	82.8	163.6	448.1	36.7
F10	INTRADOS	530.5	-298.0	0.0	530.5	-298.0	0.2
	EXTRADOS	452.1	138.4	86.9	139.3	451.2	17.1

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
F12	INTRADOS	309.0	-366.0	1.8	308.4	-365.3	21.3
	EXTRADOS	428.2	321.7	107.9	331.8	418.1	-31.2
F14	INTRADOS	80.8	-311.8	3.7	79.2	-310.1	25.2
	EXTRADOS	610.9	429.9	-7.0	608.2	432.5	-21.8
F16	INTRADOS	8.8	-347.7	1.0	8.7	-347.5	6.4
	EXTRADOS	716.9	479.5	-6.5	713.9	482.5	-26.5
F18	INTRADOS	169.6	-392.9	-2.7	168.3	-391.6	-26.6
	EXTRADOS	559.3	502.6	-38.5	537.3	524.6	-27.6
F20	INTRADOS	463.8	-452.3	-3.2	460.9	-449.4	-51.3
	EXTRADOS	529.7	224.4	89.1	224.5	529.6	4.9
F22	INTRADOS	787.8	-305.6	-5.1	779.3	-297.1	-96.2
	EXTRADOS	435.2	-32.0	80.1	-18.3	421.5	78.9
F24	INTRADOS	681.4	-25.9	-11.0	655.5	0.	-132.9
	EXTRADOS	236.6	-65.5	27.7	171.1	0.	124.4

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H 8	INTRADOS	722.9	4.7	2.7	721.3	6.3	33.7
	EXTRADOS	99.8	6.4	16.1	92.7	13.5	24.8
H10	INTRADOS	921.4	-115.5	1.3	920.9	-115.0	22.7
	EXTRADOS	324.6	127.5	81.2	132.1	320.0	29.8
H12	INTRADOS	429.4	-61.8	-0.9	429.3	-61.7	-7.3
	EXTRADOS	462.2	154.6	6.5	458.3	158.5	34.5
H14	INTRADOS	98.5	-10.6	-14.0	92.1	-4.2	-25.7
	EXTRADOS	837.8	156.9	1.2	837.5	157.2	14.3
H16	INTRADOS	8.5	-21.7	-33.7	-0.8	-12.4	-14.0
	EXTRADOS	983.3	176.3	-0.7	983.2	176.4	-9.8
H18	INTRADOS	209.7	-56.0	-3.0	209.0	-55.3	-13.7
	EXTRADOS	742.9	217.2	-2.9	741.6	218.5	-26.3
H20	INTRADOS	625.8	-137.6	-3.2	623.4	-135.2	-43.0
	EXTRADOS	290.2	249.0	-33.0	278.0	261.2	-18.8

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
H22	INTRADOS	1093.6	-78.7	-3.1	1090.1	-75.2	-64.0
	EXTRADOS	175.8	-159.1	90.3	-159.1	175.8	-1.6
J10	INTRADOS	875.3	129.0	4.8	870.1	134.2	62.4
	EXTRADOS	-63.5	-111.8	106.4	-107.9	-67.4	-13.1
J12	INTRADOS	457.5	110.7	-2.1	457.0	111.1	-12.9
	EXTRADOS	576.1	62.1	8.1	565.8	72.5	72.0
J14	INTRADOS	166.5	52.2	125.7	91.2	127.5	-54.2
	EXTRADOS	1053.1	62.2	2.3	1051.6	63.7	39.1
J16	INTRADOS	129.4	-47.7	99.0	-43.3	125.1	-27.4
	EXTRADOS	1194.9	61.5	0.0	1194.9	61.5	0.9
J18	INTRADOS	196.4	120.9	-9.0	194.5	122.8	-11.7
	EXTRADOS	878.3	77.9	-1.8	877.5	78.6	-25.1
J20	INTRADOS	639.4	90.6	-6.3	632.7	97.2	-60.2
	EXTRADOS	265.9	86.7	-3.4	265.3	87.3	-10.7

WATER ELEV. 1138 + SILT ELEV. 1069 + MAX. TEMP. COND.

		SMAX	SMIN	THETA	SX	SY	TAU
J22	INTRADOS	1037.4	-11.2	-5.9	1026.2	0.	-107.6
	EXTRADOS	0.6	-312.0	87.4	-311.4	0.	14.2

TABLE E-4

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
B 2	INTRADOS	440.2	-41.8	17.1	398.4	0.	135.6
	EXTRADOS	1036.7	-10.7	-5.8	1026.0	0.	-105.2
B 4	INTRADOS	793.8	-13.2	7.4	780.6	0.	102.5
	EXTRADOS	562.9	-1.7	-3.1	561.2	0.	-30.8
B 6	INTRADOS	637.5	-1.7	2.9	635.8	0.	32.5
	EXTRADOS	564.4	-6.8	6.3	557.6	0.	61.8
B 8	INTRADOS	635.2	-0.0	-0.5	635.2	0.	-5.5
	EXTRADOS	609.8	-2.4	3.6	607.4	0.	38.6
B10	INTRADOS	632.2	-0.0	0.1	632.2	0.	1.3
	EXTRADOS	611.1	-1.8	-3.1	609.2	0.	-33.4
B12	INTRADOS	582.9	-0.5	1.7	582.3	0.	17.3
	EXTRADOS	578.4	-3.0	-4.1	575.5	0.	-41.4
B14	INTRADOS	523.1	-1.0	2.6	522.1	0.	23.4
	EXTRADOS	605.3	-1.2	-2.5	604.1	0.	-26.8

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
B16	INTRADOS	441.8	-0.5	2.0	441.3	0.	15.2
	EXTRADOS	754.2	-1.9	-2.8	752.3	0.	-37.5
B18	INTRADOS	584.3	-0.0	-0.1	584.3	0.	-1.2
	EXTRADOS	730.0	-2.8	-3.5	727.3	0.	-44.9
B20	INTRADOS	836.3	-2.1	-2.9	834.2	0.	-41.9
	EXTRADOS	601.7	-0.9	-2.2	600.8	0.	-23.2
B22	INTRADOS	1042.7	-28.9	-9.4	1013.8	0.	-173.5
	EXTRADOS	444.5	-1.5	3.3	443.0	0.	25.4
B24	INTRADOS	874.7	-86.1	-17.4	788.6	0.	-274.4
	EXTRADOS	1293.2	-1.8	2.1	1291.4	0.	47.6
D 2	INTRADOS	781.4	-66.6	16.3	714.8	0.	228.1
	EXTRADOS	1017.9	-44.4	-11.8	973.4	0.	-212.6
D 4	INTRADOS	948.4	-310.0	7.5	927.1	-288.7	162.3
	EXTRADOS	912.7	240.3	-9.1	895.9	257.1	-104.9

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
D 6	INTRADOS	1175.8	-209.3	1.0	1175.4	-208.9	24.5
	EXTRADOS	982.9	308.6	6.4	974.6	316.9	74.4
D 8	INTRADOS	1233.5	-126.2	-1.3	1232.8	-125.5	-30.0
	EXTRADOS	1027.1	281.8	5.9	1019.2	289.7	76.3
D10	INTRADOS	1196.2	-136.1	0.3	1196.2	-136.1	7.0
	EXTRADOS	1017.1	253.8	-3.7	1013.8	257.1	-49.7
D12	INTRADOS	1075.6	-239.6	1.8	1074.3	-238.2	42.0
	EXTRADOS	1079.8	254.7	-4.9	1073.7	260.8	-70.7
D14	INTRADOS	882.6	-187.1	2.8	880.0	-184.5	52.8
	EXTRADOS	1213.9	271.1	-2.6	1212.0	273.1	-42.8
D16	INTRADOS	777.6	-268.3	1.5	776.9	-267.6	26.6
	EXTRADOS	1223.6	351.6	-3.9	1219.5	355.6	-59.4
D18	INTRADOS	920.1	-351.5	-0.9	919.8	-351.2	-19.3
	EXTRADOS	1137.7	443.3	-6.0	1130.2	450.8	-71.7

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
D20	INTRADOS	1183.2	-497.6	-3.2	1178.1	-492.4	-92.8
	EXTRADOS	958.4	574.8	-2.0	957.9	575.2	-13.1
D22	INTRADOS	1344.7	-499.4	-9.2	1297.7	-452.4	-290.5
	EXTRADOS	808.2	583.1	35.5	732.3	659.0	106.5
D24	INTRADOS	877.4	-219.8	-26.6	657.6	0.	-439.1
	EXTRADOS	934.0	-28.9	10.0	905.0	0.	164.4
F 4	INTRADOS	42.0	-340.4	19.4	0.	-298.4	119.6
	EXTRADOS	370.7	-59.3	111.8	0.	311.4	-148.3
F 6	INTRADOS	821.9	-391.4	1.1	821.4	-390.9	24.0
	EXTRADOS	526.5	437.0	19.0	517.0	446.5	27.6
F 8	INTRADOS	966.8	-428.1	1.0	966.4	-427.7	23.3
	EXTRADOS	595.4	242.5	78.7	256.0	581.9	67.7
F10	INTRADOS	768.0	-403.3	0.0	768.0	-403.3	0.6
	EXTRADOS	559.1	208.4	84.4	211.8	555.7	34.2

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
F12	INTRADOS	452.7	-466.7	1.7	451.9	-465.9	27.0
	EXTRADOS	520.9	450.7	116.5	464.7	506.9	-28.1
F14	INTRADOS	139.0	-395.3	3.7	136.8	-393.0	34.6
	EXTRADOS	836.6	511.0	-4.3	834.8	512.8	-24.4
F16	INTRADOS	45.7	-413.5	1.9	45.2	-412.9	15.6
	EXTRADOS	991.0	560.0	-5.7	986.8	564.1	-42.3
F18	INTRADOS	267.1	-470.1	-2.0	266.2	-469.2	-25.1
	EXTRADOS	785.3	596.9	-18.5	766.4	615.8	-56.6
F20	INTRADOS	690.1	-565.7	-3.5	685.5	-561.1	-76.0
	EXTRADOS	650.6	361.1	93.3	362.1	649.7	-16.6
F22	INTRADOS	1157.4	-387.5	-7.0	1134.2	-364.3	-187.7
	EXTRADOS	568.3	29.0	81.6	40.6	556.7	78.4
F24	INTRADOS	975.4	-75.2	-15.5	900.2	0.	-270.8
	EXTRADOS	358.9	-48.3	-20.1	310.6	0.	131.6

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
H 8	INTRADOS	1092.8	15.9	4.4	1086.5	22.2	82.0
	EXTRADOS	208.5	27.2	18.4	190.5	45.2	54.2
H10	INTRADOS	1289.6	-174.7	2.0	1287.8	-172.9	51.2
	EXTRADOS	403.1	182.8	75.7	196.2	389.7	52.7
H12	INTRADOS	635.1	-103.5	0.1	635.1	-103.5	1.0
	EXTRADOS	647.3	189.3	5.7	642.7	193.9	45.6
H14	INTRADOS	186.4	-46.3	-5.8	184.1	-44.0	-23.3
	EXTRADOS	1157.4	199.3	0.7	1157.3	199.4	11.2
H16	INTRADOS	55.4	-55.0	-3.8	54.9	-54.5	-7.3
	EXTRADOS	1361.2	231.8	-1.5	1360.5	232.5	-28.6
H18	INTRADOS	327.5	-106.0	-1.4	327.2	-105.7	-10.7
	EXTRADOS	1053.0	283.5	-4.3	1048.8	287.7	-57.0
H20	INTRADOS	874.3	-211.0	-3.6	870.1	-206.8	-67.5
	EXTRADOS	455.8	331.3	-21.6	438.9	348.2	-42.6

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
H22	INTRADOS	1471.4	-158.2	-4.5	1461.4	-148.2	-127.5
	EXTRADOS	287.1	-128.3	91.5	-128.0	286.8	-11.2
J10	INTRADOS	1266.7	174.1	5.9	1255.0	185.8	112.5
	EXTRADOS	-103.6	-126.4	79.3	-125.6	-104.4	4.2
J12	INTRADOS	701.8	119.5	-0.2	701.7	119.5	-2.5
	EXTRADOS	805.9	60.9	6.9	795.3	71.5	88.5
J14	INTRADOS	240.8	91.6	-24.8	214.6	117.8	-56.8
	EXTRADOS	1464.1	78.7	1.6	1463.0	79.8	39.2
J16	INTRADOS	105.8	18.1	105.8	24.6	99.3	-23.0
	EXTRADOS	1666.6	96.5	-0.6	1666.4	96.6	-16.4
J18	INTRADOS	318.5	95.3	-1.9	318.3	95.5	-7.4
	EXTRADOS	1251.5	125.5	-2.8	1248.9	128.1	-54.4
J20	INTRADOS	870.8	69.7	-6.1	861.8	78.8	-84.6
	EXTRADOS	434.7	124.1	-5.9	431.4	127.4	-32.0

EARTHQUAKE COND **WATER ELEV 1125,SILT ELEV 1037,MAX TEMP

		SMAX	SMIN	THETA	SX	SY	TAU
J22	INTRADOS	1368.1	-17.9	-6.5	1350.2	0.	-156.4
	EXTRADOS	0.1	-344.1	89.0	-344.0	0.	6.2